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From:
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Date:
August 31, 2020

Subject:
ATK Corrective Measures Implementation Annual Progress Report

Arcadis Project No.:
30044769

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Please find attached the Corrective Measures Implementation Annual Report. Please contact me at 410-279-8637 with any questions, thank you. -Tina

ARCADIS Design & Consultancy for natural and built assets

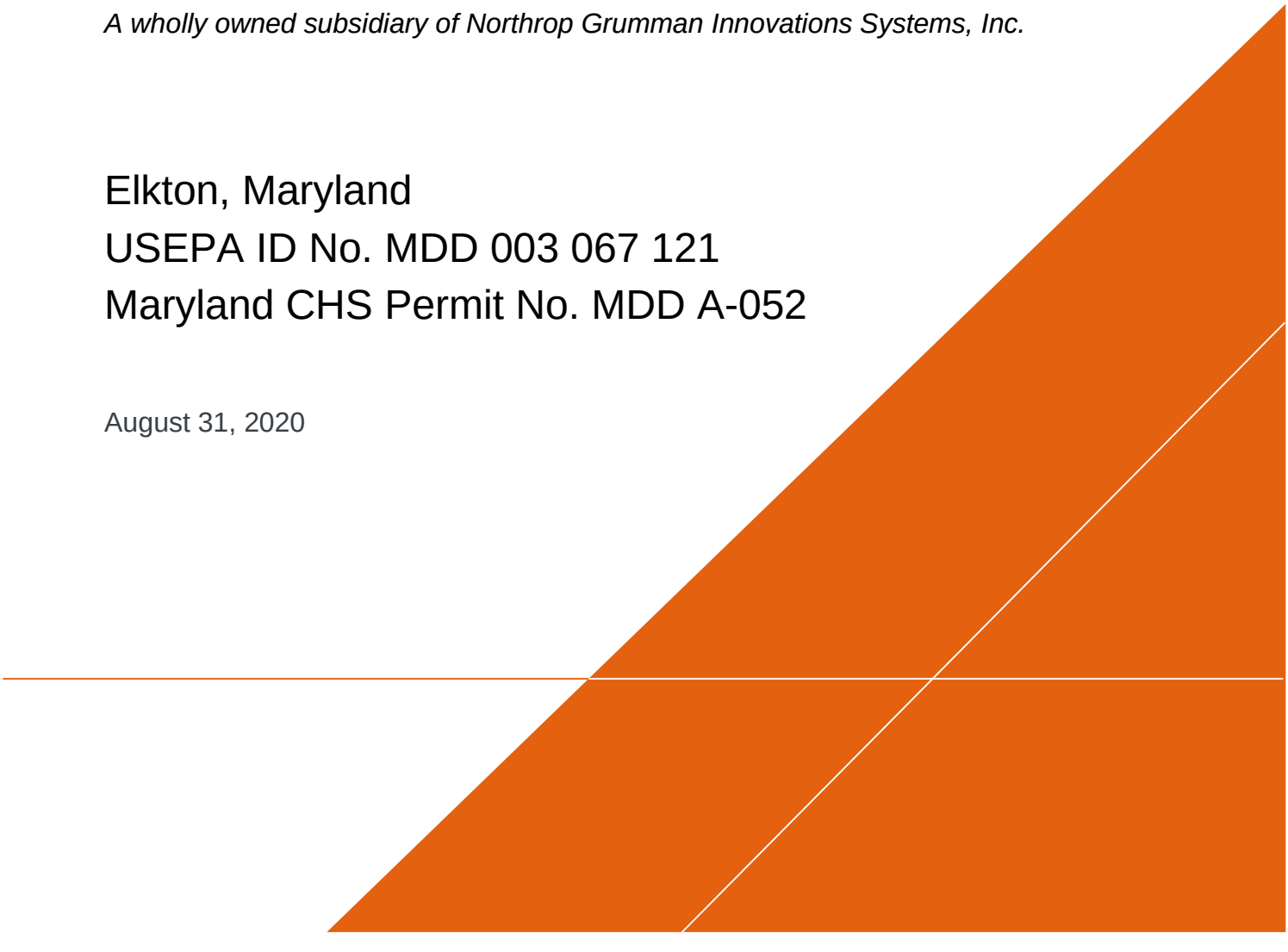
CORRECTIVE MEASURE IMPLEMENTATION (CMI) – 2020 ANNUAL PROGRESS REPORT

Alliant Techsystems Operations LLC

A wholly owned subsidiary of Northrop Grumman Innovations Systems, Inc.

Elkton, Maryland
USEPA ID No. MDD 003 067 121
Maryland CHS Permit No. MDD A-052

August 31, 2020



CORRECTIVE MEASURES IMPLEMENTATION - 2020 ANNUAL PROGRESS REPORT

Alliant Techsystems Operations LLC
Elkton, Maryland
USEPA ID No. MDD003 067 121
Maryland CHS Permit NO. MDD A-052

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ACRONYMS AND ABBREVIATIONS

A-Area SWMU	Abandoned Propellant Open Burn Area SWMU
AOC	Area of Concern
Arcadis	Arcadis U.S., Inc.
ATK	Alliant Techsystems Operations, LLC
Beryllium SWMU	Buried Beryllium Waste SWMU
bgs	below ground surface
BHC	benzene hexachloride
C-Area SWMU	Closed Incineration Feed Surface Impoundment SWMU
CA	Corrective Action
CAO	corrective action objective
CHS	Controlled Hazardous Substances
CMI	Corrective Measures Implementation
CMIWP	Corrective Measures Implementation Work Plan
CMS	Corrective Measures Study
COC	constituent of concern
DCA	dichloroethane
DCE	dichloroethene
ft	foot or feet
IEC	institutional and engineering control
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
NPDES	National Pollutant Discharge Elimination System
POC	point of compliance
PRGs	preliminary remediation goals
RA	response action
RCRA	Resource Conservation and Recovery Act
Sand Pit SWMU	Sand Pit Disposal Area SWMU
Site	Alliant Techsystems Operations, LLC facility
SOP	Standard Operating Procedure

Still Bottoms SWMU	Solvent Recovery Still Bottoms Disposal Area SWMU
SWMU	Solid Waste Management Unit
TCA	trichloroethane
TCE	trichloroethene
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound
µg/L	micrograms per liter

EXECUTIVE SUMMARY

Final Remedy Corrective Measures were approved by United States Environmental Protection Agency (USEPA) to address environmental concerns at Solid Waste Management Units (SWMUs) identified for the Alliant Techsystems Operations LLC Elkton facility located at 55 Thiokol Road, Elkton, Maryland, 21921 (Site). These SWMUs are the Trichloroethene (TCE) Area SWMU, Abandoned Propellant Open Burn Area SWMU (A-Area SWMU), Buried Beryllium Waste SWMU (Beryllium SWMU), Closed Incinerator Feed Surface Impoundment SWMU (C-Area SWMU), and Pesticide Area SWMU. In the Final Decision for the Site, the USEPA approved the Final Remedy, which consists of:

- Long term groundwater, surface water, and porewater monitoring;
- Compliance with and maintenance of land and groundwater use restrictions;
- Engineering controls; and
- Soil management including consolidation and capping at the Pesticide and Sewer Line Areas.

This Corrective Measures Implementation - 2020 Annual Progress Report (CMI Progress Report) documents performance monitoring activities that were undertaken between September 1, 2019 and August 31, 2020 in accordance with the USEPA-approved Corrective Measures Implementation Work Plan (CMIWP; Arcadis U.S., Inc. 2017) and summarizes the field data and laboratory results for SWMUs with groundwater monitoring requirements. This CMI Progress Report also includes an evaluation of the groundwater quality for each SWMU relative to the short-term performance goals and overall natural attenuation progress.

The annual performance monitoring involved the collection and analysis of groundwater, porewater, and/or surface water samples at TCE Area, A-Area, Beryllium Area, and C-Area SWMUs. In accordance with the procedures detailed in the approved CMIWP, groundwater samples were collected from 21 wells in the TCE Area SWMU, two wells in the A-Area SWMU, one well in the Beryllium Area SWMU, and 13 wells in the C-Area SWMU using a low-flow sampling technique. Porewater was sampled in Little Elk Creek at two locations associated with the TCE Area SWMU and one location associated with the Beryllium Area SWMU using drive point samplers. Grab surface water samples for Little Elk Creek were obtained at four locations associated with the TCE Area SWMU and one location associated with the Beryllium Area SWMU by directly filling the sample container from the stream at the designated location at low-stage conditions in Little Elk Creek to the extent practicable. Samples were shipped to TestAmerica Laboratories and analyzed for target compound list volatile organic compounds (VOCs), 1,4-dioxane, perchlorate, sulfate, total organic carbon, metals, nitrate, and dissolved iron as specified in the approved CMIWP.

The deviations from the performance monitoring program of the CMIWP consisted of the following:

- Oxidation-reduction potential was not measured for PW-06C, PW-06D, SW-6C and SW-6D.

Sampling logistics were disrupted in association with the initial onset of the COVID-19 pandemic. Specifically, the flow through cell required to assess sample stability and adequacy of purging did not arrive from the supplier. The decision was made to proceed as follows:

- Maintain the low flow purge to 50 to 60 minutes, and
- Collect blind duplicate samples from each well with at least 5 minutes of continued purging between collection of the parent and duplicate samples. Data from the field duplicates is useful for assessing sample stability.

Institutional and Engineering Controls (IECs) for the Beryllium SWMU were verified through visual observations of the fencing, signage, and vegetative cover. Letters were sent to the Cecil County Health Department and Elkton Building and Zoning Department as part of the IECs showing off-site areas with groundwater contamination, where groundwater use restrictions such as the installation of new potable wells are recommended. Additionally, a coordinate survey of the Pesticide Area SWMU and Sewer Line Area was conducted to define the boundary of excavation restrictions. A Soil Management Plan including a Health and Safety Plan is in place describing procedures for subsurface soil excavation at the A-Area SWMU, Pesticide SWMU, and Beryllium SWMU; the plan was modified to include the C-Area SWMU and Sewer Line Area in 2020.

Results of the groundwater monitoring at the TCE-Area SWMU indicate that perchlorate concentrations exceeded its numerical corrective action objective (CAO) (14 micrograms per liter [µg/L]) at 12 of the 21 groundwater monitoring locations during the March 2020 sampling event while TCE concentrations exceeded its numerical CAO (5 µg/L) at 16 of the 21 performance monitoring wells. Perchlorate concentrations at the sentinel wells were below the reporting limits and indicated that off-site impacts may be spatially limited. The surface and porewater monitoring results were indicative of natural attenuation of TCE and perchlorate along the flow path of the creek; although, due to the migration of the plume, TCE concentrations observed at select surface water and porewater sample locations in the TCE-Area SWMU were higher than those observed in 2018 and 2019. Statistical trend analysis demonstrates that VOC and perchlorate concentrations are stable-to-declining at most performance monitoring wells in the TCE Area SWMU providing evidence of a stable-to-shrinking plume.

For the A-Area SWMU, perchlorate concentrations exceeded the numerical CAO (14 µg/L) at both performance monitoring wells while TCE and 1,4-dioxane exceeded their numerical CAOs at well GM-1B during the March 2020 event. TCE concentrations demonstrated a decreasing trend at GM-1B, and while perchlorate concentration at GM-1B observed in March 2020 (94 µg/L) is higher than that observed in March 2019 (62 µg/L) likely due to plume core migration, trend analysis of the data indicate that there is no statistically significant increasing trend.

Performance monitoring of the 13 C-Area SWMU wells showed perchlorate concentrations exceeded the CAO at all sampled wells while TCE exceeded CAO at eight of the 13 wells. Statistical trend analysis of past and current data, however, indicates that VOC and perchlorate concentrations exhibit stable-to-declining trends at most of the 13 performance monitoring wells. These trends are indicative of a stable-to-shrinking plume as a result of continued operation of the active treatment system and possible aerobic or abiotic attenuation in areas upgradient of the treatment system.

No numerical CAOs for the Beryllium SWMU were established due to the nature of the closure of the Beryllium SWMU as waste-in-place and the demonstrated low potential for migration of hazardous waste or hazardous waste constituents from the SWMU via the shallow zone to water supply wells or to surface water. During the March 2020 event, groundwater samples exhibited detections of primarily metals; most of the semi-volatile organic compounds and VOCs constituents were not detected above laboratory

detection limits. Visual observations of fences and signs around the Beryllium SWMU soil cover system indicate that the components of the IECs are performing as designed. Dense tree cover is present throughout the SWMU, and there are no signs of disturbance or trespassing in the area.

Performance monitoring of the Pesticide SWMU AOC was performed for the first time during the March 2020 event by GEI. Samples were submitted to Eurofins TestAmerica, Buffalo for laboratory analysis of target compound list pesticides using USEPA Method 8081B/8082A.

GEI reported that MW-6 had no detections in parent or duplicate samples, however MW-5 had detections of alpha-benzene hexachloride (BHC), beta-BHC, delta-BHC, dieldrin, endrin ketone, and gamma-BHC in both the parent and duplicate samples with the exception of gamma-BHC, which was only detected in the parent sample. According to GEI, the March 2020 results are generally lower than previous sampling years.

The environmental covenant for the Site will not be completed until land use restrictions are recorded to incorporate the final Pesticide SWMU Area of Concern surveyed coordinates, which is anticipated to take place this year.

Based on the results of the performance monitoring and statistical trend analysis of past and current data, it can be concluded that although certain constituents of concern (COCs) exhibited exceedances of their numerical CAOs at certain monitoring locations during the March 2020 sampling event, overall, COC trends demonstrate groundwater quality improvements. Many COCs exhibited stable-to-decreasing trends throughout the study area (TCE Area, A-Area, and C-Area SWMUs). This provides evidence of stable or shrinking plumes. For the fourth year of CMI, changes to the performance monitoring program are not currently recommended.

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) prepared this Corrective Measures Implementation - 2020 Annual Progress Report (CMI Progress Report) on behalf of Alliant Techsystems Operations LLC (ATK), a wholly owned subsidiary of Northrop Grumman, for the ATK facility located at 55 Thiokol Road in Elkton, Maryland (the Site) shown on **Figure 1-1**. The environmental conditions requiring post-closure remedial action at the Site are being addressed under the United States Environmental Protection Agency (USEPA) Region III Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) Program. The complete RCRA Permit consists of two portions. The first is the CA Permit, MDD 003 067 121, issued by USEPA on May 26, 2017 (herein referred to as the 2017 RCRA CA Permit), which addresses provisions of the Hazardous and Solid Waste Amendments of 1984, 42 United States Code 6901-6992k. The second portion is the Controlled Hazardous Substances (CHS) Post-Closure Permit, MDD A-052, issued by the Maryland Department of the Environment (MDE) in August 2005 (herein referred to as the MDE CHS Permit), which addresses the provisions of the Code of Maryland Regulations 26.13 and is administered by MDE in lieu of the federal hazardous waste management program under RCRA.

The Site consists of seven Solid Waste Management Units (SWMUs) at which different remedies are being implemented. These SWMUs are the Trichloroethene (TCE) Area SWMU, Abandoned Propellant Open Burn Area SWMU (A-Area SWMU), Buried Beryllium Waste SWMU (Beryllium SWMU), Closed Incinerator Feed Surface Impoundment SWMU (C-Area SWMU), Solvent Recovery Still Bottoms Disposal Area SWMU (Still Bottoms SWMU), Sand Pit Disposal Area (Sand Pit SWMU), and Pesticide Area SWMU Area of Concern (AOC).

On May 26, 2017, USEPA Region III issued a Final Decision pursuant to the Solid Waste Disposal Act, as amended by the RCRA of 1976, Hazardous and Solid Waste Amendments of 1984, and 42 United States Code Section 6901, et seq. In the Final Decision for the Site, the USEPA approved the Final Remedy, which consists of:

- Long term groundwater, surface water, and porewater monitoring;
- Compliance with and maintenance of land and groundwater use restrictions;
- Engineering controls; and
- Soil management including consolidation and capping at the Pesticide and Sewer Line Areas.

Pursuant to the CA Permit issued with the Final Decision, a Corrective Measures Implementation Work Plan (CMIWP; Arcadis 2017) for the implementation of the Final Remedy was submitted to USEPA on July 25, 2017 and approved on October 4, 2017.

This CMI Progress Report documents monitoring and institutional and engineering control (IEC) verification activities performed during the third year of CMI, which comply with CA and monitoring requirements of the 2017 RCRA CA Permit. The objective of this CMI Progress Report is to evaluate and document progress toward reaching numerical Corrective Action Objectives (CAOs) and provide IEC verification. This CMI Progress Report includes an evaluation of natural attenuation at the TCE Area SWMU, assessment of long-term monitoring results for the A-Area, C-Area, and Beryllium SWMUs against the short-term performance goals, and recommendations for the next year of CMI activities. The

Final Remedy for the Site does not include any activities specific to the Still Bottoms and the Sand Pit SWMUs; therefore, they are not discussed in this CMI Progress Report.

1.1 Report Organization

In addition to the above introduction, this CMI Progress Report consists of the following sections:

- Site Background (Section 2) – presents the location, a brief history of the Site, and a summary of the environmental conditions at each SWMU;
- Final Remedy Description (Section 3) – summarizes the response actions (RAs) in place at each SWMU;
- Corrective Action Objectives (Section 4) – presents the performance goals and numerical CAOs for each SWMU;
- Methodology and Data Collection (Section 5) – summarizes the activities conducted at the Site to obtain performance monitoring data during this reporting period;
- Data Analysis and Evaluation (Section 6) – presents the compiled field data and analytical results from the 2020 sampling event and provides an assessment of the remedial performance at each SWMU;
- Conclusions and Recommendations (Section 7) – provides a summary based upon analysis of the data from each SWMU and recommendations for future actions at the Site; and
- References (Section 8) – lists references cited in this CMI Progress Report.

2 SITE BACKGROUND

This section presents a summary of the Site history, the environmental setting, and current conditions.

2.1 Site Description

The ATK Elkton facility occupies approximately 550 acres in Elkton, Cecil County, Maryland (**Figure 1-1**). Since the 1930s, the property has been primarily used for industrial purposes such as fireworks manufacturing, munitions production, pesticide production, research, and production of solid propellant rockets.

In 1984, the discovery of contamination in two production wells (W-1 and W-7) prompted ATK to investigate and identify the potential source(s) and characterize the extent of the TCE, perchlorate, and other volatile organic compounds (VOCs) in groundwater. Initial investigations included interviews with personnel regarding disposal practices and multiple site inspections by ATK personnel, as well as an USEPA Field Investigation Team 3 inspection on December 17, 1984. ATK entered into the RCRA CA Program in 1989. Groundwater investigations performed in 1998 concluded that the contaminant source(s) were likely related to multiple, diffuse release areas across the facility (Arcadis 2016). The USEPA identified the following seven SWMUs at the Site (**Figure 2-1**):

- TCE Area SWMU
- A-Area SWMU
- Beryllium SWMU
- Still Bottoms SWMU
- C-Area SWMU
- Sand Pit SWMU
- Pesticide SWMU AOC.

The Final Remedy for the Site does not include any activities specific to the Still Bottoms and the Sand Pit SWMUs; therefore, they are not discussed further in this CMI Progress Report.

2.2 Geology and Hydrogeology

2.2.1 Site Geology

The Site geology is described in the 2007 *Site-Wide Corrective Measures Study Report* (CMS Report; Arcadis 2007). Borings on and near the Site reveal that bedrock is micaceous, feldspar gneiss. The bedrock surface is smoothly undulating with a general southeast trend. Irregularities in the bedrock surface are probably a result of differential weathering, as evidenced by the varying thickness of the overlying saprolite (weathered bedrock) encountered in well borings. The thickness of saprolite ranges from 5 feet (ft) to 64 ft. The saprolite is micaceous, silty, and friable, becoming more cohesive and resistant to drilling with depth.

The sediments of the Potomac Group overlie the bedrock/saprolite. Regionally and locally, the sediments of the Potomac Group are chiefly white to gray quartz or feldspar sands, interbedded with variegated clays and silts. Some clay layers contain abundant lignite and pyrite, while others have yielded siderite, hematite, or limonite. Above the weathered bedrock, quartz pebbles have been found intercalated with micaceous clay.

A layer of predominantly fine sandy silt (varying in thickness from 18 to 35 ft) was encountered at the base of the Potomac Group in boreholes throughout the Site. Minor amounts of fine sand and clay are interspersed throughout the silt, and occasionally quartz pebble gravel is also included. Thin beds of lignite are interstratified at most locations.

The Potomac sediments above the basal silt are much more variable in composition. Interstratified sands, silts, and clays make up the majority of sediments, with occasional peat or gravel beds included. Lateral discontinuity within the Potomac Group renders correlation of most beds uncertain, even over short distances.

Quaternary alluvium overlies the Potomac Group and is composed of heterogeneous mixtures of clay, silt, sand, and gravel. Alluvium is associated with river and estuary depositional environments and, at the Site, occurs along Little Elk Creek and its tributaries. Limited data indicate an alluvial thickness of 0 to 40 ft. These beds are extremely variable in their horizontal and vertical extent. Further detail regarding Site geology is provided in the conceptual site model included as Appendix A of the *2004 Site-Wide Investigation Report* (Investigation Report; Arcadis 2004).

2.2.2 Site Hydrogeology

Site hydrogeology is presented in the CMS Report (Arcadis 2007). There are three groundwater flow regimes in the vicinity of the Site: a shallow zone of the Potomac Group aquifer, an intermediate zone of the Potomac Group aquifer, and a saprolite unit below the Potomac Group. Groundwater flow in the shallow zone is generally influenced by topography (recharge) and surface water flow. Groundwater discharge to Little Elk Creek appears to occur in the upper reaches of the creek in the northwestern portion of the Site. At the southeast side of the Site, discharge from the creek may be occurring.

Groundwater flow in the Potomac Group aquifer is to the east/southeast of the Site. The intermediate zone groundwater potentiometric contours are in accordance with regional flow patterns. Flow relationships between the intermediate zone and the overlying shallow zone and underlying saprolite unit appear to vary across the Site. In general, it appears the intermediate zone acts as a recharge zone in the northwestern portion of the Site and a discharge zone in the southeastern portion of the Site.

Groundwater flow in the saprolite is generally to the east in accordance with the regional flow directions. However, groundwater flow in the saprolite is influenced by pumping of on-site groundwater production well W-7.

A slight downward gradient has been observed in water level data from the shallow zone to the deeper units, the intermediate zone, and the saprolite. This occurs primarily in the main plant area. Moving eastward from the main plant area toward U.S. Route 40 and Little Elk Creek, a transition occurs where vertical gradients are neutral to upward. Upward gradients have been observed historically at GM-16 near Little Elk Creek. Water level data indicate groundwater in GM-16 is artesian (Shallow [S], Intermediate [M], and Deep [D]).

Low TCE concentrations detected in some saprolite unit samples collected at the main plant and non-detects east of the Site also confirm this trend in water levels. Further detail regarding site hydrogeology is provided in the conceptual site model included as Appendix A of the Investigation Report (Arcadis 2004) and the *Final Corrective Measures Study Report Addendum* (CMS Report Addendum; Arcadis 2016).

2.3 SWMU Environmental Conditions

2.3.1 TCE Area SWMU

The TCE Area SWMU (**Figure 2-1**) consists of a groundwater plume containing elevated levels of TCE and perchlorate that occupies the southern and eastern extent of the main plant area and extends off-site to the east and south of U.S. Route 40. Investigative activities were completed in 2014 and the results are presented in the *Site Investigation Report Addendum* (Arcadis 2015). These results:

- Confirm the TCE plume is discharging to Little Elk Creek and not migrating through the deep saprolite unit;
- Support shallow zone groundwater flow to the northeast, east, and southeast toward Little Elk Creek, with intermediate zone groundwater flow generally resembling that of the shallow flow regime;
- Illustrate that groundwater flow patterns are locally affected in the vicinity of the on-site groundwater production well W-7; and
- Confirm, through soil gas sampling, that there is no vapor intrusion from site-impacted groundwater occurring off-site.

Site investigation activities demonstrated an upward flow component within the vicinity of Little Elk Creek and indicated that there is groundwater discharge to the creek from both the shallow and intermediate zones, including impacted groundwater from the TCE Area SWMU. The results did not support downward migration of constituents from the TCE Area SWMU to the deep saprolite unit (Arcadis 2000 and 2015).

The lateral extent of the plume is well-defined (USEPA 1999). In the shallow zone, TCE concentrations are highest in a relatively narrow north-to-south area on the west side of Little Elk Creek in the eastern portion of the TCE Area SWMU. In the intermediate zone, TCE concentrations are highest in a larger east-to-west area extending from the west side of Little Elk Creek to the west, past Elkton Road. Concentrations of perchlorate in the shallow zone are lower than TCE concentrations and follow the same general distributions. Low levels of TCE have been detected on the far side of Little Elk Creek. They appear to be the result of diffusion and transient stage fluctuation of water levels in the creek and do not suggest underflow beneath the creek under normal conditions.

As presented in the CMS Addendum (Arcadis 2016), a review of the data collected to date for the TCE Area SWMU relative to USEPA guidelines for assessing natural attenuation indicates that attenuation of TCE, cis-1,2-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), 1,1-DCE, and perchlorate is occurring at the Site and that adverse impacts are unlikely for aquatic organisms that may be exposed to the surface water in Little Elk Creek.

The 2007 Site-Wide Risk Assessment identified recreational users exposed to constituents in surface water and sediments as the only potentially complete exposure routes for the TCE Area SWMU. The human health risk evaluation conclusions reached in the 2007 Site-Wide Risk Assessment remain valid. The calculated excessive lifetime cancer risks and non-cancer hazard indices for adult and child recreational users were within the USEPA's acceptable range of 1×10^{-6} to 1×10^{-4} for the excessive lifetime cancer risks and lower than the threshold of 1 for non-cancer hazard indices (Arcadis 2016).

The *Corrective Measures Implementation – 2019 Annual Progress Report* (2019 Annual CMI Report; Arcadis 2019) further evaluated the performance of natural attenuation at the TCE Area SWMU. Concentrations of VOCs and perchlorate were stable or declining at most performance monitoring wells. TCE and perchlorate concentrations exhibited declining trends or no trend at the plume-core wells. Plume periphery wells GM-16M, GM-16S, and GM-30M showed increasing trends, indicating the migration of the plume centroid along the groundwater flow path toward Little Elk Creek. Detections of TCE and 1,1,1-TCA daughter products and declining trends observed in 2019 indicated a generally stable or shrinking plume due to natural attenuation via abiotic or biological degradation pathways.

2.3.2 A-Area SWMU

The A-Area SWMU (**Figure 2-1**) is located near the eastern boundary of the Site and was used for the disposal of waste solid fuel rocket propellant by open burning operations in the 1950s. The area was closed in 1958, and surface materials were removed (FWA Environmental Science Inc. 1992). The A-Area SWMU is partially encompassed by the TCE Area SWMU and shares the same flow regimes and hydrogeological characteristics. The northern portion of the A-Area SWMU may contain groundwater flow paths that trend northeast toward Little Elk Creek. Perched water was identified in some borings in the A-Area SWMU at a depth of less than 5 ft below ground surface (bgs). Groundwater is typically found at a depth of 15 ft bgs in this SWMU.

The CMS Addendum (Arcadis 2016) retained TCE, 1,4-dioxane, 1,1,2,2-tetrachloroethane, and perchlorate as constituents of potential concern and concluded that while the current conditions in the A-Area SWMU are acceptable for future site workers, additional measures should be taken to reduce potential exposures for future construction workers to volatile constituents while working in trenches in this area.

The 2019 Annual CMI Report (Arcadis 2019) concluded that natural attenuation was ongoing at the A-Area SWMU, as perchlorate concentrations were stable at GM-1B and declining at GM-15M, and TCE and 1,1,1-TCA daughter products were observed, along with declining TCE concentrations at GM-1B.

2.3.3 Beryllium SWMU

The Beryllium SWMU is an area of approximately 40 ft by 170 ft located in the northern portion of the Site (H-Area) adjacent to Little Elk Creek (**Figure 2-1**). Beryllium propellant waste articles were buried in several 6-ft-deep trenches between 1962 and 1969. Buried waste was placed in two trenches approximately 4 ft by 40 ft in one area and in one trench 4 ft by 20 ft in another area within this SWMU. The buried waste area was subsequently covered with soil in 1970. Subsurface investigation of the Beryllium SWMU has been limited by the potentially ignitable and hazardous nature of the buried waste.

Currently, the Beryllium SWMU soil cover is heavily wooded and fenced to restrict access by site personnel and trespassers.

Hydrogeologic units in the Beryllium SWMU consist of a shallow unconsolidated unit and underlying saprolite. Recent investigations indicate that groundwater flow in both the water-bearing units is to the west-southwest, eventually discharging to Little Elk Creek. Groundwater is encountered in the Beryllium SWMU at a depth of less than 10 ft bgs. Recent investigations have indicated screening level exceedances for perchlorate, and to a lesser degree, 1,1-DCE and thallium in groundwater downgradient from the Beryllium SWMU. Due to apparent low transmissivity of the hydrogeologic units encountered near the Beryllium SWMU, SWMU-related dissolved constituents in groundwater are not likely to continue to migrate or ever reach nearby surface water receptors, such as Little Elk Creek or water supply wells. No performance goals were established for the Beryllium SWMU due to the nature of the closure as waste-in-place and the low potential for migration of hazardous waste, or hazardous waste constituents, via the uppermost aquifer to water supply wells or to surface water

The human health risk assessment updated in the CMS Addendum (Arcadis 2016) concluded that current surface soil (0 to 4 ft bgs), sediment, groundwater, and surface water conditions in the Beryllium SWMU are acceptable for the potential current and future receptors evaluated. The CMS Addendum additionally noted that there is significant potential for physical hazards associated with this SWMU (i.e., potentially ignitable nature of the waste remaining in place and potentially release of emissions, including dust containing beryllium or beryllium compounds, if the waste is disturbed). Therefore, engineering and institutional controls are required.

2.3.4 C-Area SWMU

The C-Area SWMU is located in the C-Area in the northwestern portion of the Site (**Figure 2-1**). From 1976 to 1987, a rubber-lined impoundment was used to store the incinerator feed (ammonium perchlorate, water, and solvents). In 1985, ATK detected solvents in downgradient monitoring wells. After the surface impoundment was drained, it was determined the rubber liner had failed, and the liner was subsequently replaced. In 1988, the liner and a 3-ft thickness of soil beneath the area were removed and replaced with a clay cover.

The hydrogeologic units in the SWMU are characterized by shallow unconsolidated and saprolite zones. Groundwater flow in this area is generally to the west-southwest discharging to Little Elk Creek. Contaminated groundwater in this area is confined to the shallow zone and is unlikely to extend beyond Little Elk Creek. ATK installed a groundwater interceptor trench and infiltration gallery with an air stripper system that was activated in 1993. The remedial system has resulted in the containment of high VOC concentration areas and a significant decline of VOC concentrations in the vicinity of the system. An edible oil in situ reactive zone remedy was added in 2003, and injections were performed in four phases that took place from 2003 through 2007. The recirculation trench was temporarily shut down in 2012 due to low water levels and problems with iron fouling in the centrifugal pump and was operated intermittently until 2015. In April 2015, a jet pump was installed, and the system has been operating with only minor service interruptions since that time.

Recent monitoring at the SWMU under MDE CHS Permit No. MDD A-052 indicates that VOCs (predominantly TCE, 1,1,1-TCA, 1,1-DCE, and tetrachloroethene) and perchlorate in groundwater remain at concentrations greater than the respective USEPA Maximum Contaminant Level (MCL) or the USEPA

Region III tap water risk-based concentrations. Perchlorate is generally more prevalent at this SWMU than other SWMUs due to the historical open burning of ammonium perchlorate fuel. The area of elevated VOC and perchlorate concentrations in this portion of the Site has been well-defined.

The 2019 Annual CMI (Arcadis 2019) concluded that VOC concentrations are exhibiting a stable-to-declining trend at most of the C-Area SWMU monitoring wells and are indicative of a shrinking plume due to the continued operation of the active treatment system.

2.3.5 Pesticide SWMU AOC and Sewer Line Area

The Pesticide SWMU AOC is located in the southwestern portion of the Site, south of the Little Elk Creek. The property was owned by Geigy Chemical Company (1947-1955; Syngenta Crop Protection, Inc. is the corporate successor to Geigy Chemical Company) and Olin Mathiesen Chemical Corporation (1955-1958; Olin Corporation is the corporate successor to Olin Mathiesen Chemical Corporation). In 1958, the property was sold to OA. There are four sub-areas within the Pesticide SWMU AOC:

- Burn Pit Area
- Ridge Area
- Tar and Ash Area
- Incineration Area.

Contamination in the Pesticide SWMU AOC is generally limited to chlorinated pesticides in surface soils, primarily 4,4'-dichlorodiphenyltrichloroethane and its metabolites. Subsurface contamination was observed only in the Burn Pit portion of the SWMU. Contaminated soils are located 50 to 90 ft above the groundwater table in this area. Sampling of soils and ditch bottom materials south of the Pesticide SWMU AOC indicates that the SWMU is not a significant source of off-site transport via runoff even prior to implementation of CA.

Surface drainage in the SWMU is generally to the south (i.e., away from Little Elk Creek). A portion of the Ridge Area drains north, toward Little Elk Creek. An extensive Interim Remedial Measure was completed in the Ridge Area in 1991 to remove debris and visibly contaminated surficial material (Woodward-Clyde Consultants 1991). This Interim Remedial Measure significantly reduced the potential for surficial contamination in the Ridge Area to impact Little Elk Creek.

The hydrogeologic units in the Pesticide SWMU AOC are characterized by a shallow unconsolidated zone and saprolite zone. Potential for leaching of the chlorinated pesticides is limited by their low solubility and high tendency to adsorb to soils. Low concentrations of pesticides are detected in a shallow unconsolidated groundwater zone immediately east of soil source areas. Groundwater flow is generally toward the northeast and east and is likely intercepted by Little Elk Creek. 2014 monitoring results indicated eight pesticides exceeded screening levels in at least one sample (4,4'-dichlorodiphenyldichloroethane, alpha-benzene hexachloride [BHC], beta-BHC, delta-BHC, gamma-BHC, dieldrin, endrin ketone, and heptachlor epoxide).

3 FINAL REMEDY DESCRIPTION

The selected remedy for the TCE Area SWMU and the A-Area SWMU groundwater is monitored natural attenuation until CAOs are met, and compliance with, and maintenance of, groundwater use restrictions to prevent the exposure to contaminants while concentrations remain above drinking water standards.

A restriction of soil excavation was put in place at the A-Area SWMU and the Beryllium SWMU in 2018, as required by the 2017 CA Permit, and surveyed in 2019 (Arcadis 2019). The soil excavation restriction areas for the C-Area SWMU, Pesticide Area SWMU AOC, and the Sewer Line Area are shown in **Figure 3-1** and 2020 surveyed coordinates are presented in **Appendix A**. Any soil excavation or earth moving activities at these sites must comply with the *Soil Management Plan* (Arcadis 2018).

The remedy in the Beryllium SWMU also includes a monitoring program to verify the integrity of the existing cover system. The existing cover system is to be inspected on an annual basis. This inspection includes observations and assessment of soil and vegetative cover conditions, as well as capturing photos of the fences and signs around the Beryllium SWMU. The results of 2020 inspection are presented in Section 6.2.

The selected remedy in the C-Area SWMU consists of continued hydraulic containment by pump-and-treat to prevent further migration of groundwater and ex situ treatment of contaminated groundwater with permitted discharge of the treated groundwater to Little Elk Creek (MDE CHS Permit No. MDD A-052). The remedy also includes compliance with, and maintenance of, groundwater use restrictions to prevent exposure to contaminants while concentrations remain above drinking water standards. IECs for this SWMU are required by MDE CHS Permit No. MDD A-052. The groundwater use restrictions are implemented on a site-wide basis and include the C-Area SWMU. A restriction on soil excavation was put in place at the C-Area SWMU and was added to the *Soil Management Plan* (Arcadis 2018). Coordinates of the restricted area in the C-Area SWMU are presented in **Appendix A**.

The remedy for the Pesticide SWMU AOC included excavation of soil from the Ridge Area and Tar and Ash Area for consolidation beneath a low permeability cap consisting of a geosynthetic clay liner and an overlying drainage/clean soil cover located at the Burn Pit and Incineration Areas. An additional asphalt cap was constructed over the Sewer Line Area. Maintenance of the caps is described in Appendix D.

Site-wide institutional controls include establishment of a deed restriction to limit the property to non-residential use and to prohibit the use of untreated groundwater on and near the Site until numerical CAOs are met. Other than the site-wide residential and groundwater use controls, no specific IECs were required for the TCE Area SWMU, Still Bottoms SWMU, and the Sand Pit SWMU. Site-wide engineering controls consist of existing fencing and controlled access via security gates.

4 CORRECTIVE ACTION OBJECTIVES

The 2017 RCRA CA Permit recorded final CAOs for site soil and groundwater based on the following CMS evaluations:

- The CMS Report (Arcadis 2007) and the CMS Report Addendum (Arcadis 2016) that developed CAOs for the TCE Area SWMU, the A-Area SWMU, and the Beryllium SWMU.
- The *Corrective Measures Study, Pesticide and Sewer Line Areas* (GEI 2016) that developed CAOs for the Pesticide SWMU AOC.

4.1 Groundwater

The CAOs for site groundwater established for the CMI are:

- Restore groundwater to drinking water standards. The *Institutional and Engineering Controls Plan* and the *Soil Consolidation and Capping Plan, Pesticide and Sewer Line Areas* (Arcadis 2017) address the other CAOs for site soil and groundwater, as defined in the 2017 RCRA CA Permit.
- Verify no unacceptable exposure to downgradient receptors.

In addition, MDE CHS Permit MDD A-052 provides CAOs for the C-Area SWMU. It requires that a CA program be implemented at the C-Area SWMU at least until specified concentration limits for groundwater set by MDE CHS Permit MDD A-052 are met at well MW-2 and all on-site downgradient wells.

4.1.1 Short-Term Objectives

In the short term, the objectives of the performance monitoring program for groundwater (as applicable for specific SWMUs) are as follows:

- Verify no unacceptable exposure to downgradient receptors;
- Verify the plume(s) is/are not expanding above levels of concern (either down gradient, laterally, or vertically);
- Detect changes in environmental conditions (e.g., hydrogeologic or geochemical) that may reduce the efficacy of the remedy;
- Identify the presence of transformation products;
- Detect new releases of contaminants to the environment that could impact the effectiveness of the remedy; and
- Comply with CA and monitoring requirements of the 2017 RCRA CA Permit and MDE CHS Permit MDD A-052 for C-Area SWMU.

4.1.2 Points of Compliance

Preliminary points of compliance (POCs), based on returning groundwater to its maximum beneficial use, were selected as monitoring points throughout the area of constituent of concern (COC)-impacted groundwater. Classification of all monitoring locations as POCs represents a “throughout-the-plume/unit

boundary" approach to the selection of POCs. The preliminary POCs include three locations intended to provide information regarding the downgradient extent of COCs ("sentinel wells" on both sides of Little Elk Creek in the TCE Area SWMU), nine locations (at multiple depths) intended to provide information regarding migration of impacted groundwater across the property boundary in the TCE Area SWMU, and three porewater sampling locations in Little Elk Creek at predicted zones of groundwater discharge (two in the TCE Area SWMU and one adjacent to the Beryllium SWMU), as well as additional groundwater monitoring locations throughout the TCE, A-Area, and Beryllium SWMUs to monitor stability and natural attenuation of the groundwater impacts.

Under MDE CHS Permit A-052, the POCs for groundwater in the C-Area SWMU are monitoring well MW-2 and all on-site downgradient wells.

The monitoring program, including the locations, media, and analytes is discussed in Section 5**.**

4.1.3 Numerical Performance Goals

In support of the CAOs, numerical performance goals were established based on USEPA MCLs for groundwater. For COCs with no MCLs, USEPA Region III regional screening levels for tap water were used, as described in the USEPA-approved CMS Report Addendum (Arcadis 2016). **Tables 4-1 and 4-2** identify the COCs for groundwater at the Site and their numerical CAO performance goals, as defined in the CMIWP (Arcadis 2017).

4.2 Institutional and Engineering Controls

The IEC objectives complement the groundwater performance monitoring objectives discussed above. Based on site conditions and the results of the human health and ecological risk evaluations presented in the CMS Addendum (Arcadis 2016), the following CAOs were established for the Site in the Statement of Basis developed by USEPA for the 2017 CA Permit:

- Manage future site use to restrict residential land use of areas within the property boundary.
- Maintain no unacceptable population-level ecological risks.
- Mitigate and/or maintain human health risks that are within or below USEPA benchmarks (i.e., cancer risk $1x10^{-4}$ and non-cancer hazard index of 1).
- Minimize and/or manage exposure to groundwater containing contaminant concentrations higher than media cleanup standards.
- Ensure that groundwater containing elevated concentrations of COCs will not impact ecological receptors nor adjacent surface water bodies until groundwater is restored to MCLs.

A SWMU-specific CAO established for the Beryllium SWMU consists of the following:

- Manage exposure to in situ waste in the Beryllium SWMU that poses a potential physical hazard. Because of the potential physical hazards associated with removal of impacted soils within this SWMU, IECs will be implemented to manage exposure.

The SWMU-specific CAOs established for the Pesticide Area SWMU consist of the following:

- Prevent human exposure to soils in the Pesticide SWMU AOC with COCs exceeding applicable preliminary remediation goals (PRGs) presented in the CMS (as calculated based on the 95% upper confidence limit [UCL] on the mean for samples collected from unremediated locations in the Pesticide SWMU AOC and the Sewer Line Area.
- Prevent ecological exposures to soil in the Pesticide SWMU AOC with chemical concentrations exceeding the PRGs (based on the 95% UCL for remediated soils).
- Prevent off-site migration of soils in the Pesticide SWMU AOC exceeding the PRGs via wind and water erosion (based on the 95% UCL for remediated soils).

5 METHODOLOGY AND DATA COLLECTION

This section discusses the site activities performed during the reporting period for the CMI. Prior to undertaking field activities, appropriate adjacent property owners and regulatory stakeholders were notified, per the notification checklist included in **Appendix B.**

5.1 Groundwater Elevation Measurements

Prior to initiating groundwater sampling activities in March 2020, water-level measurements were collected from monitoring wells in the performance monitoring program (**Table 5-1**) within 24 to 72 hours of sample collection, to the extent possible, to minimize temporal variations. Water-level measurements are presented in **Table 5-2**, along with well construction details and sampling location coordinates.

5.2 Performance Monitoring

Performance monitoring activities were performed from March 16 to 26, 2020 in accordance with the Arcadis' Standard Operating Procedures (SOPs) provided in the approved CMIWP (Arcadis 2017). Groundwater samples were collected from from 21 wells in the TCE Area SWMU, two wells in the A-Area SWMU, one well in the Beryllium Area SWMU, and 13 wells in the C-Area SWMU using low-flow sampling methods. MW-11, MW-20, and MW-22 were additionally sampled for total nitrogen, total Kjeldahl nitrogen, and nitrate-nitrogen to comply with requirements of MDE CHS Permit MDD A-052 for the C-Area SWMU. Porewater was sampled in the Little Elk Creek at two locations associated with the TCE Area SWMU and one location associated with the Beryllium Area SWMU, using drive point samplers. Grab surface water samples for Little Elk Creek were obtained at one upgradient location, four locations associated with the TCE Area SWMU, and one location associated with the Beryllium SWMU, by directly filling the sample container from the stream at the designated location at low-stage conditions to the extent practicable. Samples were submitted under chain-of-custody to TestAmerica Laboratories, Inc. in Savannah, Georgia for analysis of Target Compound List VOCs by USEPA Method 8260; 1,4-dioxane by USEPA Method 8270 selective ion monitoring; and perchlorate by USEPA Method 314.1. Sulfate, total organic carbon, and dissolved iron were also analyzed in samples from select monitoring wells and porewater locations to describe ambient geochemical conditions and document changes over time. For samples collected from the Beryllium Area SWMU, semi-volatile organic compounds (USEPA Method 8270) and metals (USEPA Method 6010C) were also analyzed.

Water quality parameters (i.e., dissolved oxygen, oxidation reduction potential, specific conductivity, temperature, turbidity, and pH) were measured throughout the purging and allowed to stabilize prior to sampling, following SOPs for low-flow groundwater sampling based on the *USEPA Region 1 Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (USEPA 1996). Field documentation, including equipment calibration forms, sampling forms, and chain-of-custody documents, is provided in **Appendix C**.

GEI collected groundwater samples from Pesticide Area SWMU monitoring wells PESTMW-5 and PESTMW-6. PESTMW-5 monitors groundwater downgradient of the Pesticide Area Cap while PESTMW-6 monitors upgradient groundwater. Details regarding GEI's methodology are provided in GEI's report presented in **Appendix D.**

5.2.1 Data Validation and Usability

Arcadis personnel validated the analytical data collected during the groundwater monitoring events in accordance with *USEPA National Functional Guidelines for Superfund Methods Data Review for inorganic and organic compounds*, respectively (USEPA 2016a, 2016b). Data validation included review of the laboratory report narrative for noted deficiencies and the potential impact to data usability; review of chain-of-custody documents, sample preservation, and sample receipt logs; and electronic data validation of selected quality control parameters. No major deficiencies were identified during the data validation process. Laboratory results are presented in **Appendix E** and data validation reports are presented in **Appendix F**.

5.2.2 Deviations from the Performance Monitoring Program

The following are deviations from the performance monitoring program that occurred during this year's activities:

- Oxidation-reduction potential was not measured for PW-06C, PW-06D, SW-6C and SW-6D; this will be corrected during next year's sampling event.
- Based on a review of well coordinates performed this year, Arcadis determined that residential well Inactive-4 has been sampled since 2018 instead of GM-2B. Inactive-4 is not part of the performance monitoring program. Data related to residential well Inactive-4 have been removed from the historical tables and figures, and are not included in the statistical analysis presented in this CMI Progress Report. Arcadis will make every effort to sample GM-2B during next year's sampling event.

5.2.3 Monitoring Well Abandonment

Monitoring wells that are not part of the performance monitoring network are being abandoned appropriately by a Maryland-licensed drilling company, AC Shultes Inc. A list of the six wells abandoned during this reporting period is presented as **Table 5-3** and well abandonment logs are presented in **Appendix G**.

5.3 Institutional and Engineering Control Measures

5.3.1 Beryllium SWMU IEC Verification

IECs for the Beryllium SWMU were verified through visual observations during a walkthrough of the area to confirm the integrity of the fencing, signage, and vegetative cover. Photographs taken to document this IEC verification are presented in **Appendix H**.

5.3.2 Off-site Groundwater Use Restriction

Letters were sent to the Cecil County Health Department and Elkton Building and Zoning Department on April 29, 2020 as part of the IECs describing off-site areas with groundwater contamination and depicting the area on a figure. The letters and delivery confirmation receipts are presented in **Appendix I**.

5.3.3 Pesticide SWMU AOC and Sewer Line Area Survey

To support the soil excavation restrictions in the Pesticide SWMU AOC and Sewer Line Area, a coordinate survey was conducted by Frederick Ward Associates to define the boundary of excavation restrictions and to establish latitude and longitude of each polygon vertex in a decimal degree format with at least seven decimal places and a negative sign for west longitude using the World Geodetic System 1984 datum. The surveyed boundaries for soil excavation restrictions are shown on **Figure 3-1** and the coordinates are provided in **Appendix A**.

5.3.4 Soil Management Plan

Per the Site's RCRA permit, a Soil Management Plan was prepared in 2018 to describe procedures for subsurface soil excavation at the A-Area SWMU, Pesticide SWMU AOC, and Beryllium SWMU. The C-Area SWMU, Pesticide SWMU AOC, and Sewer Line Area were added in 2020. As part of this plan, the Site dig permit system was modified to include a figure depicting the C-Area SWMU, Pesticide SWMU AOC, and Sewer Line Area with restrictions on soil disturbance and the following instructions:

- Any planned soil disturbance in one of the designated areas should be fully detailed in a request to, and pre-approved in writing by, the Site environmental engineer.
- The request should fully describe the extent and types of soil disturbance.
- The environmental engineer will define any preliminary investigations in the area to be disturbed, which may include soil and/or shallow groundwater sampling.
- Pending the results of the pre-disturbance investigations, the environmental engineer will define any soil management measures that must be incorporated into the planned activities that would disturb the soil.

6 DATA ANALYSIS AND EVALUATION

6.1 Performance Monitoring Results

The following sections summarize analytical results from the sampling event conducted in March 2020. Groundwater elevation contours for the shallow and intermediate zones are shown on **Figures 6-1** and **6-2**, respectively, while the analytical results for perchlorate, TCE, and 1,4-dioxane in shallow and intermediate zones are shown on **Figures 6-3** and **6-4**, respectively. The data callouts shown on **Figures 6-3** and **6-4** present the analytical data from the initial sampling date plus the three most recent sampling dates for that location; individual sampling locations may have been sampled multiple times during the intervening years. Analytical data collected in 2020 is presented on **Tables 6-1** through **6-5**.

The TCE and perchlorate concentration isocontours for shallow and intermediate zones in the TCE Area, A-Area, and C-Area SWMUs are depicted on **Figures 6-5 through 6-10**. In accordance with the CMIWP (Arcadis 2017), the groundwater and porewater results for the TCE Area, A-Area, Beryllium, and C-Area SWMUs were compared against their respective numerical CAOs. Regional Screening Levels are not available for surface water for comparison with surface water analytical results.

6.1.1 TCE Area SWMU

Analytical results for the TCE Area SWMU are presented in **Table 6-1** and summarized below for each constituent that exceeded its numerical CAO at one or more sampling locations:

- Perchlorate was detected at concentrations exceeding its numerical CAO (14 micrograms per liter [µg/L]) at 12 of the 21 performance monitoring wells during the March 2020 sampling event. The highest concentration occurred at GM-9M (620 µg/L). Detected concentrations in surface water ranged between 1.3 µg/L (SW-6C) and 1.6 µg/L (SW-6D). Perchlorate was detected at a concentration exceeding its numerical CAO at both porewater monitoring locations (PW-6C and PW-6D) at concentrations of 47 µg/L and 95 µg/L, respectively.
- 1,4-Dioxane concentrations in groundwater exceeded the numerical CAO (0.46 µg/L) at 11 of the 21 performance monitoring wells sampled during the March 2020 sampling event. The highest concentration occurred at monitoring well GM-21S (25 µg/L). 1,4-Dioxane was not detected above the reporting limit in any of the surface water samples collected. At both porewater monitoring locations PW-6C (7 µg/L) and PW-6D (5.4 µg/L), the concentration of 1,4-dioxane exceeded the numerical CAO.
- 1,1-dichloroethane (DCA) was detected in groundwater at concentrations exceeding its numerical CAO (2.7 µg/L) at 8 of the 21 performance monitoring wells during the March 2020 sampling event. The highest concentration occurred at GM-9M (16 µg/L). 1,1-DCA was not detected at any surface water monitoring locations, but was detected at both porewater monitoring locations at concentrations (7.1 µg/L) at PW-6C and 2.8 µg/L at PW-6D) that exceeded its numerical CAO.
- 1,1-DCE was detected at concentrations exceeding its numerical CAO (7 µg/L) at 11 of the 21 performance monitoring wells during the March 2020 sampling event. The highest concentration occurred at GM-22M (240 µg/L). 1,1-DCE concentrations in surface water samples ranged from non-detect to an estimated value of 0.6 µg/L (SW-7B). 1,1-DCE was detected at a concentration above its

numerical CAO at both porewater monitoring locations (PW-6C and PW-6D) at concentrations of 150 µg/L and 64 µg/L, respectively.

- cis-1,2-DCE was detected at concentrations exceeding its numerical CAO (70 µg/L) at two of the 21 performance monitoring wells during the March 2020 sampling event. These exceedances occurred at GM-14M (190 µg/L) and GM-16S (150 µg/L). At the four surface water monitoring locations, cis-1,2-DCE concentrations ranged from non-detect to an estimated value of 0.54 µg/L (SW-7B µg/L). cis-1,2-DCE concentrations were below the numerical CAO at both porewater monitoring locations.
- TCE was detected at concentrations exceeding its numerical CAO (5 µg/L) at 15 out of the 21 performance monitoring wells during the March 2020 sampling event. The highest concentration was observed at GM-22M (1,100 µg/L). TCE was detected at the four surface water monitoring locations with concentrations ranging from 4.5 µg/L (SW-6B) to 6.4 µg/L (SW-7B). TCE concentrations exceeded its numerical CAO at both porewater monitoring locations (PW-6C - 570 µg/L, and PW-6D - 230 µg/L).
- Vinyl chloride (VC) was detected at concentrations exceeding its numerical CAO (2 µg/L) at three of the 21 groundwater monitoring wells during the March 2020 sampling event. The highest concentration was observed at GM-16S (18 µg/L). It was not detected at any of the four surface water or two porewater monitoring locations.

The sentinel wells in the TCE Area SWMU include GM-32 and GM-32D across Little Elk Creek in the intermediate and saprolite zones, GM-27 at the YMCA, and GM-31S/M in the off-site residential area south of U.S. Route 40. Constituent concentrations in these wells are described below:

- No constituents were detected above reporting limits at sentinel well GM-31M, and perchlorate was the only constituent detected above reporting limits at GM-31S (1.1 µg/L), below its numerical CAO of 14 µg/L.
- No constituents were detected above reporting limits at GM-27.
- Perchlorate, 1,1-dichloroethene, cis-1,2-dichloroethene, 1,1,1,-trichloroethane and trichloroethene were the only detected constituents observed at sentinel well GM-32 with only the concentrations of perchlorate and trichloroethene exceeding their respective CAOs.
- No constituents were detected above reporting limits at sentinel well GM-32D.

6.1.2 A-Area SWMU

Groundwater analytical results for the A-Area SWMU are presented in **Table 6-2** and summarized below for each constituent that exceeded its numerical CAO at one or more monitoring wells. No surface water or porewater samples were collected for this area.

- Perchlorate concentrations exceeded the numerical CAO (14 µg/L) at both performance monitoring wells during the March 2020 sampling event. The highest concentration occurred at GM-1B (94 µg/L).
- 1,4-Dioxane concentration exceeded the numerical CAO (0.46 µg/L) at monitoring well GM-1B (2.3 µg/L).

- TCE was detected at both performance monitoring wells at a concentration exceeding the numerical CAO (5 µg/L) at monitoring well GM-1B (50 µg/L).

6.1.3 Beryllium SWMU

Analytical results for the Beryllium SWMU are presented in **Table 6-3**. No numerical CAOs for the Beryllium SWMU were established due to the nature of the closure of the Beryllium SWMU as waste-in-place and the demonstrated low potential for migration of hazardous waste or hazardous waste constituents from the SWMU via the shallow zone to water supply wells or to surface water. Groundwater samples exhibited detections of primarily metals; most of the semi-volatile organic compounds and VOCs constituents were not detected.

6.1.4 C-Area SWMU

Analytical results for the C-Area SWMU are presented in **Table 6-4** and summarized below for each constituent that exceeded its numerical CAO at one or more monitoring wells.

- Perchlorate was detected at concentrations exceeding the numerical CAO (4 µg/L) at the 13 performance monitoring wells during the March 2020 sampling event with the highest concentration occurring at MW-29 (2,500 µg/L).
- 1,1-DCE was detected at concentrations exceeding its numerical CAO (7 µg/L) at six of the 13 performance monitoring wells. The highest concentration was observed at monitoring well MW-01 (140 µg/L).
- PCE was detected at concentrations exceeding its numerical CAO (5 µg/L) at two of the 13 performance monitoring wells with the highest concentration occurring at monitoring well MW-5 (84 µg/L).
- TCE was detected at concentrations exceeding its numerical CAO (5 µg/L) at seven of the 13 performance monitoring wells with the highest concentration occurring at monitoring well MW-5 (110 µg/L).

6.1.5 Pesticide SWMU AOC Cap

Results from 2020 sampling performed by GEI are provided in **Appendix J**. Briefly, no analytes were detected in the parent and duplicate samples from the upgradient well PESTMW-6. Alpha-BHC, beta-BHC, delta-BHC, dieldrin, endrin ketone, gamma-BHC, and heptachlor epoxide were detected in the sample from downgradient well PESTMW-5 (GEI 2020). GEI concludes that the March 2020 results for downgradient well PESTMW-5 are generally lower than results obtained in 2004 and 2014, while the March 2020 results for upgradient well PESTMW-6 are consistent with prior sampling results (GEI 2020).

6.2 Assessment of Institutional and Engineering Control Performance

Visual observations of fencing and signage around the Beryllium SWMU soil cover system indicate that the components of the IECs are present and performing as designed. Dense tree cover is present

throughout the SWMU, and there are no signs of disturbance or trespassing in the area. Warning signs are visible, and fences are in good condition. Photographs documenting the IEC verification at the Beryllium SWMU are presented in **Appendix H**.

The Soil Management Plan along with modifications to the Site dig permit system outlining procedures for subsurface soil excavation at the A-Area SWMU, Pesticide SWMU, and Beryllium SWMU was approved by the USEPA on April 17, 2018 and was modified to include the C-Area SWMU and Sewer Line Area in 2020. The updated Soil Management Plan is presented as **Appendix K.**

The environmental covenant for the Site will not be completed until land use restrictions are recorded to incorporate the final Pesticide SWMU AOC surveyed coordinates, which is anticipated to take place this year.

On July 1, 2020, ATK notified MDE that it intended to supplement the sand-filled infiltration gallery currently used to infiltrate discharges from C-68 air stripper located in the C-Area to shallow groundwater. The facility intends to supplement the stone infiltration gallery with an infiltration pond, which will accept water that the infiltration gallery will not accept; currently any water that the infiltration gallery does not accept flows to a surface swale. The C-68 air stripper removes VOCs from the groundwater recovered downgradient of the closed waste incinerator feed impoundment and has been in operation since 1993. Discharges to surface water from the current system are permitted via the facility's CHS permit and a National Pollution Discharge Elimination System (NPDES) permit. Both the MDE NPDES program and groundwater injection program have been notified of the change, and no additional permitting is required. All other construction related permits and approvals are in place.

6.3 Assessment of Remedial Action Performance

To evaluate chlorinated VOC concentration trends in the TCE Area, A-Area and C-Area SWMUs, non-parametric Mann-Kendall trend tests were performed using groundwater monitoring data from sample locations with four or more data points. The trends were evaluated for monitoring locations where chlorinated VOC concentrations exceeded the CAOs at least once during the monitoring history. Trends were not evaluated at monitoring locations where any of the following criteria applied:

- Insufficient data are available (less than four data points).
- Constituent concentrations do not exceed CAOs.
- Greater than 50 percent of the results are below reporting limits.

Monitoring locations that met the applicable criteria were analyzed using the historical groundwater data and samples collected at each monitoring well through March 2020.

The Mann-Kendall trend test is a non-parametric test that calculates trends based on ranked data. The basic Mann-Kendall trend test involves listing the concentrations in temporal order and computing all differences that may be formed between a given measurement and earlier measurements (Gilbert 1987). The test statistic (sum of trend) is the difference between the number of strictly positive differences and the number of strictly negative differences. If there is an underlying increasing trend, then these differences will tend to be positive, indicated by a sufficiently large positive value (p-value) of the test statistic. The p-value of the correlation provides a measure of the level of significance of the statistical

test. Correlations were accepted as significant for p-values less than or equal to 0.05 (95 percent confidence level).

Per USEPA (2009) guidance, COC concentrations below laboratory reporting limits may be used in the Mann-Kendall analyses and were assigned a common value that is lower than any of the detected measurements for individual well/constituent. For this analysis, the non-detects were substituted with a value equal to 95 percent of the lowest reported detected concentration per individual well/constituent.

Trend plots and output from the statistical analysis are presented in **Appendix L**, and the results are summarized below. Historical data are presented in **Appendix M**. The Site annual waste minimization certification is presented in **Appendix N**.

6.3.1 TCE Area SWMU

Results from the sentinel wells in the TCE area (GM-27, GM-31S/M, GM-32, and GM-32D) indicate that off-site impacts are limited in their extent; temporal trends were not analyzed statistically for wells GM-27 and GM-31S/M because they either never contained detected concentrations of constituents or greater than 50 percent of the results are below reporting limits. In comparison to the 2019 analytical results, concentrations of perchlorate, 1,1-DCE, cis-1,2-DCE, 1,1,1-TCA, and TCE at GM-32 increased during the 2020 monitoring event. The TCE concentration increased from 25 µg/L to 34 µg/L, the 1,1-DCE concentration increased from 1.4 µg/L to 1.9 µg/L, and the perchlorate concentration increased from 11 µg/L to 16 µg/L. Concentrations of cis-1,2-DCE and 1,1,1-TCA increased by less than 0.4 µg/L from the 2019 results. The concentration of 1,4-dioxane decreased from 0.91 µg/L in 2019 to below the reporting limit in 2020.

Location SW-6B is upstream of the main TCE plume discharge area whereas locations SW-6C/PW-6C and SW-6D/PW-6D are downgradient of the plume core monitoring wells GM-22S/M and GM-21S/M, respectively. Location SW-7B represents off-site conditions downstream of the plume discharge area. Constituent concentrations in these surface water and porewater locations are described below:

- TCE and perchlorate concentrations at the downgradient surface water locations SW-6C and SW-7B are similar to those at the upstream location SW-6B.
- The surface water sample from SW-6D exhibited concentrations of perchlorate, 1,1-DCE, cis-1,2-DCE, and TCE that were more than an order of magnitude lower than those measured in the plume core monitoring wells GM-21S/M. The surface water sample from SW-6C exhibited concentrations of perchlorate, 1.4-dioxane, 1,1,1-TCE, 1,1-DCE, cis-1,2-DCE, and TCE that were more than an order of magnitude lower than those measured in the plume core monitoring wells GM-22S/M.
- The TCE concentration in porewater at location PW-6D (230 µg/L) is over 4-fold lower than that in the closest plume core monitoring well GM-21S (1,000 µg/L), but slightly higher compared to the concentration in well GM-21M (170 µg/L).
- The TCE concentration observed at PW-6D has increased from 57 µg/L in 2019 to 95 µg/L in 2020 , while the TCE concentration observed at SW-6D has varied from 6.2 µg/L in 2018 to 24 µg/L in 2019 to 5.7 µg/L in 2020. The concentration measured at PW-6D is still well within the range of values from similarly located SWIMS samples collected during field sampling in 1999 (Arcadis 2000). It is expected that the porewater concentrations could vary considerably based on the changing

concentrations of the plume discharging to Little Elk Creek and the highly variable stage conditions of the creek that can influence porewater concentrations preceding a sampling event. TCE concentrations at GM-21S and GM-22S/M have remained stable. This is evidence that the plume is migrating toward Little Elk Creek following the groundwater flow path toward the south east.

- At the porewater sampling location PW-6C, the perchlorate concentration is similar to the groundwater concentration at the closest plume core monitoring wells, GM-22S and GM-22M. The TCE concentration at PW-6C is about 2-fold lower than groundwater concentration of TCE at GM-22S and GM-22M.

These results are indicative of natural attenuation and dilution of both TCE and perchlorate along the flow path in the creek. The variable nature of the concentrations spatially and temporally in porewater are likely the results of variations in the plume concentration discharging to Little Elk Creek and the highly variable stage conditions of the creek that can influence porewater concentrations.

Groundwater geochemical results indicate that generally aerobic or mildly reducing conditions are present in the TCE Area SWMU, with more reducing conditions expected near Little Elk Creek where higher concentrations of total organic carbon are observed. The potential for pockets of reducing conditions and limited anaerobic biodegradation exists in discrete locations upgradient (such as GM-2B) where isolated layers of material with high organic carbon occur. At such locations, detections of the TCE daughter products cis-1,2-DCE and VC provide an additional line of evidence of natural attenuation. Conditions conducive to biodegradation of perchlorate and TCE under reducing conditions are found close to Little Elk Creek due to the increased availability of reduced carbon near the creek. At GM-14M, concentrations of TCE (270 µg/L in 2019; 59 µg/L in 2020), 1,1-DCE (28 µg/L in 2019; 21 µg/L in 2020) and VC (6.4 µg/L in 2019; 10 µg/L in 2020) continue to remain above their respective CAOs in both 2019 and 2020. However, the concentration of perchlorate in GM-14M decreased below its CAO between 2019 (96 µg/L) and 2020 (non-detect). The decline in TCE concentrations at GM-14M coupled with an increase in concentrations of its daughter product cis-1,2-DCE (40 µg/L in 2019 to 190 J µg/L in 2020) suggest natural attenuation is occurring via reductive dechlorination. The increase in concentration of daughter products is expected to be temporary as ongoing reductive dechlorination sequentially converts them further to the end product ethene.

Statistical trend analysis of historic data (**Appendix L**) and current and historical data presented in **Appendix M** shows that concentrations of VOCs and perchlorate are stable-to-declining at 11 performance monitoring wells in the TCE Area SWMU. The trend test results for each well and chlorinated VOC combinations are described below.

- Statistically significant decreasing trends were observed for:
  - 1,1,1-TCA at monitoring wells GM-16M, GM-22M, and GM-22S;
  - 1,1-DCA at monitoring wells GM-2B, GM-9M, and GM-22M;
  - 1,1-DCE at monitoring wells GM-14M, GM-22M, and GM-22S;
  - 1,4-Dioxane at monitoring wells GM-2B, GM-14M, GM-22M, and GM-22S;
  - Benzene at monitoring well GM-32D;
  - Perchlorate at monitoring wells GM-2B, GM-14M, GM-22M, GM-22S, and GM-24; and

  - TCE at monitoring wells GM-2B, GM-4B, GM-14M, GM-16M, GM-22M, GM-22S, GM-24, and GM-26M.

- Statistically significant increasing trends were observed for:
  - Perchlorate at monitoring wells GM-16S, GM-21M, GM-26S, and GM-32;
  - TCE at monitoring wells GM-16S, GM-26S, and GM-32;
  - 1,1-DCE at monitoring wells GM-16S and GM-26S; and
  - VC at monitoring wells GM-14M.
- The remaining well chlorinated VOC combinations showed statistically non-significant trends.

Specifically, TCE concentrations exhibited declining trends in plume-core wells GM-2B, GM-14M, GM-14S, GM-22S/M, and plume periphery well GM-16M, while no statistical trend was present for plume-core wells GM-21S/M. This decreasing trend can be attributed to natural attenuation via abiotic and biological degradation pathways. Increasing trends were observed for TCE and perchlorate at the plume periphery well GM-16S and sentinel well GM-32, and plume core monitoring well GM-21M (perchlorate only), suggesting continued migration of the plume centroid along the groundwater flow path toward Little Elk Creek. The increasing concentration trends for TCE and perchlorate at the GM-32 sentinel well are likely the result of diffusion and the large transient stage fluctuation of water levels in the creek driven by heavy precipitation events/longer drought spells which are occurring more frequently due to climate change. Water level data strongly support that the groundwater flow direction at GM-32 is actually towards the creek. Perchlorate concentrations demonstrated decreasing trends at plume-core wells GM-24, GM-14M, and GM-22S/M, while no statistical trend was present at plume-core wells GM-21S.

The trend analysis results provide multiple lines of evidence of a generally stable or shrinking plume due to natural attenuation via abiotic or biological degradation pathways.

6.3.2 A-Area SWMU

Groundwater from the A-Area SWMU generally flows into the TCE Area SWMU and northeast toward Little Elk Creek. Both monitoring wells GM-1B and GM-15M represent plume-core wells and exhibit anaerobic conditions (dissolved oxygen is < 0.1 milligram per liter) based on the geochemical data obtained during the March 2020 event. The presence of TCE and 1,1,1-TCA daughter products (cis-1,2-DCE and 1,1-DCA) suggests microenvironments may be present, where reducing conditions are conducive for biodegradation of these COCs. TCE concentrations demonstrate a decreasing trend at GM-1B and comparing the March 2020 event results to those from September 1994 indicates that the TCE concentration has declined by 3-fold (from 170 µg/L to 50 µg/L). At monitoring well GM-15M, the TCE concentration has remained stable below the CAO of 5 µg/L. The perchlorate concentration has increased at monitoring well GM-1B since 2018 (an estimated value of 41 µg/L in 2018, 62 µg/L in 2019, and 94 µg/L in 2020), however, it does not exhibit a statistically significant trend. The perchlorate concentration trend declined by over 7-fold at location GM-15M since 2002. These results are indicative of a stable or shrinking plume due ongoing natural attenuation processes in the A-Area SWMU.

6.3.3 C-Area SWMU

The remedial system consisting of a groundwater interceptor trench and infiltration gallery with an air stripper system has resulted in containment of high VOC concentration areas and significant declines in VOC concentrations in the vicinity of the system since its operation began in 1993. Evaluation of the implemented CAs has continued under MDE CHS Permit MDD A-052. During calendar year 2019, the groundwater recovery/treatment system at the closed Incinerator Feed Surface Impoundment (IFSI) (i.e., C-Area SWMU) was operational for 277 days and pumped a total of 779,771 gallons. The system was not operational during the months of January and December 2019 and for 15 days in July. The system shut downs were for preventive maintenance and to address persistent shutdown issues associated with the electrical system and pump.

The 13 shallow groundwater wells used for performance monitoring were selected to allow for continued documentation of changes to plume size and shape. Monitoring well MW-11 was not included in the trend analysis because monitoring ceased at MW-11 in 2003, as it was no longer part of the CMIWP, and there have been no recent data collected to determine concentration trends.

Statistical trend analysis indicates that constituent concentrations exhibit a stable-to-declining trend at most of the 13 performance monitoring wells. The trend test results for each well and analyte combination are described below.

- Statistically significant decreasing trends were observed for:
  - Perchlorate at monitoring wells MW-10, MW-13, MW-23, and MW-28;
  - 1,1,1-TCA at monitoring wells MW-01, MW-02, and MW-12;
  - 1,1-DCE at monitoring wells MW-01, MW-12, MW-19, MW-23, and MW-28;
  - TCE at monitoring wells MW-20; and
  - VC at monitoring wells MW-20.
- The only statistically significant increasing trend was observed for perchlorate at monitoring well MW-20.
- The remaining well chlorinated VOC combinations showed statistically non-significant trends.

Overall, these trends are indicative of a shrinking plume as a result of continued operation of the active treatment system, and support the transition from semi-annual to annual performance monitoring for this area. Geochemical conditions in the C-Area SWMU are aerobic and oxidizing suggesting that aerobic or abiotic attenuation may be occurring in areas upgradient of the treatment system.

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the performance monitoring and statistical trend analysis of past and current data, although some COCs exhibited exceedances of their numerical CAOs at certain monitoring locations during the March 2020 sampling event, overall COC trends demonstrate groundwater quality improvements. Many COCs continue to exhibit stable-to-decreasing concentrations in the TCE Area, A-Area, and C-Area SWMUs, providing evidence of stable or shrinking plumes.

Natural attenuation is ongoing in the TCE Area and A-Area SWMUs as demonstrated by decreasing concentrations of perchlorate and TCE at most of the wells. This attenuation may be attributed to reductive dechlorination due to the presence of daughter products at certain locations in the TCE Area SWMU while for other locations it may be because of abiotic or aerobic degradation. Based on the results of the porewater and surface water samples collected from Little Elk Creek, lower concentrations of TCE and perchlorate are discharging to Little Elk Creek than observed upgradient in groundwater and natural attenuation of TCE and perchlorate appears to be occurring along the flow path of the creek. The off-site impacts from the TCE Area SWMU appear to be limited in aerial extent and are not indicative of worsening environmental conditions that would require additional actions.

The active treatment system in the C-Area SWMU appears to be operating as designed to achieve containment of elevated VOC areas and a reduction in VOC concentrations. The IECs at the Beryllium SWMU are operating as designed, and the integrity of the vegetative cover has been maintained. Groundwater use and soil excavation restrictions continue to remain protective of human health. For the fourth year of CMI, changes in the performance monitoring program are not currently recommended.

8 REFERENCES

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TABLES

Table 4-1
Summary of Numerical CAOs for Groundwater for TCE Area and A-Area SWMUs
Alliant Techsystems Operations LLC
Elkton, Maryland

COC	CAO (MCL) (µg/L)
1,1,1-Trichloroethane	200
1,1-Dichloroethane	2.7*
1,1-Dichloroethene	7
1,2,4-Trimethylbenzene	15*
1,4-Dioxane	0.46*
Benzene	5
cis-1,2-Dichloroethylene	70
Naphthalene	0.17*
Perchlorate	14*
Trichloroethylene	5
Vinyl chloride	2

*RSL value indicated is the numerical CAO for COCs without an associated MCL.

(USEPA 2016a, 2016b)

Notes:
CAO - Corrective Action Objective
COC - constituent of concern
MCL - maximum contaminant level
RSL - Regional Screening Level
SWMU - Solid Waste Management Unit
µg/L - microgram per liter
USEPA - United States Environmental Protection Agency

Table 4-2
Summary of Numerical CAOs for Groundwater for C-Area SWMU
Alliant Techsystems Operations LLC
Elkton, Maryland

COC	CAO (MCL) (µg/L)
Benzene	5
Chlorobenzene	100
Chloroform	80
Carbon tetrachloride	5
1,2-Dichloroethane	5
1,1-Dichloroethene	7
Methylene chloride	5
Perchlorate	4.0*
PCE	5
1,1,1-Trichloroethane	200
1,1,2-Trichloroethane	5
Trichloroethylene	5
Vinyl chloride	2

* The perchlorate concentration of 4.0 µg/L is not a groundwater protection standard but is a concentration limit requirement of MDE CHS Permit MDD A-052.

Notes:
CAO - Corrective Action Objective
CHS - Controlled Hazardous Substances
COC - constituent of concern
MCL - maximum contaminant level
MDE - Maryland Department of the Environment
µg/L - microgram per liter

Table 5-1
Performance Monitoring Program
Alliant Techsystems Operations LLC
Elkton, Maryland

ARCADIS Design & Consultancy for natural and built assets

Monitoring Well / Sample Location ID	Sampling Frequency	Analytical Parameters	Location Description	Rationale
Upstream Surface Water				
SW1C	Annual	VOCs, SVOCs, perchlorate, metals	Little Elk Creek	Surface water quality upstream of Site
TCE Area SWMU				
GM-2B	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	Crouse Bros. property	Plume Core
GM-4B	Annual	VOCs, 1,4-dioxane, perchlorate	Northeast TCE Area near Little Elk Creek	Downgradient from A-Area
GM-9M	Annual	VOCs, 1,4-dioxane, perchlorate	Northwest TCE Area	Flow component to north
GM-10S	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	Northwest TCE Area	Flow component to north
GM-14S	Annual	VOCs, 1,4-dioxane, perchlorate	Southern property boundary	Plume Core
GM-14M	Annual	VOCs, 1,4-dioxane, perchlorate sulfate, TOC, dissolved iron	Southern property boundary	Plume Core
GM-16S	Annual	VOCs, 1,4-dioxane, perchlorate	South of U.S. Route 40 near Little Elk Creek	Plume Periphery
GM-16M	Annual	VOCs, 1,4-dioxane, perchlorate	South of U.S. Route 40 near Little Elk Creek	Plume Periphery
GM-21S	Annual	VOCs, 1,4-dioxane, perchlorate	Adjacent to Little Elk Creek	Downgradient plume core, groundwater discharge area
GM-21M	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	Adjacent to Little Elk Creek	Downgradient plume core, groundwater discharge area
GM-22S	Annual	VOCs, 1,4-dioxane, perchlorate	Adjacent to Little Elk Creek	Downgradient plume core, groundwater discharge area
GM-22M	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	Adjacent to Little Elk Creek	Downgradient plume core, groundwater discharge area
GM-24	Annual	VOCs, 1,4-dioxane, perchlorate	Western TCE Area	Upgradient plume core
GM-26S	Annual	VOCs, 1,4-dioxane, perchlorate	South of U.S. Route 40	Off-axis, bounds 1,4-dioxane exceedances
GM-26M	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	South of U.S. Route 40	Off-axis, bounds 1,4-dioxane exceedances
GM-27	Annual	VOCs, 1,4-dioxane, perchlorate	YMCA property	Sentinel well
GM-30M	Annual	VOCs, 1,4-dioxane, perchlorate	South of U.S. Route 40	Plume Periphery, bounds perchlorate exceedances
GM-31S	Annual	VOCs, 1,4-dioxane, perchlorate	Residential Area, South of U.S. Route 40	Sentinel well
GM-31M	Annual	VOCs, 1,4-dioxane, perchlorate	Residential Area, South of U.S. Route 40	Sentinel well
GM-32	Annual	VOCs, 1,4-dioxane, perchlorate	Eastern TCE Area across Little Elk Creek	Sentinel well across creek in groundwater discharge area, low TCE detections
GM-32D	Annual	VOCs, 1,4-dioxane, perchlorate	Eastern TCE Area across Little Elk Creek	Sentinel well across creek in groundwater discharge area

Table 5-1
Performance Monitoring Program
Alliant Techsystems Operations LLC
Elkton, Maryland

Monitoring Well / Sample Location ID	Sampling Frequency	Analytical Parameters	Location Description	Rationale
PW6C	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved Iron	Little Elk Creek at TCE plume discharge location	Assess discharge to surface water
PW6D	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved Iron	Little Elk Creek at TCE plume discharge location	Assess discharge to surface water
SW6B	Annual	VOCs, 1,4-dioxane, perchlorate	Little Elk Creek upstream of TCE plume discharge area	Surface water quality upstream of TCE plume discharge area
SW6C	Annual	VOCs, 1,4-dioxane, perchlorate	Little Elk Creek at TCE plume discharge location	Surface water quality at TCE plume discharge area
SW6D	Annual	VOCs, 1,4-dioxane, perchlorate	Little Elk Creek at TCE plume discharge location	Surface water quality at TCE plume discharge area
SW7B	Annual	VOCs, 1,4-dioxane, perchlorate	Little Elk Creek downstream from property boundary	Surface water quality downstream of Site boundary
A-Area SWMU				
GM-1B	Annual	VOCs, 1,4-dioxane, perchlorate, sulfate, TOC, dissolved iron	A-Area	Plume Core
GM-15M	Annual	VOCs, perchlorate	Northeast of A-Area	Plume Core
Beryllium SWMU				
BS-1	Annual	VOCs, SVOCs, perchlorate, metals, sulfate, TOC, dissolved iron	Between Beryllium SWMU and Little Elk Creek	Plume axis, downgradient of waste in place
PW2B	Annual	VOCs, SVOCs, perchlorate, metals, sulfate, TOC, dissolved iron	Little Elk Creek	Assess discharge to surface water
SW2B	Annual	VOCs, SVOCs, perchlorate, metals	Little Elk Creek	Surface water quality in potential discharge area
Pesticide SWMU AOC				
PESTMW-5	Biennial	Pesticides	Northeast of Pesticide SWMU AOC Cap	Downgradient of Cap
PESTMW-6	Biennial	Pesticides	West of Pesticide SWMU AOC Cap	Upgradient of Cap
C-Area SWMU				
MW-1	Annual	VOCs, perchlorate	Eastern C-Area	Former Source Area
MW-2	Annual	VOCs, perchlorate, sulfate, TOC, dissolved iron	Eastern C-Area	Former Source Area
MW-5	Annual	VOCs, perchlorate	Central C-Area	Plume axis
MW-10	Annual	VOCs, perchlorate	Southern C-Area	Plume periphery
MW-11[(2)]	Annual	TKN, TN, Nitrate-N	Eastern C-Area	Former Source Area
MW-12	Annual	VOCs, perchlorate sulfate, TOC, dissolved iron	Eastern C-Area	Former Source Area
MW-13	Annual	VOCs, perchlorate	Eastern C-Area	Upgradient Infiltration Gallery Area

Table 5-1
Performance Monitoring Program
Alliant Techsystems Operations LLC
Elkton, Maryland

Monitoring Well / Sample Location ID	Sampling Frequency	Analytical Parameters	Location Description	Rationale
MW-19	Annual	VOCs, perchlorate	Central C-Area	Plume axis
MW-20	Annual	VOCs, perchlorate, TKN, TN, Nitrate-N	Central C-Area	Plume axis
MW-22	Annual	VOCs, perchlorate, sulfate, TOC, dissolved iron, TKN, TN, Nitrate-N	Northern C-Area	Plume axis
MW-23	Annual	VOCs, perchlorate	Southern C-Area	Plume periphery
MW-25	Annual	VOCs, perchlorate, sulfate, TOC, dissolved iron	Southern C-Area	Plume periphery
MW-28	Annual	VOCs, perchlorate, sulfate, TOC, dissolved iron	Western C-Area	Downgradient
MW-29	Annual	VOCs, perchlorate	Western C-Area	Downgradient

Notes:

AOC - area of concern
CHS - Controlled Hazardous Substances
MDE - Maryland Department of Environment
SVOC - semivolatile organic compound
SWMU - Solid Waste Management Unit
TCE - trichloroethene
TKN - total Kjeldahl nitrogen
TN - total nitrogen
TOC - total organic carbon
VOC - volatile organic compound
* - top and bottom screen elevations for wells GM-22S, GM-22M, GM-24, GM-26S, and GM-26M approximated assuming a 3 ft stickup casing
(2) This well was not part of the Performance Monitoring Plan, but was monitored to comply with the requirement of the MDE CHS permit.

Table 5-2
Well Specifications, Sampling Location Coordinates, and Groundwater Elevations
Alliant Techsystems Operations LLC
Elkton, Maryland

ARCADIS Design & Consultancy for natural and built assets

Monitoring Well / Sample Location ID	Hydrogeologic Unit	NAD83 Easting (State Planar) (ft)	NAD83 Northing (State Planar) (ft)	Top of Casing Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Top of Screen Elevation* (ft msl)	Bottom of Screen Elevation* (ft msl)	Groundwater Elevation (March 2020) (ft msl)
Upstream Surface Water									
SW-1C	Surface Water	1632222.29	716416.25	N/A	N/A	N/A	N/A	N/A	--
TCE Area SWMU									
GM-2B	Intermediate	1634423.11	709166.75	19.33	76.15	10	-46.26	-56.26	-9.28
GM-4B	Intermediate	1634973.19	711463.74	21.69	48.92	10	-19.20	-29.20	15.19
GM-9M	Intermediate	1632227.74	711360.49	38.71	58.52	10	-10.71	-20.71	21.30
GM-10S	Shallow	1632291.65	712034.88	30.9	17.93	10	21.23	11.23	20.55
GM-14S	Shallow	1634030.47	709256.58	45.78	65.00	20	-2.82	-22.82	17.33
GM-14M	Intermediate	1634023.76	709262.99	45	107.29	30	-35.04	-65.04	16.38
GM-16S	Shallow	1635707.78	708522.11	11.75	32.17	10	-11.93	-21.93	9.21
GM-16M	Intermediate	1635731.12	708506.21	12.33	71.53	20	-43.32	-63.32	12.33
GM-21S	Shallow	1636453.25	708807.75	9.90	25	10	-7.10	-17.10	5.26
GM-21M	Intermediate	1636443.63	708797.69	9.74	52	15	-27.26	-42.26	7.43
GM-22S	Shallow	1636747.69	709300.10	12.43	20	10	0.43	-9.57	4.55
GM-22M	Intermediate	1636744.78	709283.63	12.33	37	15	-11.67	-26.67	6.04
GM-24	Intermediate	1633351.88	709510.80	50.70	96	15	-32.30	-47.30	16.95
GM-26S	Shallow	1634171.11	708685.18	45.72	60	10	-6.28	-16.28	13.25
GM-26M	Intermediate	1634190.65	708692.18	45.58	90	15	-31.42	-46.42	12.05
GM-27	Shallow	1635597.63	709393.74	24.51	18	10	16.51	6.51	16.05
GM-30M	Intermediate	1634741.54	708270.55	43.47	86	10	-32.53	-42.53	10.74
GM-31S	Shallow	1633419.17	707813.46	35.17	14	10	31.17	21.17	32.03
GM-31M	Intermediate	1633419.17	707809.02	34.88	90	10	-45.12	-55.12	13.33
GM-32	Intermediate	1636806.46	708965.62	12.08	30	10	-7.95	-17.95	6.60
GM-32D	Saprolite	1636802.60	708961.50	12.01	58	15	-30.59	-45.59	6.56
PW6C	Pore Water	1636937.36	709550.68	N/A	N/A	N/A	N/A	N/A	--
PW6D	Pore Water	1636592.73	708821.04	N/A	N/A	N/A	N/A	N/A	--
SW6B	Surface Water	1636977.94	709715.17	N/A	N/A	N/A	N/A	N/A	--
SW6C	Surface Water	1636934.08	709550.68	N/A	N/A	N/A	N/A	N/A	--
SW6D	Surface Water	1636611.57	708801.97	N/A	N/A	N/A	N/A	N/A	--
SW7B	Surface Water	1636041.13	707866.55	N/A	N/A	N/A	N/A	N/A	--
A-Area SWMU									
GM-1B	Intermediate	1633544.314	710460.4979	33.85	51.52	10	-7.91	-17.91	18.30
GM-15M	Intermediate	1634335.403	711059.0121	30.23	46.83	10	-6.17	-16.17	18.15
Beryllium SWMU									
BS-1	Shallow	1632120.52	715108.40	46.46	17.00	10	39.46	29.46	38.95
PW2B	Pore Water	1632083.02	715185.31	N/A	N/A	N/A	N/A	N/A	--
SW2B	Surface Water	1632083.02	715185.31	N/A	N/A	N/A	N/A	N/A	--

Table 5-2
Well Specifications, Sampling Location Coordinates, and Groundwater Elevations
Alliant Techsystems Operations LLC
Elkton, Maryland

Monitoring Well / Sample Location ID	Hydrogeologic Unit	NAD83 Easting (State Planar) (ft)	NAD83 Northing (State Planar) (ft)	Top of Casing Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Top of Screen Elevation* (ft msl)	Bottom of Screen Elevation* (ft msl)	Groundwater Elevation (March 2020) (ft msl)
Pesticide SWMU AOC									
MW-5	Shallow	-511.7028 [(1)]	402.958 [(1)]	105.71	87	17	33.62	16.62	25.53
MW-6	Shallow	-1072.4088 [(1)]	118.4133 [(1)]	86.82	75	15	24.25	9.25	29.41
C-Area SWMU									
MW-1	Shallow	1631613.60	713900.99	42.85	7.05	5.00	32.66	27.66	36.60
MW-2	Shallow	1631642.63	713924.61	42.43	6.36	5.00	33.98	28.98	36.83
MW-5	Shallow	1631566.89	714083.79	41.16	6.94	8.00	37.46	29.46	34.84
MW-10	Shallow	1631539.05	713708.94	41.88	15.51	10.00	34.84	24.84	35.41
MW-11[(2)]	Shallow	1631253.54	713853.65	39.63	12.00	10.00	35.07	25.07	34.19
MW-12	Shallow	1631495.77	713885.25	40.48	9.10	5.00	34.14	29.14	35.49
MW-13	Shallow	1631766.52	713963.45	42.53	9.40	10.00	36.73	26.73	37.40
MW-19	Shallow	1631070.66	713810.22	39.66	12.81	10.00	34.69	24.69	33.10
MW-20	Shallow	1631277.04	713978.91	40.17	12.17	10.00	34.65	24.65	34.05
MW-22	Shallow	1631489.11	714187.13	41.99	13.50	11.00	36.56	25.56	34.57
MW-23	Shallow	1631268.89	713158.02	41.74	13.19	11.00	35.97	24.97	33.72
MW-25	Shallow	1630993.09	713457.24	39.49	11.86	10.00	34.42	24.42	33.65
MW-28	Shallow	1630799.76	713738.58	39.55	13.53	10.00	33.26	23.26	31.34
MW-29	Shallow	1630790.30	713869.69	40.13	13.93	10.00	34.30	24.30	31.13

Notes:
AOC - area of concern
bgs - below ground surface
CHS - Controlled Hazardous Substances
ft - foot/feet
MDE - Maryland Department of Environment
msl - mean sea level
N/A - not applicable
SWMU - solid waste management unit
TCE - trichloroethene
-- - not analyzed or measured
* - top and bottom screen elevations for wells GM-22S, GM-22M, GM-24, GM-26S, and GM-26M approximated assuming a 3 ft stickup casing
[(1)] Site coordinate system used for the Pesticide SWMU AOC investigations.
[(2)] This well was not part of the Performance Monitoring Plan, but was monitored to comply with the requirement of the MDE CHS permit.

Table 5-3
List of Abandoned Wells During 2020 Reporting Period
Alliant Techsystems Operations LLC
Elkton, Maryland

Well ID
MW-3
MW-4
MW-7
MW-8
MW-14
MW-15

Notes:
Wells were abandoned between 11/4/19 and 11/8/19.

Table 6-1
TCE Area SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

		Matrix	Groundwater									
		Location ID:	GM-2B	GM-4B	GM-9M	GM-10S	DUP-01 (GM-14M)	GM-14M	GM-14S	GM-16M	GM-16S	GM-21M
		Sample Date:	3/23/2020	3/17/2020	3/18/2020	3/17/2020	3/17/2020	3/17/2020	3/17/2020	3/23/2020	3/23/2020	3/19/2020
Analyte	**Units**	**CAO**										
Anions												
Perchlorate	µg/L	14	--	**1**	**620**	**20**	< 1.0 U	< 1.0 U	**6.1**	< 1.0 U	**230**	**210**
SVOCs SIM												
1,4-Dioxane	µg/L	0.46	--	**0.4**	**7.4**	**4.7**	**2.8**	**3**	**7.3**	< 0.40 U	**12**	**3**
Naphthalene	µg/L	0.17	--	< 0.20 U	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	--
VOCs												
1,1,1-Trichloroethane	µg/L	200	--	< 1.0 U	**11**	< 1.0 U	< 1.0 U	**1.8**	**6.6**	< 1.0 U	**27**	**5.1**
1,1-Dichloroethane	µg/L	2.7	--	< 1.0 U	**16**	**5.1**	**6.8**	**6.7**	**6.3**	< 1.0 U	**11**	**1.8**
1,1-Dichloroethene	µg/L	7	**--**	< 1.0 U	**63**	**33**	**20**	**21**	**47**	< 1.0 U	**89**	**31**
1,2,4-Trimethylbenzene	µg/L	15	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U
Benzene	µg/L	5	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	70	**--**	< 1.0 U	**2.2**	< 1.0 U	**190**	**190**	**35**	< 1.0 U	**150**	**12**
Trichloroethene	µg/L	5	--	**5.1**	**120**	**12**	**58**	**59**	**160**	< 1.0 U	**550**	**170**
Vinyl chloride	µg/L	2	**--**	< 1.0 U	< 1.0 U	< 1.0 U	**9.7**	**10**	**5.3**	< 1.0 U	**18**	< 1.0 U
Water Quality Parameters												
Dissolved Oxygen	mg/L	--	--	1.44	0	0	0	0	0	3.76	7.27	0
Oxidation Reduction Potential	mV	--	--	203	237	219	-24	-24	46	194	296	168
Specific Conductivity	µS/cm	--	--	0.206	0.083	0.066	0.187	0.187	0.296	0.103	0.119	0.038
Temperature	°C	--	--	13.10	12.49	10.86	12.58	12.58	11.57	9.88	9.81	11.36
pH	S.U.	--	--	6.71	5.34	5.45	6.42	6.42	5.29	6.72	4.41	4.96
Monitored Natural Attenuation Parameters												
Sulfate	mg/L	--	--	--	--	**5.1**	**5.8**	**6**	--	--	--	**1.5**
Dissolved Iron	µg/L	--	**--**	--	--	< 50 U	**8800**	**8800**	--	--	--	**59**
Total Organic Carbon	mg/L	--	**--**	--	--	< 1.0 U	**1.7**	**1.7**	--	--	--	< 1.0 U

Notes:
1. Values exceeding laboratory reporting limits are bolded. Vales exceeding the numerical Corrective Action Objective are highlighted in gray.

2. Water quality parameters are measured in the field during each purge event.

3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

°C - degrees Celsius
CAO - corrective action objective
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
SIM - selective ion monitoring
S.U. - standard units
SVOC - semi-volatile organic compound

U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-1
TCE Area SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

		Matrix	Groundwater									
		Location ID:	GM-21S	GM-22M	GM-22S	GM-24	GM-26M	GM-26S	GM-27	GM-30M	GM-31M	DUP-02 (GM-31S)
		Sample Date:	3/19/2020	3/19/2020	3/19/2020	3/18/2020	3/19/2020	3/19/2020	3/23/2020	3/24/2020	3/19/2020	3/19/2020
Analyte	**Units**	**CAO**										
Anions												
Perchlorate	µg/L	14	**600**	**66**	**55**	**160**	**94**	**130**	< 1.0 U	**15**	< 1.0 U	**1.1**
SVOCs SIM												
1,4-Dioxane	µg/L	0.46	**25**	**11**	**10**	**0.44**	**1.5**	**1.5**	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
Naphthalene	µg/L	0.17	--	--	--	--	--	--	< 0.20 U	< 0.20 U	--	--
VOCs												
1,1,1-Trichloroethane	µg/L	200	**72**	**110**	**77**	< 1.0 U	**2.6**	**1.6**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	2.7	**11**	**12**	**9.6 J**	< 1.0 U	**1.1**	**0.59 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	7	**200**	**240**	**200**	< 1.0 U	**17**	**10**	< 1.0 U	**0.44 J**	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	µg/L	15	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	5	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	70	**27**	**23**	**17**	< 1.0 U	**8**	**6.9**	< 1.0 U	**0.43 J**	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	5	**1000**	**1100**	**890**	**7.2**	**120**	**170**	< 1.0 U	**6.4**	< 1.0 U	< 1.0 U
Vinyl chloride	µg/L	2	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Water Quality Parameters												
Dissolved Oxygen	mg/L	--	0	0	0	1.09	5.85	0.43	6.13	0	6.21	4.61
Oxidation Reduction Potential	mV	--	238	206	222	356	372	365	257	-86	189	189
Specific Conductivity	µS/cm	--	0.080	0.197	0.518	0.062	0.053	0.070	0.504	0.404	0.055	0.160
Temperature	°C	--	11.03	11.98	12.23	12.53	13.89	13.83	11.48	13.05	13.31	11.09
pH	S.U.	--	4.70	4.90	4.58	3.96	4.61	4.59	5.52	11.31	6.94	6.86
Monitored Natural Attenuation Parameters												
Sulfate	mg/L	--	--	**8.2**	--	--	**2.6**	--	--	--	--	--
Dissolved Iron	µg/L	--	--	< 50 U	--	--	< 50 U	--	--	--	--	--
Total Organic Carbon	mg/L	--	--	**0.57 J**	--	--	< 1.0 U	--	--	--	--	--

Notes:
1. Values exceeding laboratory reporting limits are bolded. Vales exceeding the numerical Corrective Action Objective are highlighted in gray.

2. Water quality parameters are measured in the field during each purge event.

3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

°C - degrees Celsius
CAO - corrective action objective
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
SIM - selective ion monitoring
S.U. - standard units
SVOC - semi-volatile organic compound

U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-1
TCE Area SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

		Matrix	Groundwater			Pore Water		Surface Water			
		Location ID:	GM-31S	GM-32	GM-32D	PW-6C	PW-6D	SW-6B	SW-6C	SW-6D	SW-7B
		Sample Date:	3/19/2020	3/24/2020	3/24/2020	3/25/2020	3/25/2020	3/25/2020	3/25/2020	3/25/2020	3/25/2020
Analyte	**Units**	**CAO**									
Anions											
Perchlorate	µg/L	14	**1.1**	**16**	< 1.0 U	**47**	**95**	**1.4**	**1.3**	**1.6**	**1.4**
SVOCs SIM											
1,4-Dioxane	µg/L	0.46	< 0.40 U	< 0.40 U	< 0.40 U	**7**	**5.4**	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
Naphthalene	µg/L	0.17	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
VOCs											
1,1,1-Trichloroethane	µg/L	200	< 1.0 U	**0.38 J**	< 1.0 U	**52**	**19**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	2.7	< 1.0 U	< 1.0 U	< 1.0 U	**7.1**	**2.8**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	7	< 1.0 U	**1.9**	< 1.0 U	**150**	**64**	< 1.0 U	< 1.0 U	**0.55 J**	**0.60 J**
1,2,4-Trimethylbenzene	µg/L	15	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	70	< 1.0 U	**1.9**	< 1.0 U	**18**	**8.3**	< 1.0 U	< 1.0 U	**0.48 J**	**0.54 J**
Trichloroethene	µg/L	5	< 1.0 U	**34**	< 1.0 U	**570**	**230**	**4.5**	**5.4**	**5.7**	**6.4**
Vinyl chloride	µg/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Water Quality Parameters											
Dissolved Oxygen	mg/L	--	4.61	7.49	1.57	8.88	8.50	8.10	9.10	8.50	8.06
Oxidation Reduction Potential	mV	--	189	259	35	--	--	114	--	--	21
Specific Conductivity	µS/cm	--	0.160	0.030	0.102	0.160	0.159	0.160	0.160	0.159	0.203
Temperature	°C	--	11.09	11.31	10.92	9.40	9.35	9.41	9.39	9.35	9.37
pH	S.U.	--	6.86	5.37	6.78	6.59	5.93	6.63	6.57	5.93	6.85
Monitored Natural Attenuation Parameters											
Sulfate	mg/L	--	--	--	--	**13**	**8.9**	--	--	--	--
Dissolved Iron	µg/L	--	--	--	--	< 50 U	< 50 U	--	--	--	--
Total Organic Carbon	mg/L	--	--	--	--	**0.91 J**	**1.6**	--	--	--	--

Notes:
1. Values exceeding laboratory reporting limits are bolded. Vales exceeding the numerical Corrective Action Objective are highlighted in gray.

2. Water quality parameters are measured in the field during each purge event.

3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

°C - degrees Celsius
CAO - corrective action objective
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
SIM - selective ion monitoring
S.U. - standard units
SVOC - semi-volatile organic compound

U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-2
A-Area SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

		Matrix:	Groundwater	
		Location ID:	GM-15M	GM-1B
		Sample Date:	3/17/2020	3/17/2020
Analyte	Units	CAO		
Anions				
Perchlorate	µg/L	14	**32**	**94**
SVOCs SIM				
1,4-Dioxane	µg/L	0.46	--	**2.3**
Naphthalene	µg/L	0.17	--	< 0.20 U
VOCs				
1,1,1-Trichloroethane	µg/L	200	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	2.7	< 1.0 U	**1**
1,1-Dichloroethene	µg/L	7	< 1.0 U	**3.3**
1,2,4-Trimethylbenzene	µg/L	15	< 1.0 U	< 1.0 U
Benzene	µg/L	5	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	70	**0.77 J**	**2.6**
Trichloroethene	µg/L	5	**4**	**50**
Vinyl chloride	µg/L	2	< 1.0 U	< 1.0 U
Water Quality Parameters				
Dissolved Oxygen	mg/L	--	0	0
Oxidation Reduction Potential	mV	--	250	210
Specific Conductivity	µS/cm	--	0.134	0.121
Temperature	°C	--	11.65	11.66
pH	S.U.	--	5.99	5.67
Monitored Natural Attenuation Parameters				
Sulfate	mg/L	--	--	**1700**
Dissolved Iron	µg/L	--	--	< 50 U
Total Organic Carbon	mg/L	--	--	**530 J**

Notes:
1. Values exceeding laboratory reporting limits are bolded. Values exceeding the numerical Corrective Action Objective are highlighted in gray.
2. Water quality parameters are measured in the field during each purge event.

°C - degrees Celsius
CAO - corrective action objective
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
SIM - selective ion monitoring
S.U. - standard units
SVOC - semi-volatile organic compound
U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-3
Beryllium SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

ARCADIS Design & Consultancy for natural and built assets

	Matrix:	Groundwater	Pore Water	Surface Water
	Location ID:	BS-1	PW-2B	SW-2B
	Sample Date:	3/24/2020	3/25/2020	3/25/2020
Analyte	**Units**			
Anions				
Perchlorate	µg/L	**0.41 J**	**1**	**0.58 J**
Sulfate	µg/L	**3600**	**7300**	--
Metals				
Aluminum	µg/L	**290**	**2900**	**180 J**
Antimony	µg/L	< 20 U	< 20 U	< 20 U
Arsenic	µg/L	< 20 U	< 20 U	< 20 U
Barium	µg/L	**8.7 J**	**38**	**35**
Beryllium	µg/L	< 4.0 U	**0.11 J**	< 4.0 U
Cadmium	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Calcium	µg/L	**13000**	**4800**	**12000**
Chromium	µg/L	< 10 U	**10**	< 10 U
Cobalt	µg/L	< 10 U	**3.4 J**	< 10 U
Copper	µg/L	**4.4 J**	**6.0 J**	< 20 U
Iron	µg/L	**330 B**	**11000 B**	**430 B**
Iron (filtered)	µg/L	**410 B**	**5800 B**	**--**
Lead	µg/L	< 10 U	**4.7 J**	< 10 U
Magnesium	µg/L	**4100**	**2700**	**8300**
Manganese	µg/L	**5.1 J**	**1000**	**46**
Mercury	µg/L	< 0.20 U	< 0.20 U	**0.33**
Nickel	µg/L	< 40 U	**12 J**	**3.5 J**
Potassium	µg/L	**560 J**	**740 J**	**2100**
Selenium	µg/L	< 20 U	< 20 U	< 20 U
Silver	µg/L	**0.60 JB**	**1.3 JB**	< 10 U
Sodium	µg/L	**5800**	**6700**	**12000**
Thallium	µg/L	< 25 U	< 25 U	< 25 U
Vanadium	µg/L	**1.1 J**	**6.5 J**	**1.0 J**
Zinc	µg/L	< 20 U	**15 J**	< 20 U
SVOCs				
1,1-Biphenyl	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
1,2,4-Trichlorobenzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
2,4,5-Trichlorophenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2,4,6-Trichlorophenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2,4-Dichlorophenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2,4-Dimethylphenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2,4-Dinitrophenol	µg/L	< 50 U	< 49 U	< 48 U
2,4-Dinitrotoluene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2,6-Dinitrotoluene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2-Chloronaphthalene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2-Chlorophenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2-Methyl-4,6-dinitrophenol	µg/L	< 50 U	< 49 U	< 48 U
2-Methylnaphthalene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2-Methylphenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
2-Nitroaniline	µg/L	< 50 U	< 49 U	< 48 U

Table 6-3
Beryllium SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

ARCADIS Design & Consultancy for natural and built assets

	Matrix:	Groundwater	Pore Water	Surface Water
	Location ID:	BS-1	PW-2B	SW-2B
	Sample Date:	3/24/2020	3/25/2020	3/25/2020
Analyte	Units			
2-Nitrophenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
3,3-Dichlorobenzidine	µg/L	< 59 U	< 58 U	< 58 U
3-Nitroaniline	µg/L	< 50 U	< 49 U	< 48 U
4-Bromophenyl phenyl ether	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
4-Chloro-3-Methylphenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
4-Chlorophenyl phenyl ether	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
4-Nitroaniline	µg/L	< 50 U	< 49 U	< 48 U
4-Nitrophenol	µg/L	< 50 U	< 49 U	< 48 U
Acenaphthene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Acenaphthylene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Acetophenone	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Anthracene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Atrazine	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzaldehyde	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzo(a)anthracene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzo(a)pyrene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzo(b)fluoranthene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzo(g,h,i)perylene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Benzo(k)fluoranthene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
bis(2-Chloroethoxy)methane	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
bis(2-Chloroethyl)ether	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
bis(2-Ethylhexyl)phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Butyl benzyl phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Caprolactam	µg/L	**7.2 J**	< 9.7 U	< 9.6 U
Carbazole	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Chrysene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Dibenzo(a,h)anthracene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Dibenzofuran	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Diethyl phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Dimethyl phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Di-n-butyl phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Di-n-octyl phthalate	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Fluoranthene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Fluorene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Hexachloro-1,3-butadiene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Hexachlorobenzene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Hexachlorocyclopentadiene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Hexachloroethane	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Indeno(1,2,3-cd)pyrene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Isophorone	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Nitrobenzene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
N-Nitrosodi-n-propylamine	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
N-Nitrosodiphenylamine	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
p-Chloroaniline	µg/L	< 20 U	< 19 U	< 19 U
Pentachlorophenol	µg/L	< 50 U	< 49 U	< 48 U
Phenanthrene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
Phenol	µg/L	< 9.9 U	< 9.7 U	< 9.6 U

Table 6-3
Beryllium SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

	Matrix:	Groundwater	Pore Water	Surface Water
	Location ID:	BS-1	PW-2B	SW-2B
	Sample Date:	3/24/2020	3/25/2020	3/25/2020
Analyte	**Units**			
Pyrene	µg/L	< 9.9 U	< 9.7 U	< 9.6 U
TOC				
Total Organic Carbon	µg/L	**7000**	**3000**	--
VOCs				
1,1,1,2-Tetrachloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2,2-Tetrachloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	**0.53 J**	< 1.0 U
1,1-Dichloropropene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichlorobenzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2,3-Trichloropropane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trichlorobenzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2,4-Trimethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromo-3-chloropropane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dibromoethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethene, Total	µg/L	< 2.0 U	< 2.0 U	< 2.0 U
1,2-Dichloropropane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,3,5-Trimethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichloropropane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
2,2-Dichloropropane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
2-Butanone (MEK)	µg/L	< 10 U	< 10 U	< 10 U
2-Chloroethyl vinyl ether	µg/L	< 10 U	< 10 U	< 10 U
2-Chlorotoluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
4-Chlorotoluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
4-Methyl-2-Pentanone	µg/L	< 10 U	< 10 U	< 10 U
Acetone	µg/L	< 10 U	< 10 U	< 10 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Bromobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Bromochloromethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Bromodichloromethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Bromoform	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Bromomethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	µg/L	< 2.0 U	< 2.0 U	< 2.0 U
Carbon Tetrachloride	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
CFC-11	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
CFC-12	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Chlorodibromomethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Chloromethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U

Table 6-3
Beryllium SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

	Matrix:	Groundwater	Pore Water	Surface Water
	Location ID:	BS-1	PW-2B	SW-2B
	Sample Date:	3/24/2020	3/25/2020	3/25/2020
Analyte	**Units**			
cis-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,3-Dichloropropene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Cymene (p-Isopropyltoluene)	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Dibromomethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Hexachloro-1,3-butadiene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Isopropylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Methyl N-Butyl Ketone (2-Hexanone)	µg/L	< 10 U	< 10 U	< 10 U
Methyl-tert-butylether	µg/L	< 10 U	< 10 U	< 10 U
n-Butylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
n-Propylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
o-Xylene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
sec-Butylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Styrene (Monomer)	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
tert-Butylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Total Xylenes	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,3-Dichloropropene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl acetate	µg/L	< 2.0 U	< 2.0 U	< 2.0 U
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	< 1.0 U
Water Quality Parameters				
Dissolved Oxygen	mg/L	0.57	10.38	10.39
Oxidation Reduction Potential	mV	165	20	20
Specific Conductivity	µS/cm	0.102	0.158	0.158
Temperature	°C	9.54	9.68	9.68
pH	S.U.	6.53	7.08	7.08

Notes:
1. Values exceeding laboratory reporting limits are bolded.
2. Water quality parameters are measured in the field during each purge event.

°C - degrees Celsius
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
S.U. - standard units
SVOC - semi-volatile organic compound
TOC - total organic carbon
U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-4
C-Area SWMU Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

Matrix:			Groundwater														
Location ID:			MW-01	MW-02	MW-5	MW-10	MW-11	MW-12	MW-13	MW-19	MW-20	DUP-03 (MW-22)	MW-22	MW-23	MW-25	MW-28	MW-29
Sample Date:			3/18/2020	3/18/2020	3/18/2020	3/18/2020	3/20/2020	3/18/2020	3/18/2020	3/20/2020	3/20/2020	3/20/2020	3/20/2020	3/18/2020	3/20/2020	3/20/2020	3/20/2020
Analyte	CAO	Units															
Anions																	
Perchlorate	4	µg/L	**1900**	**490**	**110**	**110**	--	**640**	**76**	**890**	**490**	**58**	**56**	**15**	**110**	**150**	**2500**
VOCs																	
1,1,1-Trichloroethane	200	µg/L	**250**	**11000**	< 1.0 U	**8.3**	--	**1**	< 10 U	**10**	**37**	**61**	**55**	**20**	< 1.0 U	**8.4**	**9.6**
1,1,2-Trichloroethane	5	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	µg/L	**140**	**120**	**2.5**	**4.2**	--	< 1.0 U	< 10 U	**16**	**12**	**9.4**	**9.1**	**3.9**	**0.52 J**	**1.9**	**8.1**
1,2-Dichloroethane	5	µg/L	**0.69 J**	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	µg/L	< 1.0 U	**0.47 J**	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	5	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	100	µg/L	**1.3**	**62**	**0.28 J**	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	80	µg/L	**4.6**	**2.3**	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	5	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	--	< 5.0 U	< 50 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	µg/L	**0.93 J**	**1**	**84**	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	**0.99 J**	**16**	**16**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	5	µg/L	**9.8**	**9.1**	**110**	**4.3**	--	< 1.0 U	**32**	**2.6**	**2.9**	**34**	**32**	**0.94 J**	**0.52 J**	**13**	**14**
Vinyl chloride	2	µg/L	< 1.0 U	**5.6**	< 1.0 U	< 1.0 U	--	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Water Quality Parameters																	
Dissolved Oxygen	--	mg/L	0	0	0	0	4.76	0	0	0	0	0	0	0	0	0	0
Oxidation Reduction Potential	--	mV	176	177	144	385	265	303	136	183	251	186	186	382	194	-59	88
Specific Conductivity	--	µS/cm	0.134	0.115	0.476	0.118	0.164	0.249	0.181	0.147	0.227	0.199	0.199	0.101	0.428	0.335	0.200
Temperature	--	°C	10.48	10.53	10.39	10.55	11.92	12.76	10.25	12.46	12.27	11.64	11.64	10.48	11.66	12.06	11.94
pH	--	S.U.	5.99	5.89	6.49	3.28	5.42	4.30	6.47	5.63	5.58	5.79	5.79	3.28	6.60	6.29	5.90
Monitored Natural Attenuation Parameters																	
Sulfate	--	µg/L	--	**5300**	--	--	--	**18000**	--	--	--	**23000**	**23000**	--	**41000**	**20000**	--
Dissolved Iron	--	µg/L	--	< 50 U	--	--	--	< 50 U	--	--	--	**55**	< 50 U	--	< 50 U	**9800**	--
Total Organic Carbon	--	µg/L	--	**2500**	--	--	--	**1400**	--	--	--	**710 J**	**770 J**	--	**1100**	**6300**	--
MDE CHS Permit Parameters																	
Total Nitrogen	--	µg/L	--	--	--	--	**2.9**	--	--	--	**7.5**	**0.54**	**0.55**	--	--	--	--
Total Kjeldahl Nitrogen	--	µg/L	--	--	--	--	--	--	--	--	**1.3**	--	--	--	--	--	--
Nitrate-Nitrogen	--	µg/L	--	--	--	--	**2.9**	--	--	--	**6.2**	**0.54**	**0.55**	--	--	--	--

Notes:
1. Values exceeding laboratory reporting limits are bolded. Values exceeding the numerical Corrective Action Objective are highlighted in gray.
2. Water quality parameters are measured in the field during each purge event.
3. Duplicate samples are presented with parent well ID in parentheses.

°C - degrees Celsius
CAO - corrective action objective
CHS - Controlled Hazardous Substance
MDE - Maryand Department of the Environment
SIM - selective ion monitoring
SVOC - semi-volatile organic compound
J - Indicates an estimated result
mg/L - milligram per liter
mV - millivolt
S.U. - standard units
U - Indicates the analyte was analyzed but not detected above the detection limit
VOC - volatile organic compound
µg/L - microgram per liter
µS/cm - microsiemens per centimeter
-- - not analyzed or measured

Table 6-5
Upstream Surface Water Sample Results
Alliant Techsystems Operations LLC
Elkton, Maryland

	Matrix:	Surface Water	
	Location ID:	DUP-04 (SW1C)	SW1C
	Sample Date:	3/25/2020	3/25/2020
Analyte	**Units**		
Anions			
Perchlorate	µg/L	**0.71 J**	**0.53 J**
SVOCs SIM			
1,4-Dioxane	µg/L	--	--
Naphthalene	µg/L	--	--
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	µg/L	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	< 1.0 U	< 1.0 U
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U

Notes:

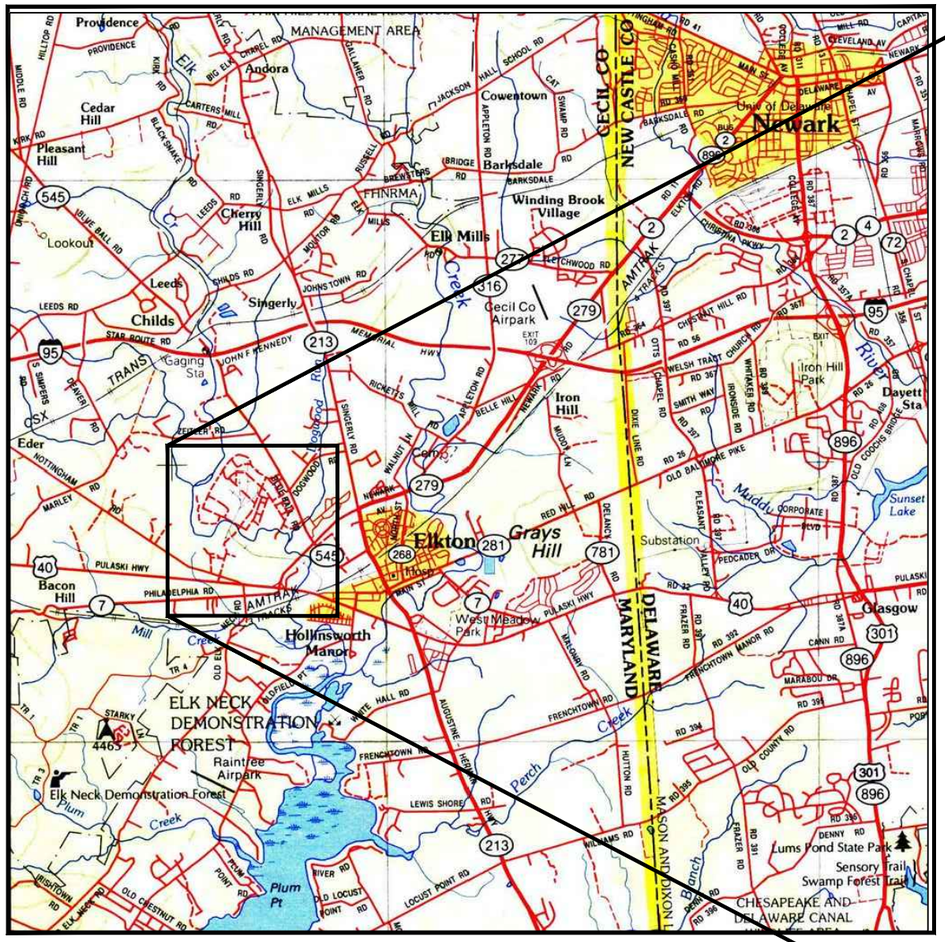
1. Values exceeding laboratory reporting limits are bolded. Values exceeding the numerical Corrective Action Objective goals are highlighted in gray.

2. Water quality parameters are measured in the field during each purge event.

3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
-- - not analyzed or measured
J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit

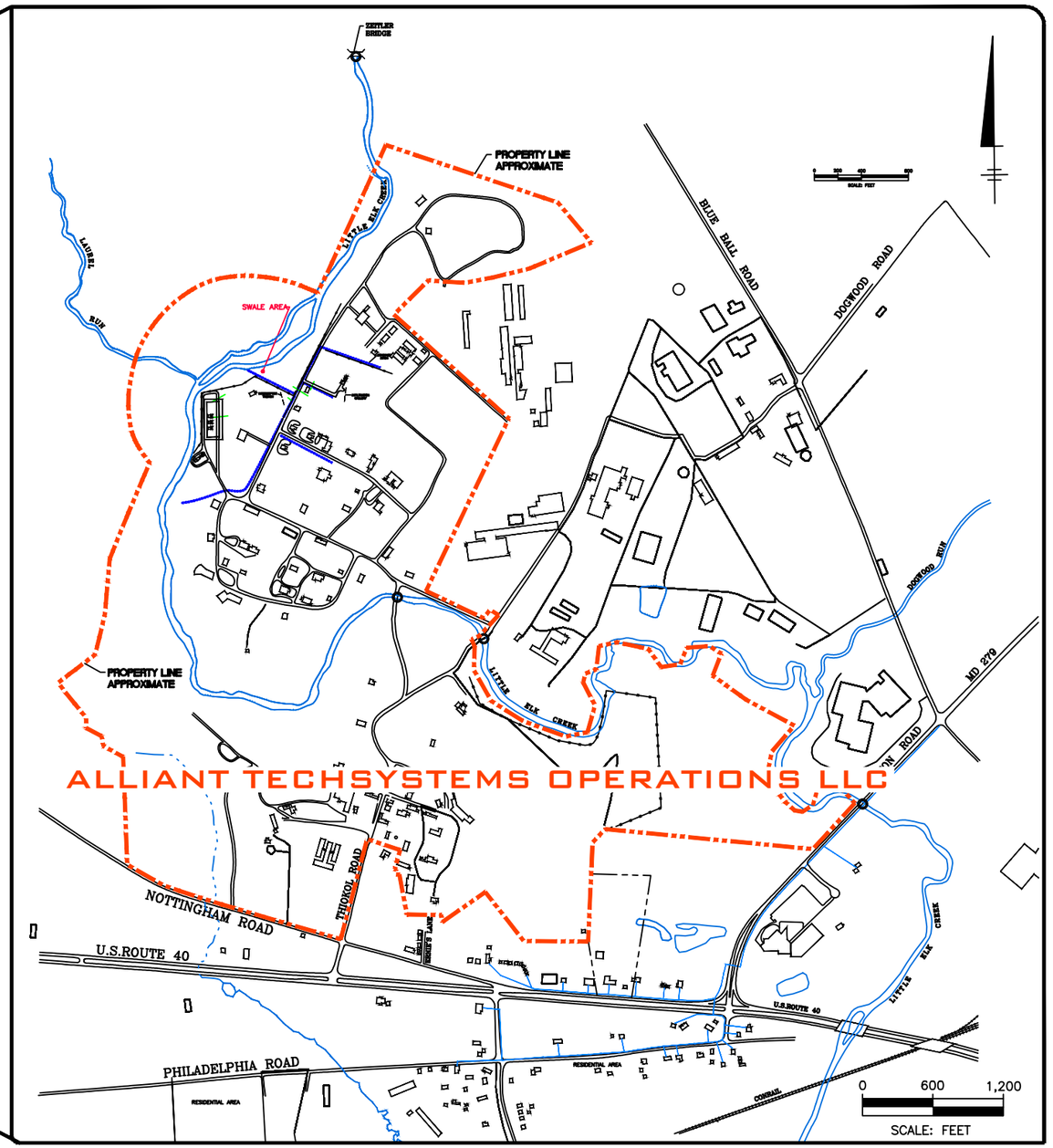
FIGURES



MAP SOURCE: MARYLAND DELAWARE ATLAS, DeLORME, FREEPORT MAIN, 1993

0 .75 1.5

SCALE: MILES



ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-1

CITY:(Read) DIV/GROUP:(Read) DB:(Read) LD:(Opt) PIC:(Opt) PM:(Read) TM:(Opt) LYR:(On)ON=*;OFF=*REF*
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BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: ---
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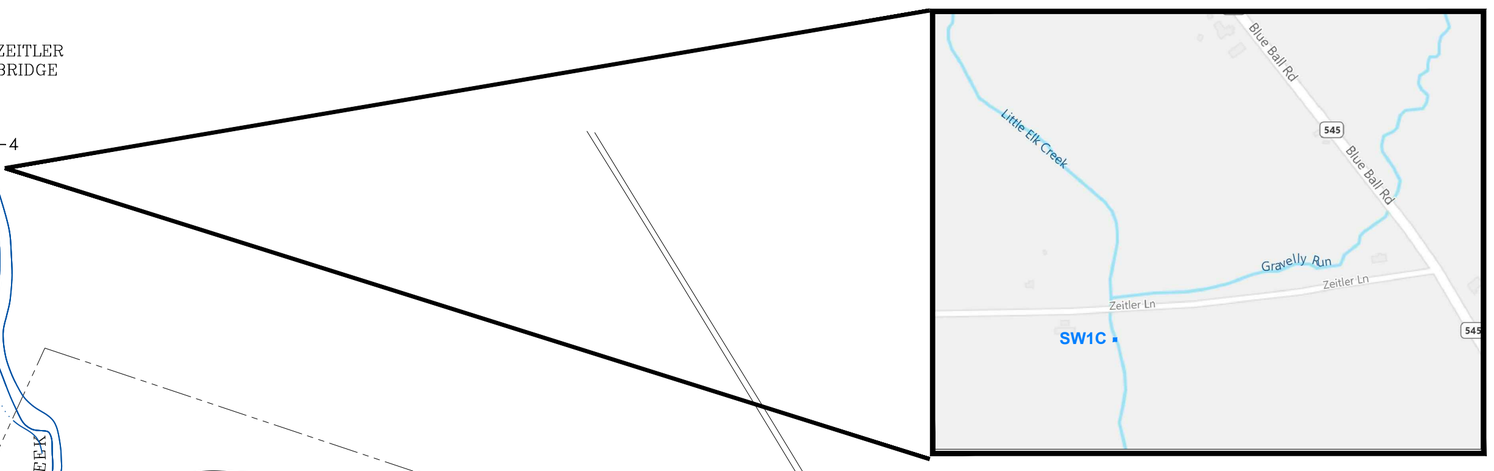

ZEITLER BRIDGE
S-4
SW1C
LITTLE ELK CREEK
BERYLLIUM SWMU
STILL BOTTOMS SWMU
BLUE BALL ROAD
APPROXIMATE PROPERTY LIMIT
LAUREL RUN
SWALE AREA
C-AREA SWMU
CLOSED INCINERATION FEED SURFACE IMPOUNDMENT
SW/PW-3B
SW2B
PW2B
BS-1
GM-20S, GM-20D
GM-17
GM-19
GM-18S, GM-18D
DRAINAGE DITCH
INTERCEPTOR TRENCH
INFILTRATION GALLERY
GM-12S, GM-12M, GM-12D
GM-11S, GM-11M, GM-11D
S-3
GM-10S
GM-10M, GM-10D
S-1
SW/PW-5A
GM-15S, GM-15M, GM-15D
GM-4B
GM-4S
GM-4A
DOGWOOD RUN
MD 279
ELKTON ROAD
PROPERTY LIMIT APPROXIMATE
PESTICIDE AREA SWMU AOC
SEWER LINE AREA
GM-13S GM-13M GM-13D
FENCE
S-2
GM-1B
GM-1A
GM-1S
GM-25
APPROXIMATE PROPERTY LIMIT
A-AREA SWMU ABANDONED BURN AREA
THIOKOL ROAD
NOTHINGHAM ROAD
ERNIE'S LANE
CROUSE BROS.
CR-4
CR-3
CR-1
CR-2
TCE AREA SWMU
GM-24
GM-14R(A-82)
GM-14D
GM-14S, GM-14M,
GM-2A, GM-2B
GM-3A
GM-3B
SG1-5/10
GM-27
YMCA
GM-23S, GM-23M
GM-22S, GM-22M
SW6B
SW6C
PW6C
SW6D
PW6D
GM-21S, GM-21M
GM-32
GM-32D
GM-33D
GM-33
U.S.ROUTE 40
OSRW-3
GM-28
INACTIVE-3
INACTIVE-4
GM-29
INACTIVE-2
OSRW-4
GM-26S, GM-26M
INACTIVE-1
GM-16S, GM-16M, GM-16D
OSRW-26
OSRW-27
OSRW-8
OSRW-17
OSRW-15
OSRW-16
OSRW-10
OSRW-23
OSRW-18
OSRW-24
OSRW-22
OSRW-21
OSRW-9
GM-31S GM-31M
OSRW-14
OSRW-20
OSRW-19
RESIDENTIAL AREA
OSRW-25
GM-30S
GM-30M
OSRW-5
OSRW-6
PHILADELPHIA ROAD
CONRAIL
SW7B
EXTENT OF RESIDENTIAL WELL SURVEY
OSRW-12
OSRW-13
OSRW-1
OSRW-2
OSRW-11
MW-1 (WCC-1)
SP-1
MW-6
GT-1
MW-2(WCC-2)
MW-5
GM-6
GM-8
GM-7
(WCC-3)
MW-3
MW-4(WCC-4)
GM-5A
GM-5B
GP01
GP02
GP03
W-4
W-1
W-2
W-5
W-6
W-7
MW-22
MW-21
MW-20
MW-29
MW-19
MW-28
MW-27
MW-26
MW-25
MW-24
MW-18
MW-11
MW-6
MW-17
MW-16
MW-23
MW-5
MW-4
MW-3
MW-13
MW-12
MW-2
MW-1
MW-8
MW-14
MW-7
MW-15
MW-10

LEGEND:

- W-7 Ⓟ PLANT WELL
- ABANDONED MONITORING WELL
- GM-1 MONITORING WELL
- GM-16S, GM-16M, GM-16D WELL CLUSTER (CONSISTS OF SHALLOW, INTERMEDIATE, AND DEEP WELLS)
- OSRW-20 APPROXIMATE LOCATION OF RESIDENTIAL WELL
- APPROXIMATE LOCATION OF WATER LINE
- CR-1 APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- S-1 SURFACE WATER GAUGE
- SG1-5/10 LOCATION OF SOIL GAS POINT
- SW7A SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S GROUNDWATER PERFORMANCE MONITORING LOCATION
- APPROXIMATE SWMU OUTLINE

NOTES:
AOC=AREA OF CONCERN
SWMU=SOLID WASTE MANAGEMENT UNIT
TCE=TRICHLOROETHENE

0 200 400 800
SCALE: FEET

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

SITE PLAN AND PERFORMANCE MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\wdberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\MD001106 MW01 Mar 2020.dwg LAYOUT: 3-1 SR AREA SAVED: 8/27/2020 3:54 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/28/2020 11:33 AM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: ----
MD001106X01-3-2020.jpg

ZEITLER BRIDGE
S-4
SW1C
LITTLE ELK CREEK
BERYLLIUM SWMU
APPROXIMATE PROPERTY LIMIT
SW2B
PW2B
BS-1
GM-20S, GM-20D
STILL BOTTOMS SWMU
GM-17
GM-19
GM-18S, GM-18D
BLUE BALL ROAD
DOGWOOD ROAD
LAUREL RUN
SWALE AREA
DRAINAGE DITCH
C-AREA SWMU
INTERCEPTOR TRENCH
INFILTRATION GALLERY
CLOSED INCINERATION FEED SURFACE IMPOUNDMENT
SW/PW-3B
GM-12S, GM-12M, GM-12D
GM-11S, GM-11M, GM-11D
S-3
GM-10M, GM-10D
GM-10S
S-1
GM-9S, GM-9M, GM-9D
LITTLE ELK CREEK
SW/PW-5A
GM-15S, GM-15M, GM-15D
GM-4B
GM-4S
GM-4A
DOGWOOD RUN
MD 279
ELKTON ROAD
S-2
PROPERTY LIMIT APPROXIMATE
MW-1 (WCC-1)
PESTICIDE AREA SWMU AOC
SEWER LINE AREA
GM-13S GM-13M GM-13D
FENCE
GM-1B GM-1A GM-1S
GM-25
APPROXIMATE PROPERTY LIMIT
A-AREA SWMU ABANDONED BURN AREA
GP01 GP02 GP03
THIOKOL ROAD
NOTHINGHAM ROAD
CROUSE BROS.
CR-4
CR-3
TCE AREA SWMU
GM-24
GM-14R(A-82)
CR-1
GM-14D
GM-14S, GM-14M,
CR-2
GM-2A GM-2B
SG1-5/10
GM-27
YMCA
SW6B
GM-23S, GM-23M
ELK CREEK
SW6C
PW6C
GM-22S, GM-22M
SW6D
PW6D
GM-21S, GM-21M
GM-32
GM-32D
GM-33D
GM-33
LITTLE
ERNIE'S LANE
GM-3A GM-3B
OSRW-11
OSRW-12
OSRW-13
OSRW-1
OSRW-2
U.S.ROUTE 40
OSRW-3
INACTIVE-3
INACTIVE-2
INACTIVE-4
GM-28
GM-29
OSRW-4
OSRW-27
OSRW-26
GM-26S GM-26M
GM-16S, GM-16M, GM-16D
INACTIVE-1
OSRW-8
OSRW-17
PHILADELPHIA ROAD
RESIDENTIAL AREA
OSRW-15
OSRW-16
OSRW-10
OSRW-23
OSRW-18
OSRW-24
OSRW-25
GM-30S
OSRW-5
GM-30M
OSRW-6
OSRW-22
OSRW-9
OSRW-21
GM-31S GM-31M
OSRW-14
OSRW-20
OSRW-19
CONRAIL
SW7B
EXTENT OF RESIDENTIAL WELL SURVEY

LEGEND:

- W-7 — PLANT WELL
- GM-1 — MONITORING WELL
- GM-16S, GM-16M, GM-16D — WELL CLUSTER (CONSISTS OF SHALLOW, INTERMEDIATE, AND DEEP WELLS)
- ABANDONED WELL
- OSRW-20 — APPROXIMATE LOCATION OF RESIDENTIAL WELL
- APPROXIMATE LOCATION OF WATER LINE
- CR-1 — APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- S-1 — SURFACE WATER GAUGE
- SG1-5/10 — LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- APPROXIMATE SWMU OUTLINE
- SOIL EXCAVATION RESTRICTION AREA

NOTES:
AOC=AREA OF CONCERN
SWMU=SOLID WASTE MANAGEMENT UNIT
TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

0 200 400 800
SCALE: FEET

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

SOIL EXCAVATION RESTRICTION AREA

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3-1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020

ZEITLER BRIDGE
S-4
SW1C
40
LITTLE ELK CREEK
BERYLLIUM SWMU
APPROXIMATE PROPERTY LIMIT
LAUREL RUN
SW2B
35
BS-1
PW 38.95
GM-20S, GM-20D
STILL BOTTOMS SWMU
GM-17
GM-19
GM-18S, GM-18D
BLUE BALL ROAD
DOGWOOD ROAD
SWALE AREA
36.60
34.57
MW-22
34.84
MW-5
35.49
MW-21
MW-4
MW-3
C-AREA SWMU
MW-20
34.05
MW-29
31.13
MW-19
MW-13
37.40
MW-2
INTERCEPTOR TRENCH
INFILTRATION GALLERY
36.83
33.10
MW-28
31.34
MW-11
34.19
MW-26
MW-18
MW-1
MW-8
MW-14
MW-7
MW-15
MW-10
35.41
CLOSED INCINERATION FEED SURFACE IMPOUNDMENT
MW-27
MW-25
33.65
MW-17
MW-24
MW-16
SW/PW-3B
30
MW-23
33.72
GM-12S, GM-12M, GM-12D
35
40
30
25
20
GM-11S, GM-11M, GM-11D
S-3
GM-10M, GM-10D
20.55 GM-10S
S-1
LITTLE ELK CREEK
GM-9S, GM-9M, GM-9D
PROPERTY LIMIT APPROXIMATE
MW-1 (WCC-1)
PESTICIDE AREA SWMU AOC
29.41
MW-6
SP-1
GT-1
MW-2(WCC-2)
MW-5
25.53
GM-6
GM-8
GM-7
(WCC-3)
MW-3
MW-4(WCC-4)
GM-5A
GM-5B
GP01
GP02
GP03
W-4
W-5
W-1
W-2
W-6
GM-13S GM-13M GM-13D
ABANDONED PROPELLENT OPEN BURN FIELD (A-AREA SWMU)
THIOKOL ROAD
W-7
GM-3A
GM-3B
ERNIE'S LANE
NOTHINGHAM ROAD
OSRW-12
OSRW-13
OSRW-1
OSRW-2
OSRW-11
U.S.ROUTE 40
OSRW-26
OSRW-27
OSRW-8
OSRW-17
OSRW-15
OSRW-16
OSRW-10
OSRW-23
OSRW-24
OSRW-22
OSRW-9
32.03*
GM-31S
GM-31M
OSRW-21
OSRW-14
OSRW-19
OSRW-20
RESIDENTIAL AREA
PHILADELPHIA ROAD
RESIDENTIAL AREA
OSRW-18
OSRW-25
OSRW-5
GM-30S
GM-30M
OSRW-6
INACTIVE-1
9.21
GM-16S, GM-16M, GM-16D
13.15*
GM-26S, GM-26M
OSRW-3
GM-28
INACTIVE-3
INACTIVE-4
GM-29
INACTIVE-2
OSRW-4
CR-4
CROUSE BROS.
CR-3
TCE AREA SWMU
GM-24
GM-14R(A-82)
CR-1
17.33
GM-14S, GM-14M
GM-14D
CR-2
GM-2A, GM-2B
A-AREA SWMU ABANDONED BURN AREA
GM-15S, GM-15M,
GM-15D
SW/PW-5A
GM-4B
GM-4S
GM-4A
MD 279
DOGWOOD RUN
FENCE
GM-1B
GM-1A
GM-1S
GM-25
APPROXIMATE PROPERTY LIMIT
S-2
ELKTON ROAD
SG1-5/10
GM-27
16.05*
YMCA
GM-23S, GM-23M
4.55
GM-22S, GM-22M
SW6B
SW6C
PW6C
LITTLE ELK CREEK
6.56
GM-32
GM-32D
SW6D
5.26
GM-21S, GM-21M
GM-33D
GM-33
CONRAIL
SW7B
EXTENT OF RESIDENTIAL WELL SURVEY
10
5
15

LEGEND:

- MONITORING WELL
- ABANDONED MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- 15 — INFERRED WATER LEVEL CONTOUR (FT NAVD88)
- 17.33 — WATER LEVEL (FT NAVD88)
- 32.03* — WATER LEVEL PERCHED ZONE, NOT USED IN CONTOURING (FT NAVD88)
- NAVD88 — NORTH AMERICAN VERTICAL DATUM 88
- INFERRED GROUNDWATER FLOW DIRECTION
- APPROXIMATE SWMU OUTLINE

NOTES:
SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

0 200 400 800
SCALE: FEET

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

SITE-WIDE GROUNDWATER ELEVATIONS SHALLOW ZONE MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020

ZEITLER BRIDGE
S-4
SW1C
LITTLE ELK CREEK
BERYLLIUM SWMU
APPROXIMATE PROPERTY LIMIT
LAUREL RUN
SW2B
BS-1
PW2B
GM-20S, GM-20D
STILL BOTTOMS SWMU
GM-19
GM-17
GM-18S, GM-18D
BLUE BALL ROAD
DOGWOOD ROAD
SWALE AREA
DRAINAGE DITCH
C-AREA SWMU
INTERCEPTOR TRENCH
INFILTRATION GALLERY
CLOSED INCINERATION FEED SURFACE IMPOUNDMENT
SW/PW-3B
GM-12S, GM-12M, GM-12D
GM-11S, GM-11M, GM-11D
S-3
GM-10S
GM-10M, GM-10D
S-1
DOGWOOD RUN
MD 279
PROPERTY LIMIT APPROXIMATE
21.30
GM-9S, GM-9M,
GM-9D
LITTLE ELK CREEK
SW/PW-5A
18.15
GM-15S, GM-15M,
GM-15D
15.19
GM-4B
GM-4S
GM-4A
ELKTON ROAD
PESTICIDE AREA SWMU AOC
GM-13S
GM-13M
GM-13D
FENCE
18.30
GM-1B
GM-1A
GM-1S
GM-25
APPROXIMATE PROPERTY LIMIT
S-2
ABANDONED PROPELLENT OPEN BURN FIELD (A-AREA SWMU)
A-AREA SWMU ABANDONED BURN AREA
THIOKOL ROAD
NOTHINGHAM ROAD
GM-3A
GM-3B
ERNIE'S LANE
CR-4
CROUSE BROS.
CR-3
GM-24
16.95
GM-14R(A-82)
CR-1
GM-14D
GM-14S, GM-14M, 16.38
CR-2
GM-2A
GM-2B
9.28
TCE AREA SWMU
SG1-5/10
GM-27
YMCA
SW6B
GM-23S, GM-23M
LITTLE ELK CREEK
SW6C
PW6C
GM-22S, GM-22M
6.04
6.60
GM-32
GM-32D
SW6D
PW6D
GM-21S, GM-21M
7.43
GM-33D
GM-33
U.S.ROUTE 40
OSRW-12
OSRW-13
OSRW-1
OSRW-2
OSRW-11
OSRW-3
GM-28
INACTIVE-3
INACTIVE-4
GM-29
INACTIVE-2
OSRW-4
OSRW-26
OSRW-27
GM-26S, GM-26M
12.05
12.33
GM-16S, GM-16M, GM-16D
INACTIVE-1
OSRW-8
OSRW-17
OSRW-15
OSRW-16
OSRW-10
OSRW-23
OSRW-18
RESIDENTIAL AREA
GM-30S
GM-30M
OSRW-5
OSRW-6
OSRW-25
PHILADELPHIA ROAD
RESIDENTIAL AREA
OSRW-24
OSRW-22
OSRW-21
OSRW-9
GM-31S
GM-31M
13.33
OSRW-14
OSRW-20
OSRW-19
CONRAIL
SW7B
EXTENT OF RESIDENTIAL WELL SURVEY
MW-1 (WCC-1)
SP-1
MW-6
GT-1
MW-2(WCC-2)
MW-5
GM-6
GM-8
GM-7
(WCC-3)
MW-3
MW-4(WCC-4)
GM-5A
GM-5B
GP01
GP02
GP03
W-4
W-5
W-1
W-2
W-6
W-7
MW-22
MW-21
MW-20
MW-29
MW-19
MW-28
MW-26
MW-27
MW-25
MW-24
MW-5
MW-4
MW-3
MW-13
MW-12
MW-2
MW-6
MW-11
MW-1
MW-8
MW-14
MW-7
MW-15
MW-18
MW-10
MW-17
MW-16
MW-23

LEGEND:

- MONITORING WELL
- ABANDONED MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- 15 — INFERRED WATER LEVEL CONTOUR (FT NAVD88)
- 16.95 WATER LEVEL (FT NAVD88)
- NAVD88 NORTH AMERICAN VERTICAL DATUM 88
- INFERRED GROUNDWATER FLOW DIRECTION
- APPROXIMATE SWMU OUTLINE

NOTES:
SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

0 200 400 800
SCALE: FEET

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

SITE-WIDE GROUNDWATER ELEVATIONS INTERMEDIATE ZONE MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-2

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\wdberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\MD001106 DBOX01 MAR 2020.dwg LAYOUT: 6-3 SAVED: 8/5/2020 6:50 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: COLOR.CTB
PLOTTED: 8/17/2020 4:06 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020

SW2B			
Sample Date	3/26/2018	3/27/2019	03/25/2020
Perchlorate	**0.61 J**	**0.80 J**	**0.58 J**
1,4-Dioxane	NA	NA	NA
Trichloroethene	<1.0 U	<1.0 U	<1.0 U

SW1C			
Sample Date	3/29/2018	3/27/2019	03/25/2020
Perchlorate	**0.79 J**	**0.53 J**	**0.53 J**
1,4-Dioxane	NA	NA	NA
Trichloroethene	<1.0 U	<1.0 U	<1.0 U

PW2B			
Sample Date	3/26/2018	3/27/2019	3/25/2020
Perchlorate	**0.41 J**	**0.42 J**	**1**
1,4-Dioxane	NA	NA	NA
Trichloroethene	< 1.0 U	<1.0 U	<1.0 U

MW-22						
Sample Date	9/3/1992	10/2/2017	3/23/2018	3/20/2019	3/20/2020	Trend
Perchlorate	NA	NA	**120**	**24**	**56**	NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	< 500 U	NA	**60**	**21**	**32**	-

BS-1	
Sample Date	3/22/2019
Perchlorate	< 1.0 U
1,4-Dioxane	NA
Trichloroethene	< 1.0 U

MW-12						
Sample Date	3/5/1992	10/2/2017	3/19/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	NA	**550**	**350**	**640**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**600**	NA	< 1.0 U	< 1.0 U	< 1.0 U	-

MW-5						
Sample Date	3/5/1992	10/2/2017	3/23/2018	3/22/2019	3/18/2020	Trend
Perchlorate	NA	**160**	**110**	**15**	**110**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**1200**	**110**	**71**	**14**	**110**	-

MW-20						
Sample Date	9/3/1992	10/2/2017	3/19/2018	3/20/2019	3/20/2020	Trend
Perchlorate	NA	NA	**250**	**480**	**490**	NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	< 500 U	NA	**1.6**	**5.8**	**2.9**	-

MW-02						
Sample Date	3/5/1992	10/2/2017	3/23/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	NA	**86**	**1000**	**490**	NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**800**	NA	**18 J**	<1.0 UH	**9.1**	-

MW-19						
Sample Date	9/3/1992	10/2/2017	3/23/2018	3/22/2019	3/20/2020	Trend
Perchlorate	NA	**880**	**95**	**650**	**890**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	< 500 U	**3**	**2.5**	**1.7**	**2.6**	-

MW-13						
Sample Date	3/5/1992	10/2/2017	3/23/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	NA	**400**	**250**	**76**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**940**	NA	**210**	**350**	**32**	-

MW-01						
Sample Date	3/5/1992	10/2/2017	3/19/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	NA	**180**	**240**	**1900**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**600**	NA	**0.78 J**	**0.66 J**	**9.8**	-

MW-10						
Sample Date	3/5/1992	10/2/2017	3/23/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	NA	**200**	**46**	**110**	+NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**760**	NA	**5.6**	**7.8**	4.3	-

MW-29						
Sample Date	6/24/1992	10/2/2017	3/19/2018	3/22/2019	3/20/2020	Trend
Perchlorate	NA	**2100**	**2700**	**4100**	**2500**	NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**210**	**15**	**15**	**17**	**14**	-

MW-25						
Sample Date	9/3/1992	10/2/2017	3/23/2018	3/22/2019	3/20/2020	Trend
Perchlorate	NA	NA	**54**	**56**	**110**	+
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**80**	NA	**0.49 J**	<1.0 U	**0.52 J**	-

MW-23						
Sample Date	9/3/1992	10/2/2017	3/16/2018	3/22/2019	3/18/2020	Trend
Perchlorate	NA	**16**	**18**	**7.9**	**15**	NS
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**100**	<0.5 U	**0.62 J**	<1.0 U	**0.94 J**	-

MW-28						
Sample Date	3/5/1992	10/2/2017	3/19/2018	3/22/2019	3/20/2020	Trend
Perchlorate	NA	NA	**1700**	**160**	**150**	-
1,4-Dioxane	NA	NA	NA	NA	NA	NE
Trichloroethene	**170**	NA	**49**	**20**	**13**	-

GM-10S						
Sample Date	9/2/1994	03/18/2004	3/19/2018	3/20/2019	3/17/2020	Trend
Perchlorate	NA	**45.7**	**14**	**4.2**	**20**	NE
1,4-Dioxane	NA	**7.6**	**5.3 J**	**0.89**	**4.7**	NE
Trichloroethene	**6**	**8.7**	**7.8**	**3**	**12**	NS

SW6B				
Sample Date	11/30/2006	3/26/2018	3/27/2019	03/25/2020
Perchlorate	NA	**2.1**	**1.6**	**1.4**
1,4-Dioxane	NA	< 0.40 U	< 0.40 U	< 0.40 U
Trichloroethene	**6.9**	**4.4**	**3.8**	**4.5**

GM-22S						
Sample Date	03/23/2004	05/20/2014	3/22/2018	3/25/2019	3/19/2020	Trend
Perchlorate	**183**	**97**	**67**	**61**	**55**	-
1,4-Dioxane	**150**	**33**	**13**	**13**	**10**	NS
Trichloroethene	**3200**	**1500**	**1000**	**1200**	**890**	-

SW6C				
Sample Date	11/30/2006	3/26/2018	3/27/2019	03/25/2020
Perchlorate	NA	**2.2**	**1.5**	**1.3**
1,4-Dioxane	NA	< 0.40 U	< 0.40 U	< 0.40 U
Trichloroethene	**7.8**	**4.8**	**4.6**	**5.4**

SW6D				
Sample Date	11/30/2006	3/26/2018	3/27/2019	03/25/2020
Perchlorate	NA	**2.7**	**4.4**	**1.6**
1,4-Dioxane	NA	< 0.40 U	**1.6**	< 0.40 U
Trichloroethene	**9.3**	**6.2**	**24**	**5.7**

PW6D			
Sample Date	3/26/2018	03/27/2019	03/25/2020
Perchlorate	**2.5**	**57**	**95**
1,4-Dioxane	< 0.50 U	**3.7**	**5.4**
Trichloroethene	**6.1**	**160**	**230**

GM-27						
Sample Date	04/01/2004	05/20/2014	3/22/2018	3/21/2019	3/23/2020	Trend
Perchlorate	< 4.0 U	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NE
1,4-Dioxane	< 5.0 U	< 9.5 U	< 0.42 U	< 0.40 U	< 0.40 U	NE
Trichloroethene	< 10 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	NE

GM-21S						
Sample Date	11/05/2002	05/20/2014	3/22/2018	3/25/2019	3/17/2020	Trend
Perchlorate	**510**	**890**	**690**	**64**	**600**	NS
1,4-Dioxane	NA	**48**	**19**	**20**	**25**	NS
Trichloroethene	**1100 D**	**1200**	**980**	**1100**	**1000**	NS

GM-14S						
Sample Date	09/16/1994	05/13/2014	3/28/2018	3/19/2019	3/17/2020	Trend
Perchlorate	NA	**1.5 J**	< 1.0 U	< 1.0 U	**6.1**	NE
1,4-Dioxane	NA	**25**	**11**	**9.8**	**7.3**	-
Trichloroethene	**2100**	**19**	**7.1**	**8.4**	**160**	-

PW6C			
Sample Date	03/26/2018	03/27/2019	3/25/2020
Perchlorate	**30**	**28**	**47**
1,4-Dioxane	**1.1**	**4.7**	**7**
Trichloroethene	**62**	**370**	**570**

GM-16S						
Sample Date	9/15/1994	3/24/2004	3/27/2018	3/26/2019	3/23/2020	Trend
Perchlorate	NA	**11.3**	**89**	**280**	**230**	NS
1,4-Dioxane	NA	<5.0 U	**2**	**15**	**12**	NE
Trichloroethene	**49**	**62**	**210**	**740**	**550**	NS

GM-31S						
Sample Date	3/19/2004	05/11/2004	3/22/2018	3/26/2019	3/19/2020	Trend
Perchlorate	**4.8**	< 4.0 U	< 1.0 U	< 1.0 U	**1.1**	NE
1,4-Dioxane	< 5.0 U	NA	< 0.42 U	< 0.40 U	< 0.40 U	NE
Trichloroethene	**0.11 J**	NA	< 1.0 U	< 1.0 U	< 1.0 U	NE

SW7B				
Sample Date	11/30/2006	3/26/2018	3/27/2019	03/25/2020
Perchlorate	NA	**2.7**	**2**	**1.4**
1,4-Dioxane	NA	< 0.40 U	< 0.40 U	< 0.40 U
Trichloroethene	**11**	**5.9**	**4.7**	**5.9**

GM-26S						
Sample Date	11/05/2002	05/21/2014	3/27/2018	3/26/2019	3/19/2020	Trend
Perchlorate	**19.2**	**100**	**98**	**110**	**130**	+
1,4-Dioxane	NA	< 11 U	**1.2**	**2.6**	**1.5**	NE
Trichloroethene	**18**	**120**	**110**	**180**	**170**	+

LEGEND:

- W-7 — PLANT WELL
- GM-1 — MONITORING WELL
- GM-16S, GM-16M, GM-16D — WELL CLUSTER (CONSISTS OF SHALLOW, INTERMEDIATE, AND DEEP WELLS)
- ABANDONED MONITORING WELL
- OSRW-20 — APPROXIMATE LOCATION OF RESIDENTIAL WELL
- APPROXIMATE LOCATION OF WATER LINE
- CR-1 — APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- S-1 — SURFACE WATER GAUGE
- SG1-5/10 — LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- APPROXIMATE SWMU OUTLINE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

NOTES:
AOC=AREA OF CONCERN
SWMU=SOLID WASTE MANAGEMENT UNIT
TCE=TRICHLOROETHENE
NA=NOT ANALYZED
J=ESTIMATED VALUE
U=ANALYTE NOT DETECTED ABOVE THE METHOD DETECTION LIMIT
MCL=MAXIMUM CONTAINMENT LEVELS
CONCENTRATIONS ARE IN MICROGRAMS PER LITER (µg/L)
VALUES IN BOLD ARE DETECTIONS
HIGHLIGHTED VALUES EXCEED THE SCREENING CRITERIA

MCL	
Perchlorate	**14**
1,4-Dioxane	**0.46**
Trichloroethene	**5**

\+ = Statistically significant increasing trend at p = 0.05
\- = Statistically significant decreasing trend at p = 0.05
NE = Not evaluated due to insufficient data
NS = Trend not statistically significant

0 200 400 800
SCALE: FEET

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

ANALYTICAL RESULTS SITE-WIDE POTOMAC WELLS SHALLOW

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\wdberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\MD001106 DBOX01 MAR 2020.dwg LAYOUT: 6- 4 SAVED: 8/5/2020 6:50 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: COLOR.CTB
PLOTTED: 8/17/2020 3:35 PM BY: BERNDGEN, WENDY

XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020

ZEITLER BRIDGE
S-4
SW1C
LAUREL RUN
APPROXIMATE PROPERTY LIMIT
LITTLE ELK CREEK
BERYLLIUM SWMU
SW2B
PW2B
BS-1
GM-20S, GM-20D
STILL BOTTOMS SWMU
GM-17
GM-19
GM-18S, GM-18D
BLUE BALL ROAD
DOGWOOD ROAD
SWALE AREA
DRAINAGE DITCH
C-AREA SWMU
INTERCEPTOR TRENCH
INFILTRATION GALLERY
CLOSED INCINERATION FEED SURFACE IMPOUNDMENT
SW/PW-3B
GM-12S, GM-12M, GM-12D
GM-11S, GM-11M, GM-11D
S-3
GM-10S
GM-10M, GM-10D
LYGWOOD RUN
PROPERTY LIMIT APPROXIMATE
GM-9S, GM-9M, GM-9D
PESTICIDE AREA SWMU AOC
SEWER LINE ARE
GM-13S GM-13M GM-13D
GM-15S, GM-15M, GM-15D
GM-4B GM-4S GM-4A
FENCE
ELKTON ROAD
S-2
GM-1B GM-1A GM-1S
DIRT ROAD
GM-25
APPROXIMATE PROPERTY LIMIT
A-AREA SWMU ABANDONED BURN AREA
CROUSE BROS.
CR-4
CR-3
TCE AREA SWMU
SG1-5/10
GM-27
YMCA
GM-23S, GM-23M
SW6B
SW6C
ELK CREEK
GM-14R(A-R2)
CR-1
GM-14D
GM-14S, GM-14M,
GM-2A, GM-2B
CR-2
GM-22S GM-22M
SW6D PW6D
GM-21S, GM-21M
GM-32 GM-32D
GM-33D GM-33
NOTHINGHAM ROAD
U.S.ROUTE 40
PHILADELPHIA ROAD
RESIDENTIAL AREA
GM-3A GM-3B
NIE'S LANE
OSRW-12
OSRW-2
OSRW-11
OSRW-13
OSRW-3
GM-28
OSRW-26
OSRW-27
GM-26S, GM-26M
GM-16S, GM-16M, GM-16D
INACTIVE-1
OSRW-8
OSRW-17
OSRW-15
OSRW-16
OSRW-10
OSRW-23
OSRW-18
OSRW-24
OSRW-22
OSRW-21
OSRW-9
GM-31S GM-31M
OSRW-14
OSRW-20
OSRW-19
OSRW-25
OSRW-5
GM-30S GM-30M
OSRW-6
CONRAIL
EXTENT OF RESIDENTIAL WELL SURVEY
MW-1 (WCC-1)
SP-1
MW-6
GT-1
MW-2(WCC-2)
MW-5
GM-6
GM-8
GM-7
(WCC-3)
MW-3
GM-5A
GM-5B
GP01
GP02
GP03
MW-4(WCC-4)
W-4
W-1
W-2
W-7
GM-24
GM-14R(A-R2)
GM-14D
GM-14S, GM-14M,
GM-2A, GM-2B
GM-25
GM-4B
GM-4S
GM-4A
SW-6B
SW-6C
PW6D
GM-32
GM-32D
GM-33D
GM-33
GM-16S, GM-16M, GM-16D
INACTIVE-1
GM-30S
GM-30M
OSRW-5
OSRW-6
RESIDENTIAL AREA
CONRAIL
EXTENT OF RESIDENTIAL WELL SURVEY

GM-15M						
Sample Date	09/15/1994	03/15/2004	3/28/2018	3/19/2019	3/17/2020	Trend
Perchlorate	NA	**148 J**	**40**	**44**	**32**	NS
1,4-Dioxane	NA	< 5.0 U	NA	NA	NA	NE
Trichloroethene	**0.72**	**4.4**	**4.1**	**4.5**	**4**	NE

GM-9M						
Sample Date	9/13/1994	2/10/1999	3/19/2018	3/20/2019	3/18/2020	Trend
Perchlorate	NA	**10**	**620**	**570**	**620**	NE
1,4-Dioxane	NA	NA	**13 J**	**8.3**	**7.4**	NE
Trichloroethene	**330**	**127**	**120**	**120**	**120**	NS

GM-4B						
Sample Date	mm/dd/1988	9/20/1994	3/28/2018	3/19/2019	3/17/2020	Trend
Perchlorate	NA	NA	**43**	**1.4**	**1**	NE
1,4-Dioxane	NA	NA	**0.31 J**	< 0.40 U	**0.4**	NE
Trichloroethene	**23.1**	**36**	**14**	**13**	**5.1**	-

GM-1B						
Sample Date	9/16/1994	03/22/2004	3/28/2018	3/19/2019	3/17/2020	Trend
Perchlorate	NA	**37.1**	**41 J**	**62**	**94**	+
1,4-Dioxane	NA	**15**	**5.9**	**3.7**	**2.3**	NE
Trichloroethene	**170**	**100**	**46**	**40**	**50**	-

GM-22M						
Sample Date	11/04/2002	05/20/2014	3/22/2018	3/25/2019	3/19/2020	Trend
Perchlorate	**189**	**92**	**67**	**71**	**66**	-
1,4-Dioxane	NA	**29**	**13**	**16**	**11**	-
Trichloroethene	**5100**	**1700**	**1300**	**1500**	**1100**	-

GM-2B			
Sample Date	mm/dd/1988	05/23/2014	Trend
Perchlorate	NA	**700**	NE
1,4-Dioxane	NA	**26**	NE
Trichloroethene	**3465**	**950**	NE

GM-24						
Sample Date	11/19/2002	05/14/2014	3/28/2018	3/19/2019	3/18/2020	Trend
Perchlorate	**362**	**160**	**140**	**130**	**160**	-
1,4-Dioxane	NA	< 10 U	**0.44**	<0.40 U	**0.44**	NE
Trichloroethene	**46**	**21**	**27**	**20**	**7.2**	-

GM-14M						
Sample Date	09/16/1994	05/13/2014	3/28/2018	3/19/2019	3/17/2020	Trend
Perchlorate	NA	**5.8**	< 1.0 UB	**96**	< 1.0 U	NS
1,4-Dioxane	NA	**20**	**6.1**	**4.7**	**3**	-
Trichloroethene	**1900**	**32**	**2.2**	**270**	**59**	-

GM-21M						
Sample Date	11/5/2002	05/20/2014	3/22/2018	3/25/2019	3/19/2020	Trend
Perchlorate	**59.9**	**190**	**96**	**220**	**210**	+
1,4-Dioxane	NA	**4.9 J**	**1.6**	**3.1**	**3**	NS
Trichloroethene	**190**	**230**	**100**	**190**	**170**	NS

GM-32D					
Sample Date	06/09/2014	3/27/2018	3/25/2019	3/24/2020	Trend
Perchlorate	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NE
1,4-Dioxane	< 9.9 U	< 0.40 U	< 0.40 U	< 0.40 U	NE
Trichloroethene	**11**	< 1.0 U	< 1.0 U	< 1.0 U	NE

GM-31M					
Sample Date	03/19/2004	3/22/2018	3/26/2019	3/19/2020	Trend
Perchlorate	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NE
1,4-Dioxane	< 5.0 U	< 0.42 U	< 0.40 U	< 0.40 U	NE
Trichloroethene	**9.3**	< 1.0 U	< 1.0 U	< 1.0 U	NE

GM-32						
Sample Date	03/25/2004	05/23/2014	3/27/2018	3/25/2019	3/24/2020	Trend
Perchlorate	< 4.0 U	**2.6 J**	**5.4**	**11**	**16**	+
1,4-Dioxane	< 5.0 U	< 10 U	**0.25 J**	**0.91**	< 0.40 U	NE
Trichloroethene	**7**	**11**	**16**	**25**	**34**	+

GM-26M						
Sample Date	11/05/2002	05/21/2014	3/27/2018	3/26/2019	3/19/2020	Trend
Perchlorate	**101**	**160**	**110**	**96**	**94**	-
1,4-Dioxane	NA	< 10 U	**1.5**	**2.6**	**1.5**	NE
Trichloroethene	**290**	**260**	**170**	**180**	**120**	-

GM-16M						
Sample Date	09/14/1994	05/20/2014	3/27/2018	3/26/2019	3/23/2020	Trend
Perchlorate	NA	**33**	**54**	< 1.0 U	< 1.0 U	NS
1,4-Dioxane	NA	< 9.8 U	**1**	**0.18 J**	< 0.40 U	NE
Trichloroethene	**68**	**44**	**54**	**2.1**	< 1.0 U	-

GM-30M						
Sample Date	03/26/2004	05/22/2014	3/29/2018	3/26/2019	3/24/2020	Trend
Perchlorate	**4.9**	**13**	**14**	< 1.0 U	**15**	+
1,4-Dioxane	< 5.0 U	< 11 U	< 0.40 U	< 0.40 U	< 0.40 U	NE
Trichloroethene	**2.1**	**9.3**	**5.8**	**0.70 J**	**6.4**	NS

LEGEND:

- W-7 — PLANT WELL
- GM-1 — MONITORING WELL
- GM-16S, GM-16M, GM-16D — WELL CLUSTER (CONSISTS OF SHALLOW, INTERMEDIATE, AND DEEP WELLS)
- ABANDONED MONITORING WELL
- OSRW-20 — APPROXIMATE LOCATION OF RESIDENTIAL WELL
- APPROXIMATE LOCATION OF WATER LINE
- CR-1 — APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
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- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
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NOTES:
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VALUES IN BOLD ARE DETECTIONS
HIGHLIGHTED VALUES EXCEED THE SCREENING CRITERIA

MCL	
Perchlorate	**14**
1,4-Dioxane	**0.46**
Trichloroethene	**5**

\+ = Statistically significant increasing trend at p = 0.05
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0 200 400 800
SCALE: FEET

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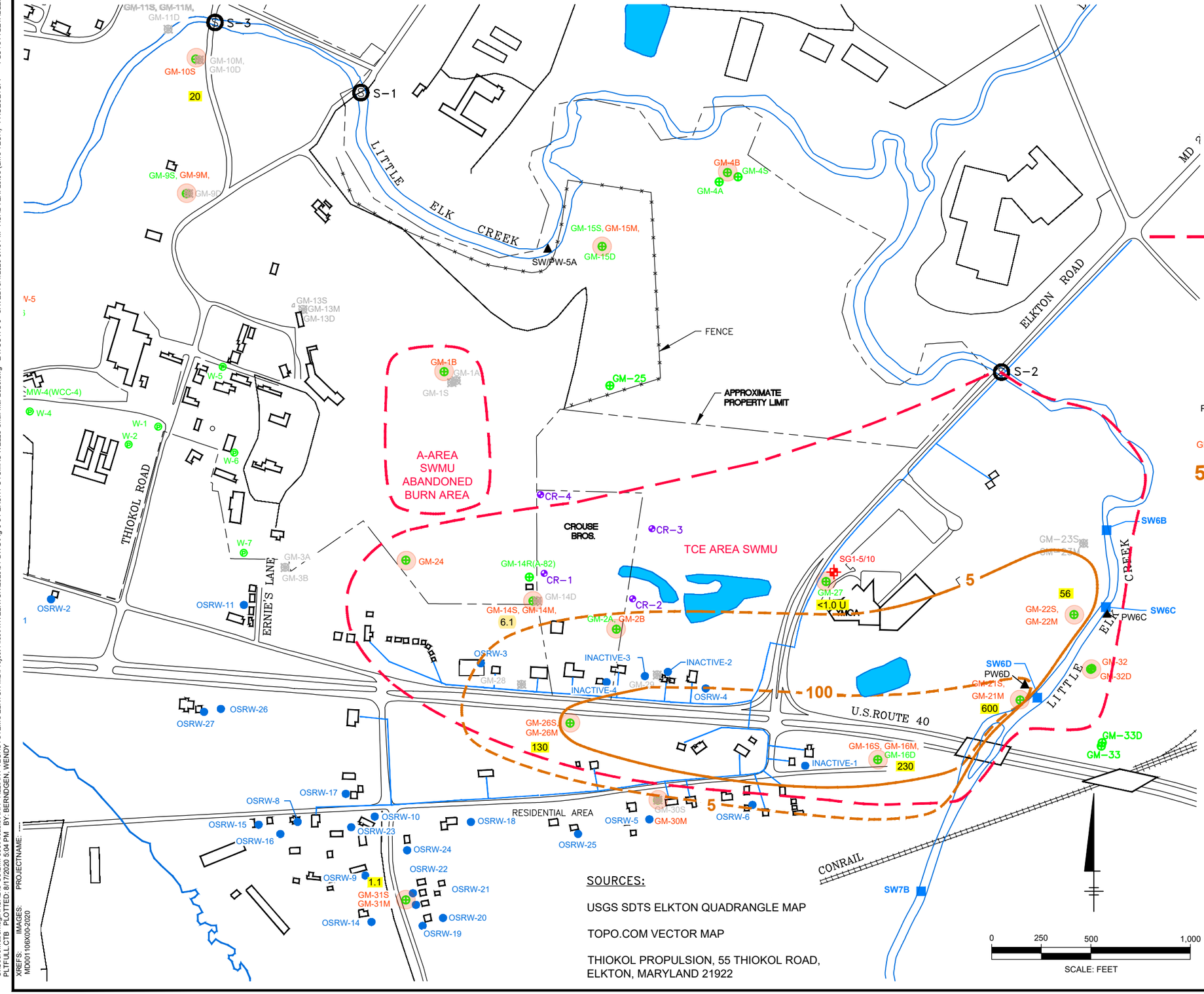
ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

ANALYTICAL RESULTS SITE-WIDE POTOMAC WELLS INTERMEDIATE

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-4



LEGEND:

- ABANDONED MONITORING WELL
- APPROXIMATE SWMU OUTLINE
- MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- 5 — PERCHLORATE ISOCONCENTRATION CONTOUR (µg/L) DASHED WHERE INFERRED
- 1.1 PERCHLORATE CONCENTRATION µg/L (MARCH 2020)
- µg/L MICROGRAMS PER LITER

NOTES:
FOR MONITORING WELLS WITH VERTICAL PROFILING, THE MAXIMUM DETECTION CONCENTRATION IS PRESENTED

SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

PERCHLORATE CONCENTRATIONS IN THE TCE SWMU AREA, SHALLOW ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-5

C:\Users\wtbernig.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-5 PERCH POTOMAC WELLS Shall Mar 2020.dwg LAYOUT: 6-5 SAVED: 8/4/2020 6:40 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/17/2020 5:04 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME:
MD0011066X00-2020

C:\Users\wdberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON\ MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-6 PERCH POTOMAC WELLS INT Mar 2020.dwg LAYOUT: 6-6 SAVED: 8/4/2020 6:39 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/17/2020 5:07 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020

GM-11S, GM-11M, GM-11D
S-3
GM-10S
GM-9M, GM-9D
S-1
620
GM-9S, GM-9M,
100
5
LITTLE ELK CREEK
1
GM-4B
GM-4S
GM-4A
32
GM-15S, GM-15M,
GM-15D
SW/PW-5A
MD 279
ELKTON ROAD
GM-13S
GM-13M
GM-13D
50
5
FENCE
94
GM-1B
GM-1A
GM-25
APPROXIMATE PROPERTY LIMIT
S-2
4(WCC-4)
-4
W-5
W-1
W-2
W-6
THIOKOL ROAD
A-AREA SWMU ABANDONED BURN AREA
5
CR-4
CROUSE BROS.
CR-3
100
TCE AREA SWMU
SW6B
GM-23S
GM-23M
W-7
GM-3A
GM-3B
GM-24
160
GM-14R(A-82)
CR-1
SG1-5/10
GM-27
YMCA
SRW-2
OSRW-11
ERNIE'S LANE
GM-14D
GM-14S, GM-14M, <1.0 U
CR-2
GM-2A, GM-2B
GM-22S, GM-22M
66
SW6C
PW6C
BLK CREEK
16
OSRW-3
INACTIVE-3
INACTIVE-2
GM-32
GM-32D
SW6D
PW6D
GM-21S, GM-21M
210
LITTLE
INACTIVE-4
GM-29
OSRW-4
OSRW-26
OSRW-27
U.S.ROUTE 40
GM-26S, GM-26M
94
GM-16S, GM-16M, GM-16D
<1.0 U
INACTIVE-1
GM-33D
GM-33
OSRW-8
OSRW-17
OSRW-15
OSRW-10
OSRW-18
RESIDENTIAL AREA
OSRW-5
GM-30S
GM-30M
15
OSRW-6
OSRW-16
OSRW-23
OSRW-25
OSRW-24
OSRW-22
OSRW-9
OSRW-21
GM-31S
GM-31M
<1.0 U
OSRW-20
OSRW-14
OSRW-19
CONRAIL
SW7B

LEGEND:

- APPROXIMATE SWMU OUTLINE
- ABANDONED MONITORING WELL
- MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- 5 — PERCHLORATE ISOCONCENTRATION CONTOUR (µg/L) DASHED WHERE INFERRED
- 11 — PERCHLORATE CONCENTRATION µg/L (MARCH 2020)
- µg/L — MICROGRAMS PER LITER

NOTES:
FOR MONITORING WELLS WITH VERTICAL PROFILING, THE MAXIMUM DETECTION CONCENTRATION IS PRESENTED

SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

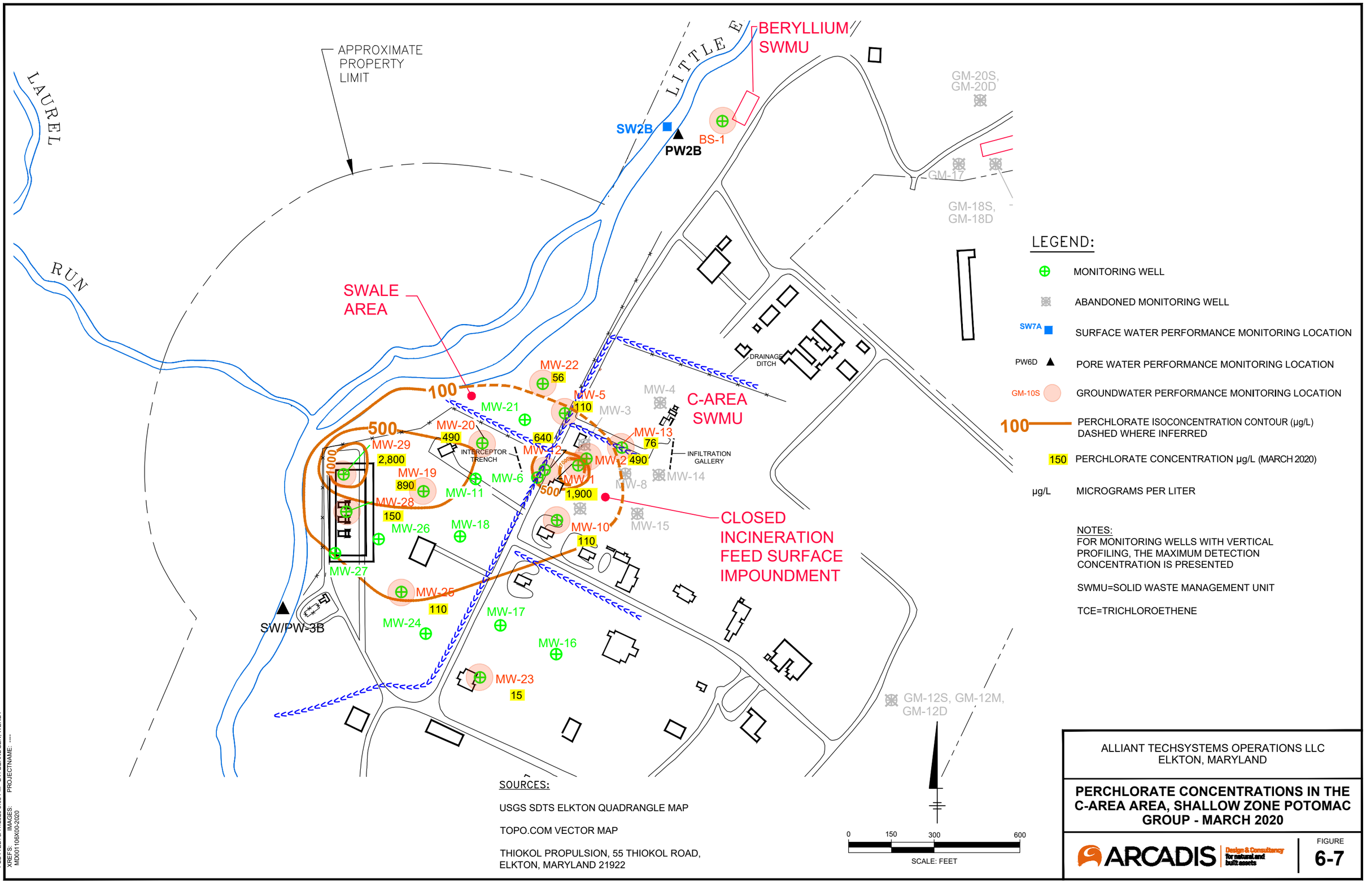
0 250 500 1,000
SCALE: FEET

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

PERCHLORATE CONCENTRATIONS IN THE TCE SWMU AREA, INTERMEDIATE ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-6



ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

PERCHLORATE CONCENTRATIONS IN THE C-AREA AREA, SHALLOW ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-7

C:\Users\wbernd\g ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-7 PERCH CAREA SHALL 2020.dwg LAYOUT: 6-7 SAVED: 8/4/2020 6:39 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB
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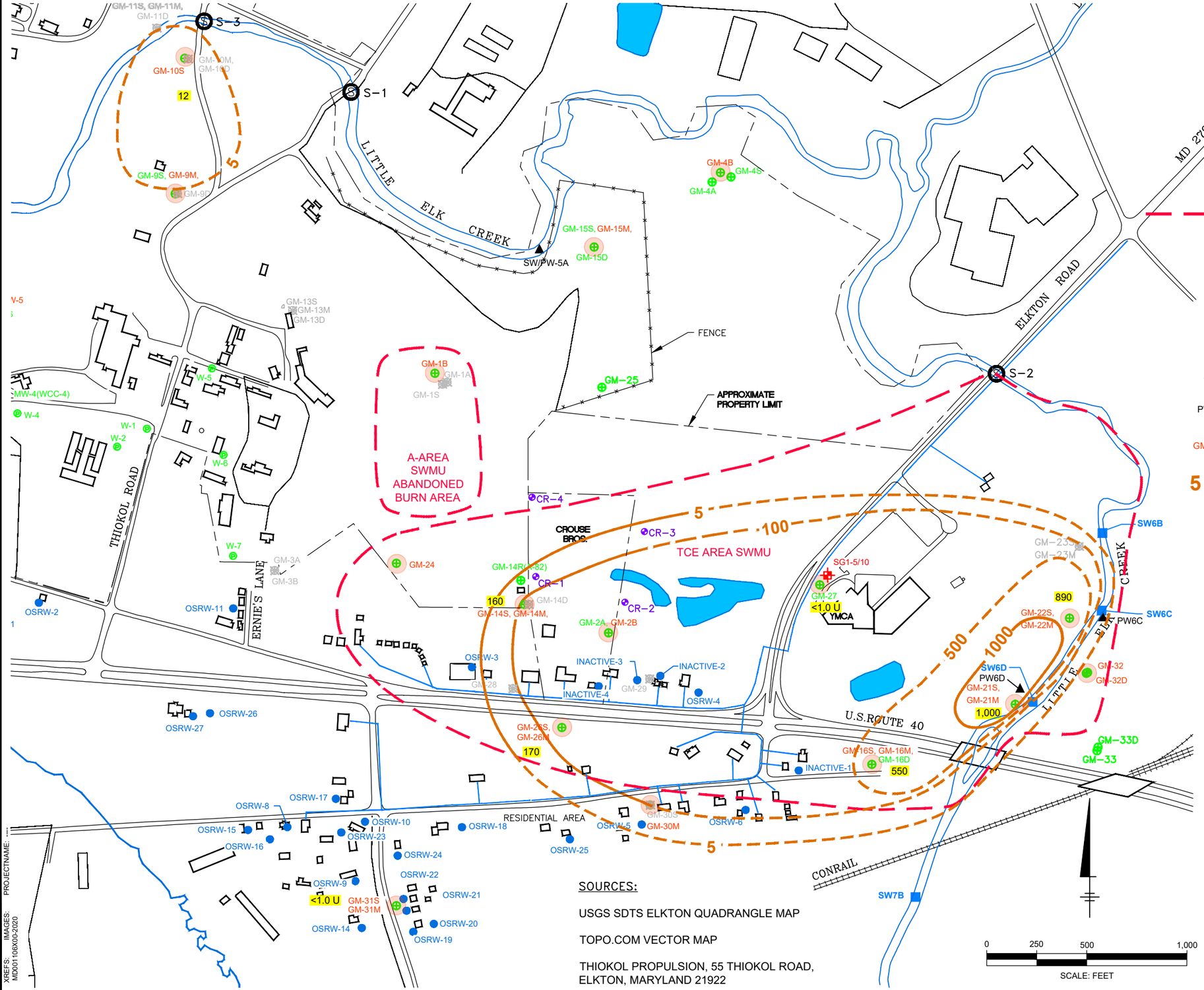
XREFS: IMAGES: PROJECTNAME: ----
MD001106X00-2020



LEGEND:

- APPROXIMATE SWMU OUTLINE
- ABANDONED MONITORING WELL
- MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- 5 — TCE ISOCONCENTRATION CONTOUR (µg/L) DASHED WHERE INFERRED
- 8.4 — TCE CONCENTRATION µg/L (MARCH 2020)
- µg/L — MICROGRAMS PER LITER

NOTES:
FOR MONITORING WELLS WITH VERTICAL PROFILING, THE MAXIMUM DETECTION CONCENTRATION IS PRESENTED

SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

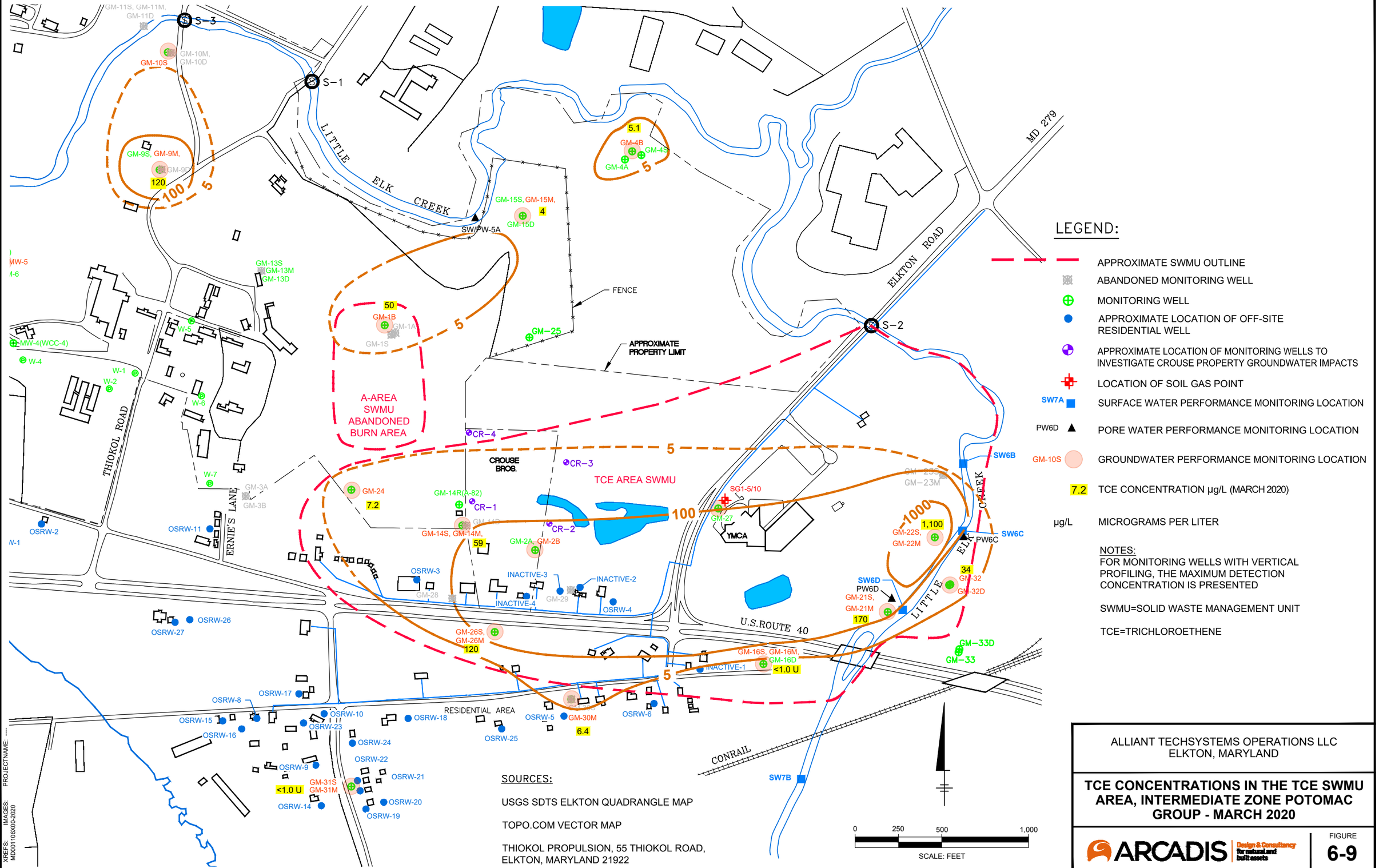
ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

TCE CONCENTRATIONS IN THE TCE SWMU AREA, SHALLOW ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-8

C:\Users\wdberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-8 TCE POTOMAC WELLS Shall 2020.dwg LAYOUT: 6-8 SAVED: 8/4/2020 6:36 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/17/2020 5:10 PM BY: BERNDGEN, WENDY
XREFS: MD001106X00-2020 IMAGES: PROJECTNAME: ----



LEGEND:

- APPROXIMATE SWMU OUTLINE
- ABANDONED MONITORING WELL
- MONITORING WELL
- APPROXIMATE LOCATION OF OFF-SITE RESIDENTIAL WELL
- APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
- LOCATION OF SOIL GAS POINT
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- 7.2 — TCE CONCENTRATION µg/L (MARCH 2020)
- µg/L — MICROGRAMS PER LITER

NOTES:
FOR MONITORING WELLS WITH VERTICAL PROFILING, THE MAXIMUM DETECTION CONCENTRATION IS PRESENTED

SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

TCE CONCENTRATIONS IN THE TCE SWMU AREA, INTERMEDIATE ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-9

C:\Users\wbernd\g ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-9 TCE POTOMAC WELLS Int 2020.dwg LAYOUT: 6-9 SAVED: 8/17/2020 5:13 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/17/2020 5:14 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: ----
MD0001106X00-2020

C:\Users\wberndg.ARCADIS-US\BIM 360\Arcadis\ANA - ALLIANT TECHSYSTEMS ELKTON MD\Project Files\ATK ELKTON\2020\01-DWG\Fig 6-10 TCE CAREA SHALL 2020.dwg LAYOUT: 6-10 SAVED: 8/4/2020 6:25 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB
PLOTTED: 8/17/2020 5:15 PM BY: BERNDGEN, WENDY
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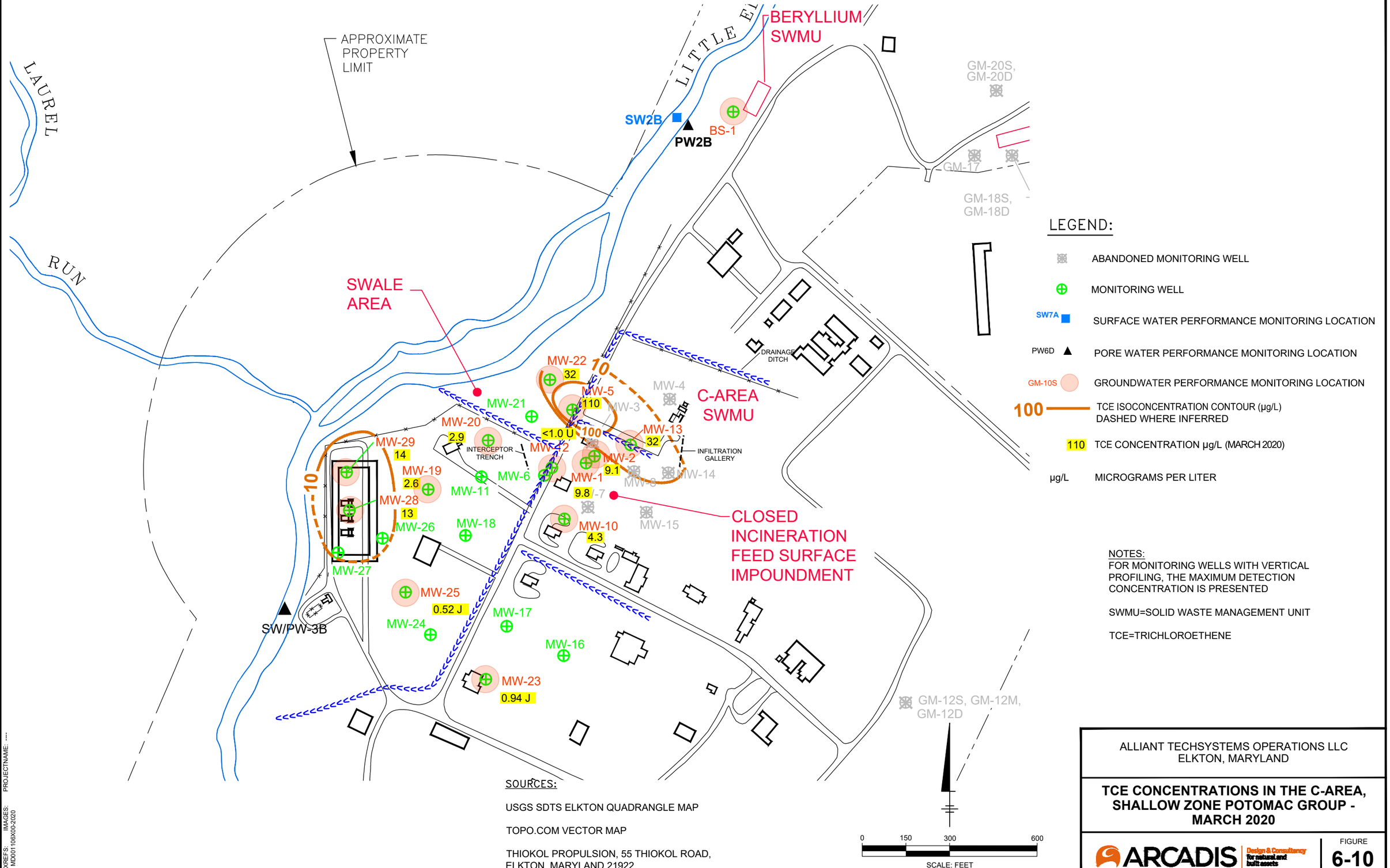
MD0010606X00-2020



LEGEND:

- ABANDONED MONITORING WELL
- MONITORING WELL
- SW7A — SURFACE WATER PERFORMANCE MONITORING LOCATION
- PW6D — PORE WATER PERFORMANCE MONITORING LOCATION
- GM-10S — GROUNDWATER PERFORMANCE MONITORING LOCATION
- 100 — TCE ISOCONCENTRATION CONTOUR (µg/L) DASHED WHERE INFERRED
- 110 — TCE CONCENTRATION µg/L (MARCH 2020)
- µg/L — MICROGRAMS PER LITER

NOTES:
FOR MONITORING WELLS WITH VERTICAL PROFILING, THE MAXIMUM DETECTION CONCENTRATION IS PRESENTED

SWMU=SOLID WASTE MANAGEMENT UNIT

TCE=TRICHLOROETHENE

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP

TOPO.COM VECTOR MAP

THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

0 150 300 600
SCALE: FEET

ALLIANT TECHSYSTEMS OPERATIONS LLC
ELKTON, MARYLAND

TCE CONCENTRATIONS IN THE C-AREA, SHALLOW ZONE POTOMAC GROUP - MARCH 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6-10

APPENDIX A

Soil Excavation Restriction Area Exhibits – Beryllium and A-Area SWMUs

FREDERICK WARD ASSOCIATES

5 South Main Street
P.O. Box 727
Bel Air, Maryland 21014
410-838-7900

www.frederickward.com

Pesticide Area SWMU

PART OF Cecil County Tax Map 0309, Grid 0007 (Pesticide Area SWMU actually partially located in Grids 0007 & 0013), Parcel 0127, Tax Account No. 03-032175 – BEING part of Parcel No. 2 of those tracts or parcels of land conveyed by Olin Mathieson Chemical Corporation to Thiokol Chemical Corporation by a deed dated December 30, 1958 as recorded among the land records of Cecil County in Liber WAS 69, folio 421.

79332 Square Foot Parcel of Land, Surveyed for Northrop Grumman Innovation Systems, Inc., Located at 55 Thiokol Road, Third Election District, Cecil County, Maryland

BEGINNING for the same at a wood stake heretofore set lying South 80°37'12" East 681.90 feet from a ½" iron pipe heretofore set in concrete at the end of the second or South 53°30'00" East 448.78 feet line of that tract or parcel of land conveyed by Thiokol Corporation to Martin F. Herron and Eva Lee Herron by a deed dated March 10, 1981 as recorded among the land records of Cecil County in Liber NDS 65, folio 22 and shown on Minor Subdivision Plat No. 773 on file at the Cecil County Office of Planning and Zoning and lying North 24°31'02" West 1857.42 feet from an iron pipe heretofore set on the northerly right of way line of U.S. Route 40 at the end of the fifth or South 29°04' West 338 feet course of Parcel No. 1 of those tracts or parcels of land conveyed by Olin Mathieson Chemical Corporation to Thiokol Chemical Corporation by a deed dated December 30, 1958 as recorded among the land records of Cecil County in Liber WAS 69, folio 421. Said point of beginning also lies North 88°54'39" West 216.84 feet from the southwest corner of a ten foot by twelve foot building located within the herein described area. Said point of beginning bears coordinates, referenced to the Maryland Coordinate System (NAD83/2011) of North 710711.0939 and East 1630806.0909 and WGS84 Latitude +39.61266732 and Longitude -075.86962779. Thence, from the point of beginning, with bearings referenced to the Maryland Coordinate System,

1) North 05°32'11" East 114.63 feet to a wood stake heretofore set, (+39.61298013, -075.86958353)

2) North 59°58'02" East 182.04 feet to a wood stake heretofore set, (+39.61322487, -075.86902020)

3) South 55°25'05" East 93.94 feet to a wood stake heretofore set, (+39.61307588, -075.86874806) lying North 77°11'31" West 80.62 feet from a monitoring

Pesticide Area SWMU

well heretofore placed and North 10°06'58" East 148.65 feet from the northwest corner of the aforesaid ten foot by 12 foot building located within the herein described area,

4) South 34°17'53" East 182.79 feet to a wood stake heretofore set, (+39.61265788, -075.86838916)

5) by a curve to the right, non-tangent to the previous course, in a southwesterly direction, of radius 87.64 feet, an arc length of 85.82 feet and, subtended by a chord; South 13°14'37" West 82.43 feet to a wood stake heretofore set, (+39.61243826, -075.86845971)

6) South 61°24'21" West, passing over a wood stake heretofore set at 77.44 feet and continuing, for a total distance of 91.56, (+39.61232071, -075.86874695)

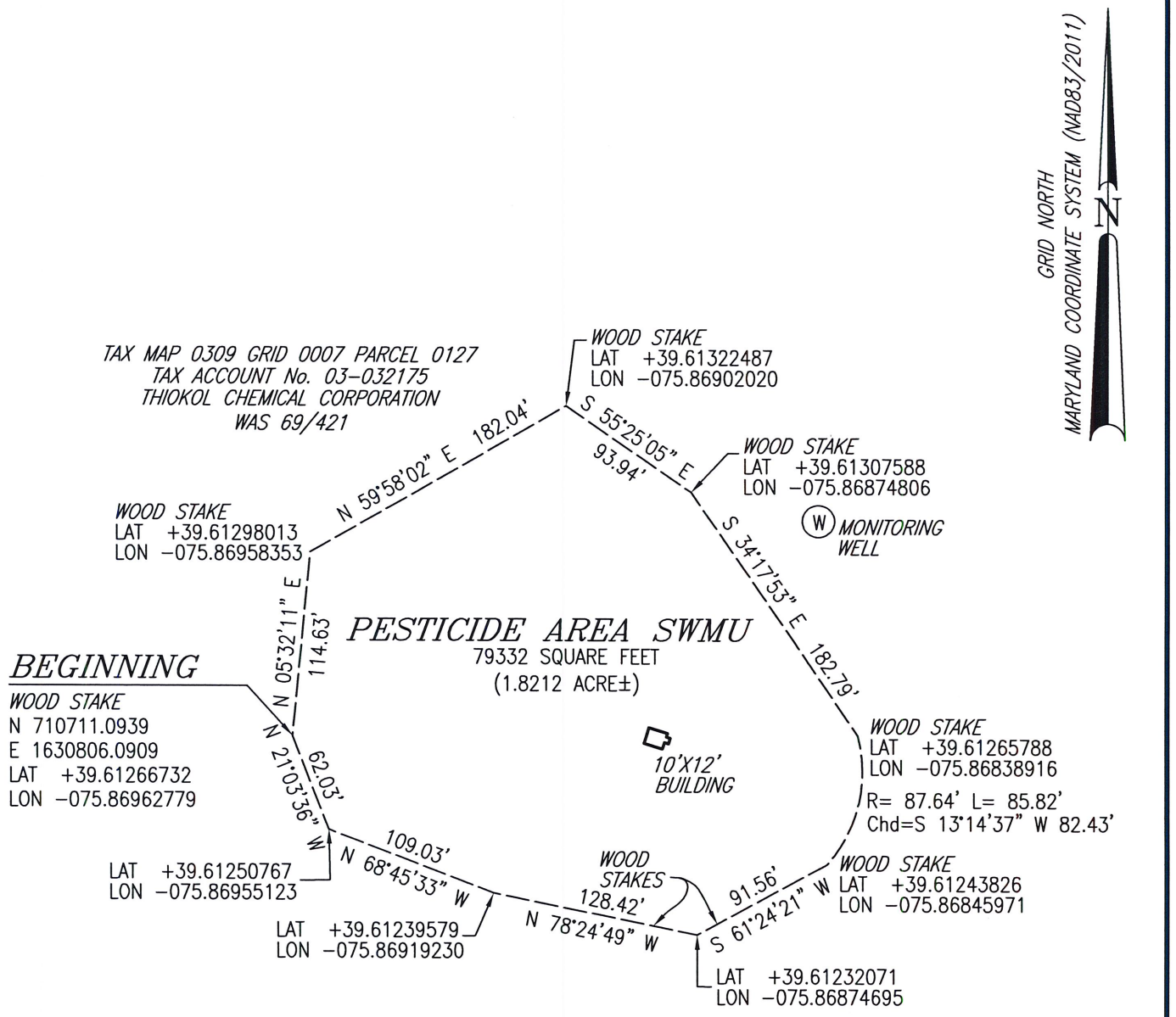
7) North 78°24'49" West, passing over a wood stake heretofore set at 27.86 feet and continuing, for a total distance of 128.42 feet to a wood stake heretofore set, (+39.61239579, -075.86919230)

8) North 68°45'33" West 109.03 feet to a wood stake heretofore set, (+39.61250767, -075.86955123)

9) North 21°03'36" West 62.03 feet to the point of beginning hereof.

CONTAINING 79332 square feet (1.8212 acre) of land, more or less.

THIS PARTICULAR DESCRIPTION was prepared by Vincent X. Nohe, a Professional Land Surveyor in the State of Maryland and in accordance with the Minimum Standards of Practice for Land Surveyors of the Annotated Code of Maryland. My current license expires August 8, 2020.



THIS EXHIBIT DRAWING AND THE FIELD SURVEYS ON WHICH IT IS BASED WERE PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION OR ABSTRACT.

I HEREBY CERTIFY THAT A PROFESSIONAL LAND SURVEYOR WAS IN RESPONSIBLE CHARGE OVER THE PREPARATION OF THIS EXHIBIT DRAWING AND THE FIELD SURVEYS MADE ON THE GROUND ON WHICH IT IS BASED BEGINNING IN MAY, 2018 THROUGH MARCH, 2019 AND WAS MADE IN ACCORDANCE WITH THE MINIMUM STANDARDS OF PRACTICE FOR LAND SURVEYORS OF THE CODE OF MARYLAND REGULATIONS (09.13.06.12).

STATE OF MARYLAND
VINCENT X. NOHE
No. 308
REGISTERED
PROFESSIONAL LAND SURVEYOR

VINCENT X. NOHE
REG. PROF. LS No. 308
MY CURRENT LICENSE
EXPIRES AUGUST 8, 2020

SCALE 1"= 100'	DATE 03/26/19
DRAWN BY VXN	CHECKED BY
PLAT NUMBER	FWA JOB NUMBER 2171115.02

FREDERICK WARD ASSOCIATES
www.frederickward.com
P.O. Box 727, 5 South Main Street
Bel Air Maryland 21014 - 0727
410-838-7900
410-893-1243 fax
ARCHITECTS | ENGINEERS | PLANNERS | SURVEYORS

EXHIBIT TO ACCOMPANY PARTICULAR DESCRIPTION OF RESTRICTED AREA

PESTICIDE AREA SWMU

LOCATED AT 55 THIOKOL ROAD
THIRD ELECTION DISTRICT
CECIL COUNTY, MARYLAND

M:\Projects\2171115.00 GEI ATK Elkton Control and Topo\Surveys\CAD\PExhibit Restricted Areas.dwg

FREDERICK WARD ASSOCIATES

5 South Main Street
P.O. Box 727
Bel Air, Maryland 21014
410-838-7900

www.frederickward.com

Sewer Line Area

PART OF Cecil County Tax Map 0309, Grid 0007 (Sewer Line Area actually located in Grid 0014), Parcel 0127, Tax Account No. 03-032175 – BEING part of Parcel No. 2 of those tracts or parcels of land conveyed by Olin Mathieson Chemical Corporation to Thiokol Chemical Corporation by a deed dated December 30, 1958 as recorded among the land records of Cecil County in Liber WAS 69, folio 421.

7227 Square Foot Parcel of Land, Surveyed for Northrop Grumman Innovation Systems, Inc., Located at 55 Thiokol Road, Third Election District, Cecil County, Maryland

BEGINNING for the same on the edge of the existing paving at a point lying South 75°37'06" East 1900.67 feet from a ½" iron pipe heretofore set in concrete at the end of the second or South 53°30'00" East 448.78 feet line of that tract or parcel of land conveyed by Thiokol Corporation to Martin F. Herron and Eva Lee Herron by a deed dated March 10, 1981 as recorded among the land records of Cecil County in Liber NDS 65, folio 22 and shown on Minor Subdivision Plat No. 773 on file at the Cecil County Office of Planning and Zoning and lying North 16°39'16" East 1387.19 feet from an iron pipe heretofore set on the northerly right of way line of U.S. Route 40 at the end of the fifth or South 29°04' West 338 feet course of Parcel No. 1 of those tracts or parcels of land conveyed by Olin Mathieson Chemical Corporation to Thiokol Chemical Corporation by a deed dated December 30, 1958 as recorded among the land records of Cecil County in Liber WAS 69, folio 421. Said point of beginning also lies South 87°07'42" West 77.06 feet from the southernmost corner of Building G20 and South 57°33'00" West 35.20 feet from the southwest corner of said building. Said point of beginning bears coordinates, referenced to the Maryland Coordinate System (NAD83/2011) of North 710350.1422 and East 1631974.4195 and WGS84 Latitude +39.61163673 and Longitude -075.86549733. Thence, from the point of beginning, leaving the edge of paving, with bearings referenced to the Maryland Coordinate System,

l) South 59°33'29" West 23.71 feet, (+39.61160446, -075.86557039) to a point lying North 85°06'26" East 24.63 feet from a utility pole heretofore placed,

2) North 81°30'06" West 50.95 feet, (+39.61162684, -075.86574888)

3) North 78°04'52" West 55.12 feet, (+39.61165993 -075.86593976)

4) North 44°24'26" West 18.52 feet, (+39.61169669, -075.86598518) to a point lying North 33°44'56" East 17.90 feet from a utility pole heretofore placed,

5) North 07°53'42" East 34.22 feet, (+39.61178957, -075.86596700)

6) North 30°43'17" East 29.80 feet, (+39.61185937, -075.86591184). Thence, binding on the edge of the paving aforesaid, the three following courses;

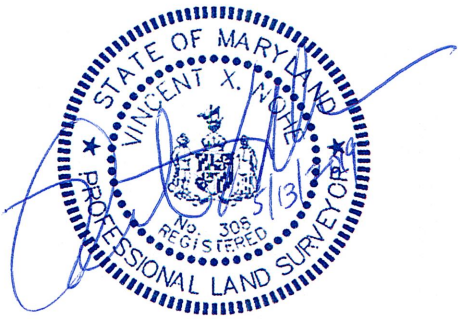
7) by a curve to the right, non-tangent to the previous course, in a southeasterly direction, of radius 86.66 feet, an arc length of 52.80 feet and, subtended by a chord; South 68°36'00" East 51.99 feet to a point of tangency (+39.61180565, -075.86574090)

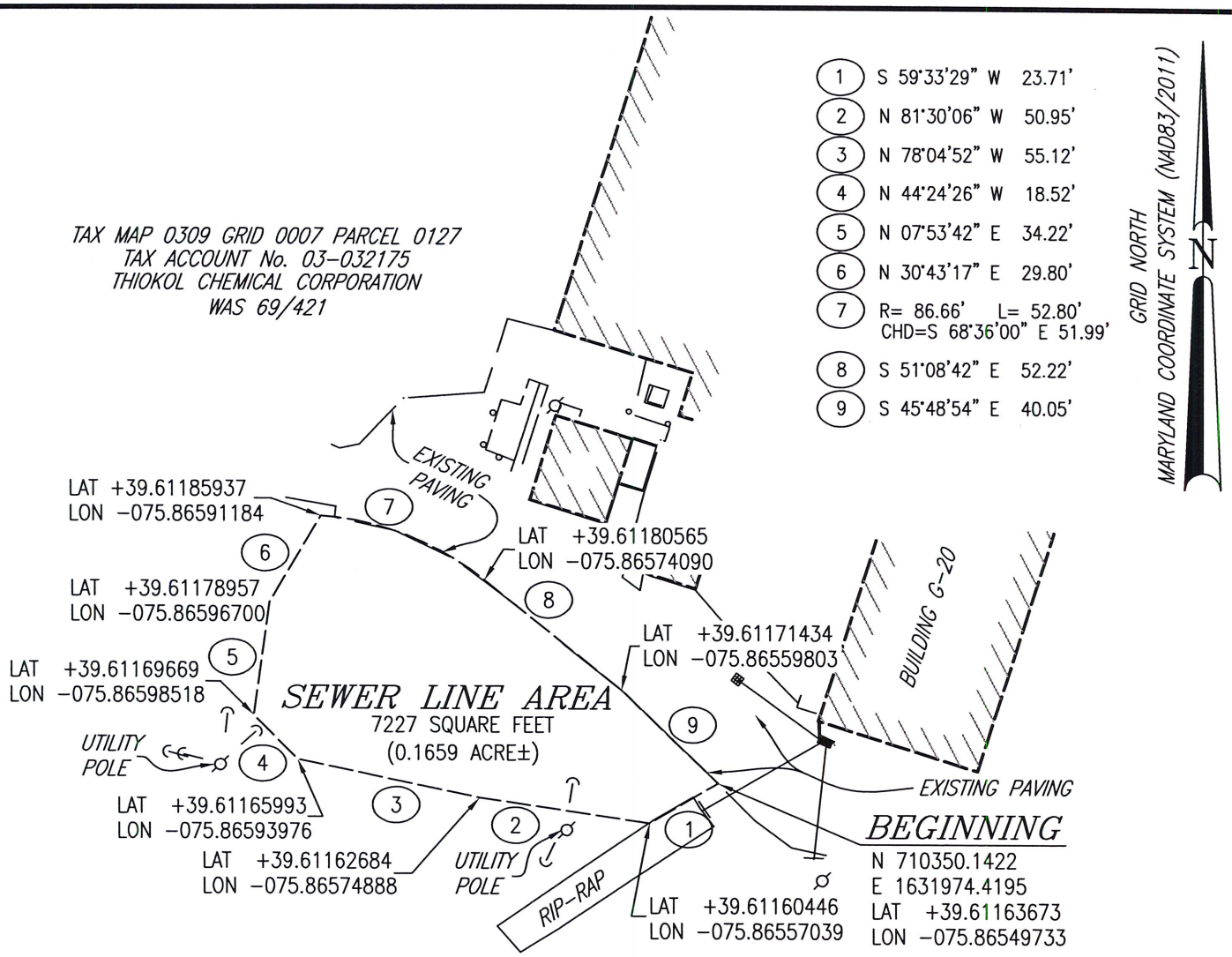
8) South 51°08'42" East 52.22 feet, (+39.61171434, -075.86559803)

9) South 45°48'54" East 40.05 feet to the point of beginning hereof.

CONTAINING 7227 square feet (0.1659 acre) of land, more or less.

THIS PARTICULAR DESCRIPTION was prepared by Vincent X. Nohe, a Professional Land Surveyor in the State of Maryland and in accordance with the Minimum Standards of Practice for Land Surveyors of the Annotated Code of Maryland. My current license expires August 8, 2020.





THIS EXHIBIT DRAWING AND THE FIELD SURVEYS ON WHICH IT IS BASED WERE PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION OR ABSTRACT.

I HEREBY CERTIFY THAT A PROFESSIONAL LAND SURVEYOR WAS IN RESPONSIBLE CHARGE OVER THE PREPARATION OF THIS EXHIBIT DRAWING AND THE FIELD SURVEYS MADE ON THE GROUND ON WHICH IT IS BASED BEGINNING IN MAY, 2018 THROUGH MARCH, 2019 AND WAS MADE IN ACCORDANCE WITH THE MINIMUM STANDARDS OF PRACTICE FOR LAND SURVEYORS OF THE CODE OF MARYLAND REGULATIONS (09.13.06.12).

STATE OF MARYLAND
VINCENT X. NOHE
No. 308
REGISTERED
PROFESSIONAL LAND SURVEYOR

VINCENT X. NOHE
REG. PROF. LS No. 308
MY CURRENT LICENSE
EXPIRES AUGUST 8, 2020

SCALE	DATE
1"= 50'	03/26/19
DRAWN BY	CHECKED BY
VXN	
PLAT NUMBER	FWA JOB NUMBER
	2171115.02

FREDERICK WARD ASSOCIATES
www.frederickward.com
P.O. Box 727, 5 South Main Street
Bel Air Maryland 21014 - 0727
410-838-7900
410-893-1243 fax
ARCHITECTS | ENGINEERS | PLANNERS | SURVEYORS

EXHIBIT TO ACCOMPANY PARTICULAR DESCRIPTION OF RESTRICTED AREA

SEWER LINE AREA

LOCATED AT 55 THIOKOL ROAD
THIRD ELECTION DISTRICT
CECIL COUNTY, MARYLAND

M:\Projects\2171115.00 GEI ATK Elkton Control and Topo\Surveys\CAD\PExhibit Restricted Areas.dwg

APPENDIX B

Notification Checklist

Notification Checklist:

YMCA of Cecil County, Inc.
Executive Director
George Patchell
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APPENDIX C

Field Logs

ARCADIS

Surface Water Sample Log

Sample ID SW-1C
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF/MK
Time 1130
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~1.0'
Velocity
Other Comments
Substrate Description
Location
Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method peri pump
Sample Description

Temperature (°C/°F) 9.45
pH 6.96
Dissolved Oxygen 15.64
SC 79
Salinity 0.1
ORP
cond. 0.155

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
1 L Amber	SVOC	—
250 Plastic	Metals	HNO_3
500 Plastic	perchlorate	—

DUP-04

ARCADIS

Surface Water Sample Log

Sample ID SW-2B
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF/MK
Time 1300
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~2.0
Velocity
Other Comments
Substrate Description
Location

Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method peri pump
Sample Description

Temperature (°C/°F) 9.68
pH 7.08
Dissolved Oxygen 10.34
orp ~~SC~~ 20
~~Salinity~~ cond. 0.58
turbidity 0.0
salinity 0.1

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOCs	HCl
1L Amber	SVOCs	—
500 Plastic	Perchlorate	—
250 Plastic	metals	HNO_3

ARCADIS

Surface Water Sample Log

Sample ID SW-6D
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF/MIC
Time 0925
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~5.0
Velocity
Other Comments
Substrate Description
Location

Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method perri pump
Sample Description

Temperature (°C/°F) 09.35
pH 5.93
Dissolved Oxygen 850
~~SC~~ cond. 0.159
~~Salinity~~ 0.1

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—

ARCADIS

Surface Water Sample Log

Sample ID SW-7B
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF / MK
Time 1205
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~6.0'
Velocity
Other Comments
Substrate Description
Location

Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method perri pump
Sample Description

Temperature (°C/°F) 9.37
pH 6.85
Dissolved Oxygen 8.06
cond. 0.203
Salinity 0.0
orp 21
turbity
salinity 0.1

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—

ARCADIS

Pore Water Sample Log

Sample ID PW-2B
Date 3-25-20
Time 1300
Weather Rain

Project/No. 30044769
Sampling Personnel AF/MK

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~2.0'
Depth Advanced into Sediment ~3.0'
Substrate Description
Location

Description of Nearby Vegetation

Velocity

FIELD PARAMETERS:

Sample Method Peristaltic pump
Sample Description

Temperature (°C/°F) 9.68
Dissolved Oxygen (mg/L) 10.38
~~Turbidity~~ Cond. (mV) 0.158

pH 7.08
orp ~~sc~~ 20
Turbidity (NTU) 0.0
salinity 0.1

CONTAINER DESCRIPTION:

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
1L Amber	SVOC	–
500 Plastic	Perchlorate	–
250 Plastic	metals	HNO_3
125 Plastic	sulfate	–
40 Amber	TOC	H_2SO_4
250 Plastic	dissolved iron	HNO_3

ARCADIS

Pore Water Sample Log

Sample ID: PW-6D
Project/No.: 30044769
Date: 3-25-20
Sampling Personnel: AF/MK
Time: 0925
Weather: rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body: Little Elk Creek
Depth of Water: ~5.0'
Velocity:
Depth Advanced into Sediment: ~1.0'
Substrate Description:
Location:

Description of Nearby Vegetation:

FIELD PARAMETERS:

Sample Method: perri pump
Sample Description:

Temperature (°C/F): 0.935
pH: 5.93
Dissolved Oxygen (mg/L): 8.50
SC: 0.159
~~Turbidity (mV)~~ salinity: 0.1
Turbidity (NTU): 0.0

CONTAINER DESCRIPTION:

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—
125 plastic	Sulfate	—
40 Amber	TOC	H_2SO_4
250 plastic	dissolved iron	HNO_3

ARCADIS

Pore Water Sample Log

Sample ID PW-6C
Date 3-25-20
Time 1000
Weather Rain

Project/No. 30044769
Sampling Personnel AF/MK:

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~4.0
Velocity
Depth Advanced into Sediment
Substrate Description
Location

Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method peri pump
Sample Description

Temperature (°C/°F) 9.40
Dissolved Oxygen (mg/L) 8.88
Turbidity (mV) 0.0

pH 6.59
SC 0.160
Turbidity (NTU) 0.0
Salinity 0.1

CONTAINER DESCRIPTION:

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—
40 Amber	TOC	H_2SO_4
125 Plastic	Sulfate	—
250 Plastic	dissolved iron	HNO_3

ARCADIS

Surface Water Sample Log

Sample ID SW-6C
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF/MK
Time 1000
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~4.0'
Velocity
Other Comments
Substrate Description
Location
Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method perri pump
Sample Description

Temperature (°C/°F) 09.39
pH 6.57
Dissolved Oxygen 9.10
SC 0.160
Salinity 0.1
Turbity 0.0

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—

ARCADIS

Surface Water Sample Log

Sample ID SW-6B
Project/No. 30044769
Date 3-25-20
Sampling Personnel AF/MK
Time 1100
Weather Rain

DESCRIPTION OF SAMPLE LOCATION:

Name of Water Body Little Elk Creek
Depth of Water ~4.0
Velocity
Other Comments
Substrate Description
Location

Description of Nearby Vegetation

FIELD PARAMETERS:

Sample Method peri pump
Sample Description

Temperature (°C/°F) 9.41
pH ~~9.44~~ 6.63
Dissolved Oxygen 8.16
SC 0.160
Salinity 0.1
ORP 114 Turb 0.0

CONTAINER DESCRIPTION: From Lab ARCADIS

Bottle Type	Analysis	Preservative
40 VOA	VOC	HCl
250 Amber	1,4-Dioxane	—
500 Plastic	Perchlorate	—

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-32 | Date 3-24-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 7-17 | Casing Diameter (in.): 4 | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 33.52 | Static Water Level (ft-bmp): 5.48 | Water Column in Well: 28.04 | Gallons in Well: 18.2

Calc.Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___, Submersible x, Disp. Bailer ___, Other ___ | Sample Method: Low flow

Gallons Purged: 3.0 | MP Elevation: -- | Pump On/Off: 0850 /

Sample Time: Label 0930 | Replicate/ Code No. - | Sampled by MK - AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) ~~(mS/cm)~~	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. ~~(°C)~~ (°F)	Redox (mV)	Appearance	
											Color	Odor
0851	0	250	5.62	-	5.14	0.038	23.5	9.01	10.96	247	none	none
0856	5	250	6.04	-	5.33	0.031	18.6	8.63	11.21	246	"	"
0901	10	250	6.37	-	5.37	0.031	14.2	8.24	11.20	250	"	"
0906	15	250	6.62	-	5.38	0.030	16.4	7.78	11.25	255	"	"
0911	20	250	6.71	-	5.39	0.030	19.5	7.48	11.29	257	"	"
0916	25	250	6.79	-	5.35	0.030	19.0	7.41	11.29	260	"	"
0921	30	250	6.82	-	5.37	0.030	18.5	7.49	11.31	259	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: ~~Yes~~ / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | ~~4" = 0.65~~ | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-32D | Date 3-24-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 30-45 | Casing Diameter (in.): 2 | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 57.67 | Static Water Level (ft-bmp): 5.45 | Water Column in Well: 52.22 | Gallons in Well: 8.4

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___ / Submersible x / Disp. Bailer ___ / Other ___ | Sample Method: Low Flow

Gallons Purged: 1.5 | MP Elevation: -- | Pump On/Off: 0938 /

Sample Time: Label: 1020 | Replicate/ Code No.: — | Sampled by: AF/MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0940	0	200	5.87	—	6.24	0.092	27.8	2.64	10.67	103	none	none
0945	5	200	6.69	—	6.58	0.097	26.9	2.00	10.69	79	"	"
0950	10	200	7.19	—	6.68	0.098	21.9	1.97	10.73	64	"	"
0955	15	200	7.61	—	6.72	0.099	20.5	1.95	10.78	45	"	"
1000	20	200	7.87	—	6.74	0.101	16.2	1.69	10.86	33	"	"
1005	25	200	8.03	—	6.77	0.102	16.5	1.59	10.90	37	"	"
1010	30	200	8.67	—	6.78	0.102	16.9	1.57	10.92	35	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | 4" = 0.66 | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. 30044769 | Well ID BS-1 | Date 3-24-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 39-29 | Casing Diameter (in.) 4 | Well Material x PVC / SS / Other

Total Depth (ft-bmp) 18.73 | Static Water Level (ft-bmp) 7.51 | Water Column in Well 11.22 | Gallons in Well 7.2

Calc. Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible x / Disp. Bailer / Other | Sample Method low flow

Gallons Purged 4.0 | MP Elevation -- | Pump On/Off 1148 /

Sample Time: Label 1200 | Replicate/ Code No. — | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (~~mS/cm~~)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1120	0	250	6.45	-	6.67	0.103	60.8	2.51	1099	138	none	none
1125	5	250	6.71	-	6.57	0.102	43.9	1.28	10.16	140	"	"
1130	10	250	6.57	-	6.52	0.103	33.7	1.00	9.80	144	"	"
1135	15	250	6.60	-	6.52	0.104	28.8	0.78	9.70	149	"	"
1140	20	250	6.60	-	6.51	0.103	27.2	0.67	9.68	155	"	"
1145	25	250	6.60	-	6.54	0.104	25.1	0.59	9.66	160	"	"
1150	30	250	6.60	-	6.54	0.104	26.3	0.61	9.67	164	"	"
1155	35	250	6.60	-	6.53	0.102	24.1	0.57	9.54	165	"	"
						Sampled						

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
SVOC	1L Amber	1	—
Perchlorate	500 Plastic	1	—
Metals	250 Plastic	1	HNO_3
Sulfate	125 plastic	1	—
TOC	40 Amber VOA	3	H_2SO_4
iron	250 Plastic	1	HNO_3

Well Information

Well Location: verified by map | Well Locked at Arrival: (Yes) / No

Condition of Well: good | Well Locked at Departure: (Yes) / No

Well Completion: Flush Mount / (Stick Up) | Key Number To Well:

NOTES: ~~MW~~ BS-1 (032420)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	(4" = 0.65)	

ARCADIS

Groundwater Sampling Form

Page 1 of ___

Project No. 30044769.01 Well ID GM-23 Date 3/23/20

Project Name/Location ATK Orbital Weather rainy

Measuring Pt. Description TOC Screen Setting (ft-bmp) ___ Casing Diameter (in.) 4 Well Material (X) PVC ( ) SS (X) Other none

Total Depth (ft-bmp) 50.2 Static Water Level (ft-bmp) 29.61 Water Column in Well ___ Gallons in Well ___

Calc. Gallons Purged ___ Pump Intake (ft-bmp) ___ Purge Method: Centrifugal ___ Sample Method Low flow

Gallons Purged ~2.5 MP Elevation ___ Submersible ___

Sample Time: Label 1050 Replicate/ Code No. — Disp. Bailer (Other) Bladder pump Pump On/Off ___

Sampled by KM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1010		400	28.61		6.22	0.113	42.1	0	9.25	180	Silty	—
1015	5	400	28.67		6.24	0.115	37.4	0	9.19	151	"	—
1020	5	400	28.66		6.29	0.127	30.3	0	9.31	151	"	—
1025	5	400	28.71		7.11	0.341	14.6	0	10.19	217	"	—
1030	5	400	28.71		7.12	0.346	12.2	0	10.21	220	"	—
1035	5	400	28.71		7.13	0.351	11.1	0	10.22	220	"	—
1040	5	400	28.71		7.13	0.351	9.7	0	10.25	221	"	—
1045	5	400	28.71		7.12	0.354	10.6	0	10.22	220	"	—

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4 Dioxane	250mL Amber	2	—
Perchlorate	500mL Plastic	1	—

Well Information

Well Location: Circle Bro's property

Condition of Well: poor, hole with no casing

Well Completion: Flush Mount / (Stick Up)

Well Locked at Arrival: Yes / (No)

Well Locked at Departure: Yes / (No)

Key Number To Well: ___

NOTES:

Sampled @ 1050

Well Casing Volumes

Gallons/Foot				
1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Page 1 of ___

Project No. 30044769.01

Well ID GM-16S

Date 3/23/20

Project Name/Location ATK Orbital

Weather rainy cold

Measuring Pt. Description TOC

Screen Setting (ft-bmp)

Casing Diameter (in.) 4

Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 32.17

Static Water Level (ft-bmp) 2.61

Water Column in Well

Gallons in Well

Calc.Gallons Purged

Pump Intake (ft-bmp) ≈26ft

Purge Method: Centrifugal Submersible ___ Disp. Bailer Other Bladder pump

Sample Method Low flow

Gallons Purged ≈2.5

MP Elevation 11.75

Pump On/Off

Sample Time: Label 0920

Replicate/ Code No. —

Sampled by KM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0840		400	2.61		4.23	0.124	27.1	6.93	9.10	258	clear	—
0845	5	400	2.71		4.35	0.119	4	6.60	9.84	278	—	—
0850	5	400	2.71		4.35	0.119	34.5	5.73	9.76	288	—	—
0855	5	400	2.71		4.40	0.118	33.7	5.26	9.76	289	"	"
0900	5	400	2.71		4.39	0.119	26.7	4.65	9.82	294	"	"
0905	5	400	2.71		4.39	0.119	28.2	4.36	9.80	296	"	"
0910	5	400	2.71		4.41	0.119	27.2	4.27	9.81	296	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCL
1-4 Dioxane	250mL Amber	2	—
Perchlorate	500mL Plastic	1	—

Well Information

Well Location: state highway property

Condition of Well: poor. In needs, no lock, PVC out of well

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES: sampled @ 0920

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47

1.25" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65

Field Forms-Environmental.xls

GW Samp Form

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-16M | Date 3-23-20

Project Name/Location ATK Orbital | Weather rain

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 43-63 | Casing Diameter (in.) 4 | Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 100.41 | Static Water Level (ft-bmp) 0 | Water Column in Well 100.41 | Gallons in Well 65.3

Calc. Gallons Purged ___ | Pump Intake (ft-bmp) ___ | Purge Method: Centrifugal ___ Submersible X | Sample Method Low flow

Gallons Purged 1.5 | MP Elevation -- | Disp. Bailer ___ | Pump On/Off 0840/0930

Sample Time: Label 0920 | Replicate/ Code No. — | Other ___ | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0843	0	150	0.0	—	6.59	0.111	11.88	4.10	10.01	192	None	None
0848	5	150	0.6	—	6.64	0.104	10.48	3.82	10.69	193	"	"
0853	10	150	0.7	—	6.68	0.104	10.19	3.85	10.39	193	"	"
0858	15	150	0.71	—	6.70	0.104	9.47	3.27	10.14	194	"	"
0903	20	150	0.71	—	6.72	0.104	9.35	3.28	9.99	194	"	"
0908	25	150	0.71	—	6.72	0.103	8.74	3.77	9.86	194	"	"
0913	30	150	0.71	—	6.72	0.103	8.17	3.76	9.88	194	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: Verified by map | Well Locked at Arrival: Yes / No

Condition of Well: bad | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES: well in bad shape

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | 4" = 0.65 | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-27 | Date 3-23-20

Project Name/Location ATK Orbital | Weather rain

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 6-16 | Casing Diameter (in.) 4 | Well Material ~~X~~ PVC / ___ SS / ___ Other

Total Depth (ft-bmp) 17.75 | Static Water Level (ft-bmp) 8.46 | Water Column in Well 9.29 | Gallons in Well 6.04

Calc. Gallons Purged ___ | Pump Intake (ft-bmp) ___ | Purge Method: | Sample Method Low flow

Gallons Purged 3.5 | MP Elevation -- | Centrifugal / Submersible ~~X~~

Sample Time: Label 1100 | Replicate/ Code No. — | Disp. Bailer / Other ___ | Pump On/Off 1000 / 1110

Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) ~~(mS/cm)~~	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. ~~(°C)~~ (°F)	Redox (mV)	Appearance Color	Appearance Odor
1022	0	250	8.35	—	5.73	0.505	35.3	4.50	10.88	224	none	none
1027	5	250	8.41	"	5.55	0.506	36.3	6.75	11.45	237	"	"
1032	10	250	8.41	"	5.52	0.506	55.2	6.58	11.49	243	"	"
1037	15	250	8.41	"	5.40	0.595	65.8	7.05	11.48	249	"	"
1042	20	250	8.41	"	5.52	0.505	51.5	6.23	11.49	251	"	"
1047	25	250	8.41	"	5.52	0.504	52.3	6.23	11.48	257	"	"
1052	30	250	8.41	"	5.52	0.504	52.8	6.13	11.48	257	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: ~~Flush Mount~~ / Stick Up | Key Number To Well:

NOTES: GM-27 (032320)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	~~4" = 0.65~~	

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID MW-29 | Date 3-20-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 24-34 | Casing Diameter (in.): 4 | Well Material: x PVC / SS / Other

Total Depth (ft-bmp): 16.82 | Static Water Level (ft-bmp): 9.00 | Water Column in Well: 7.82 | Gallons in Well: 5.1

Calc. Gallons Purged: | Pump Intake (ft-bmp): | Purge Method: Centrifugal / Submersible: x / Disp. Bailer / Other: | Sample Method: Low flow

Gallons Purged: 2.7 | MP Elevation: -- | Pump On/Off: 0845/

Sample Time: Label 0930 | Replicate/ Code No.: - | Sampled by: AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0848	0	150	8.66	-	5.84	0.216	3.26	0.00	12.37	179	none	none
0853	5	150	8.74	-	5.89	0.205	2.87	0.06	11.99	146	"	"
0858	10	150	8.68	-	5.92	0.203	2.31	0.00	11.87	136	"	"
0903	15	150	8.68	-	5.88	0.202	2.89	0.06	11.84	119	"	"
0908	20	150	8.68	-	5.85	0.201	2.31	0.06	11.78	111	"	"
0913	25	150	8.68	-	5.84	0.202	2.16	0.00	11.80	97	"	"
0918	30	150	8.68	-	5.84	0.202	3.14	0.00	11.87	92	"	"
0923	35	150	8.68	-	5.90	0.200	2.52	0.00	11.94	88	"	"
						Sampled						

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
Perchlorate	500 Plastic	1	-

Well Information

Well Location: Verified by map | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES: MW-29 (032020)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | ~~4" = 0.65~~ | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID MW-28 | Date 3-20-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 23-33 | Casing Diameter (in.) 4 | Well Material x PVC / SS / Other

Total Depth (ft-bmp) 16.91 | Static Water Level (ft-bmp) 8.21 | Water Column in Well 8.7 | Gallons in Well 4.35

Calc.Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible x / Disp. Bailer / Other | Sample Method Lowflow

Gallons Purged 1.5 | MP Elevation -- | Pump On/Off 0940 / 1100

Sample Time: Label 1030 | Replicate/ Code No. — | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0950	0	150	7.69	—	6.38	0.333	17.7	0.00	12.99	-43	none	none
0955	5	150	7.69	—	6.36	0.344	23.3	0.00	12.67	-50	"	"
1000	10	150	7.70	—	6.35	0.344	18.9	0.00	12.63	-53	"	"
1005	15	150	7.70	—	6.35	0.342	16.5	0.00	12.72	-56	"	"
1010	20	150	7.70	—	6.30	0.341	17.0	0.00	12.20	-54	"	"
1015	25	150	7.70	—	6.26	0.334	16.5	0.00	12.00	-56	"	"
1020	30	150	7.70	—	6.29	0.335	16.4	0.00	12.06	-59	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
Perchlorate	500 Plastic	1	—
Sulfate	125 Plastic	1	—
TOC	40 Amber VOA	3	H_2SO_4
dissolved iron	250 Plastic	1	HNO_3

Well Information

Well Location: verified by mep | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES: MW-28 (032020)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | ~~4" = 0.65~~ | 6" = 1.47

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Groundwater Sampling Form

Page 1 of 1

Project No. _____ Well ID MW-25 Date 3/20/20

Project Name/Location Orbital ATK Weather Foggy 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 15-5' Casing Diameter (in.) 4" Well Material ___ PVC ___ SS ___ Other

Total Depth (ft-bmp) 14.96 Static Water Level (ft-bmp) 5.84 Water Column in Well 9.12 Gallons in Well 5.93

Calc.Gallons Purged 3.0 Pump Intake (ft-bmp) 10' Purge Method: Centrifugal ___ Submersible X Sample Method Low-Flow

Gallons Purged ~3.5 MP Elevation -- Disp. Bailer ___ Other ___ Pump On/Off ~~935~~ 910/950

Sample Time: Label 945 Replicate/ Code No. ___ Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
910	0	200	5.84	0	5.82	0.447	6.38	1.24	14.77	225	Clear	None
915	5	200	5.97	0.5	6.40	0.424	4.85	0.00	11.60	204		
920	10	200	5.97	1.0	6.52	0.431	4.11	0.00	11.34	201		
925	15	200	5.97	1.5	6.54	0.429	4.03	0.00	11.24	200		
930	20	200	5.97	2.0	6.56	0.428	3.97	0.00	11.52	~~198~~		
935	25	|	|	25	6.60	0.428		0.00	11.66	194		
940	30	|	|	30								

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
Perchlorate	500mL Plastic	1	None
Sulfate	125mL Plastic	1	None
TOC	40mL VOA	3	H_2SO_4
Diss Iron	250mL Plastic	1	HNO_3

Well Information

Well Location: Verified on Map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: ___

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769 | Well ID MW-22 | Date 3-20-20

Project Name/Location ATK Orbital | Weather Sunny

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 25-36 | Casing Diameter (in.) 4 | Well Material (PVC) / SS / Other

Total Depth (ft-bmp) 17.00 | Static Water Level (ft-bmp) 7.42 | Water Column in Well 9.58 | Gallons in Well 6.23

Calc. Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible (X) / Disp. Bailer / Other | Sample Method Lowflow

Gallons Purged 1.5 | MP Elevation -- | Pump On/Off 1100 /

Sample Time: Label 1140 | Replicate/ Code No. DUP-03 | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (~~mS/cm~~)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1104	0	150	7.12	-	6.00	0.195	34.5	0.00	13.30	96	none	none
1109	5	150	7.16	-	5.78	0.199	22.3	0.00	1198	155	"	"
1114	10	150	7.17	-	5.79	0.199	18.1	0.00	11.80	165	"	"
1119	15	150	7.17	-	5.79	0.199	15.7	0.00	11.77	169	"	"
1124	20	150	7.17	-	5.80	0.199	13.7	0.00	11.64	178	"	"
1129	25	150	7.17	-	5.79	0.198	13.5	0.00	11.72	183	"	"
1134	30	150	7.17	-	5.79	0.199	12.92	0.00	11.64	186	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
Perchlorate	500 Plastic	1	—
sulfate	125 Plastic	1	—
TOC	40 Amber VOA	3	H_2SO_4
dissolved iron	250 Plastic	1	HNO_3
TKN - Nitrate	250 Plastic	1	H_2SO_4

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / (Stick Up) | Key Number To Well:

NOTES: MW-22 (032020)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	~~4" = 0.65~~	

ARCADIS

Groundwater Sampling Form

Project No. _____ Well ID MW-20 Date 3/20/20

Project Name/Location ATK Corinth Weather Light Rain, 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 13-3' Casing Diameter (in.) 4" Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 12.92 Static Water Level (ft-bmp) 6.12 Water Column in Well 6.80 Gallons in Well 4.42

Calc.Gallons Purged 3.6 Pump Intake (ft-bmp) ~~9'~~ Purge Method: Centrifugal ___ Submersible X Sample Method Low-Flow

Gallons Purged 3.0 MP Elevation -- Disp. Bailer ___ Other ___ Pump On/Off 1240

Sample Time: Label 1315 Replicate/ Code No. _____ Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1240	0	~~200~~	5.41	0	5.54	0.214	5.19	3.02	14.85	224	Clear	None
1245	5	200	5.62	0.5	5.51	0.224	3.61	0.00	12.77	242	"	"
1250	10	200	"	1.0	5.49	0.224	2.08	0.00	12.09	252	"	"
1255	15	200	"	1.5	5.49	0.224	1.19	0.00	12.21	255	"	"
1300	20	"	"	2.0	5.51	0.226	1.64	0.00	12.22	254	"	"
1305	25	"	"	2.5	5.55	0.226	1.53	0.00	12.21	253	"	"
1310	30	"	"	3.0	5.58	0.227	1.67	0.00	12.27	251	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOAs	3	HCl
Perchlorate	500mL Plastic	1	None
Nitrates (TKN, TN, Nitrate-N)	250mL Plastic	1	H_2SO_4

Well Information

Well Location: Marked on Map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. _____ Well ID MW-11 Date 3/20/20

Project Name/Location Orbital ATK Weather Sunny 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 14-19' Casing Diameter (in.) 4" Well Material x PVC ___ SS ___ Other

Total Depth (ft-bmp) 14.10 Static Water Level (ft-bmp) 5.44 Water Column in Well 8.66 Gallons in Well 5.63

Calc.Gallons Purged 3.0 Pump Intake (ft-bmp) 10' Purge Method: Centrifugal Submersible x Sample Method Low-Flow

Gallons Purged 3.0 MP Elevation -- Disp. Bailer Other ___ Pump On/Off ~~1025~~ 1030/1115

Sample Time: Label ~~1100~~ 1105 Replicate/ Code No. ___ Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1030	0	200	5.44	0	5.57	0.162	10.05	5.93	12.17	214	Clear	None
1035	5	200	~~5.44~~ 5.47	1	5.68	0.160	11.43	5.77	12.19	228		
1040	10	200	5.47	1.0	5.59	0.159	~~10.09~~ 10.04	5.24	12.12	235		
1045	15	200	5.47	1.5	5.46	0.160	7.54	5.08	12.03	252		
1050	20			2.0	5.45	0.160	7.85	4.82	12.00	256		
1055	25			2.5	5.42	0.164	6.38	4.84	11.99	262		
1100	30			3.0	5.42	0.164	6.24	4.76	11.92	265		

Constituents Sampled	Container	Number	Preservative
TKN	250 mL Plastic	1	~~H2SO4~~
TN			
Nitrate-N			

Well Information

Well Location:	Located on Map	Well Locked at Arrival:	Yes / No
Condition of Well:	Good	Well Locked at Departure:	Yes / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. _____ Well ID MW-19 Date 3/20/20

Project Name/Location Orbital ATK Weather Overcast, 50s

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ~~10~~ 15-5' | Casing Diameter (in.) 4" | Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 15.52 | Static Water Level (ft-bmp) 6.56 | Water Column in Well 8.96 | Gallons in Well 5.82

Calc.Gallons Purged 3.0 | Pump Intake (ft-bmp) 10" | Purge Method: | Sample Method Low-Flow

Gallons Purged ~2.5 | MP Elevation -- | Centrifugal ___ Submersible X

Sample Time: Label 1200 | Replicate/ Code No. _____ | Disp. Bailer ___ Other ___ | Pump On/Off 1125/1205

Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1125	0	200	6.56	0	5.63	0.156	57.7	0.17	14.53	164	Clear	None
1130	5	200	6.78	0.5	5.64	0.164	43.2	0.00	13.64	158		
1135	10	200	6.89	1.0	5.63	0.149	25.0	0.00	12.85	161		
1140	15	200	6.84	1.5	5.63	0.147	14.9	0.00	12.73	167		
1145	20	200	6.84	2.0	5.64	0.146	8.69	0.00	12.60	171		
1150	25			2.5	5.64	0.146	6.22	0.00	12.55	179		
1155	30			3.0	5.63	0.147	4.34	0.00	12.46	183		

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL VOA	3	HCl
Perchlorate	500 mL	1	

Well Information

Well Location: VPR. fed on map

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769 | Well ID GM-315 | Date 3-19-20

Project Name/Location ATKorbital | Weather rain

Measuring Pt. Description TOC | Screen Setting (ft-bmp) | Casing Diameter (in.) 4 | Well Material x PVC ___ SS ___ Other

Total Depth (ft-bmp) 13.91 | Static Water Level (ft-bmp) 3.14 | Water Column in Well 10.77 | Gallons in Well 7.00

Calc. Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal ___ Submersible x | Sample Method Low flow

Gallons Purged 3.5 | MP Elevation -- | Disp. Bailer ___ Other ___ | Pump On/Off 0920 / 1010

Sample Time: Label 1000 | Replicate/ Code No. DUP-02 | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (~~mS/cm~~)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0925	0	150	3.04	-	7.78	0.203	57.1	4.42	11.39	133	yellow	none
0930	5	150	3.09	-	7.02	0.171	61.2	4.93	11.20	168	"	"
0935	10	150	3.11	-	6.95	0.164	66.8	4.94	11.15	174	"	"
0940	15	150	3.11	-	6.90	0.161	58.2	4.85	11.12	181	"	"
0945	20	150	3.11	-	6.87	0.165	38.7	4.62	11.13	185	"	"
0950	25	150	3.11	-	6.88	0.162	37.7	4.68	11.11	187	"	"
0955	30	150	3.11	-	6.86	0.160	35.1	4.61	11.09	189	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location:	verified by Map	Well Locked at Arrival:	(Yes) / No
Condition of Well:	good	Well Locked at Departure:	~~Yes~~ / No
Well Completion:	~~Flush Mount~~ / Stick Up	Key Number To Well:	

NOTES: GM-315 (031920)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-31M | Date 3-19-20

Project Name/Location ATK Orbital | Weather rain

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 45-55 | Casing Diameter (in.) 4 | Well Material X PVC, ___ SS, ___ Other

Total Depth (ft-bmp) 90.98 | Static Water Level (ft-bmp) 21.55 | Water Column in Well 69.43 | Gallons in Well 45.2

Calc. Gallons Purged ___ | Pump Intake (ft-bmp) ___ | Purge Method: Centrifugal ___ Submersible X Disp. Bailer ___ Other ___ | Sample Method Low flow

Gallons Purged 1.5 | MP Elevation -- | Pump On/Off 1023 / 1120

Sample Time: Label 1110 | Replicate/ Code No. ___ | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°F)	Redox (mV)	Appearance Color	Appearance Odor
1030	0	150	21.33	--	7.37	0.064	40.1	5.99	12.40	164	none	none
1035	5	150	21.33	-	7.19	0.061	38.1	5.89	12.48	174	"	"
1040	10	150	21.38	-	7.12	0.059	34.2	6.15	12.54	177	"	"
1045	15	150	21.40	-	7.05	0.056	36.7	6.17	12.71	180	"	"
1050	20	150	21.40	-	7.00	0.056	41.6	6.15	12.89	184	"	"
1055	25	150	21.40	-	6.98	0.055	38.0	6.18	13.09	184	"	"
1100	30	150	21.40	-	6.97	0.055	35.0	6.20	13.21	188	"	"
1105	35	150	21.40	-	6.94	0.055	36.7	6.21	13.31	189	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: (Yes) / No

Condition of Well: good | Well Locked at Departure: (Yes) / No

Well Completion: (Flush Mount) / Stick Up | Key Number To Well: ___

NOTES: GM-31M (031920)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	~~4" = 0.65~~	

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-26S | Date 3-19-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 6-16 | Casing Diameter (in.): 4 | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 64.50 | Static Water Level (ft-bmp): 32.47 | Water Column in Well: 32.03 | Gallons in Well: 20.82

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___, Submersible x, Disp. Bailer ___, Other ___ | Sample Method: Low Flow

Gallons Purged: 2.0 | MP Elevation: -- | Pump On/Off: 1220/1330

Sample Time: Label 1315 | Replicate/ Code No. ___ | Sampled by: AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1230	0	150	32.49	-	5.53	0079	9.69	1.30	13.55	248	none	none
1235	5	150	32.51	-	4.75	0.077	6.29	0.81	13.73	299	"	"
1240	10	150	32.55	-	4.67	0.076	7.79	0.74	13.77	318	"	"
1245	15	150	32.55	-	4.64	0.076	8.82	0.63	13.78	333	"	"
1250	20	150	32.55	-	4.63	0.075	10.22	0.60	13.80	337	"	"
1255	25	150	32.55	-	4.61	0.074	10.29	0.50	13.80	348	"	"
1300	30	150	32.55	-	4.59	0.073	5.69	0.46	13.82	357	"	"
1305	35	150	32.55	-	4.58	0.072	5.24	0.46	13.82	362	"	"
1310	40	150	32.55	-	4.59	0.070	4.48	0.43	13.83	365	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
1,4-Dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: (Yes) / No

Condition of Well: good | Well Locked at Departure: ~~Yes~~ / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well: ___

NOTES: GM-26S (031920)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	(4" = 0.65)	

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM-26M | Date 3-19-20

Project Name/Location ATK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 31-46 | Casing Diameter (in.): 4 | Well Material: * PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 93.70 | Static Water Level (ft-bmp): 33.53 | Water Column in Well: 60.17 | Gallons in Well: 39.11

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___, Submersible x, Disp. Bailer ___, Other ___ | Sample Method: Low flow

Gallons Purged: 2.5 | MP Elevation: -- | Pump On/Off: 1350

Sample Time: Label 1450 | Replicate/ Code No. — | Sampled by: AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1352	0	150	33.41	-	4.86	0.054	10.41	4.23	1384	310	none	none
1357	5	150	33.45	-	4.67	0.054	46.5	3.56	1388	339	"	"
1402	10	150	33.39	-	4.62	0.054	35.4	6.51	13.91	354	"	"
1407	15	150	33.41	-	4.62	0.054	42.4	6.34	13.89	360	"	"
1412	20	150	33.42	-	4.60	0.054	42.6	6.18	13.90	365	"	"
1417	25	150	33.42	-	4.61	0.054	29.4	6.04	13.91	370	"	"
1422	30	150	33.42	-	4.59	0.054	33.1	6.01	13.85	361	"	"
1427	35	150	33.42	-	4.60	0.053	32.2	5.88	13.85	365	"	"
1432	40	150	33.42	-	4.62	0.053	33.3	5.85	13.87	371	"	"
1437	45	150	33.42	-	4.61	0.053	31.0	5.85	13.89	372	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOC	40 VOA	3	HCl
Perchlorate	500 Plastic	1	—
1,4-Dioxane	250 Amber	2	—
Sulfate	125 plastic	1	—
TOC	40 Amber VOA	3	H_2SO_4
Iron	250 Plastic	1	HNO3

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: ~~Yes~~ / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES: GM-26M (031920)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Page 1 of ____

Project No. 30044769.01 | Well ID GM-22S | Date 3/19/20

Project Name/Location ATK-Orbital | Weather ____

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ____ | Casing Diameter (in.) 4inch | Well Material ✓ PVC ___ SS ___ Other

Total Depth (ft-bmp) 20 | Static Water Level (ft-bmp) 7.47 | Water Column in Well ____ | Gallons in Well ____

Calc. Gallons Purged ____ | Pump Intake (ft-bmp) ≈15ft | Purge Method: Centrifugal Submersible ____ Disp. Bailer ____ (Other) bladder pump | Sample Method Low flow

Gallons Purged ≈3 | MP Elevation ____ | Pump On/Off 0915

Sample Time: Label 0955 | Replicate/ Code No. — | Sampled by KM

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (umhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0915		~~500mL~~	7.47		4.72	0.535	3.38	0.0	12.26	169	clear	—
0920	5	≈500mL/min	7.48		4.65	0.525	3.41	0.0	12.25	190	"	"
0925	5	≈500mL	7.46		4.51	0.522	3.71	0.0	12.25	208	"	"
0930	5	500mL	7.45		4.55	0.519	4.05	0.0	12.20	214	"	"
0935	5	500mL	7.45		4.57	0.519	3.82	0.0	12.17	216	"	"
0940	5	500mL	7.45		4.56	0.520	3.84	0.0	12.19	219	"	"
0945	5	500mL	7.45		4.59	0.519	3.79	0.0	12.21	220	"	"
0950	5	500mL	7.45		4.58	0.516	3.78	0.0	12.23	222	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4 Dioxane	250mL Amber	2	—
Perchlorate	500mL Plastic	1	—

Well Information

Well Location: YMCA football field

Condition of Well: good, rusty

Well Completion: Flush Mount / (Stick Up)

Well Locked at Arrival: (Yes) / No

Well Locked at Departure: (Yes) / No

Key Number To Well: ____

NOTES: sample taken @ 0955

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | 4" = 0.65 | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Page ___ of ___

Project No. 30044769.01 | Well ID GM-22M | Date 3/19/20

Project Name/Location ATK-Orbital | Weather Cloudy

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ___ | Casing Diameter (in.) 4 inch | Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 37 | Static Water Level (ft-bmp) 5.72 | Water Column in Well ___ | Gallons in Well ___

Calc. Gallons Purged ___ | Pump Intake (ft-bmp) ≈30 | Purge Method: Centrifugal ___ Submersible ___ Disp. Bailer ___ Other bladder | Sample Method Low flow

Gallons Purged ≈2.5 | MP Elevation ___ | Pump On/Off 1010

Sample Time: Label 1055 | Replicate/ Code No. — | Sampled by KM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1015		500mL	5.72		4.81	0.224	91.2	0.0	12.33	210	clear	—
1020	5	500mL	5.97		4.83	0.213	53.5	0.0	12.44	213	clear	—
1025	5	500mL	5.88		4.87	0.201	30.8	0.0	12.22	213	"	—
1030	5	500mL	5.86		4.85	0.200	15.6	0.0	12.21	209	"	"
1035	5	500mL	5.81		4.87	0.197	14.5	0.0	12.20	209	"	"
1040	5	500mL	5.78		4.90	0.195	9.66	0.0	12.00	206	"	"
1045	5	500mL	5.78		4.91	0.196	9.56	0.0	11.97	205	"	"
1050	5	500mL	5.78		4.90	0.197	9.77	0.0	11.98	206	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4 Dioxane	250mL Amber	2	—
Perchlorate	500mL Plastic	1	—
Sulfate	125mL Plastic	1	—
TOC	40mL VOA	3	Sulfuric Acid
Dissolved Iron	250mL Plastic	1	Nitric Acid

Well Information

Well Location: YMCA Football field | Well Locked at Arrival: Yes / No

Condition of Well: Good, rusty | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well: ___

NOTES: Sampled @ 1055

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | 4" = 0.65 | 6" = 1.47

ARCADIS

Groundwater Sampling Form

Project No. 30044769.01 | Well ID GM-21S | Date 3/19/20

Project Name/Location ATK Orbital | Weather Cloudy

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ____ | Casing Diameter (in.) 4 inch | Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 25 | Static Water Level (ft-bmp) 3.96 | Water Column in Well ____ | Gallons in Well ____

Calc. Gallons Purged ____ | Pump Intake (ft-bmp) ≈ 20 | Purge Method: Centrifugal ____ Submersible ____ Disp. Bailer ____ Other Bladderpump | Sample Method LowFlow

Gallons Purged ≈2 | MP Elevation ____ | Pump On/Off 1145

Sample Time: Label 1230 | Replicate/ Code No. — | Sampled by KM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) mS/cm	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1150		≈900	3.96		4.71	0.086	22.6	0.0	11.33	234	clear	—
1155	5	400	4.27		4.65	0.083	31.6	0.0	11.23	242	"	"
1200	5	400	4.31		4.68	0.082	27.5	0.0	11.12	242	"	"
1205	5	400	4.32		4.71	0.081	23.8	0.0	11.08	243	"	"
1210	5	400	4.29		4.71	0.080	24.4	0.0	11.06	240	"	"
1215	5	400	4.29		4.72	0.080	23.1	0.0	11.05	238	"	"
1220	5	400	4.29		4.71	0.080	21.7	0.0	11.04	237	"	"
1225	5	400	4.29		4.70	0.080	20.9	0.0	11.03	238	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4 Dioxane	250mL Amber	2	—
perchlorate	500mL Plastic	1	

Well Information

Well Location: YMCA Football field

Condition of Well: good, rusty, backet well lid broken

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES: sampled @ 1230

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769.01 | Well ID 6M-21M | Date 3/19/20

Project Name/Location ATK-Orbital | Weather Cloudy

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): ____ | Casing Diameter (in.): ____ | Well Material: ___ PVC ___ SS ___ Other

Total Depth (ft-bmp): 52 | Static Water Level (ft-bmp): 1.96 | Water Column in Well: ____ | Gallons in Well: ____

Calc. Gallons Purged: ____ | Pump Intake (ft-bmp): ≈45 | Purge Method: Centrifugal ____ Submersible ____ Disp. Bailer ____ Other Bladder | Sample Method: Low flow

Gallons Purged: ≈2 | MP Elevation: ____ | Pump On/Off: 1245

Sample Time: Label 1335 | Replicate/ Code No.: — | Sampled by: KM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1250		400	1.96		4.77	0.041	58.2	0	11.38	184	clear	—
1255	5	400	1.96		5.19	0.041	69.7	0	11.28	162	"	"
1300	5	400	1.96		5.17	0.040	76.2	0	11.23	151	"	"
1305	5	400	1.96		5.00	0.038	30.6	0	11.32	151	"	"
1310	5	400	1.96		4.93	0.038	36.3	0	11.32	162	"	"
1315	5	400	1.96		4.87	0.037	29.9	0	11.34	167	"	"
1320	5	400	1.96		4.92	0.037	30.5	0	11.36	167	"	"
1325	5	400	1.96		4.94	0.038	29.7	0	11.38	168	"	"
1330	5	400	1.96		4.96	0.038	29.2	0	11.36	168	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4 Dioxane	250mL Amber	2	—
Perchlorate	500mL Plastic	1	—
Sulfate	125mL Plastic	1	—
TOC	40mL VOA	3	Sulfuric Acid
Dissolved Iron	250mL Plastic	1	Nitric Acid

Well Information

Well Location: YMCA football field | Well Locked at Arrival: Yes / No

Condition of Well: good, rusty | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well: ____

NOTES: Sampled @ 1335

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769 | Well ID GM-24 | Date 3-18-20

Project Name/Location ATK Orbital | Weather Sunny

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 32-47 | Casing Diameter (in.) 4 | Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 93.98 | Static Water Level (ft-bmp) 33.75 | Water Column in Well 60.23 | Gallons in Well 39.15

Calc. Gallons Purged ___ | Pump Intake (ft-bmp) ___ | Purge Method: Centrifugal ___ Submersible X Disp. Bailer ___ Other ___ | Sample Method Low flow

Gallons Purged 2.0 | MP Elevation -- | Pump On/Off 0920/1020

Sample Time: Label 1010 | Replicate/ Code No. — | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (~~mS/cm~~)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
0937	0	150	33.90	~	3.15	0.133	3.19	1.29	10.58	402	none	none
0942	5	150	34.12	~	3.69	0.085	2.10	1.40	11.66	374	"	"
0947	10	150	34.31	~	3.81	0.075	1.46	1.12	12.05	365	"	"
0952	15	150	34.43	~	3.84	0.067	1.64	1.07	12.05	363	"	"
0957	20	150	34.51	~	3.90	0.064	1.57	1.06	12.32	360	"	"
1002	25	150	34.61	~	3.94	0.063	1.70	1.04	12.48	357	"	"
1007	30	150	34.61	~	3.96	0.062	1.53	1.09	12.53	356	"	"
						Sampled						

Constituents Sampled	Container	Number	Preservative
VOCs	40 VOA	3	HCl
Perchlorate	500 Plastic	1	—
1,4-dioxane	250 Amber	2	—

Well Information

Well Location: verified by Map | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES: GM-24 (031820)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | ~~4" = 0.653~~ | 6" = 1.47

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Groundwater Sampling Form

Page 1 of 1

Project No. 30044769 | Well ID MW-23 | Date 3-18-20

Project Name/Location ATK Orbital | Weather sunny

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 39-24 | Casing Diameter (in.) 4 | Well Material ✓ PVC / SS / Other

Total Depth (ft-bmp) 17.10 | Static Water Level (ft-bmp) 8.02 | Water Column in Well 9.08 | Gallons in Well 5.9

Calc.Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible ✓ / Disp. Bailer / Other | Sample Method Lowflow

Gallons Purged 3.0 | MP Elevation -- | Pump On/Off 1115/1215

Sample Time: Label 1210 | Replicate/ Code No. — | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) ~~(mS/cm)~~	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1117	0	200	8.15	—	3.03	0.105	8.14	0.00	11.15	388	none	none
1122	5	200	8.28	—	2.99	0.102	11.97	0.00	10.72	384	"	"
1127	10	200	8.15	—	3.06	0.102	10.85	0.00	10.61	382	"	"
1147	~~15~~	200	8.18	—	3.17	0.101	12.00	0.00	11.50	379	"	"
1152	~~20~~	200	8.16	—	3.21	0.101	8.36	0.00	10.67	378	"	"
1157	~~25~~	200	8.16	—	3.25	0.101	6.42	0.00	10.54	380	"	"
1202	~~30~~	200	8.16	—	3.28	0.101	6.62	0.00	1048	382	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL VOA	3	HCl
Perchlorate	500mL Plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES: MW-23 (031820)

Stopped for Burn pit (.

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. _____ Well ID MW-13 Date 3/18/25

Project Name/Location Orbital ATK Weather Sunny, 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 17-7' Casing Diameter (in.) 4" Well Material X PVC / SS / Other

Total Depth (ft-bmp) 17.00 Static Water Level (ft-bmp) 5.13 Water Column in Well 11.87 Gallons in Well 7.72

Calc.Gallons Purged _____ Pump Intake (ft-bmp) _____ Purge Method: Centrifugal Submersible X Sample Method Low-Flow

Gallons Purged _____ MP Elevation -- Disp. Bailer / Other _____ Pump On/Off 1035/1115

Sample Time: Label 1110 Replicate/ Code No. _____ Sampled by MT

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1035	0	200	5.13	0	6.14	0.186	2.46	0.00	10.70	198	Clear	None
1040	5	200	5.55	0.5	6.32	0.180	1.81	0.00	10.64	143		
1045	10	200	5.56	1.0	6.57	0.186	1.97	0.00	10.54	182		
1050	15	200	5.56	1.5	6.48	0.178	2.54	0.00	10.39	158		
1055	20	200	5.56	2.0	6.58	0.180	3.09	0.00	10.35	154		
1100	25	200	5.56	2.5	6.50	0.181	3.24	0.00	10.23	140		
1105	30	200	5.56	3.0	6.47	0.181	3.91	0.00	10.25	136		

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VoA	3	HCl
Perchlorate	500mL Plastic	1	None

Well Information

Well Location: Verified on Map

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.16 2.5" = 0.26 3" = 0.37 3.5" = 0.50 4" = 0.65 6" = 1.47

ARCADIS

Groundwater Sampling Form

Project No. 30044369 | Well ID MW-12 | Date 3-18-20

Project Name/Location ATK Orbital | Weather sunny

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 34 - 29 | Casing Diameter (in.): 4 | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 11.46 | Static Water Level (ft-bmp): 4.99 | Water Column in Well: 6.47 | Gallons in Well: 9.21

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___ Submersible x Disp. Bailer ___ Other ___ | Sample Method: Low flow

Gallons Purged: 2.7 | MP Elevation: -- | Pump On/Off: 1403/1450

Sample Time: Label 1440 | Replicate/ Code No. — | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (~~mS/cm~~)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1405	0	200	5.14	-	3.85	0.239	2.89	0.00	14.19	344	none	none
1410	5	200	5.22	-	4.08	0.247	1.50	0.00	12.97	333	"	"
1415	10	200	5.24	-	4.17	0.249	1.70	0.00	12.83	323	"	"
1420	15	200	5.24	-	4.23	0.249	0.93	0.00	12.85	316	"	"
1425	20	200	5.24	-	4.27	0.249	0.83	0.00	12.83	309	"	"
1430	25	200	5.24	-	4.28	0.249	0.98	0.00	12.78	306	"	"
1435	30	200	5.24	-	4.36	0.249	0.47	0.00	12.76	303	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40 VOA	3	HCl
Perchlorate	500 plastic	1	—
1,4-dioxane	250 Amber	2	—
TOC	40 Amber VOA	3	H_2SO_4
Sulfate	125 oblong plastic	1	—
Dissolved Iron	250 plastic	1	HNO_3

Well Information

Well Location: verified by map | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: ~~Yes~~ / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES: MW-12 (031820)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	~~4" = 0.65~~	

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Groundwater Sampling Form

Project No. 30044769 | Well ID MW-10 | Date 3-18-20

Project Name/Location ATK Orbital | Weather Sunny

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 24-34 | Casing Diameter (in.): 4 | Well Material: X PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 17.52 | Static Water Level (ft-bmp): 6.47 | Water Column in Well: 11.05 | Gallons in Well: 7.18

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal Submersible X, Disp. Bailer ___, Other ___ | Sample Method: Lowflow

Gallons Purged: 4.5 | MP Elevation: -- | Pump On/Off: 1235 / 1330

Sample Time: Label 1320 | Replicate/ Code No. - | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) ~~mS/cm~~	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. ~~°C~~ (°F)	Redox (mV)	Appearance Color	Appearance Odor
1237	0	200	6.75	-	3.30	0.104	2.53	0.78	13.10	371	none	none
1242	5	200	6.82	-	3.21	0.104	0.22	0.19	12.39	378	"	"
1247	10	200	6.82	-	3.21	0.104	0.76	0.28	12.24	380	"	"
1252	15	200	6.82	-	3.19	0.106	0.95	0.27	12.15	384	"	"
1257	20	200	6.82	-	3.20	0.107	0.05	0.24	11.95	385	"	"
1302	25	200	6.82	-	3.21	0.111	0.01	0.19	11.14	386	"	"
1307	30	200	6.82	-	3.23	0.114	0.30	[illegible]	10.65	385	"	"
1312	35	200	6.82	-	3.25	0.117	0.01	0.13 0.55	10.62	386	"	"
1317	40	200	6.82	-	3.28	0.118	0.01	0.00	10.55	385	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40 VOA	3	HCl
Perchlorate	500 plastic	1	—

Well Information

Well Location: verified by map | Well Locked at Arrival: (Yes) / No

Condition of Well: good | Well Locked at Departure: (Yes) / No

Well Completion: Flush Mount / (Stick Up) | Key Number To Well:

NOTES: MW-10 (031820)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | (4" = 0.65) | 6" = 1.47

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Groundwater Sampling Form

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Project No. _____ Well ID MW-5 Date 3/18/20

Project Name/Location Orbital ATK Weather Sunny 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 13-5' Casing Diameter (in.) 4 Well Material ✓ PVC ___ SS ___ Other

Total Depth (ft-bmp) 13.32 Static Water Level (ft-bmp) 6.32 Water Column in Well 7 Gallons in Well 4.55

Calc.Gallons Purged _____ Pump Intake (ft-bmp) _____ Purge Method: Centrifugal _____ Sample Method Low-Flow

Gallons Purged _____ MP Elevation -- Submersible X

Sample Time: Label 1455 Replicate/ Code No. _____ Disp. Bailer _____ Other _____ Pump On/Off 1420/1500

Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1420	0	200	6.32	0	6.44	0.481	3.37	10.77	11.60	165	Clear	None
1425	5	200	6.65	0.5	6.43	0.477	3.43	~~11.01~~	11.01	154		
1430	10		6.67	1.0	6.51	0.471	3.01	0.00 1.0	10.54	140		
1435	15		6.67	1.5	6.44	0.479	3.11	0.00	10.49	138		
1440	20			2.0	6.52	0.476	2.78	0.00	10.35	143		
1445	25			2.5	6.55	0.477	2.77	0.00	10.37	147		
1450	30			3.0	6.49	0.476	3.01	0.00	10.39	144		

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
Perchlorate	500mL Plastic	1	None

Well Information

Well Location: Verified on Map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

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Project No. _____ Well ID MW-2 Date 3/18/20

Project Name/Location Orbital ATK Weather Sunny 40s

Measuring Pt. Description TOC Screen Setting (ft-bmp) ~~14~~ 14-9' Casing Diameter (in.) 4" Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 14.12 Static Water Level (ft-bmp) 5.60 Water Column in Well 8.52 Gallons in Well 5.54

Calc.Gallons Purged 3.5 Pump Intake (ft-bmp) _____ Purge Method: Centrifugal _____ Submersible X Sample Method Low-Flow

Gallons Purged 3.5 MP Elevation -- Disp. Bailer _____ Other _____ Pump On/Off 1200/1246

Sample Time: Label 1235 Replicate/ Code No. _____ Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1200	~~0~~	200	5.60	0.5	5.83	0.122	3.13	0.00	10.43	189	Clear	None
1205	5	200	6.05	~~1.0~~	5.78	0.121	3.09	0.00	10.78	184	"	"
1210	10	200	6.37	1.5	5.71	0.116	2.52	0.00	10.55	181	"	"
1215	15	"	"	2.0	5.71	0.114	2.11	0.00	10.54	181	"	"
1220	20	"	"	2.5	5.89	0.116	2.08	0.00	10.51	183	"	"
1225	25	"	"	3.0	~~5~~ 5.87	0.115	2.13	0.00	10.54	182	"	"
1230	30	"	"	3.5	5.89	0.115	2.15	0.00	10.53	177	"	"

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL VOA	3	HCl
1,4-Dioxane	250 Amber	2	None
Perchlorate	500 mL Plastic	1	None
Sulfate	125 mL Plastic	1	None
TOC	40mL VOA	3	H2SO4
Diss. Iron	250 mL Plastic	1	HNO3

Well Information

Well Location: Verified on map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. _____ Well ID MW-1 Date 3/18/20

Project Name/Location AIK orbital Weather Sunny 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 15-10 Casing Diameter (in.) 4" Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 15.71 Static Water Level (ft-bmp) 6.25 Water Column in Well 9.46 Gallons in Well 6.15

Calc.Gallons Purged _____ Pump Intake (ft-bmp) 7' Purge Method: Centrifugal _____ Submersible X Sample Method Low-Flow

Gallons Purged _____ MP Elevation -- Disp. Bailer _____ Other _____ Pump On/Off 1315/1355

Sample Time: Label 1350 Replicate/ Code No. _____ Sampled by MR

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1315	0	200	6.25	0	6.06	0.137	2.77	8.75	11.88	169	clear	None
1320	5	200	6.95	0.5	5.93	0.137	2.83	3.67	10.84	169		
1325	10	200	7.25	1.0	5.90	0.131	2.87	0.92	10.63	174		
1330	15	200	7.25	1.5	6.02	0.132	3.24	0.00	10.49	178		
1335	20	200		2.0	6.00	0.135	3.33	0.00	10.45	175		
1340	25	200		3.0	5.97	0.133	2.68	0.00	10.47	179		
1345	30	200		3.5	5.99	0.134	3.01	0.00	10.48	176		

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
Perchlorate	500mL Plastic	1	

Well Information

Well Location: Marked on Map

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. _____ Well ID G-4-GM Date 3/18/20

Project Name/Location Orbital ATK Weather _____

Measuring Pt. Description TOC Screen Setting (ft-bmp) 60-50 Casing Diameter (in.) 4 Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 55.99 Static Water Level (ft-bmp) 17.41 Water Column in Well 41.58 Gallons in Well 27.03

Calc.Gallons Purged 3.0 Pump Intake (ft-bmp) 55 Purge Method: Centrifugal Submersible X Sample Method Low Flow

Gallons Purged ~3.5 MP Elevation -- Disp. Bailer Other _____ Pump On/Off 905 / 945

Sample Time: Label 940 Replicate/ Code No. — Sampled by MR

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
905	0	200	17.41	0	5.06	0.150	4.15	0.00	11.28	244	Clear	None
910	5	200	17.46	0.5	5.21	0.092	5.67	0.00	12.07	237		
915	10	200	18.35	1.0	5.24	0.084	6.47	0.00	12.41	245		
920	15	200	18.35	1.5	5.31	0.054	8.22	0.00	12.45	240		
925	20	200	18.35	2.0	5.28	0.053	7.76	0.00	12.49	231		
930	25	200	18.35	2.5	5.36	0.053	8.32	0.00	12.48	236		
935	30	200	18.35	3.0	5.34	0.053	8.77	0.00	12.49	237		

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1-4, Dioxane	250 Amber	2	—
Perchlorate	500mL Plastic	1	—

Well Information

Well Location: verified on Map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769 | Well ID GM-15M | Date 3-17-20

Project Name/Location 4TK Orbital | Weather overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 6.17-16.17 | Casing Diameter (in.): 4 | Well Material: X PVC, SS, Other

Total Depth (ft-bmp): 47.83 | Static Water Level (ft-bmp): 12.08 | Water Column in Well: 35.75 | Gallons in Well: 23.24

Calc. Gallons Purged | Pump Intake (ft-bmp) | Purge Method: Centrifugal, Submersible X, Disp. Bailer, Other | Sample Method: Low flow

Gallons Purged: 3.5 | MP Elevation: -- | Pump On/Off: 1130 / 1220

Sample Time: Label: 1215 | Replicate/ Code No.: - | Sampled by: AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH ±1	Cond. (µmhos) (mS/cm) 3%	Turbidity (NTU) 10%	Dissolved Oxygen (mg/L) 10%	Temp (°C) (°F) 3%	Redox (mV) ±10	Appearance Color	Appearance Odor
1135	0	200	12.15	-	6.06	0.156	0.4	0.00	11.23	164	none	none
1140	5	200	12.12	-	6.00	0.143	1.26	0.00	11.32	194	"	"
1145	10	200	12.08	-	5.95	0.138	0.67	0.00	11.40	212	"	"
1150	15	200	12.08	-	6.00	0.138	1.58	0.00	11.42	224	"	"
1155	20	200	12.08	-	6.08	0.141	0.41	0.00	11.47	234	"	"
1200	25	200	12.08	-	5.98	0.134	0.39	0.00	11.58	241	"	"
1205	30	200	12.08	-	5.98	0.134	0.26	0.00	11.64	247	"	"
1210	35	200	12.08	-	5.99	0.134	0.45	0.00	11.65	250	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
Perchlorate	500mL Plastic	1	-

Well Information

Well Location: verified by map | Well Locked at Arrival: ~~Yes~~ / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES: GM-15M (031720)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | 4" = 0.65 | 6" = 1.47

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Groundwater Sampling Form

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Project No. 30447769 | Well ID GM-145 | Date 3/17/20

Project Name/Location Orbital ATK | Weather Rainy 40s

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ~~65-45~~ | Casing Diameter (in.) 4 | Well Material X PVC / SS / Other

Total Depth (ft-bmp) 65.71 | Static Water Level (ft-bmp) 28.45 | Water Column in Well 37.26 | Gallons in Well 24.219

Calc.Gallons Purged 1.2 | Pump Intake (ft-bmp) 50 | Purge Method: | Sample Method Low-Flow

Gallons Purged ~1.5 | MP Elevation -- | Centrifugal / Submersible X

Disp. Bailer / Other | Pump On/Off 935/1010

Sample Time: Label 1005 | Replicate/ Code No. — | Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
					0.1	3/10	1990	10/100	3/0	±10		
935	0	150	28.45	X	4.94	0.309	23.7	0.00	11.69	64	Clear	None
940	5	150	28.54	0.2	5.05	0.307	23.4	0.00	11.64	55	Clear	None
945	10	150	28.54	0.4	5.23	0.296	18.7	0.00	11.62	44	Clear	None
940 950	15	150	28.54	0.6	5.21	0.294	16.0	0.00	11.58	48	Clear	None
955	20	150	28.54	0.8	5.25	0.294	11.60	0.00	11.56	45		
1000	25	150	28.54	1.0	5.27	0.294	9.37	0.00	11.55	43		
1005	30	150	28.54	1.2	5.29	0.296		0.00	11.57	46		

Constituents Sampled	Container	Number	Preservative
VOCs	40ml VOA	3	HCl
1-4,-dioxane	250 Amber	2	None
Perchlorate	500 mL Plastic	1	None

Well Information

Well Location: Verified on Map | Well Locked at Arrival: Yes / No

Condition of Well: Good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769 | Well ID GM-14M | Date 3-17-20

Project Name/Location ATK Orbital | Weather Rain

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 35-65 | Casing Diameter (in.): 6" | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 94.0 | Static Water Level (ft-bmp): 28.62 | Water Column in Well: 65.38 | Gallons in Well: 96.11

Calc. Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___, Submersible x, Disp. Bailer ___, Other ___ | Sample Method: Low flow

Gallons Purged: 3.0 | MP Elevation: -- | Pump On/Off: 0950/

Sample Time: Label 1030 | Replicate/ Code No. DUP-01 | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH (.1)	Cond. (µmhos) ~~mS/cm~~ (3%)	Turbidity (NTU) (10%)	Dissolved Oxygen (mg/L) (10%)	Temp. ~~°C~~ (°F) (3%)	Redox (mV) (±10)	Appearance Color	Appearance Odor
0953	0	150	28.57	-	5.68	0.200	7.34	0.00	12.72	33	none	none
0958	5	150	28.76	-	5.91	0.190	5.61	0.00	12.72	17	"	"
1003	10	150	28.91	-	6.09	0.190	2.37	0.00	12.71	0	"	"
1008	15	150	28.96	-	6.16	0.188	4.43	0.00	12.66	-7	"	"
1013	20	150	28.98	-	6.39	0.187	4.90	0.00	12.63	-20	"	"
1018	25	150	28.98	-	6.40	0.188	5.90	0.00	12.60	-21	"	"
1023	30	150	28.98	-	6.42	0.187	5.90	0.00	12.58	-24	"	"
					Sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40ml VOA	3	HCl
1-4, dioxane	250 Amber	2	—
Perchlorate	500 Plastic	1	—
TOC	40 Amber VOA	3	H_2SO_4
Sulfate	250 plastic	1	—
dissolved Iron	250 Plastic	1	HNO_3

Well Information

Well Location: verified by map | Well Locked at Arrival: Yes / No

Condition of Well: good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / ~~Stick Up~~ | Key Number To Well:

NOTES: sample ID = GM-14M(031720)

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

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Project No. 3044769 | Well ID GM-105 | Date 3/17/20

Project Name/Location Orbital ATK | Weather Sunny 40s

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 19-9 | Casing Diameter (in.) 4" | Well Material X PVC / SS / Other

Total Depth (ft-bmp) 19.65 ~~19.6~~ | Static Water Level (ft-bmp) 10.35 | Water Column in Well 9.30 | Gallons in Well 6.05

Calc. Gallons Purged | Pump Intake (ft-bmp) 15 | Purge Method: Centrifugal / Submersible X | Sample Method Low-Flow

Gallons Purged | MP Elevation -- | Disp. Bailer / Other | Pump On/Off 1355

Sample Time: Label 1430 | Replicate/ Code No. | Sampled by MK/AF

					0.1	3%	0%	10%	3%	10±		
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1355	0	200	10.35	0	5.56	0.066	21.9	0.00	11.78	179	Clear	None
1400	5	200	10.42	0.80	5.49	0.064	13.2	0.00	11.35	203		
1405	10	200	10.42	1.60	5.54	0.064	12.7	0.00	11.12	209		
1410	15	200	10.42	2.15	5.49	0.063	9.65	0.00	11.07	212		
1415	20	|	|	2.0	5.47	0.065	9.64	0.00	10.83	215		
1420	25	|	|	2.5	5.49	0.067	9.63	0.00	10.81	217		
1425	30	|	|	3.0	5.45	0.066	9.51	0.00	10.86	219		

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
1,4-dioxane	250mL Amber	2	None
Perchlorate	500mL Plastic	1	None
Sulfate	125mL Plastic	1	None
TOC	40mL VOA	3	H_2SO_4
Diss. Iron	250mL Plastic	1	HNO_3

Well Information

Well Location: Verified on Map | Well Locked at Arrival: Yes / No

Condition of Well: Good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Project No. 30044769 | Well ID GM - 4B | Date 3-17-16

Project Name/Location ATK Orbital | Weather Overcast

Measuring Pt. Description: TOC | Screen Setting (ft-bmp): 19.2 - 29.2 | Casing Diameter (in.): 4 | Well Material: x PVC, ___ SS, ___ Other

Total Depth (ft-bmp): 50.83 | Static Water Level (ft-bmp): 6.50 | Water Column in Well: 44.33 | Gallons in Well: 28.8

Calc.Gallons Purged: ___ | Pump Intake (ft-bmp): ___ | Purge Method: Centrifugal ___, Submersible x, Disp. Bailer ___, Other ___ | Sample Method: Low Flow

Gallons Purged: 3.0 | MP Elevation: -- | Pump On/Off: 1300/1350

Sample Time: Label 1340 | Replicate/ Code No. - | Sampled by AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) ~~(mS/cm)~~	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1302	0	150	6.55	-	6.53	0237	2.54	1.61	1230	174	none	none
1307	5	150	6.65	-	6.30	0.212	1.70	1.43	1243	212	"	"
1312	10	150	6.65	-	6.08	0.210	0.82	1.44	1256	229	"	"
1317	15	150	6.65	-	6.66	0.212	1.09	1.47	12.71	200	"	"
1322	20	150	6.65	-	6.69	0.208	0.72	1.41	12.89	200	"	"
1327	25	150	6.65	-	6.70	0.207	1.31	1.42	13.01	202	"	"
1332	30	150	6.65	-	6.71	0.206	0.64	1.44	13.10	203	"	"
					sampled							

Constituents Sampled	Container	Number	Preservative
VOCs	40mL VOA	3	HCl
Perchlorate	500 Plastic	1	-
1,4- Dioxane	250 Amber	2	-

Well Information

Well Location: verified by map | Well Locked at Arrival: (Yes) / No

Condition of Well: good | Well Locked at Departure: (Yes) / No

Well Completion: Flush Mount / (Stick Up) | Key Number To Well:

NOTES: GM-4B (031720)

Well Casing Volumes

Gallons/Foot: 1" = 0.04 | 1.25" = 0.06 | 1.5" = 0.09 | 2" = 0.16 | 2.5" = 0.26 | 3" = 0.37 | 3.5" = 0.50 | (4" = 0.65) | 6" = 1.47

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Page 1 of 1

Project No. 30047769.01 | Well ID GM-1B | Date 3/17/20

Project Name/Location Orofino ATK | Weather Overcast, 40s

Measuring Pt. Description TOC | Screen Setting (ft-bmp) 51-41 | Casing Diameter (in.) 4 | Well Material X PVC / SS / Other

Total Depth (ft-bmp) 51.52 | Static Water Level (ft-bmp) 33.85 15.55 | Water Column in Well 17.67 35.97 | Gallons in Well 11.49 23.38

Calc.Gallons Purged 1.75 | Pump Intake (ft-bmp) | Purge Method: Centrifugal / Submersible X / Disp. Bailer / Other | Sample Method Low-Flow

Gallons Purged ~2.0 | MP Elevation --

Sample Time: Label 1220 | Replicate/ Code No. | Pump On/Off 1145/1225

Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1145	0	200	33.85 15.55	0	5.59	0.126	3.42	0.00	16.79	130	clear	None
1150	5	200	15.57	0.25	5.62	0.124	2.69	0.00	11.22	160		
1155	10	200	15.61	0.5	5.55	0.122	2.29	0.00	11.55	184		
1200	15	200	15.61	1.0	5.63	0.121	1.93	0.00	11.62	199		
1205	20	200	15.61	1.25	5.60	0.120	1.75	0.00	11.63	201		
1210	25	200	15.61	1.5	5.63	0.120	1.74	0.00	11.64	207		
1215	30	200	15.61	1.75	5.67	0.121	1.76	0.00	11.66	210		

Constituents Sampled	Container	Number	Preservative
VOCs	~~VOCs~~ 40mL VOAs	3	HCl
1,4-dioxane	250mL Amber	2	None
Perchlorate	500mL Plastic	1	None
Sulfate	125 mL Plastic	1	None
TOC	40mL VOAs	3	H_2SO_4
# Dissolved Iron	250 Plastic	1	HNO_3

Well Information

Well Location: Verified on Map

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

NOTES:

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

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Groundwater Sampling Form

Project No. 30044769.01 | Well ID GM-2B | Date 3/26/20

Project Name/Location ATK Orbital | Weather Sunny

Measuring Pt. Description TOC | Screen Setting (ft-bmp) ____ | Casing Diameter (in.) 4 | Well Material ___ PVC ___ SS X Other

Total Depth (ft-bmp) 50.2 | Static Water Level (ft-bmp) 29.62 | Water Column in Well ____ | Gallons in Well ____

Calc. Gallons Purged ____ | Pump Intake (ft-bmp) ≈ 40ft | Purge Method: | Sample Method Bladder pump

Gallons Purged ____ | MP Elevation ____ | Centrifugal ____ Submersible ____ Disp. Bailer ____ Other Bladder pump | Pump On/Off 1030

Sample Time: Label 1110 | Replicate/ Code No. — | Sampled by ICM/AF

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
1035	-	300	29.62		6.60	0.340	14.4	0.0	12.14	-173	clear	-
1040	5	300	29.64		6.71	0.334	13.5	0.0	12.60	-196	clear	-
1045	5	300	29.64		6.86	0.327	9.93	0.0	13.28	-215	"	"
1050	5	300	29.65		6.99	0.319	10.66	0.0	14.11	-228	"	"
1055	5	300	29.65		6.96	0.317	9.72	0.0	14.18	-230	"	"
1100	5	300	29.65		6.97	0.318	10.21	0.0	14.20	-232	"	"
1105	5	300	29.65		6.97	0.318	9.96	0.0	14.22	-231	"	"

Constituents Sampled	Container	Number	Preservative
TOC	40mL VOA	3	Sulfuric Acid
Sulfate	125mL oblong	1	—
Dissolved Iron	250mL Plastic	1	HNO_3

Well Information

Well Location: Grouse Bro's property

Condition of Well: rusted, broken lid, no casing

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well: ____

NOTES: no casing, hole in well, sampled @ 1110

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. _____ Well ID GM-30S Date 3/24/20

Project Name/Location Orbital ATK Weather Overcast 50s

Measuring Pt. Description TOC Screen Setting (ft-bmp) 86-76 Casing Diameter (in.) 4" Well Material X PVC ___ SS ___ Other

Total Depth (ft-bmp) 86.26 Static Water Level (ft-bmp) 32.19 Water Column in Well 54.07 Gallons in Well 35.14

Calc. Gallons Purged 14 Pump Intake (ft-bmp) 80 Purge Method: Centrifugal Submersible X Sample Method Low-Flow

Gallons Purged ~1.5 MP Elevation -- Disp. Bailer Other ___ Pump On/Off ~~1105~~ 1110/1155

Sample Time: Label ~~1150~~ 1150 Replicate/ Code No. ___ Sampled by MK

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
~~1105~~ 1110	0	150	32.19	0	2.95	0.421	167	2.96	12.85	301	~~Clear~~ Flowing	None
1115	5	150	32.51	0.2	11.18	0.481	2091 AU	0.00	12.60	-72		
1120	10	150	32.61	0.4	11.26	0.485	2434 AU	0.00	12.70	-81		
1125	15	150	32.57	0.6	11.31	0.488	2355 AU	0.00	13.08	-79		
1130	20	150	33.14	0.8	11.33	0.491	1922 AU	0.00	12.99	-88		
1135	25	150	33.17	1.0	11.34	0.492	1698 AU	0.00	12.94	-87		
1140	30	150	33.17	1.2	11.33	0.493	1591 AU	0.00	12.97	-89		
1145	35	150	33.17	1.4	11.31	0.494	1595 AU	0.00	13.05	-86		

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL VOA	3	HCl
1,4-Dioxane	250 mL Amber	2	None
Perchlorate	500 mL Plastic	1	None

Well Information

Well Location: Verification Map Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: ___

NOTES:

Well Casing Volumes

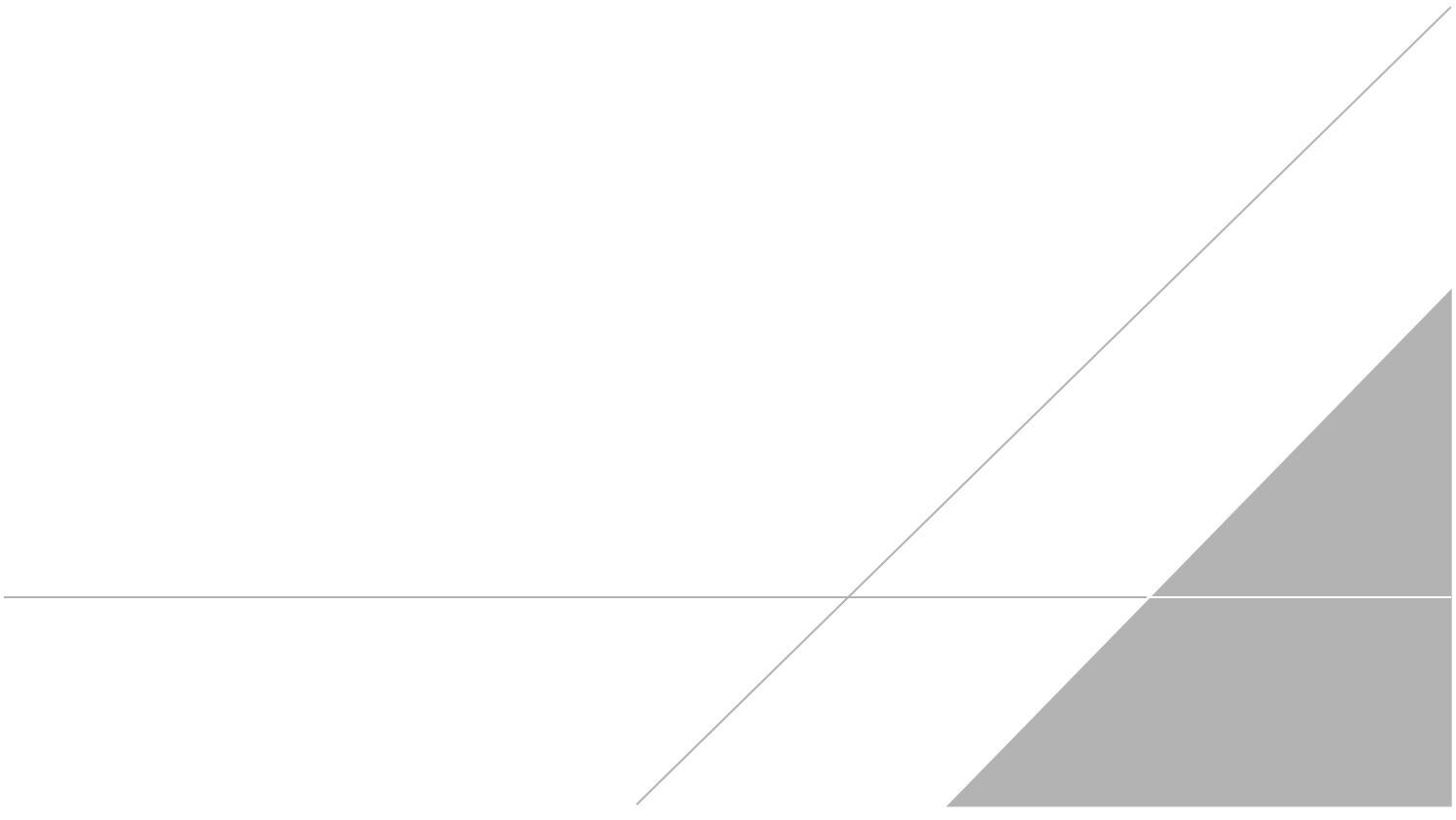
Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

APPENDIX D

Elkton ATK Site: Pesticide Areas Update

APPENDIX D-1

Corrective Measures Implementation Report



GEI Consultants

Consulting
Engineers and
Scientists

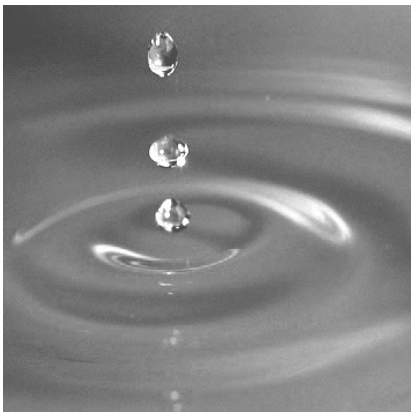
Corrective Measures Implementation Report
Soil Consolidation and Capping
Pesticide and Sewer Line Areas

Thiokol Site
Elkton, Maryland

Prepared for:
Syngenta Crop Protection
Olin Corporation

Submitted by:
GEI Consultants, Inc., P.C.
100 Sylvan Parkway, Suite 400
Amherst, NY 14228

October 2019
Project 1610692.3.3001



Helen Robinson, P.E.
Senior Consultant

Kelly R. McIntosh, P.E., Ph.D.
Senior Consultant

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B Geotechnical Laboratory Test Results
C Geosynthetic Clay Liner
D Seeding Mixtures
E Construction Documentation Figures (As-Built Drawings)

Executive Summary

Syngenta Crop Protection, LLC (Syngenta) and Olin Corporation (Olin) (the Companies), in cooperation with Alliant Techsystems Operations, LLC, a wholly-owned subsidiary of Northrup Grumman Innovations Systems, Inc., (Alliant) have retained GEI Consultants (GEI) to prepare this Corrective Measures Implementation (CMI) Report for the Thiokol Site located in Elkton Maryland (Figure 2-1). This report documents the 2019 construction activities performed for completion of the CMI at the Pesticide Area Solid Waste Management Unit Area of Concern (Pesticide SWMU AOC) and the Sewer Line Area.

As documented herein, based on GEI staff field observations, field and laboratory test results, and submittals from the contractor, the corrective measures were implemented in accordance with the Statement of Basis and Permit for Corrective Action.

With the appropriate Site management and use restrictions in place, the CMI has/will attain the Pesticide Area SWMU AOC Corrective Action Objectives.

1. Certifications

1.1 On-Site Quality Assurance Personnel

On-site quality assurance personnel included the following:

Personnel	Construction Aspects
Helen Robinson, P.E.	Final Cover Construction on Consolidation Area Certification
Jeff Carlson and Marla Hart	Initial grading, soil excavations, geosynthetics installation observations, cover soil placement, restoration
Kelly McIntosh, P.E., Ph.D	Environmental oversite and project management

1.2 Recommendation

GEI Consultants, Inc. (GEI) was retained to document the construction of the soil excavation, consolidation and capping at the Thiokol site for activities associated with the pesticide and sewer line areas. Based on the field observations, contractor submittals, and field and laboratory test results, the remediation was completed in accordance with the design plans and specifications and Permit for Corrective Action.

_____ _____

Helen Robinson, P.E. Date

2. Introduction

Syngenta Crop Protection, LLC (Syngenta) and Olin Corporation (Olin) (the Companies), in cooperation with Alliant Techsystems Operations, LLC, a wholly-owned subsidiary of Northrup Grumman Innovations Systems, Inc., (Alliant) have retained GEI Consultants (GEI) to prepare this Corrective Measures Implementation (CMI) Report for the Thiokol Site located in Elkton Maryland (Figure 2-1). This report summarizes the 2019 construction activities performed for completion of the CMI at the Pesticide Area Solid Waste Management Unit Area of Concern (Pesticide SWMU AOC) and the Sewer Line Area.

The CMI was performed in accordance with the document entitled "Soil Consolidation and Capping Plan, Pesticide and Sewer Line Areas, Thiokol Site, Elkton, Maryland" submitted to USEPA as an Attachment to the "Corrective Measures Implementation Work Plan" dated July 28, 2017 (CMI Work Plan). The CMI Work Plan was prepared in accordance with the following documents:

- Corrective Measures Study, Pesticide and Sewer Line Areas. Thiokol Site, Elkton, Maryland. Prepared for Syngenta Crop Protection and Olin Corporation. December by GEI (December 20, 2016).
- USEPA Region III Final Decision, Orbital ATK Inc., Elkton, MD (May 26, 2017).
- USEPA Region III Permit for Corrective Action, Orbital ATK, Inc., Elkton, MD (May 26, 2017).
- USEPA Region III Statement of Basis, Orbital ATK, Inc., Elkton, MD (March 22, 2017).

EPA approved the CMI Work Plan by letter dated October 4, 2017.

2.1 Background

The Pesticide SWMU AOC is located in the southwestern portion of the Site, south of the Little Elk Creek. The property was owned by Geigy Chemical Company (1947-1955; Syngenta Crop Protection, Inc. is the corporate successor) and Olin Mathieson Chemical Corporation (1955-1958; Olin Corporation is the corporate successor). In 1958 the property was sold to Alliant's predecessor (Thiokol Corporation). There are four sub-areas within the Pesticide SWMU AOC:

- Burn Pit Area
- Ridge Area
- Tar and Ash Area

- Incineration Area

Contamination in the Pesticide Area SWMU AOC is characterized as chlorinated pesticides, primarily 4,4'-dichlorodiphenyltrichloroethane (DDT) and its metabolites, in surface soils. Subsurface contamination was observed only in the Burn Pit subarea. Impacted soils are located 50 to 90 ft above the groundwater table in this area.

The Sewer Line Area is a small (approximately one-half acre) area located in an active portion of the Plant, within the facility security fence. In 1991, pesticide presence was encountered during excavation activities in the Sewer Line Area. Soils below 2 feet depth were generally below 1 mg/kg total pesticides. Pesticide concentrations in the upper 2 feet of soils are shown on Figure 2-2.

The Corrective Measures Study (CMS) (GEI 2016) developed and evaluated Corrective Measures Alternatives (CMAs). The recommended CMA included: targeted excavations of soil from the Tar and Ash Area and Ridge Area and consolidation of excavated soils beneath a cap constructed of Geosynthetic Clay Liner (GCL) located to cover the Burn Pit and Incineration Areas. This recommended CMA formed the basis for the selection by USEPA of the Final Remedy for the Pesticide SWMU AOC and Sewer Line Area (see Section 2.3).

2.2 Corrective Action Objectives

EPA established the following corrective Action Objectives (CAO) for soils at the Pesticide SWMU AOC and Sewer Line Area:

- Prevent human exposure to contaminants concentrations above the EPA allowable risk range of $1 \times l0^{-4}$ to $l \times l0^{-6}$ and non-cancer Hazard Index of 1 for an industrial exposure scenario.

- Manage future Site use to restrict residential land use of areas within the property boundary.

- Prevent human exposure to soils in the Pesticide SWMU AOC with COPC exceeding applicable PRGs presented in the CMS, as calculated based on the 95% upper confidence limit (UCL) on the mean, for samples collected from unremediated locations in the Pesticide SWMU AOC and Sewer Line Area.

- Prevent ecological exposures to soil in the Pesticide SWMU AOC with chemical concentrations exceeding the PRGs (based on the 95% UCL for unremediated soils).

- Prevent off-site migration of soils in the Pesticide SWMU AOC exceeding the PRGs via wind and water erosion (based on the 95% UCL for unremediated soils).

2.3 Description of the Final Remedy for Pesticide SWMU AOC and Sewer Line Area

The Final Remedy selected by USEPA for the Pesticide SWMU AOC consists of the excavation of soil from the Ridge Area and Tar and Ash Area for consolidation beneath a low permeability cap consisting of Geosynthetic Clay Liner (GCL) and overlying drainage/clean soil cover to be located over the Burn Pit and Incineration Areas. As necessary and/or appropriate, soils from other areas at the Facility could be placed under the cap. The GCL cap covers approximately 2 acres. An additional asphalt cap is to be constructed over the Sewer Line Area where soils do not meet the PRGs.

In conjunction with the consolidation and capping activities, certain land and groundwater use restrictions are to be implemented for the Pesticide SWMU AOC (as specified in the Statement of Basis). These include:

1. All earth moving activities at the Pesticide SWMU AOC, including excavation, drilling and construction activities, shall be conducted in compliance with Facility-specific health and safety protocols and an EPA-approved Soil Management Plan (that includes appropriate Personal Protective Equipment requirements sufficient to meet EPA's acceptable risk and complies with all applicable OSHA requirements and practices to prevent off-site migration of soils;

2. Site-wide access restrictions through the use and maintenance of fencing and controlled access (security gate);

3. Groundwater at the Pesticide SWMU AOC shall not be used for any purpose, including, but not limited to, use as a potable water source without treatment to achieve MCLs, other than to conduct the monitoring activities required by EPA; and

4. The Pesticide SWMU AOC shall not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy.

Soil areas to be excavated/consolidated and capped were identified in the CMS to achieve the PRGs presented in the CMS (listed below) in uncovered soils as calculated based on the 95% upper confidence limit (UCL) on the mean, for samples collected from uncapped locations in the Pesticide SWMU AOC and Sewer Line Area:

Chemical	Human Health PRG [(1)]	Basis	Ecological PRG (HI = 1)	Overall PRG [(2)]
Aldrin	4.8	C	1.3	1.3
alpha-BHC	13	C	3.5	3.5
beta-BHC	46	C	2.7	2.7
gamma-BHC (lindane)	91	C	133	91
Chlordane [(3)]	290	C	13	13
DDD	340	C	28	28
DDE	240	C	28	28
DDT	300	C	28	28
Dieldrin	5.1	C	2.3	2.3
Heptachlor	18	C	0.6	0.6
Heptachlor epoxide	9.0	C	0.2	0.2
Methoxychlor	150,000	N	27	27
Toxaphene	75	C	138	75
Hexachlorobenzene	51	C	NA	51
Arsenic	110	C	NA	110

Notes:
All units in mg/kg (ppm).

(1) Individual HH PRGs based on a cancer risk of 1×10^{-6} (including the long-term construction worker scenario) and an HQ of 0.1 or 1, depending on the analyte (see Attachment B). HH PRG value is lower of carcinogenic (C) or noncarcinogenic (N) endpoint, as indicated.

(2) Overall PRG is lower of human health PRG and ecological PRG values.

(3) Chlordane PRG is applied to sum of alpha-chlordane and gamma-chlordane concentrations.

NA = Not applicable.

The CMS presented an evaluation of a range of consolidation/capping scenarios to determine the UCL on the mean for unremediated sample locations under each scenario. This evaluation determined that the PRGs listed above would be attained through consolidation and capping of soils containing greater than 100 mg/kg total pesticides. Based on this analysis, the areas to be excavated, consolidated and capped are shown on Figure 2-3.

2.4 CMI Design

The CMI Final Design and Specifications were submitted to USEPA and Maryland Department of Environment (MDE) by letter dated October 31, 2017. This submittal included:

- Technical Specifications and Design Plans
- Post Closure Care Plan
- Construction Quality Assurance Plan
- Health and Safety Plan
- Corrective Measures Permitting Plan

The construction activities described in Section 4.0 were performed in accordance with these documents.

3. Project Participants

The 2019 construction was contracted to Entact, LLC (ENTACT) as the prime contractor. GEI performed construction quality assurance services associated with the earthwork construction and installation of the geosynthetic liner system. The geosynthetic clay liner installation was performed by ENTACT. Included in this report are construction observations and testing reports, laboratory analyses, and a summary of construction procedures and quality assurance (QA) tasks.

Key personnel involved with the CMI construction:

- Project Owners – Syngenta Crop Protection/Olin Corporation
- Site Owner-Alliant Techsystems Operations LLC, A Wholly Owned Subsidiary of Northrup Grumman Innovations Systems, Inc.
- General Contractor – Entact, LLC
- Site Surveying – Fredrick Ward Associates
- GCL – CETCO, Inc.
- Geotextile Supplier – IWT Cargo Guard
- Erosion Control Products Supplier –IWT Cargo Guard
- Import Materials Trucking – WC Logan & Sons
- Topsoil, Structural fill, and Gravel Provider – Dix Hollow Contracting and Paving
- Asphalt Placement S&M Paving, Inc.
- Hydro-seeding Contractor – LEMS Contracting
- Asbestos Abatement Contractor – County Environmental Co.
- Pavement compaction testing – Geo-Technology Associates, Inc.

3.1 Roles and Responsibilities

Overall work for the project including clearing of trees from work areas, installation of erosion and sediment controls, preparation of site access roads, impacted soil excavation, consolidation and grading of impacted soils, installation of a geosynthetic clay liner (GCL), placement of clean fill to restore excavated areas and build a cover system over GCL, and final site restoration and seeding. ENTACT was the general contractor and performed the work on the project with the

assistance of specialty contractors for clearing and paving. Local trucking firms were contracted to haul structural fill, gravel and restoration soils onto the project site.

Fredrick Ward Associates provided initial and final site surveying. ENTACT site staff performed grade control daily when needed and survey documentation of GCL panels. CETCO, Inc., supplied the GCL.

GEI performed construction quality assurance observations on all aspects of the construction. Density testing of asphalt was performed by Geo-Technology Associates, INC.

3.2 Reference Documents

In addition to the reports and design plans/specifications referenced in Section 2, the project was performed under guidance of the following document:

- Syngenta Crop Protection/Olin Corporation Final Stormwater Management/Erosion Control Plan, Soil Consolidation and Capping Pesticide and Sewer Line Areas – Thiokol Site, Elkton, Maryland

3.3 Site Visits

3.3.1 Environmental Protection Agency

On Tuesday, July 2, 2019, representatives of the Environmental Protection Agency were on site to observe progress of the project. GEI personnel accompanied the representatives.

3.3.2 Maryland Department of Environment

On Monday, July 29, 2019, representatives of the Maryland Department of Environment were on site to observe construction practices and erosion control devices. GEI personnel accompanied the representatives.

4. Construction and Schedule

In general, the consolidation area for impacted soils was constructed in the following sequence:

- Removal of vegetation
- Leveling of structures
- Deposition of relocated excavated soil
- Final subgrade/surface preparation
- Geosynthetics installation
- Rooting zone/topsoil cap
- Vegetative cover

Appendix A contains the Daily Field Reports and a Construction Photolog.

4.1 Initial Site Preparation

Initial preparation activities for the consolidation area were conducted in late June and early July 2019. Site preparation activities included removal of vegetation (from the consolidation area and areas where impacted soils were located), leveling of structures occupying the consolidation area, installation of erosion control measures (filter logs, silt fence, and super silt fence), and construction of a drainage swale along the east and west sides of the consolidation area.

4.2 Remediation Areas

In order to facilitate management of the construction, the various areas to be remediated were assigned identification numbers as described below. Figure 4-1 shows the locations of the Remediation Areas.

4.2.1 Area 1

Area 1 is defined as the stockpiled soil resulting from prior maintenance-related excavation conducted at the Sewer Line Area. At Area 1, the project specifications called for removal of 20 to 30 dump truck loads of soil identified as potentially being impacted with pesticides. The estimated area of Area 1 is 13,000 square feet. The disturbances at Area 1 were limited to footprint of each pile.

ENTACT accessed Area 1 from the west on the south side of Structure 70. Trees greater than 12” in diameter were not removed as part of the remediation activity. After removal of brushy vegetation and trees less than 12” in diameter, erosion control devices were installed. ENTACT installed filter logs on the north, west, and south sides of the excavation area.

Excavation activities in Area 1 were completed during June 21 to June 24, 2019. Utilizing a Caterpillar 308 E2 CR mini excavator, 259D skid steer, and two Ford F-750 dump trucks, ENTACT excavated and hauled 58 truckloads (406 cubic yards) of soil to the consolidation area (identified as Area 9).

Upon completion of excavation, the area was seeded and mulched with # 10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 60%. On September 19, 2019 revegetation was estimated to be 90%.

4.2.2 Area 2

Area 2 is located at the southern limits of the pesticide area that was designated the Tar and Ash Area.

ENTACT accessed Area 2 from the existing haul road located adjacent and to the north. After removal of brushy vegetation and several small trees, erosion control devices were installed. ENTACT installed silt fence adjacent and south of the excavation area.

Excavation activities in Area 2 were completed on June 24, 2019. Utilizing a Caterpillar 308 E2 CR mini excavator, 259D skid steer, and two Ford F-750 dump trucks, ENTACT excavated and hauled 28 truckloads (196 cubic yards) of soil to Area 9. ENTACT excavated Area 2 to a depth of 2.0-feet.

Upon completion of the excavation, the area was backfilled with top soil and seeded and mulched with #10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 55%. On September 19, 2019 revegetation was estimated to be 80%.

4.2.3 Areas 3 and 4

Areas 3 and 4 are located adjacent and north of Area 2. These areas consist of approximately 7,150 square feet.

ENTACT accessed Area 3 and 4 from the existing haul road located adjacent and east of the excavation areas. Brushy vegetation and small trees were removed to allow access to each of the areas. Erosion control devices were installed prior to beginning excavation activities. ENTACT installed filter logs adjacent to the south, west, and north sides of the excavation areas.

Excavation activities in Areas 3 and 4 were completed on June 25 and June 26, 2019. Utilizing a Kubota K-008-3 mini excavator, Caterpillar 308E2 CR excavator, Caterpillar 259D skid steer, and two Ford F-750 dump trucks, ENTACT excavated each of the areas to an approximate 1.0-feet. The excavation depth was approximately 0.5-feet in areas where near-surface tree roots

were present to improve the chances of tree survival. ENTACT hauled 32 truckloads (224 cubic yards) of soil from Areas 3 and 4 to Area 9.

Upon completion of the excavations, the area was backfilled with topsoil and the area was seeded and mulched with # 10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 60%. On September 19, 2019 revegetation was estimated to be 80%.

4.2.4 Areas 5 and 6

Areas 5 and 6 are circular excavations that are located at the northern limits of the pesticide area. Each area is approximately 50 feet in diameter.

ENTACT accessed Area 5 and 6 from the existing haul road located adjacent and east of the excavation areas. ENTACT removed brushy vegetation and small trees to allow access to the areas. Erosion control devices were installed prior to beginning excavation activities. ENTACT installed filter logs adjacent to the south, west, east, and north sides of the excavation areas.

Excavation activities in Areas 5 and 6 were completed during June 26 to June 28, 2019. Utilizing a Kubota K-008-3 mini excavator, Caterpillar 308E2 CR excavator, Caterpillar 259D skid steer, and two Ford F-750 dump trucks, ENTACT excavated to a depth of approximately 0.5-feet. ENTACT hauled 9 truckloads (63 cubic yards) of soil to Area 9.

Upon completion of excavation, the area was backfilled with topsoil and was seeded and mulched with # 10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 75%.

4.2.5 Area 7

Areas 7 is a relatively flat bench that is located just north of the ridgeline with the pesticide area. The excavation area is approximately 150 by 60 feet.

ENTACT accessed Area 7 from the existing haul road located adjacent and south of the excavation area. After removal of brushy vegetation and small trees to allow for access to the area, erosion control devices were installed prior to beginning excavation activities. ENTACT installed filter logs adjacent to the north, east, and west sides of the excavation areas.

Excavation activities in Area 7 were completed during June 26 to June 28, 2019. Utilizing a Kubota K-008-3 mini excavator, Caterpillar 308E2 CR excavator, Caterpillar 259D skid steer, and two Ford F-750 dump trucks, ENTACT excavated the area to an approximate depth of 0.5-feet. ENTACT hauled 28 truckloads (196 cubic yards) of soil to Area 9.

Upon completion of excavation, the area was backfilled with topsoil and seeded and mulched with #10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. The steeper slope of the area was also stabilized with erosion control blanket. On August 19, 2019, revegetation was estimated to be at approximately 10%. On October 11, 2019 revegetation was estimated to be at approximately 90%.

4.2.6 Area 8

Area 8 is located adjacent and north of Area 7. Area 8 is a 20 – 30-foot diameter circle of land located on the hill sloping down to Little Elk River.

ENTACT accessed Area 8 from the existing haul road located adjacent and south of the excavation area. Erosion control devices were installed prior to beginning excavation activities. ENTACT installed filter logs adjacent to the north, east, and west sides of the excavation areas.

Excavation activities in Area 8 were completed during June 28 and June 29, 2019. Utilizing a Kubota K-008-3 mini excavator, Caterpillar 308E2 CR excavator, Caterpillar 259D skid steer, hand tools, and Ford F-750 dump truck, ENTACT excavated to an approximate depth of 0.5-feet except in tree root areas where lesser amounts of materials were removed. ENTACT hauled 10 cubic yards of soil to Area 9.

Upon completion of excavation, the area was backfilled with topsoil and seeded with # 10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. The area was also mulched/stabilized with erosion control blanket. On August 19, 2019, revegetation was estimated to be at approximately 50%. On October 11, 2019 revegetation was estimated to be at approximately 90%.

4.2.7 Area 9

Area 9 is located south and west of the existing haul road. This is the Consolidation Area where excavated soils from Areas 1 through 8, and 10 were placed. The total disturbed area for Area 9 with tree removal and initial grading to provide access for placement and compaction of the impacted soil is approximately 80,000 sq. ft. This area is located on a sloped portion of the pesticide area. The area has an average slope of 10%. In preparation for placement of impacted soils, the trees within this area were clear cut. The smaller branches and trunks were chipped, and the larger logs were piled as wildlife habitat near the work limits. Prior to clearing the area, erosion control devices were installed on the downslope side. Additional silt fencing was installed to limit the movement of impacted soils within the consolidation area. The limits of the consolidation area are at least 100 feet from the drainage ditch in this portion of the site. The surface water from surrounding up-slope areas is diverted by the existing site haul road on the north and eastern limits of the consolidation area. A temporary diversion ditch was graded along the western and southern limits to control the flow onto the work area. These features also prevented runoff water from reaching Areas 2, 3 and 4 that are down slope of this area.

Following placement of the impacted soils in Area 9, it was covered with a GCL and 18-inches of off-site clean topsoil. The final slopes for the consolidation area are 2 to 12% with an average of approximately 10% across the entire area. There was no tree seedling planting on the cap due to the GCL layer, however brush and small shrubs are anticipated to self-seed on the area over time.

Area 9 construction details are summarized below.

ENTACT accessed Area 9 from the existing haul road located adjacent north and east of the excavation area. After removal of brushy material and trees (completed by Wright Brothers, a sub-contractor of ENTACT), erosion control devices were installed prior to beginning grading and excavation activities.

ENTACT installed silt fence adjacent to the east, south, and west sides of the Repository Area and filter logs on the north and west sides. In addition, a Super Silt Fence was installed on the south side of Area 9.

Utilizing a Caterpillar 308E2 CR excavator and Caterpillar 259D skid steer, ENTACT excavated the eastern area of Area 9 to a depth of approximately 1.5-feet. ENTACT moved 1,148 cubic yards of soil from the eastern side of Area 9 into Area 9 to the west.

Upon completion of excavation, the area was backfilled with topsoil and seeded and mulched with #10 seed mix in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 65%.

While making observations of the remnants of the incinerator structure, cementitious panels and pieces of cementitious panels were observed on and adjacent to the structure. The observed material was identified in the field as an asbestos containing material known as transite. County Environmental Company was hired by ENTACT to remove the transite panels and pieces observed near the incinerator structure. On June 29, 2019, the crew filled and removed 16 bags of transite. The crew estimated the quantity to be approximately 100 square feet. Following removal, field observations did not reveal evidence of transite remaining on the structure or on the ground surface. The work was completed in accordance with Occupational Safety and Health Administration, Environmental Protection Agency, and State and local rules and regulations.

ENTACT disassembled structures within the consolidation limits and graded the area flat on the western side. Debris was covered with material originating from Areas 1 through 9.

ENTACT conducted grading activities to achieve subgrade elevations specified in the project specifications. Soil originating from Areas 1 through 9, 10, and G-11 were used for achieving

the subgrade elevations. In addition, 500 cubic yards of fill was brought in from off-site and placed below the GCL to help with achieving subgrade elevations.

Once the subgrade elevations were achieved, ENTACT began to lay GCL panels at Area 9. ENTACT used hand tools and a Caterpillar vibratory roller to prepare the subgrade surface for GCL deployment. Panels were deployed working from west to east. Each panel edge was overlapped 6-8-inches utilizing the manufacturers markings. Panel ends that overlapped were sealed with granular bentonite.

Over a period of ten working days, ENTACT deployed GCL and covered it with clean topsoil. Areas of GCL that were not covered with topsoil by the end of the workday were covered with polyethylene sheets to protect from precipitation.

Topsoil was placed on the GCL at a depth of 18-inches. Once this amount of topsoil was achieved, it was graded and prepared for seeding.

Prior to seeding, ENTACT "track walked" the final pre-seeding surface in a north-south direction to help reduce erosion during precipitation events prior to re-vegetation of the area.

Upon completion of grading, the final surface was hydro-seeded with #10 seed mix and mulched with straw in accordance with the State of Maryland Standards and Specifications for Permanent Stabilization. On August 19, 2019, revegetation was estimated to be at approximately 3%. On September 19, 2019 revegetation was estimated to be 75%. On October 11, 2019 revegetation was estimated to be at approximately 85%.

4.2.8 Area 10

Area 10 is the area designated as the Sewer Line Area located within the plant complex and adjacent to an existing paved service drive

ENTACT accessed Area 10 from the adjacent existing paved service road. Erosion control devices were installed prior to beginning excavation activities. ENTACT installed filter logs adjacent to the north, east, south, and west sides of the excavation areas.

Utilizing a Caterpillar 308E2 CR excavator, Caterpillar 259D skid steer, and Ford F-750 dump trucks, ENTACT excavated to an approximate depth of 1.0-feet. ENTACT hauled 161 cubic yards of soil to Area 9.

Upon completion of excavation, the subgrade was prepared and the 12 oz. geotextile was installed. Structural fill was placed above the geotextile and compacted, and 8-inches of gravel subbase was placed above the structural fill. A 4-inch asphalt layer and associated curbing was applied over the gravel subbase. The asphalt was installed in two thin lifts with compaction to meet specifications. In addition, a Pavement Drainage Diversion (Speed Bump) was installed on the eastern side of the paved area.

In addition, in order to comply with stormwater management requirements, a micro-bioretention area was installed adjacent and south of Area 10. The micro-bioretention basin was constructed by excavating an area approximately 30' x 15' to a depth of approximately 3.0-feet.

A 4-inch, perforated underdrain (with a clean out access and overflow inlet) running west to east, was installed at the bottom of the excavation. ENTACT placed 6-inches of #57 gravel in the excavation. Four inches of pea gravel was then placed on top of the #57 gravel. The next component of the micro-bioretention area consisted of 2-feet of planting medium. Two inches of mulch was applied to the top of the planting medium.

Stormwater from Area 10 paved area drains to the micro-bioretention area. Overflow events discharge to an adjacent drainage swale situated east of the area.

4.2.9 G-11 Area

. In early 2019, after completion and submittal of the project design drawings and specifications, building G-11 located adjacent to the Sewer Line Area was destroyed by fire. Rubble and debris were removed from the site by Alliant leaving only the building slab in place. The purpose of the G-11 Area construction activities described below was to remove the building slab and underground utilities in support of future new building construction by Alliant at this location. This work was not part of the Pesticide Area SWMU AOC corrective action. It is documented in this CMI Report because excavated soil was placed in the consolidation area in accordance with the Statement of Basis and Permit.

ENTACT accessed the G-11 area via the existing paved service road. This area is located adjacent and north of Area 10 (Sewer Line Area). After identifying the areas requiring excavation, the ENTACT crew began work by sawing and breaking up concrete and asphalt to expose soils in the vicinity of existing water and gas lines and beneath a structure that historically occupied an existing slab-on-grade concrete foundation. A gasoline concrete saw, Caterpillar 259D skid steer (with jack hammer attachment), and Caterpillar 308E2 CR mini excavator was used to accomplish the work at the G-11 area. The crew filled 5 roll-off dumpsters with concrete and asphalt removed from the G-11 area. The material was hauled off-site by Maryland Portable Concrete. No construction debris from the G-11 Area were transported to the consolidation area.

Upon removal of the pavement that covered the soils at this area, ENTACT began excavating soils potentially impacted with pesticides. The crew loaded excavated material onto dump trucks and moved them to the repository (Area 9). A total of 57 loads (399 cubic yards) of material was excavated and placed in the repository. A petroleum fuel tank had been reported to be in the footprint of the excavation. The fuel tank had been removed previously. ENTACT did encounter piping that was associated with the historical fuel tank but did not encounter evidence of petroleum contamination. The piping was removed during excavation activities and disposed off-site.

Upon completion of soil removal, the ENTACT crew backfilled the excavations. Backfill materials included Elm Mills #10 screening, Elk Mills CR6, and Elk Mills #57 screening.

In addition, two 8" roof drain extensions were installed at the G-11 area to move the discharge location of roof drains beyond the excavations areas. The roof drain extensions were installed as authorized by David Thrash of Alliant.

4.3 Geosynthetic Clay Liner Installation

Installation of the geosynthetic clay liner (GCL) commenced on July 27, 2019 and was completed August 7, 2019. The GCL was manufactured by CETCO, Inc., of Cartersville, Georgia. Manufacturer quality control testing was performed and submitted by ENTACT (Appendix B).

4.3.1 Transportation, Delivery, and Storage of Geosynthetics

Thirty-seven full GCL rolls were used to complete the capping. The rolls were delivered in four individual shipments. Three shipments brought twelve rolls each and the fourth brought two GCL rolls. ENTACT unloaded all the GCL rolls for the project. As the rolls were unloaded, ENTACT inventoried individual rolls and compared the roll numbers to the packing list. GEI personnel also confirmed this by comparing roll numbers to the packing list. The GCL rolls were temporarily stored on pallets in the laydown area of the site, south of the field office. The GCL rolls were covered with polyethylene sheets in order to protect the GCL from precipitation.

Geosynthetic roll inventories and manufacturer quality control information are presented in Appendix C.

4.3.2 Surface Preparation

Following final grading of the soil layer within the consolidation area, the soil surface was smooth drum rolled. The surface was observed to be smooth and free of irregularities, protrusions, angular stones, grade stakes, construction debris, and soft areas. The prepared surface was observed by GEI and accepted by ENTACT personnel prior to deployment of the GCL. Subgrade surface acceptance forms are provided in Appendix C.

4.3.3 GCL Panel Placement

GCL panels were generally placed in the north-south direction. The GCL panels were deployed using a Caterpillar 316 LE and spreader bar. The GCL was unrolled in a loose, relaxed condition and adjusted into final position by hand. As panels were deployed, ENTACT staff inspected them for damage. GEI observed the deployment and documented panel placement. A total of 37 panels of GCL were installed to cover the prepared Repository area.

4.4 Cover Soil Layer

An 18-inch layer of topsoil was graded across the GCL to act as a rooting zone/topsoil cap. This cover provides a subgrade suitable for to support grasses and small shrubs. The cover soil was placed in one lift to minimize traffic on the GCL. Grade control was maintained at all times to protect the GCL. Following the completion of the grading, the consolidation area was seeded.

4.5 Restoration

All disturbed areas were restored following the requirements of the local stormwater and erosion control permit. The wooded areas received a woodland grass mixture, the consolidation area received an open meadow mixture, and the area around the paving and bio-retention area was seeded with a lawn mixture to match the adjacent lawn. The bio-retention area was seeded with the specialty mixture for the flat portion and slopes. Product data for Woodland Seed Mix #10 and Bioretention Basin seed are included in Appendix D.

Erosion control measures were maintained through the completion of grading, seeding and revegetation.

5. Attainment of Corrective Action Objectives

GEI was retained to observe and document the excavation and consolidation of impacted soils to the GCL capped area at the Thiokol site in Elkton Maryland. Based on GEI staff field observations, field and laboratory test results, and submittals from the contractor, the corrective measures were implemented in accordance with the Statement of Basis, Permit for Corrective Action and design plans as shown on Figures 5-1 and 5-2.

Surveying to document the as-constructed field conditions was completed and the information is presented in drawing format contained in this report. As-built drawings are contained in Appendix E. The limits of excavations were in accordance with the plans for horizontal and vertical extent. Field and laboratory tests were conducted on samples of replacement fill brought to the site for final site closure and grading. The GCL cap and environmental marker in the Repository was installed in accordance with the specifications and to the limits contained in the Statement of Basis and Permit for Corrective Action and as specified in the project design submittals (see Section 2.4).

Site restoration was completed in accordance with the Cecil County erosion and sediment control approvals.

With the appropriate site management (described in Section 5.0) and use restrictions in place, the CMI has/will attain the Pesticide Area SWMU AOC Corrective Action Objectives as identified in Section 2.2.

6. Post-CMI Care

The post-CMI management activities described in this Section will be performed to assure continued attainment of the Corrective Action Objectives.

6.1 Inspections

The areas outside of the capped limits do not require further inspections after the release of the contractor since these areas have natural soils and have been successfully revegetated to the terms of the contract. However, during the first 5 years of post-closure care, following a major storm event such as a 100-year rain event or tornado, these areas will be inspected for erosion or other aesthetic concerns.

The site access road and fencing will be inspected periodically. Inspections will note the condition of the fence, any blockage of access roads, and if the access gate has a functioning lock. The inspection will be documented on an inspection form. Any maintenance and repair activities will be scheduled as needed following the inspections. These inspections will occur annually.

The GCL capped area will be inspected on a semi-annual basis for the first 5 years, annually for years 6 to 10, and once every 5 years thereafter. Inspections will be performed to determine areas of erosion, invasive vegetation species, and for the scheduling of mowing or other maintenance. Mowing will be used to control the development of wood species on the cap. Shrubs and briars are acceptable, however trees with a trunk diameter of 2-inches need to be controlled. Any major differential settlement, subsidence or compromise of the cap system will be repaired.

The perimeter ditch will be inspected for erosion and blockage of flow. Flow lines on the cap will be inspected for signs of significant erosion. If mowing, ditch clearing, seeding/erosion repair, or vegetation control is needed, it will be noted on the inspection form and scheduled.

The asphalt at the Sewer Line Area will be inspected annually. Any areas of deteriorated asphalt resulting in exposed soil will be noted. Any asphalt maintenance and repair activities will be scheduled as needed following the inspections.

6.2 Maintenance

All cap maintenance and repair activities will be documented in a maintenance log book.

6.3 Cover System

During the first five years, the capped area will be mowed once a year to control weeds and woody species. Spot repair and fertilizing of the vegetation may be needed to assure control of erosion. The erosion control components placed for construction that are not naturally degradable will be removed after the completion of the first growing season and successful vegetation establishment.

When mowing is required, the vegetation will be mowed at an average height of six inches. The vegetation clippings will remain on the cover to degrade and add to the quality of the cover topsoil.

When needed, grading and reseeding will be performed using the smallest equipment practical for the work. This will minimize site disturbance. The original specifications will be followed for placement of soils and seeding.

6.4 Perimeter Drainage

The perimeter of the capped area will be inspected during the site inspections. Erosion gullies deeper than 12-inches will be noted on the site as-built drawing and scheduled for regrading and seeding.

Biodegradable erosion control products such as fiber mats, coir logs, and chips for mulch were used during the construction stage of the project as described above. These products generally last four to eight years in the natural environment. During the site inspection, the location of these products will be checked to determine if they are still functioning or if partial replacements are needed. This will be performed in the first five years of post-closure and while the vegetation is being established.

6.5 Pavement Maintenance (Sewer Line Area)

The sealing of existing pavement and installation new pavement in the Sewer Line Area will be inspected during the site inspections. Asphalt maintenance and repair activities will be scheduled as needed to address any areas of deteriorated asphalt which have exposed underlying soil.

6.6 Documentation, Record Retention and Reporting

Inspection forms and documentation of maintenance or repairs will be maintained in accordance with the above-cited Permit for Corrective Action.

The documentation should include a description of the work, duration, location, soil management procedures followed, copies of waste disposal documentation (if applicable), backfill procedures, photos, and any other information that may be relevant to soil management.

Cover Condition Reports will be prepared and present the following information:

1. Inspection documentation.
2. Description of any activities involving disturbance of the cover system.
3. Description of any maintenance or repairs conducted during the reporting period.

The Cover Conditions Report will be submitted on an annual basis for the first 10 years and once every 5 years thereafter. The report will be provided to USEPA by January 31 of the following year.

7. References

GEI Consultants (2016). Corrective Measures Study, Pesticide and Sewer Line Areas, Thiokol Site, Elkton, Maryland. Prepared for Syngenta Crop Protection and Olin Corporation. December 20, 2016.

GEI Consultants (2017). CMI Final Design and Specifications, Thiokol Site, Elkton, Maryland. Prepared for Syngenta Crop Protection and Olin Corporation. October 31, 2017.

GEI Consultants (2017). Soil Consolidation and Capping Plan, Pesticide and Sewer Line Areas, Thiokol Site, Elkton, Maryland. July 28, 2017. *Plan contained as Attachment to Arcadis (2017), Corrective Measures Implementation Work Plan, Orbital ATK, Inc., Elkton, Maryland, July 28, 2017.*

GEI Consultants (2017). CMI Final Design and Specifications Soil Consolidation and Capping, Pesticide and Sewer Line Areas, Thiokol Site, Elkton, Maryland. October 31, 2017

GEI Consultants (2019). Final Stormwater Management/Erosion Control Plan, Soil Consolidation and Capping Pesticide and Sewer Line Areas – Thiokol Site, Elkton, Maryland. June 2019.

USEPA (2017). USEPA Region III Final Decision, Orbital ATK Inc., Elkton, MD. May 26, 2017.

USEPA (2017). USEPA Region III Permit for Corrective Action, Orbital ATK, Inc., Elkton, MD (May 26, 2017).

USEPA (2017). USEPA Region III Statement of Basis, Orbital ATK, Inc., Elkton, MD (March 22, 2017).

0 150' 300'

SCALE: 1"=150'

N

LITTLE ELK CREEK

G-20 INSTRUMENT SHOP

G-9

SEWER LINE

SPRINGHOUSE

LEGEND:

- FA-SS-001 — SURFACE SOIL GRAB SAMPLE LOCATION
- TA-SB-001 — SOIL BORING LOCATION
- PEST MW-4 — MONITORING WELL LOCATION
- .0866 — TOTAL PESTICIDE CONCENTRATION (PPM) FOR THE SURFACE (0–2' OR 0–6")
- ND — NON DETECT– NONE DETECTED ABOVE CRQL
- 25 / 100 — EXISTING ELEVATION CONTOURS IN FEET
- 25 / 100 — TOTAL PESTICIDE CONCENTRATION CONTOURS IN PPM
- TEST PIT LOCATION
- SL-SB-014 — EXISTING SOIL BORING LOCATION
- NEW SHALLOW SOIL BORING LOCATION (0–2, 2–4 AND 5–7 FT BGS)
- SEDIMENT/SURFACE WATER SAMPLE LOCATION
- ND — NON DETECT – NONE DETECTED ABOVE CRQL

NOTES:

1. ORIGINAL DRAWING CREATED BY URS/AECOM DATED DECEMBER 2014.

PESTICIDE AREA SWMU/AOC ATK FACILITY	GEI Consultants	TOTAL PESTICIDE CONCENTRATIONS IN SURFACE SOILS
ELKTON, MARYLAND	Project 1610692	July 2017 Fig.2-2

0 100

1" = 100'

N

LEGEND

- EXISTING GROUND SURFACE CONTOUR (DASHED WHERE APPROXIMATE DUE TO DENSE VEGETATION)
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- SURFACE SOIL SAMPLE LOCATION
- TEST PIT LOCATION
- SEWER LINE AREA ASPHALT CAP
- EXISTING ASPHALT - INSPECT / CLEAN / SEAL
- PESTICIDE AREA CAP
- EXCAVATION AREA (CONSOLIDATE UNDER PESTICIDE AREA CAP)

RIDGE AREA

TAR AND ASH AREA

G-20
INSTRUMENT SHOP

RG-SS-002 RG-SS-003 RG-SS-004 RG-SS-005 RG-SS-19 RG-SS-010 RG-SS-23 RG-SS-009 RG-SS-17 RG-SS-008 RG-SS-007 RG-SS-13 RG-SS-16 RG-SS-18 RG-SS-20 RG-SS-22 RG-SS-24 RG-SS-15 RG-SS-14 RG-SB-1 RG-SB-2 RG-SB-3 RG-SB-4 RG-SB-5 MW1CE-88-2233 MWSP1CE-88-1752 FA-SS-008 FA-SS-010 FA-SS-007 FA-SS-009 FA-SS-015 FA-SS-014 FA-SS-020 FA-SS-013 FA-SS-019 MW2CE-88-2234 MWGM6 FA-SS-018 FA-SS-024 BP-SB-001 BP-SB-003 BP-SB-10 BP-TP-2 BP-SB-9 BP-SB-8 MW01CE-88-0993 FA-SS-012 BP-TP-1 BP-SS-001 BP-SB-002 BP-SB-004 BP-TP-3 BP-SB-006 I-SB-001 I-SS-002 BP-SS-002 BP-SB-005 BP-TP-4 BP-SB-007 I-SB-002 I-SS-001 I-SB-003 FA-SS-033 FA-SS-011 FA-SS-026 FA-SS-032 FA-SS-042 BP-SS-003 BP-SS-004 FA-SB-001 FA-SS-025 FA-SS-023 FA-SS-031 FA-SS-017 FA-SS-041 FA-SB-002 FA-SS-030 FA-SS-016 ID-SW-005 FA-SS-040 FA-SS-022 MWGM8 MWGM7 MW4 FA-SS-029 FA-SS-021 ID-SD-006 FA-SS-039 FA-SS-028 FA-SS-045 FA-SS-035 FA-SS-027 FA-SS-038 FA-SS-034 FA-SB-003 FA-SS-44 ID-SD-001 FA-SS-037 TA-SB-002 TA-SB-006 MW3 CE-88-2235 TA-SS-002 FA-SS-036 TA-SB-001 TA-SB-003 TA-SB-005 FA-SS-043 TA-SS-001 TA-SB-004

Syngenta Crop Protection Olin Corporation	GEI Consultants	PESTICIDE EXCAVATION AND CAPPING AREAS
Thiokol Site Elkton, Maryland	Project 1610692	July 2017 Fig. 2-3

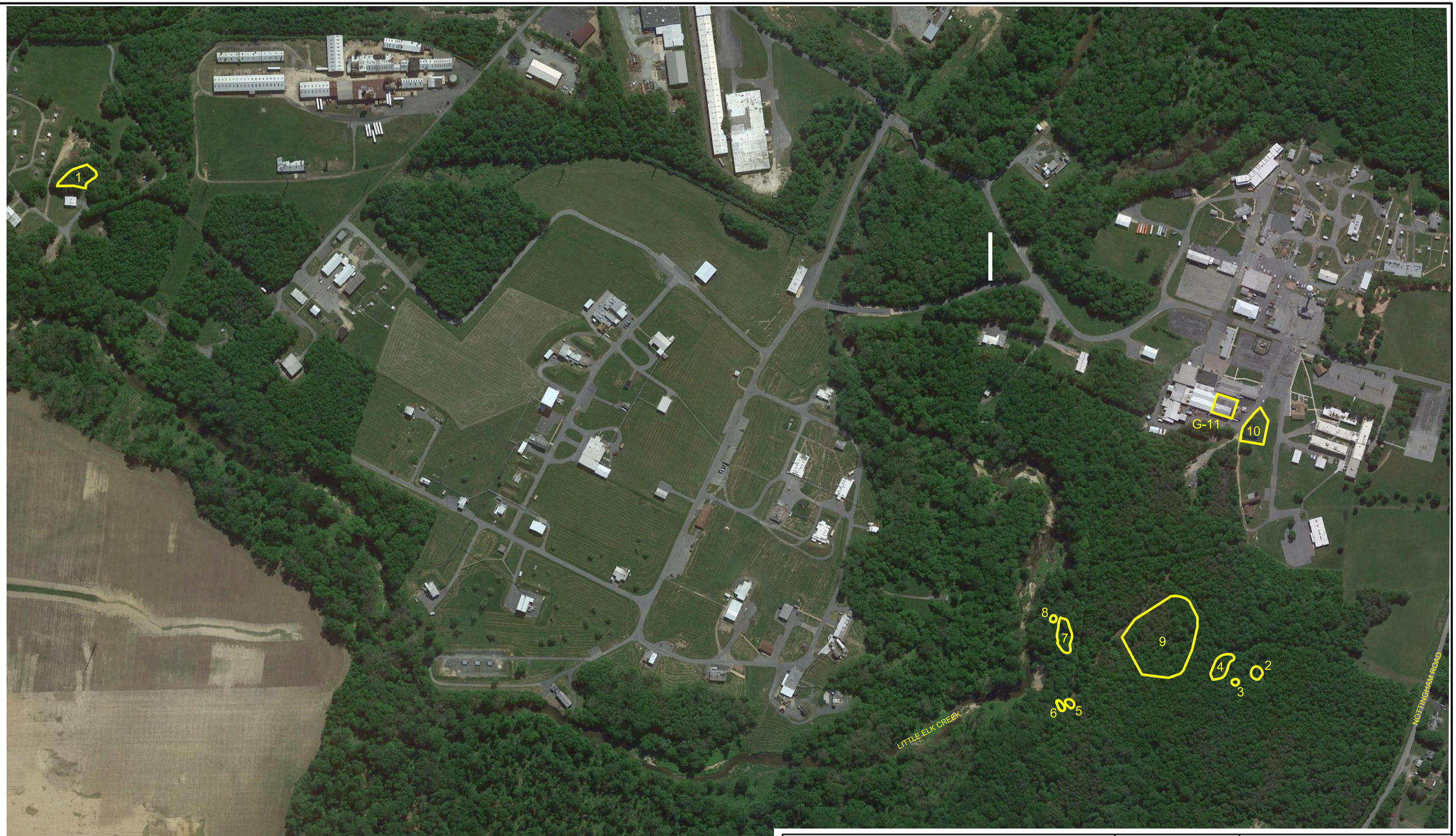


IMAGE SOURCE: Google Earth, DATED 5/25/2013

Syngenta Crop Protection / Olin Corporation
Thiokol Site
Elkton, Maryland

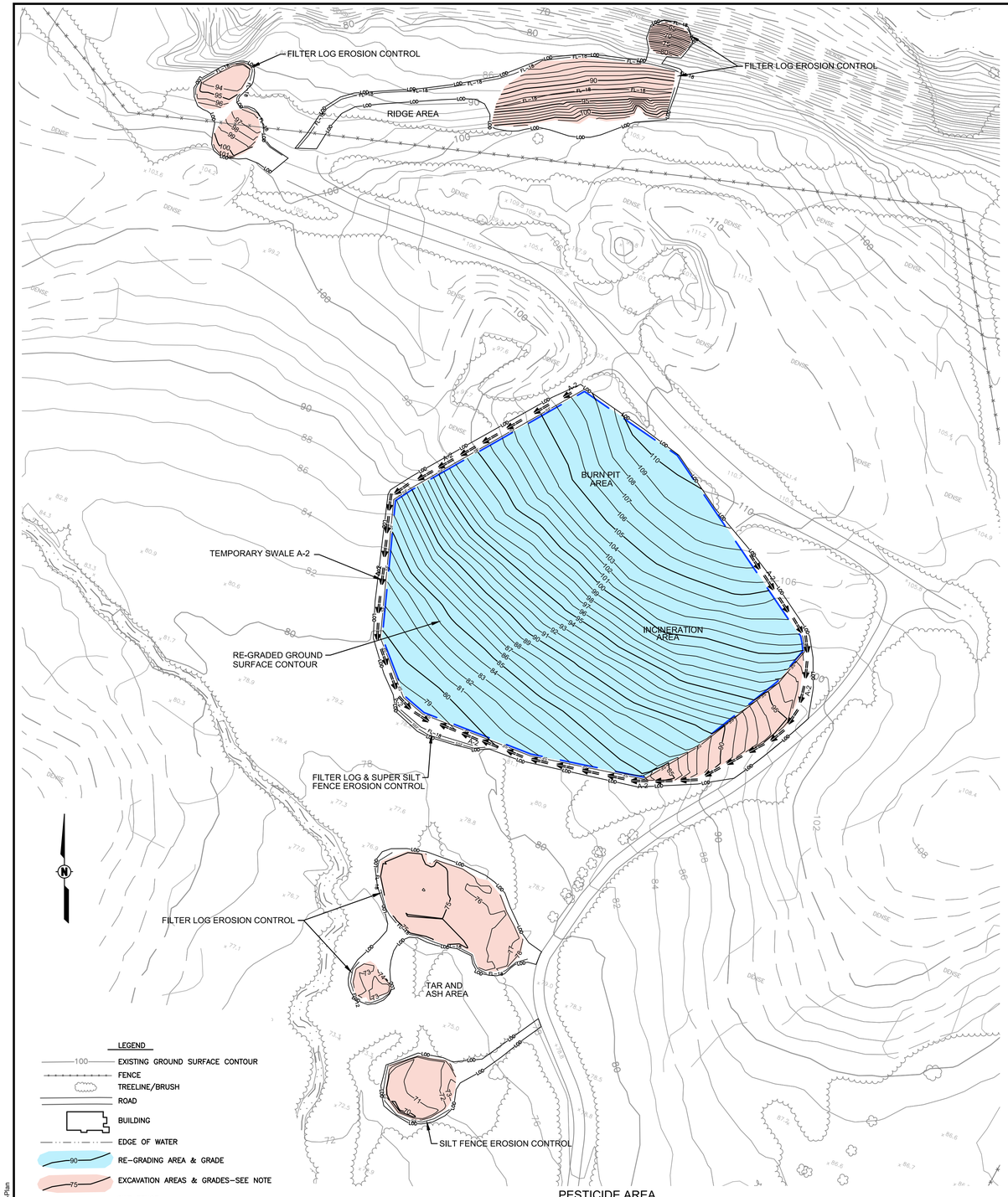
Construction Documentation

GEI Consultants

REMEDIATION AREAS
LOCATION PLAN

Project 1610692 | October 2019 | Fig.4-1

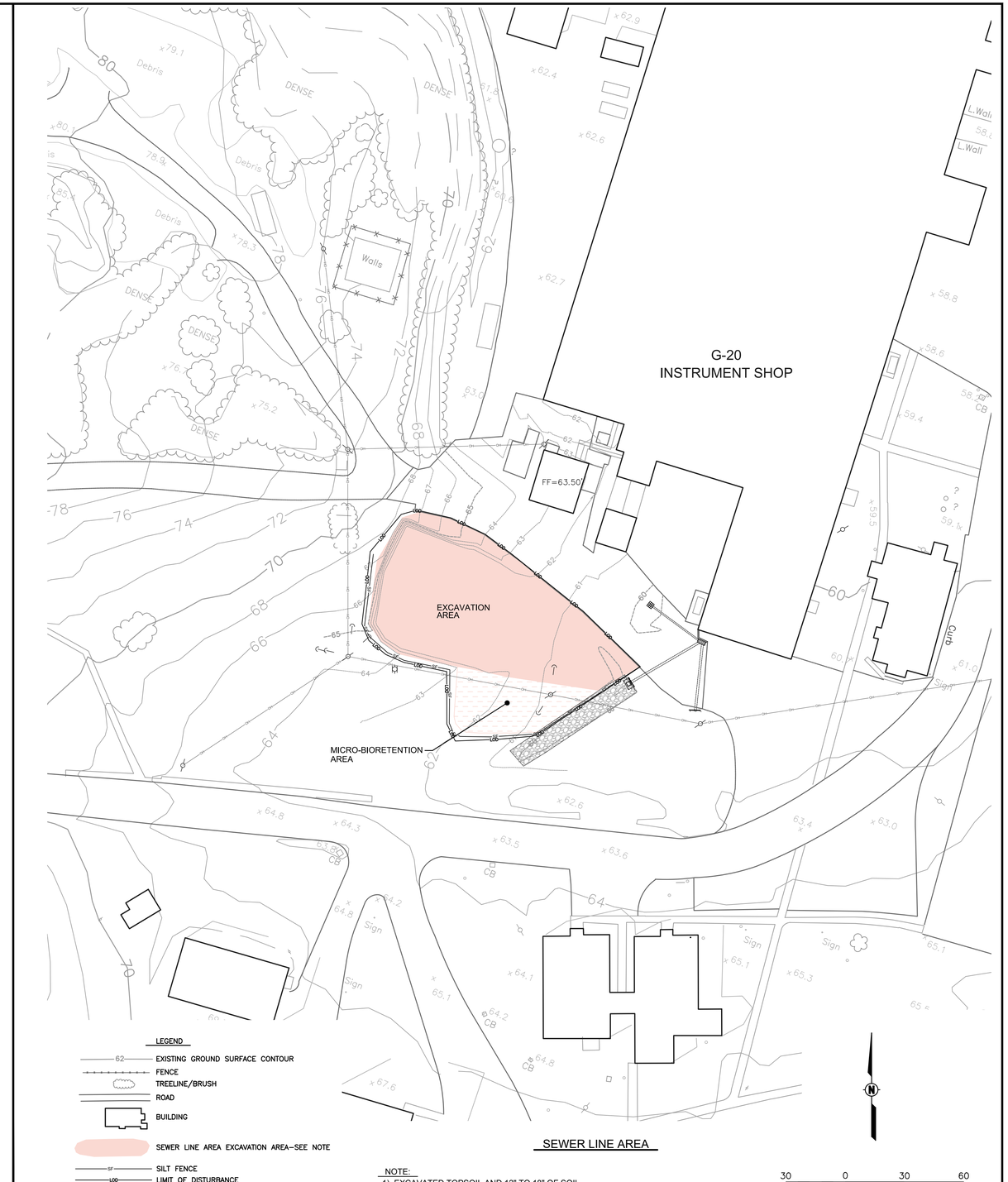
E:\Landfills\Elkton_ATK\As-Built\Fig_4-1_Remediation-Areas-Location-Plan



PESTICIDE AREA

NOTE:
1) EXCAVATED TOPSOIL AND 12" TO 18" OF SOIL. PLACED EXCAVATED SOILS IN PESTICIDE AREA CAP AREA. FILLED TO ORIGINAL GRADE WITH CLEAN SOIL.

50 0 50 100
1" = 50'



SEWER LINE AREA

NOTE:
1) EXCAVATED TOPSOIL AND 12" TO 18" OF SOIL. PLACED EXCAVATED SOILS IN PESTICIDE AREA CAP AREA.

30 0 30 60
1" = 30'

E:\Landfills\Elkton_ATK\As-Built\CD-1_Excavation-Plan

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

NO.	DATE	ISSUE/REVISION	APP
1	9/25/19	CONSTRUCTION DOCUMENTATION	MGR
0	10/1/18	FINAL REGULATORY REVIEW	MGR

Designed: MGR
Checked: KRM
Drawn: KJC
Submittal Date: 6/15/2018

GEI Consultants
100 Campbell Blvd., Suite 103
Exton, Pennsylvania 19341
484-872-7000

SYNGENTA CROP PROTECTION
OLIN CORPORATION
THIOKOL SITE
ELKTON, MARYLAND
GEI Project 1610692

CONSTRUCTION DOCUMENTATION

EXCAVATION AND RE-GRADING PLAN

DWG. NO. CD-1

Figure No. 5-1

FILTER LOG EROSION CONTROL

FILTER LOG EROSION CONTROL

RIDGE AREA

BURN PIT AREA

TEMPORARY SWALE A-2

INCINERATION AREA

CAP AREA - GCL & FINAL COVER SOILS

FILTER LOG & SUPER SILT FENCE EROSION CONTROL

FILTER LOG EROSION CONTROL

TAR AND ASH AREA

SILT FENCE EROSION CONTROL

LEGEND

- 100 — EXISTING GROUND SURFACE CONTOUR
- 95 — RESTORATION AREA GRADE
- FENCE
- TREELINE/BRUSH
- ROAD
- BUILDING
- EDGE OF WATER
- CAP AREA – GCL & FINAL COVER SOILS
- RESTORATION AREA
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- FL-18 — FILTER LOG
- LOD — LIMIT OF DISTURBANCE
- TEMPORARY SWALE

PESTICIDE AREA

NOTES:

1) EXCAVATED AREAS FILLED TO ORIGINAL GRADE WITH CLEAN SOILS. ALL DISTURBED AREAS ARE SEEDED.

50 0 50 100

1" = 50'

G-20
INSTRUMENT SHOP

CLEAN AND RE-SEAL EXISTING ASPHALT AND SEAL ALONG CONCRETE FOUNDATIONS SEAL COATED AREA OUTLINED IN RED (2 AREAS) THE REMAINING BLUE AREA LEFT WITH STONE SUBGRADE FOR FUTURE WORK ASSOCIATED WITH THE G-17 BUILDING REPLACEMENT.

FF=63.50'

AREA SEAL COATED

AREA SEAL COATED

AREA NOT SEAL COATED

AREA NOT SEAL COATED

PAVEMENT DRAINAGE DIVERSION BUMP

CATCH BASIN TOP=59.71' INV.=58.49' (8" PVC)

INV.=58.33' (8" PVC)

CATCH BASIN TOP=60.21'

INV.=58.23' (12" PVC)

INV.=58.18' (12" PVC)

INV.=59.03' (12" PVC)

ASPHALT CURB

WATER VALVE

OVERHEAD ELECTRIC

PVC CLEANOUT TOP=61.10 INV.=57.84

SIP

4" PVC INV.=59.07

TOP HEADWALL=60.75' INV.=58.75', PROTECT CULVERT

EXISTING RIPRAP LINED DITCH

MICRO-BIORETENTION

SILT FENCE

MD CL1 RIPRAP

4" PERFORATED PIPE WITH STANDPIPE FOR OVERFLOW TOP=61.05 INV.=57.64

LEGEND

- 62 — EXISTING GROUND SURFACE CONTOUR
- 65 — AS-BUILT GRADE
- FENCE
- TREELINE/BRUSH
- ROAD
- BUILDING
- SEWER LINE AREA ASPHALT CAP
- SF — SILT FENCE
- LOD — LIMIT OF DISTURBANCE
- SIP — STANDARD INLET PROTECTION

SEWER LINE AREA

30 0 30 60

1" = 30'

NO.	DATE	ISSUE/REVISION	APP
1	9/25/19	CONSTRUCTION DOCUMENTATION	MGR
0	10/1/18	FINAL REGULATORY REVIEW	MGR

Attention:

0 1"

If this scale bar does not measure 1" then drawing is not original scale.

Designed: MGR
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SYNGENTA CROP PROTECTION
OLIN CORPORATION

THIOKOL SITE
ELKTON, MARYLAND

GEI Project 1610692

CONSTRUCTION DOCUMENTATION

CAPPING, RESTORATION AND PAVING PLAN

DWG. NO. CD-2

Figure No. 5-2

E:\Landfills\Elkton_ATK\As-Built\CD-2_Capping-Restoration-Paving-Plan

Appendix A

Daily Field Reports and Construction Photolog

Daily Field Reports

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-10-2019
Client:	Olin and Syngenta	**Report No.:**	1
Contractor:	ENTACT	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Rain Temperature: 80

Contractor Work Force:

ENTACT
Davide Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter Foreman
Wright Brothers
Hank Wright, Jason Stacey, and Dalton Grant

Observations:

Contractor start: 7:00 am End: 11:00 pm

After completing the necessary steps to obtain the badges, the ENTACT crew and I met back at the onsite project office. Rain continued to fall. Local forecasts and radar suggested that the rain would continue throughout the day with little to no breaks. The crew decided to call it a “rain day” and left the site at approximately 11:00 am. Vegetation management/removal crew was not on site either due to the weather.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-11-2019
Client:	Olin and Syngenta	**Report No.:**	2
Contractor:	ENTACT	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny Sky Temperature: 72

Contractor Work Force:

ENTACT crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers (Vegetation Clearing)

Hank Wright, Dalton Grant, and Jason Stacey

Observations:

Contractor start: 7:00 am End: 5:00 pm

The contractor and sub-contractor were both on site for 7:00 am show up meeting at the laydown area of the project site.

The Wright Brothers crew activities were taking place on the north side of the "burn/incinerator" area and included felling of trees, chipping the trees and tops, and grinding stumps. The crew is utilizing a hand tools (chainsaws) and a Kubota SVL 90 Skid Steer to bring felled trees to a Bandit Intimidator 1390XP chipper. A cable from a winch mounted on the chipper pulls the trees to the receiving end of the machine. Chips are being piled adjacent to the work area. A Carlton SP 7015 stump grinder is being utilized to grind stumps to a level stumps to ground level.

The ENTACT crew activities were taking place at the Sewer Line Spoil Pile location and included tree trimming and clearing out brush. The crew was utilizing hand tools (reciprocating saws) and a Bandit 200XP chipper to mulch removed vegetation. Mulched materials are being thin spread at upland locations adjacent to the area to be disturbed. The crew was also utilizing a Caterpillar 259D skid steer and Ford F750 dump truck. The crew was installing the sediment control devices at this location. The filter berm will be installed around the entire area to be disturbed.

Each of the crews have equipment staged at the laydown area at the site. A Vermeer RTX250 trencher, a Caterpillar D5K2 LGP Dozer, and a Caterpillar 308E2 CR excavator are staged at the laydown yard. In addition, an Enermax KL TSX generator and a 550-gallon off road diesel fuel AST are located adjacent and south of the field office.

Meeting notes for today (provided by Mike Ruetten)

June 11 Status Meeting Elkton

Safety--- Entact reported training being completed for staff and reminders for site bio-hazards such as ticks and poison ivy. Rich Z reported no comments from site staff on Entact activities to date and that means everything is good.

Project Status--- Peter reported mobilization continued and is almost complete for the intended staff and equipment, clearing of the work areas was ongoing along with installation of erosion controls. The site construction entrance was improved and some clearing was done to improve the line of site.

Anticipated Activities: Peter reported that they intend to continue with clearing and erosion controls. May move over to the plant site later in the week. Potentially will be working on the soil excavation on the plant site early next week.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-11-2019
Client:	Olin and Syngenta	**Report No.:**	2
Contractor:	ENTACT	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

RFI's----- Rich and George brought up the need to discuss the G-11 building area excavation and there could potentially be a meeting onsite next week when George was onsite. Mike R. will send an email with questions for the site facility engineer and building designer. The oil tank location makes excavation difficult for the previous building footprint.

Open Topics—Mike R requested information on borrow sites from Entact if hauling may start in the next two weeks, Peter and Jeff C will coordinate site visits in the coming weeks for soil and gravel.

Next meeting June 18.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-12-2019
Client:	Olin and Syngenta	**Report No.:**	3
Contractor:	ENTACT	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny Sky Temperature: 75

Contractor Work Force:

ENTACT crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers (Vegetation Clearing)

Hank Wright and Stacey

Observations:

Contractor start: 7:00 am End: 5:00 pm

The contractor and sub-contractor were both on site for 7:00 am show up meeting at the laydown area of the project site.

The Wright Brothers crew activities were taking place on the north side of the "burn/incinerator" area and included felling of trees and chipping the trees and tops. The crew is utilizing a hand tools (chainsaws) and a Kubota SVL 90 Skid Steer to bring felled trees to a Bandit Intimidator 1390XP chipper. A cable from a winch mounted on the chipper pulls the trees to the receiving end of the machine. Chips are being piled adjacent to the work area.

The ENTACT crew morning activities took place at the Sewer Line Spoil Pile location tar and ash location. Work activities at these locations included trimming trees and clearing out brush. The crew was utilizing hand tools (reciprocating saws) and a Bandit 200XP chipper to mulch the removed vegetation. The crew was also utilizing a Caterpillar 259D skid steer and Ford F750 dump truck. The crew was installing the sediment control devices at this location. The filter berm will be installed around the entire area to be disturbed (this has yet to be completed).

During the afternoon, the ENTACT crew moved to locations near the ridge area. The crew is trimming trees and removing brush. Vegetation removed from this area is being chipped.

Each of the crews have equipment staged at the laydown area at the site. A Vermeer RTX250 trencher, a Caterpillar D5K2 LGP Dozer, and a Caterpillar 308E2 CR excavator are staged at the laydown yard. In addition, an Enermax KL TSX generator and a 550-gallon off road diesel fuel AST are located adjacent and south of the field office.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-13-2019
Client:	Olin and Syngenta	**Report No.:**	4
Contractor:	Entact	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Rain AM, Mostly Cloudy PM Temperature: 69 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers Crew – (Vegetation Clearing)
Hank Wright, Dalton Grant, and Jason Stacey

Observations:

Contractor start: 12:00 PM End: 5:00PM

Due to moderate to heavy rain overnight and into the early and mid-morning, ENTACT elected to shut down operations for the morning. At 7:00 am, Peter Porter indicated that if the weather cleared the crews would likely start back up around 11:00 am. At 11:40 am, ENTACT sent a message indicating that they would be back to working during the afternoon.

During the afternoon, the ENTACT crew focused on clearing vegetation at the ridge area. The crew was utilizing hand tools for this work. The crew brought the Caterpillar 308 CR excavator to the end of the road near the fence south of the ridge area.

Wright Brothers concentrated on felling trees and chipping on the northwest portion of the burn/incinerator area. The crew is utilizing hand tools (chainsaws) and a Kubota SVL 90 Skid Steer to bring felled trees to a Bandit Intimidator 1390XP chipper. Chips are being piled adjacent to the work area.

Each of the crews have equipment staged at the laydown area at the site. A Vermeer RTX250 trencher, and a Caterpillar D5K2 LGP Dozer are staged at the laydown yard. In addition, an Enermax KL TSX generator and a 550-gallon off road diesel fuel AST are located adjacent and south of the field office.

By: Jeff Carlson **Reviewed By: MGR**

GEI Consultants

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-14-2019
Client:	Olin and Syngenta	**Report No.:**	5
Contractor:	Entact	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Partly Cloud Temperature: 70 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers Crew – (Vegetation Clearing)
Dalton Grant and Jason Stacey

Observations:

Contractor start: 7:00 AM End: 5:00PM

ENTACT crew met at the laydown area office for show up meeting. Topics covered work plan for the day and safety topics. Safety discussion related to biological hazards potentially encountered in the field, being fit for work, and being alert and aware. The ENTACT crew is scheduled to work up at the ridge area. Pete Porter of ENTACT indicated that the Wright Brothers crew would be working at the sewer line area.

The ENTACT crew moved the Caterpillar D5K2 LGP dozer to the ridge area. The crew now has the dozer, Caterpillar 308 E2 CR, and the Bandit 200XP chipper at the ridge area. The crew completed clearing and chipping activities at approximately 3:00 PM. They then began to bring erosion control items to the ridge area through the rest of the day.

Wright Brothers are working at the sewer line area today. The crew is felling trees and clearing vegetation. Trees and vegetation removed from this area are being chipped on site into a truck. These chips are then transported to the laydown area and staged for future use on roads or for stabilization needs. The crew is completing this work utilizing chainsaws, the Bandit Intimidator 1390XP, and a covered truck for hauling the chipped vegetation. The crew was off site approximately 3:00 PM.

Each of the crews have equipment staged at the laydown area at the site. A Vermeer RTX250 trencher is staged at the laydown area. In addition, an Enermax KL TSX generator and a 550-gallon off road diesel fuel AST are located adjacent and south of the field office.

Clearing progress is as follows:
Areas 1 through 8 are 100% complete.
Area 9 is at 85% complete
Area 10 is 100% complete

This week saw two significant rain events. According to NOAA, 1.73 inches of rain fell on Monday June 10, 2019 and 1.74 inches of rain fell on Thursday June 13, 2019. The ENTACT certified erosion control inspector has conducted erosion control inspections after each of these rain events.

By: Jeff Carlson **Reviewed By: MGH**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-15-2019
Client:	Olin and Syngenta	**Report No.:**	6
Contractor:	Entact	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Temperature: 75 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers Crew – (Vegetation Clearing)
Personnel not on site today

Observations:

Contractor start: 7:00 AM End: 3:45 PM

ENTACT crew met at the laydown area office for tailgate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to install filter logs/sediment logs at locations 5, 6, 7, and 8. Safety discussion today involved being aware of your surroundings, when lifting heavy objects, get assistance, and awareness in the vicinity of heavy equipment that is being operated.

The ENTACT crew has been moving materials to locations 5, 6, 7, and 8 with pick-up trucks, dump truck, and Caterpillar 259D skid steer. The Caterpillar 308 E2 CR mini excavator is at the work location.
The crew has been concentrating on locations 7 and 8 during the morning hours. This is the area of the project with steep slope. The crew has raked the area and cleared vegetation debris prior to installation of the erosion control measure. The crew is driving stakes through the filter log every 4 feet to a depth of at least 12". Proper overlapping of filter logs was observed where separate filter logs met. Compost (leaves) has been placed to ½ the height of the uphill side of the filter log.

During the afternoon, the crew moved over to location 5 and 6 to work on filter logs at that location. The crew finished up on location 6. Location 5 is not complete.

Erosion control estimated completion percentages:
Locations 1, 2, 7, and 8 are 100% complete.
Location 3, 5, and 6 is 75% complete
Location 4, 9, 10 are 0% complete

Precipitation: According to NOAA, precipitation was not recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

GEI Consultants

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-17-2019
Client:	Olin and Syngenta	**Report No.:**	7
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Partly Sunny Humid Temperature: 92 degrees
According to NOAA, 0.10" precipitation reported for the past 24 hours.

Contractor Work Force:
ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon (Health and Safety Officer. Peter Porter is the Project Manager.
Wright Brothers Crew – (Vegetation Clearing)
Jason Stacey, Dalton Grant, Hank Wright

Observations:
Contractor start: 7:00 AM End: 5:00 PM

ENTACT and Wright Brothers crew met at the laydown area office for tailgate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue installing filter logs/sediment logs at locations 3, 4, 5, 6, and 10. Safety discussion today was regarding lightning safety.

The ENTACT crew began the day moving materials to locations 5 and 6 with pick-up trucks, dump truck, and Caterpillar 259D skid steer. The Caterpillar 308 E2 CR mini excavator is parked at location 5.

After completing the work at area 5 and 6, the crew moved to area 3 and 4 to install filter logs.
I met with Peter Porter and Kelly McIntosh to discuss several items.

Peter Porter, Kelly McIntosh, and I called and spoke with Mike Ruetten regarding the following issues:

- Utilizing filter logs at location 10
- The swale at location 9
- Anchor trenching
- Clearing trees for turning around at the north side (on the north side of the road) of location 9

Late morning, the crew moved to location 10 and began to install erosion control measures around the perimeter of the work area.

During the afternoon, an ENTACT crew was continuing with installation of erosion control measures at location 10. One ENTACT crew member was operating the Caterpillar 308E2 CR mini excavator at the northwest corner of location 9 and moving logs off to the side.

Peter Porter, Kelly McIntosh, and Jeff Carlson met with a lineman from The Tri M Group, LLC (the company that handles Orbital ATK's power/line needs at the plant) regarding the guy wires located on the power pole at the east side of location 10. The guy wires on the south side of the pole are in the way of excavating for the Micro Bioretention pond. According to the lineman, the guy wires on the south side of the power pole were not effective at this time and could be taken off without affecting the stability of the pole. He indicated that if Orbital ATK personnel would like a support wire to be added, they would run a wire to the next pole to the south and add a guy wire to that pole. The lineman indicated that he would speak to his contact at the facility regarding the need to add the additional

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-17-2019
Client:	Olin and Syngenta	**Report No.:**	7
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

support. The lineman removed the guy wire.

Wright Brothers are at location 9 felling trees and chipping vegetation during the morning

During the afternoon, Wright Brothers continue with felling trees and chipping vegetation.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, and 10 are 100% complete.
Location 9 0% complete

Precipitation: According to NOAA, precipitation 0.10” precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-15-2019
Client:	Olin and Syngenta	**Report No.:**	8
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Cloudy Temperature: 85 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon. Peter Porter is the foreman.

Wright Brothers Crew – (Vegetation Clearing)
Hank Wright, Jason Stacy, and Dalton Grant

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT and Wright Brothers crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to remove vegetation on the north side of the access road north of location 9 and remove logs from and off location 9. For Wright Brothers, their plan is to finish up with the clearing today.

Safety discussion today related to keeping focus on the task what you are working on. Awareness, and not rushing trough tasks.

During the morning, the ENTACT crew was mobilizing to the north side of the access road north of location 9 to begin clearing of vegetation to make room for trucks to turn around when bringing impacted soils to the fill area. An ENTACT crew member is running the Caterpillar 308E2 CR mini excavator at location 9. The operator is moving logs from the area and placing them outside of the LOD line perpendicular to surface water flow.

10:00 AM Conference Call notes are as follows:

- Safety Topic, Peter Porter (ENTACT)
  As of today, we have had safe operations at the work site. We have been getting some thunderstorms, but, they are coming in after the work day has been completed.

  A few ticks have been found by individuals on site, but, they have been removed before they were able to bite.

  Safety discussions occur each morning during the tailgate meeting. Topics are discussed and individuals working on the project can discuss or ask questions.

- Project Status:
  Rain has slowed things down, wet conditions exist. ENTACT plans to begin excavation activities Wednesday, June 19, or Thursday, June 20. Erosion control measures are installed at all location except location 9.
- Clearing/Grubbing:
  The outlying areas of the project have been cleared and are ready for excavation. Location 9 is

nearly completed. The clearing contractor anticipates completing clearing either this afternoon or tomorrow.

- Schedule:
  ENTACT anticipates excavation to begin late tomorrow or Thursday. ENTACT asked what can be expected of the structure located in the "burn pit" area. The structure should be cinder block construction. Extensive soil testing was done at this location. Analytical results did not indicate an issue at this location.
- Submittals:
  Clean certification for backfill and cover soil will be submitted today.
- Guy Wire:
  Peter Porter, Kelly McIntosh, and Jeff Carlson met with a lineman from The Tri M Group, LLC (the company that handles Orbital ATK's power/line needs at the plant) on June 17, 2019, regarding the guy wires located on the power pole at the east side of location 10. The guy wires on the south side of the pole are in the way of excavating for the Micro Bioretention pond. According to the lineman, the guy wires on the south side of the power pole were not effective at this time and could be taken off without affecting the stability of the pole. He indicated that if Orbital ATK personnel would like a support wire to be added, they would run a wire to the next pole to the south and add a guy wire to that pole. The lineman indicated that he would speak to his contact at the facility regarding the need to add the additional support. The lineman removed the guy wire. For the guy wire hitting the pavement, the lineman directed contractor to put a PVC tube around the wire for protection.
- Request for information:
  None
- Change Orders:
  None
- G-11 Building:
  ENTACT will be providing a scope of work for this area that will be ready before June 25, 2019.
- Logs from felled trees:
  Logs will stay on site.
- Action Items/follow-up/miscellaneous:
  Rich Zambito noted that he has a conference room set up for the kick off meeting for the EPA visit in early July.
  A contractor will be on site in July to abandon monitoring wells on the project site.
  On June 26, 2019, there is a scheduled test at the facility and personnel will need to be off of the hill area (locations 2, 3, 4, 5, 6, 7, 8, and 9).

After the 10:00 AM meeting, Peter Porter, Jeff Carlson, George Crouse, and Kelly McIntosh drove to the location where top soil will be coming from. The location is just east of the intersection of Maryland 279 and Maryland 545. The location was described as historically agricultural. Based on review of recent aerial photographs (Apple Maps Application), the location appears to be developed as an agricultural property. Evidence to suggest that this parcel of land had historically been utilized as industrial or commercial property (non-agricultural) was not observed. George Crouse agreed and approved of top soil originating from this location.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-15-2019
Client:	Olin and Syngenta	**Report No.:**	8
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Also today, samples were collected from the Elk Mills Quarry (by ENTACT personnel) for the structural fill (screenings) and road base (MD-CR6) for geotechnical testing. These materials were submitted to Geo-Technical Associates, Inc., for testing.

Late morning, Jeff Carlson and Helen Robinson toured the project site at location 2 through 9. The project was discussed during the walk through of these areas.

The Wright Brothers are continuing to fell trees and chip vegetation. The crew is utilizing hand tools, Bandit Intimidator 1390XP chipper, and Kubota SUL 90 skid steer.

During the afternoon, ENTACT personnel continued with clearing north of location 9 and moving logs within location 9.

The Wright Brothers continued with felling trees and chipping vegetation during the afternoon.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, and 10 100% complete.
Location 9, 0% complete

Clearing at location 9 is at approximately 95%. All other locations are cleared and ready for excavation activities.

Precipitation: According to NOAA, 1.78” precipitation reported for the past 24 hours. The ENTACT certified erosion control inspector conducted an inspection of the erosion control measures installed on the project site.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-19-2019
Client:	Olin and Syngenta	**Report No.:**	9
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Temperature: 88 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary(Health and Safety Oficer), and Artis Camon. Peter Porter is the project manager.

Wright Brothers Crew – (Vegetation Clearing)
Hank Wright

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT and Wright Brothers crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to move logs and trim vegetation from location 9. The crew will also be preparing and beginning to install erosion control measures at the south end of location 9 (super silt fence and filter log). The crew will also be starting the drainage swale around location 9.

For Wright Brothers, their plan is to finish final clearing cleanup of location 9.

Safety discussion today involved going over the ENTACT Hazard Identification Cards. The crew went over a variety of hazards in the work place printed on the cards and discussed.

The ENTACT crew has mobilized to location 9. The crew is operating the Caterpillar 308E2 CR mini excavator and Caterpillar 259D skid steer involving cleanup activities at location 9 (moving logs). Crew members are also using hand tools to complete trimming at this location.

Wright Brothers are operating a Kubota SUL 90 skid steer with grapple attachment to move logs out of location 9.

During the afternoon, ENTACT personnel are back out at location 9. The crew has the Vermeer RTX 250 Trencher at location 9. The crew continues operating the Caterpillar 308E2 CR excavator and the Caterpillar D5K2 dozer at location 9 conducting preparation work.

The rest of the crew has the Caterpillar 259D skid steer and is working to stabilize and entrance into the location 2 area. The crew is placing vegetation and chips on the entrance to this area.

Mid-afternoon, ENTACT crews have laid out the locations to be trenched to install silt fence and super silt fence. The crew began operating the Vermeer trencher starting at the northwest corner of location 9.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-19-2019
Client:	Olin and Syngenta	**Report No.:**	9
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The Wright Brothers have completed clearing and chipping operations. Hank Wright is onsite during the afternoon loading the Kubota skid steer and mower attachment onto a trailer to move off-site.

Surveyor was on site this afternoon. Departed mid-afternoon.

Yesterday, June 18, 2019, I had a conversation with Peter Porter of ENTACT regarding traffic patterns and the potential need of flagging personnel during hauling operations. Peter indicated that he had appropriate staff available.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, and 10 are 100% complete.
Location 9, 0% complete

Clearing is now 100% complete.

Precipitation: According to NOAA, 0.20” precipitation recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-20-2019
Client:	Olin and Syngenta	**Report No.:**	10
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy Temperature: 88 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary(Health and Safety Oficer), and Artis Camon. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue with installation of silt fence and cleaning up on the south side of Location 9 with the excavator.

Safety discussion today related to the recent rainy conditions we have been experiencing. The site received nearly 2.00" of rain overnight creating slippery surfaces in our work areas.

The ENTACT crew has mobilized to location 9. The crew is continuing to prepare location 9 and is utilizing the Caterpillar 308E2 CR mini excavator for this work activity.

Remaining crew members are continuing with silt fence installation.

During the afternoon, the crews continued with work on location 9.

Wright Brothers are back on site to take care of a few stumps that were too high. A one-man crew is completing this task.

Earlier today, while making observations of the incinerator structure within location 9, I observed materials that appear to be transite. Transite is a cementitious material that contains asbestos fibers. The material was commonly placed on walls in situations where high heat levels were present. Kelly McIntosh was notified of the observed material. Orbital ATK provided the name of the certified asbestos abatement contractor that is used at the facility. A scope of work will be created and provided to the abatement contractor.

Moderate to heavy rain fall beginning at approximately 2:30 PM. This lasted for about a half hour.

The ENTACT crew completed installing the Super Silt Fence and associated filter log.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, and 10 are 100% complete.
Location 9, 70% complete

Clearing is now 100% complete.

Precipitation: According to NOAA, 1.76" precipitation recorded for the past 24 hours.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-20-2019
Client:	Olin and Syngenta	**Report No.:**	10
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

By: Jeff Carlson	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-21-2019
Client:	Olin and Syngenta	**Report No.:**	11
Contractor:	Entact	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 75 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, Carlos McQuary, and Artis Camon (Health and Safety Officer). Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to finish up with installation of silt fence and begin excavation at location 1.

Safety discussion today related to being aware of and checking for ticks during the day and after work.

The ENTACT crew has mobilized to location 9. The crew is working on the silt fence.

Part of the crew was mobilizing the Caterpillar 308 E2 CR mini excavator to location 1 to begin with excavation activities.

The crew has completed the silt fence installation at location 9.

During the afternoon, Entact began hauling soils from location 1 to location 9. The crew is utilizing two F-150 dump trucks. The crew is loading the dump trucks with the mini excavator. The material is spread out using the Caterpillar D5K2 dozer after the material is placed at location 9. Proper traffic patterns are being utilized. The crew is sweeping material from the exterior of the dump trucks before leaving the loading area in order to reduce the risk of spreading impacted soils while transporting to location 9.

14 dump truck loads (approximately 98 yards) of soil was removed and hauled to location 9.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is now 100% complete.

Precipitation: According to NOAA, 0.07" precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-21-2019
Client:	Olin and Syngenta	**Report No.:**	11
Contractor:	Entact	**Page:**	2 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-22-2019
Client:	Olin and Syngenta	**Report No.:**	12
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 85 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue to excavate soils at location 1 and haul them to location 9.

Today the safety topic was communication while hauling materials on the approved traffic routes. Be aware of the other heavy equipment. Use a spotter if necessary when backing into a work area.

The Entact crew is hauling soils from Location 1 to location 9.

Soil is being excavated at location 1 utilizing the Caterpillar 308 E2 CR mini excavator to load the dump trucks. Entact is running two dump trucks to haul material to location 9.

At location 9, the impacted material is placed and the Caterpillar D5K2 dozer grades the impacted soils.

The crew was also conducting rough grading activities and review of the major contour lines as they are staked.

Proper traffic patterns are being utilized. The crew is sweeping material from the exterior of the dump trucks before leaving the loading area in order to reduce spreading of soils while transporting to location 9.

The Caterpillar 259D skid steer is being used to "dress up" the completed portions of the excavated area and to clean up tracking onto the roadway.

This has been occurring in the morning and afternoon.

34 dump truck loads (approximately 238 yards) of soil were removed and hauled to location 9.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-22-2019
Client:	Olin and Syngenta	**Report No.:**	12
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is now 100% complete.

Excavation of location 1 is approximately 85% complete

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-24-2019
Client:	Olin and Syngenta	**Report No.:**	13
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 85 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue and complete excavation of soils at location 1 and haul them to location 9. After that is completed, move on to location 2.

Today the safety topic was biological hazards. Watch for snakes and spiders in supplies being unpacked and in the portable bathrooms.

The Entact crew is hauling soils from Location 1 to location 9 during the first part of the morning. The crew finished up at approximately 10:00 am. The crew hauled approximately 77 yards of soil from location 1 today.

Soil is being excavated at location 1 utilizing the Caterpillar 308 E2 CR mini excavator to load the dump trucks. Entact is running two dump trucks to haul material to location 9.

At location 9, soils are placed and the Caterpillar D5K2 dozer grades the material.

The Caterpillar 259D skid steer is also being used to clean up.

Proper traffic patterns are being utilized. The crew is sweeping material from the exterior of the dump trucks before leaving the loading area in order to reduce spreading of soils while transporting to location 9.

After completing excavation work at location 1, the crew moved back to the laydown area to unload the GCL from a semi-trailer. The GCL was unloaded utilizing straps and the excavator to lift the rolls off the semi-trailer. They were then placed on pallets within the laydown area.

During the afternoon, the crew began to excavate soils from location 2. The crew worked at this are all afternoon. Approximately 196 yards of soils were removed from location 2 and placed on the north side of location 9.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-24-2019
Client:	Olin and Syngenta	**Report No.:**	13
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is now 100% complete.
Excavation of location 1 and 2 is 100%

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-25-2019
Client:	Olin and Syngenta	**Report No.:**	14
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 85 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:45 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to begin excavation activities at locations 3 and 4 and haul soil to location 9.

Today the safety topic was related to heat stress. Today, high temperatures and humidity during work ours can be contributors to heat stress and heat stroke. Drink plenty of fluids and take breaks to cool down.

The first task for the crew was to unload a semi-trailer hauling the second load of GCL. The crew off loaded the rolls of material with lifting slings and the Caterpillar 308 E2 CR excavator. The rolls are being staged on pallets within the laydown area.

The Entact crew is excavating soil from location 4. The crew has not started to haul the soils.

Early afternoon, the Entact crew is starting to haul excavated soils to location 9. Entact has brought another piece of equipment to the project to assist with excavation tighter areas. A Kubota mini excavator is also involved with excavations at location 3.

Another load of GCL was unloaded during the afternoon. The GCL is stored in the same manner as previously received material.

At location 9, the soils are placed and the Caterpillar D5K2 dozer grades the impacted soils.

The Caterpillar 259D skid steer is also being used to assist with work activities.

The crew moved approximately 105 yards of soil from locations 3 and 4.

Mid-afternoon I walked location 9 with Peter Porter discussing and looking at the stumps, cut areas, and fill areas.

The crew was off site at 5:45 PM

Construction meeting notes:

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-25-2019
Client:	Olin and Syngenta	**Report No.:**	14
Contractor:	Entact	**Page:**	2 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Safety:
Entact discussed safety issues that related to biological hazards as well as heat hazards.

Progress update from Peter Portor:
Clearing is 100% complete
Installation of erosion control is 100% complete
Excavation of soil from locations 1 and 2 are 100% complete. 406 yards of soil was removed from location 1 and 196 yards was removed from location 2.

The crew will be working at locations 3 and 4 today, excavation soils and hauling to location 9.

The surveyor was out on the project last week to stake the contour lines at location 9.

Several stumps have been removed while grading to allow for cuts on the north side of location 9. Some additional stumps may have to come out. After it is looked at closer later today more will be known about additional stump removals. Kelly McIntosh indicated removal of stumps to make cuts would be OK.

Construction is going well. Two loads of GCL have arrived yesterday and today.

Project Submittals:

After all the GCL arrives, Entact will provide appropriate documentation.

Entact has ordered the #10 woodland seed mix. Seeding will commence when seeds arrive. Entact will also provide appropriate documentation.

Change Orders:
For the G-11 building, Entact has nearly completed the change order. Information regarding concrete was the last piece they needed before finalizing. Entact indicated that they would have this ready by the end of business today.

Two asbestos abatement contractors were on site today to take a look at the transite near the incinerator. The contractors are supposed to provide a cost in the next day or two. The work may have to take place on a Saturday due to their schedules. A ten-day notification is not needed. However, a courtesy notification to the state will be required.

The contractors had two questions. Will a hygienist be desired to inspect the work? Do you desire to have personnel on site during the demolition of the incinerator? It was decided that neither of these services would be needed. Jeff Carlson is to make observations after work is completed and during demolition of the incinerator.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-25-2019
Client:	Olin and Syngenta	**Report No.:**	14
Contractor:	Entact	**Page:**	3 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Miscellaneous:
Entact is to remove a small dirt pile located west of the G-11 building. The material is covered by plastic.

Mike Ruetten discussed the rain spread sheet that documents the rainfall and how work activities have been affected by precipitation. Mike mentioned that based on the wet conditions, Entact continued to make progress and worked through issues related to the wet conditions.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of location 1 and 2 is 100% complete
Excavation of location 3 15% complete
Excavation of location 4 is 65% complete

Precipitation: According to NOAA, 0.02” precipitation recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-26-2019
Client:	Olin and Syngenta	**Report No.:**	15
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 90 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:15 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue with excavation activities at locations 3 and 4 and haul soil to location 9. At 9:30 am today, we have to be out of the gated area (the "hill") until after a test takes place between 9:30 am to 11:00 am. During this time period, the crew will be removing the small pile of soil covered by plastic (northwest of location 10) and location 10.

Today the safety topic was related to heat stress. The crew went over Entact material related to working in the heat.

The crew worked at locations 3 and 4 until approximately 9:00 am. The crew hauled approximately 70 yards of soil to location 9.

At 9:00 am, the crew mobilized to the location 10 area to begin with excavating soils.

After the test was concluded, the crew mobilized back to location 3 and 4. The crew hauled one load of soil to location 9 before breaking for lunch.

During the early and mid-afternoon, the crew split up into to two groups. One group continued with locations 3 and 4 while the other group began work on locations 6 and 7.

At location 9, the soils are placed and the Caterpillar D5K2 dozer grades the impacted soils.

The Caterpillar 259D skid steer, Caterpillar 308E2 CR mini excavator, and Kubota K-008-3 mini excavator is also being used to assist with work activities.

Late afternoon, the crew has completed locations 3 and 4. Approximately 119 cubic yards of soil was removed and placed in location 9 today.

One load of soil was hauled from location 5 today, approximately 7 cubic yards.

The crew is beginning to excavate in location 6 and 7 late afternoon.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-26-2019
Client:	Olin and Syngenta	**Report No.:**	15
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Entact demobilized the Kubota mini excavator due to safety concerns when working on the hillside.

Late afternoon Peter Porter and I walked through location 9 and discussed the stump situation.

The crew was off site at 6:15 PM

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of location 1, 2, 3, and 4 is 100% complete. Peter Porter and myself assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Excavation of location 5 is 5% complete.
Excavation of location 6 is 10% complete.
Excavation of location 7 is 10% complete.
Work at location 10 is 10% complete.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-27-2019
Client:	Olin and Syngenta	**Report No.:**	16
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 96 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue with excavation activities at locations 5, 6, and 7 and haul soil to location 9.

Today the safety topic was again related to heat. It will be hotter today. The crews were reminded to not over exert, to keep hydrated, and to take breaks to cool down.

During the morning, the crew was concentrating on location 7. The crew was utilizing the Caterpillar 308 E2 CR. Later this morning, the crew will be mobilizing a Kubota mini excavator to work in tighter spots at the northern locations.

In order to bring dump trucks close enough to be loaded with soils removed from location 7, Entact obtained permission from Rich Zambito to remove the fencing at a location east of the fence gate. This area has already been damaged by a tree that fell on the fence. The property owner approved removal of the fence. Entact will repair the fence when removal of the soils has been completed. The fence was put back up after the work shift.

During the afternoon, the crew was hauling soils removed from location 5 and 7 to location 9.

The Caterpillar D5K2 LGP dozer is grading at location 9. General grading activities and removal of stumps in large cut areas only. Also rearranging of the remnants of the wooden structure associated with the shooting range in a manner to minimize/eliminate voids.

The Caterpillar 259D skid steer, Caterpillar 308E2 CR mini excavator, and Kubota KX71-3 mini excavator is also being used to assist with work activities.

Approximately 105 cubic yards of soil was removed from location 7 and placed in location 9 today.

Approximately 28 cubic yards of soil was removed from location 5 today and placed in location 9. Total amount removed from this area is 35 cubic yards due to the soil pile located within the excavation area (this was removed on Wednesday, June 26, 2019).

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-27-2019
Client:	Olin and Syngenta	**Report No.:**	16
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The crew was off site at 6:00 PM

The Asbestos clean up change order has been approved. Entact is in the process of scheduling the work.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, and 5 is 100% complete. Peter Porter and myself assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Excavation of location 6 is 10% complete.
Excavation of location 7 is 80% complete.
Work at location 10 is 10% complete.

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

A fox den was discovered north of location 9, north of the access road. Kits have been observed running around the site. The den is not in any of the work areas. The animals have not caused any issues with work. The work being conducted does not appear to be affecting the animals.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-28-2019
Client:	Olin and Syngenta	**Report No.:**	17
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 96 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work plan is to continue with excavation activities at locations 6, 7, and 8 and haul soil to location 9. Continue with grading activities at location 9.

Today the safety topic was again related to heat related to working on the steep hill side. Stressed the importance of footing, body positioning, and tying off.

During the morning, the crew was working at locations 6, 7, and 8. The crew was utilizing the Caterpillar 308 E2 CR at location 6. The crew is operating a KX71-3 mini excavator at location 7.

The crew completed location 6 today. 28 cubic yards of soil were removed from this location and placed in location 9.

During the afternoon, the crew was hauling soils removed from location 7 to location 9. These soils were loaded into dump trucks with the Caterpillar excavator.

An Entact crew is removing soil from location 8 (hillside) utilizing hand tools and buckets.

Approximately 70 cubic yards of soil was removed from location 7 and placed in location 9.

A Caterpillar 259D skid steer is also being used to assist with work activities.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, and 7 is 100% complete. Peter Porter and myself assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-28-2019
Client:	Olin and Syngenta	**Report No.:**	17
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Excavation at location 8 is 60% complete.
Work at location 10 is 10% complete.

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-29-2019
Client:	Olin and Syngenta	**Report No.:**	18
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 97 degrees

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, Cory Mallory, and Carlos McQuary. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Wright Brothers – Jason Stacey

County Environmental Company – Jesse Price and Erwine Chante

Observations:

Contractor start: 7:00 AM End: 4:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work activities include cleaning up at location 7 and 8. General grading activities at location 9. Excavating the east side of 9. Grinding stumps (Wright Brothers). Removal of transite material from location 9 (County Environmental Company).

Today the safety topic was related to staying focused on your work with a day off and a holiday coming up. Also, there will be asbestos removal occurring at location 9. Avoid this area while the work is occurring.

During the morning, the one crew was working at locations 7 and 8. The crew completed soil location 8 mid-morning and removed approximately 1.5 yards of soil. The crew hauled 3 loads of soil (approximately 21 cubic yards) originating at locations 7 and 8 to location 9. The Caterpillar 308 E2 CR excavator was used to load the soil into a dump truck.

The remaining Entact crew members were addressing access to excavation locations for backfilling activities that will begin on Monday.

After completion of removing the soils that originated at location 8, the excavator mobilized to location 9 to knock the incinerator structure down and to begin excavation of the east side of location 9. Approximately 63 cubic yards of soil was excavated from the east side of location 9.

The two-man crew from County Environmental Company was working at the incinerator structure location. The crew was picking up broken pieces of transite that was scattered around the structure. The crew wore appropriate safety gear. Tyvek suits were worn. Appropriate respiratory protection was also worn. The crew removed filled 16 bags with transite. The crew estimated the quantity to be approximately 100 square feet. The crew completed the work by mid-morning and was off site at approximately 10:30 am. Peter Porter and I each walked the area with the contractor after they had indicated that they had completed their cleanup. Field observations did not reveal evidence of transite on the structure or on the ground surface.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	06-29-2019
Client:	Olin and Syngenta	**Report No.:**	18
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Wright Brothers has one crew member on site operating a stump grinder. The operator seems to be on a good pace. He is completing at least 4 stumps per hour. Perhaps more.

During the afternoon, the crews continued working in the location 9 area. Wright Brothers continuing with stump grinding and Entact crews continued with excavation activities in location 9.

Peter Porter with Entact was operating the Caterpillar D5K2 to conduct general grading activities.

A Caterpillar 259D skid steer is also being used to assist with work activities.

At approximately 3:00 pm, the crews were beginning to clean up as a line of potentially severe storms were approaching the area.

The crews were off-site at 4:00 pm.

The transite has been removed. The incinerator structure has been knocked down.
Stump grinding is moving along at a good pace.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.

Precipitation: According to NOAA, 0.36” precipitation recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-01-2019
Client:	Olin and Syngenta	**Report No.:**	19
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 82 degrees

Contractor Work Force:

ENTACT Crew – David Meredith and Kevin King. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Wright Brothers – Jason Stacey

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Two crew members are sick today. Topics covered work plan for the day and safety topics. Today's work activities include grading at location 9. Installing silt fence on the east side of location 9. Tasks to prepare for receiving backfill materials tomorrow. Possibly roughing up and seeding location 1. Grinding stumps (Wright Brothers).

Today the safety topic was related to working around the rolls of GCL. While the materials are covered and secured, if one were to roll off the pile, it has the potential to injure you if you are working in that area.

During the morning, the Caterpillar D5K2 dozer and 308 E2 CR excavator were being operated. The excavator was used to break up the remaining portions of the incinerator base. The dozer was used for general grading activities.

An Entact crew has completed installation of the temporary silt fence on the east side of location 9.

Wright Brothers has one crew member on site operating a stump grinder. Late in the morning a belt broke on the grinder that put the equipment out of order. The equipment was repaired in the field to a point that it was operational until 3:30 pm. The replacement part is scheduled to arrive on July 6, 2019. According to Peter Porter, this will not slow him down. We anticipate that the grinding will be completed on Monday July 8, 2019. The operator indicated (during a mid-morning conversation) to me that he had about 40 stumps left to grind.

A Caterpillar 259D skid steer is also being used to assist with work activities.

During the afternoon, an Entact crew mobilized to location 1 to begin restoration activities. The crew conditioned the ground surface and then spread the #10 woodland seed mix that the project specifications call for. The crew also applied straw to the seeded surface. The straw contains a tackifier. Location 1 was completed today. Restoration is 100%.

The crews were off-site at 5:00 pm.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-01-2019
Client:	Olin and Syngenta	**Report No.:**	19
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1 is at 100%.

Precipitation: According to NOAA, 0.36" precipitation recorded for over the weekend.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-02-2019
Client:	Olin and Syngenta	**Report No.:**	20
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 82 degrees

Contractor Work Force:

ENTACT Crew – David Meredith and Kevin King. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Fredrick Ward Associates (surveying firm)

WC Logan and Sons Incorporated (top soil hauler/provider)

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Today's work activities include receiving top soil at locations 2, 3, and 4 and grading at location 9. Possibly seeding and mulching locations 2 and 3.

Today the safety topic was related to working around sub-contractor trucks as top soil will be brought on site with a dump truck. Make sure to have good communication with operator and make sure they can see you.

WC Logan & Sons Inc. has begun to bring top soil to the site. After the first load was delivered, Peter Porter and I visited the site to observe the stockpiled top soil.

During the morning, crew was utilizing the Caterpillar 259D skid steer and 308 E2 CR excavator to move top soil to locations 2 and 3.

During the afternoon, the crew began to use the Caterpillar D5K2 dozer to move top soil into the location 2 excavation. The skid steer has been moving top soil to the location 3 excavation.

Early afternoon, location 2 was 90% backfilled with top soil. Location 3 was 100% backfilled with top soil. The crew is preparing to seed and mulch the location 3 area. Location 3 was seeded and mulched. 9 loads of topsoil were received today. 117 cubic yards.

Mid-afternoon Peter Porter brought the dozer back up to location 9 to begin general grading activities.

The crews were off-site at 5:00 pm.

Meeting notes:

Peter Porter ran the meeting today.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-02-2019
Client:	Olin and Syngenta	**Report No.:**	20
Contractor:	Entact	**Page:**	2 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Safety Topic:

- No incidents or accidents to report. Safety discussion was related to safety around dump trucks and keeping focused on our tasks as a holiday and time off approaches.

Project Status:

- All the outlying areas have been excavated to 100%.
- Surveyors on site today to finish up bottom shots at excavations.
- We will begin backfilling excavations today (starting at locations 2, 3, and 4).
- Location 10 excavating is not complete.

(Peter Porter asked if soil from the micro-bioretention can be used as backfill material for the G-11 project. The response was that materials excavated from location 10 will go to location 9)

- Holiday work schedule is shut down on July 3 at 12:00 pm and resume work on the morning of July 8, 2019.
- Location 1 has been completed. Seeding and mulching has occurred.
- The week following the holiday week, work on location 10 (after the EPA visit on the 9th of July) will resume.
- Stump grinding is going well. Approximately ½-day to complete grinding. Likely to happen on July 3. Machine went down yesterday with broken belt.
- The transite material located by the incinerator area was removed on Saturday June 29, 2019, by County Environmental Company.
- ENTACT sent out a new schedule yesterday (July 1, 2019).
- Mike Ruetten asked if anyone had a comment regarding things to accomplish prior to the visit from the EPA on July 9, 2019.
  - George Crouse indicated that the EPA visit in our area of work would occur mid-morning.
  - Peter Porter asked that all that visit the 2 through 9 locations sign in at the field office at the laydown area.
  - PPE will be required in the work areas.
  - Cover the incinerator and shooting range remnants.

Project Submittals:

- GCL has been submitted.
- The seed has arrived. Peter Porter will provide that documentation.
- Peter Porter was not aware of any additional outstanding submittals.

RFI:

- None outstanding.

Change orders

- The three change orders that were submitted have been signed. The change orders

were for the transite removal, stump grinding, and G-11.

Action Items/Miscellaneous:

- A discussion occurred regarding roll-off dumpsters or temporary storage of concrete originating from the G-11 work. From this discussion, the following items came up:
  - 2 roll-off dumpsters will likely be needed for concrete disposal.
  - An oil tank will be removed from the area and there could be a small amount of piping encountered during excavation activities.
  - We should provide Rich Zambito with written notice that work in G-11 work area may create dusty conditions for those who park in the G-11 work area.
- Who will be attending the meeting with the EPA on July 9, 2019:
  - Peter Porter to provide a list of individuals that will attend the meeting.

Meeting ended 10:40 am

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1 and 3 is at 100%.
Backfilling at location 2 is 90%.
Backfilling at location 3 is 100%.
The surveyor completed surveying the bottom of excavation in location 7, 8, and east side of 9. All areas have been surveyed.
Received 9 loads of topsoil. 13 cubic yards/truck (117 cy)

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-03-2019
Client:	Olin and Syngenta	**Report No.:**	21
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Mostly Sunny Sky Temperature: 95 degrees

Contractor Work Force:

ENTACT Crew – David Meredith and Kevin King. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 12:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Topics covered work plan for the day and safety topics. Due to receiving nearly half inch of rain last night and the fact that today is just a half work day, Entact decided to hold off on brining in topsoil today. Instead, the crew will be preparing for the July 9, 2019 EPA visit and conducting general grading activities.

Today the safety topic was related to focusing on your work today with the holiday beginning this afternoon.

This morning, the crew was starting with house keeping tasks. Then they moved on to placing signs around location 9 that read “NOTICE AUTHORIZED PERSONNEL ONLY NO ENTRANCE”. It is also printed in spanish.

The crew was also operation the Caterpillar 308 E2 CR excavator and the D5K2 dozer to complete general grading activities and to move the debris from the incinerator structure into the area of location 5 that will be filled (west of the location of the incinerator). The crew moved 90% of the debris. The remainder will be moved on July 8. The debris will be covered that day.

The crew wrapped up activities at the site just before noon. The crew was off-site at 12:00 pm and will return on Monday, July 8, 2019.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1 and 3 is at 100%.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-03-2019
Client:	Olin and Syngenta	**Report No.:**	21
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Backfilling at location 2 is 90%

Precipitation: According to NOAA, 0.47" precipitation recorded for the past 24 hours.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-08-2019
Client:	Olin and Syngenta	**Report No.:**	22
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy Rain Temperature: 65 degrees

Contractor Work Force:

ENTACT Crew – David Merideth. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM (1:00 PM Restart) End: 9:00 AM (6:00 PM After Restart)

ENTACT crew met at the laydown area office for the tail gate meeting. Due to raining conditions that are expected to continue through the morning, the crew called the day due to rain. The thought is if it clears up they would try to get some work done this afternoon.

1:00 PM, the Entact crew begins working at location 9. The crew is grading with the Caterpillar D5K2 dozer and moving material around with the Caterpillar 308 E2 CR mini excavator. The crew is moving the remainder of the incinerator chimney to the west where it will be buried.

Entact is also conducting house keeping tasks to prepare for the EPA visit tomorrow.

The crew was onsite until 6:00 PM.

The remainder of the incinerator has been buried within location 9.

The seeds that were planted at locations 1 and 3 have germinated.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1 and 3 is at 100%.
Backfilling at location 2 is 90%

Precipitation: According to NOAA, 2.55” precipitation recorded over the weekend.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-08-2019
Client:	Olin and Syngenta	**Report No.:**	22
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-09-2019
Client:	Olin and Syngenta	**Report No.:**	23
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Partly Cloudy Skies Temperature: 94 degrees

Contractor Work Force:

ENTACT Crew – David Merideth and Kevin King. Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Wright Brothers – Jason Stacey and Dalton Grant

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to receive top soil at locations 2 and 4 and to continue with grading activities at location 9.

Safety discussion was related to awareness and swing radius around heavy equipment and awareness around dump trucks hauling topsoil to the site.

Morning:
The Entact crews are active at locations 2 and 4 receiving topsoil and conducting grading activities at location 9. The crew are operating a Caterpillar 259D skid steer, 308 E2 CR mini-excavator, and D5K2 dozer.

The Wright Brothers crew did not complete the stump grinding today at location 9 due to equipment breakdown.

At approximately 10:50 AM, the EPA inspection team arrived at the laydown office. The following individuals viewed the work areas:

George Course, Syngenta
Carrie Hunt, Olin
Keith Roberts, Olin
John Hoplins, EPA Region 3
Joel Hennessy, EPA Region 3
Tina Armstrong, Arcadis

I accompanied the group into the work areas. We drove up to the ridge area and observed the 2, 3, and 4 work areas, the location 9 area, and the ridge area (locations 5, 6, 7, and 8).

The observations took approximately 15 minutes. The group was signed out at 11:15 AM.

During the afternoon, the crew continued working at locations 2, 4, and 9. They received topsoil until 3:30 PM (at which time the trucking company was done for the day). A total of 16

loads were received at the site.

The crew was onsite until 6:00 PM.

Construction Call Notes:

Safety:
Artis Camon, Entact Health and Safety Officer, provided a safety update to the group. He indicated that to date there have been no safety incidents or issues.

Project Status:
Peter Porter provided a progress and work plan to the group.

- All of the excavation areas are completed with the exception of location 10 and the G-11 area.
- Backfilling and restoration is ongoing.
- Locations 1 and 3 have been backfilled. Restoration has occurred. The areas were seeded and mulched. The seed has germinated and grass and clover is growing.
- The crews continue to grade within the repository area (location 9).
- Topsoil is being hauled on site to the excavation areas in the location 9 area (locations 2 and 4).
- Next week the crews plan to continue work at location 10 and G-11.
- A survey crew is expected to come in and survey the G-11 area.

RFI or Unknowns:

- Stump grinding is expected to be completed today.

Submittals:

- Entact has seed information to submit.

Invoicing:

- GEI has received the first invoice for project work. Needs to be reviewed by GEI.

Miscellaneous:

- No miscellaneous items were discussed.

Meeting was completed at 10:10 AM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-09-2019
Client:	Olin and Syngenta	**Report No.:**	23
Contractor:	Entact	**Page:**	3 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1 and 3 is at 100%.
Backfilling at location 2 is 95%
Backfilling at location 4 is 75%

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

16 loads of topsoil, 240 cubic yards. Topsoil is coming from the construction site located east of the intersection of Maryland Highways 219 and 545. The material is slightly lighter in color than the materials being brought from the topsoil stockpile located at WC Logan and Sons site. Previous topsoil loads were delivered by WC Logan and Sons. The previous loads came from the topsoil stockpile at WC Logan and Sons site.

By: Jeff Carlson	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-10-2019
Client:	Olin and Syngenta	**Report No.:**	24
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny Skies Temperature: 90 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Wright Brothers Crew – Jason Stacey

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to receive top soil at location 4 and to continue with grading activities at location 9. A new crew member has joined the team today. Justin McGinnis is an equipment operator.

Safety discussion was related to awareness while working at location 9. Making eye contact with operator of heavy equipment while being active in this area.

Morning:
The Entact crews are active at location 4 receiving topsoil and conducting grading activities at location 9. The crew are operating a Caterpillar 259D skid steer, 308 E2 CR mini-excavator, and D5K2 dozer.

Wright Brothers is on site grinding stumps at location 9. Grading activities are also ongoing at location 9.

Topsoil is being brought to location 4, 5, and 9.

Entact crew member is operating the mini-excavator to backfill location 5.

Location 2 has been completed. The crew seeded and mulched this area today.

During the afternoon, the crew continued working at locations 4, 5, and 9. They received topsoil until 3:30 PM (at which time the trucking company was done for the day). A total of 14 loads were received at the site.

The Wright Brothers have completed stump grinding today.

George Crouse from Syngenta stopped by the site during the late afternoon. We observed Entact activities and locations 2 through 8.

The eastern side of location 9 (where excavating soil occurred) was backfilled, seeded, and mulched.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-10-2019
Client:	Olin and Syngenta	**Report No.:**	24
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The crew was onsite until 6:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

14 loads of topsoil, 210 cubic yards. The topsoil originates from the construction site (former agricultural property) located east of the intersection of Maryland highways 219 and 545. The material is being hauled to the site by WC Logan and Sons Trucking.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-11-2019
Client:	Olin and Syngenta	**Report No.:**	25
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine and clouds mix with on and off rain
Temperature: 90 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to continue with grading activities at location 9 and begin work at the G-11 location. A slight rain delay to start the day as showers passed through the area.

Safety discussion was related to severe weather safety. There is a test today between 10:30 and 11:30 AM. We will be off the "hill from 10:00 AM until all clear is given at approximately 11:30AM

Morning:
The Entact crew is working at the G-11 location prepping for breaking up concrete and sawing pavement.

Justin McGinnis is operating the Caterpillar D5K2 LGP dozer to conduct grading activities.

At 10:00 AM, we left the "hill" area during the test period. The crew continued at the G-11 location preparing for concrete and pavement removal.

Early afternoon a storm moved through. The storm caused a slight delay in work. After the storm moved through, the crew continued at G-11. They are using the Caterpillar 259D skid steer with a jack hammer attachment to break up concrete. They are also using a gasoline powered pavement saw to cut through the asphalt pavement.

The early afternoon storm created wet conditions at location 9. Grading activities were suspended for the afternoon.

Topsoil was not delivered to the site today because of the test at the facility and the forecast of rain.

The crew was off-site at 5:00 PM.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-11-2019
Client:	Olin and Syngenta	**Report No.:**	25
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours (rain did fall during the work shift, this will be accounted for in tomorrow's notes.

By: Jeff Carlson **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-12-2019
Client:	Olin and Syngenta	**Report No.:**	26
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny
Temperature: High of 88 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to work at G-11 breaking concrete and cutting asphalt.

Safety discussion was related to live utilities, contamination, and hazardous material awareness. All utilities at G-11 are live and there is potential for contamination below the concrete/pavement.

Morning:
The ENTACT crew is working at the G-11 location prepping for breaking up concrete and sawing pavement.

Justin McGinnis is operating the CAT 259D with hammer attachment. The crew is also using a concrete power saw with gasoline to cut the asphalt.

Mid-morning: ENTACT crew continued breaking concrete with the CAT 259D and cutting the asphalt with the power saw.

Afternoon:
Early afternoon crew finished cutting asphalt and focused on breaking concrete at G-11 concrete slab.

3:30 pm: ENTACT crew started moving concrete from the concrete slab to the dumpster. At the end of the day the dumpster was full (at maximum weight capacity) and the second dumpster will be delivered on Saturday 7/13/19.

The crew was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-12-2019
Client:	Olin and Syngenta	**Report No.:**	26
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.53” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-13-2019
Client:	Olin and Syngenta	**Report No.:**	27
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine

Temperature: High of 87 degrees, low of 68 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 3:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to continue breaking concrete the G-11 location and drying out the Area 9 repository.

Safety discussion was related to live utilities at the G-11 location as well as heat stress.

Morning:
The ENTACT crew worked on drying out Area 9 and preforming some rough grading. The crew also resumed breaking concrete at the G-11 location.

A 2-inch steel waterline was uncovered at the west side of the G-11 building. This was thought to be the waterline that fed into the G-11 area but later a shorter waterline was uncovered on the east side of the G-11 building. There was an excess of potential groundwater in this area so ENTACT attempted to drain the trench with buckets. While draining, a bucket caught the small waterline and pulled it out. A temporary cap and valve was installed but it is unknown where the rest of the line flows.

Justin McGinnis is operating the CAT 259D Skid Steer with jack hammer attachment.

By the end of the day the trenched area where the first waterline was uncovered had filled up with water.

The crew was off-site at 3:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-13-2019
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amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-15-2019
Client:	Olin and Syngenta	**Report No.:**	28
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High 87 degrees, Low 66 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to continue loading concrete at the G-11 location and possibly start loading soil.

Safety discussions were proper communication (using hand signals/radio) and heat stress.

Morning:
The ENTACT crew is working at the G-11 location attempting to clear water from around the water line. Additionally, there is a small trench 18 inches deep filled with water at center west of the steel water line.

ENTACT crew members are operating a CAT excavator 308E for soil and concrete.

Around 11:00 am, the crew moved over to the Repository and Area 7 to fix/reinforce the silt fencing since the areas had dried out since Friday.

Afternoon:
1:00 pm: the perched water was discussed with ENTACT, Rick Bambito, and GEI and it was decided to stop work in this area until it was determine how ENTACT should proceed with the water disposal.

1:45 pm: Maryland Portable Concrete began to move two dumpsters of concrete off site. There is still one full dumpster that has not been moved off site. ENTACT used the CAT 380E to move the concrete from the slab area to the dumpster.

5:00 pm ENTACT started to clean up site and cover work areas.

The crew was off-site at 6:00 PM.

Erosion control estimated completion percentages:

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Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-15-2019
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Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Peter Porter and I assessed these areas after excavating was completed and agreed that the appropriate amount of soil had been removed.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By:**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-16-2019
Client:	Olin and Syngenta	**Report No.:**	29
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High of 94 degrees, low of 76 degrees

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to continue work at the G-11 location with focus on excavating the sewer line area.

Safety discussion regarding using common sense in the work area. There are a lot of people working in a small area so communication is key to preventing injury. Heat stress is also a topic for the entire week as the temperature will be in the 90's.

Morning:
The ENTACT crew is working at the G-11 location breaking asphalt and digging the trench where the sewer line is located.

ENTACT is operating the CAT 308E excavator to remove the asphalt and soil from the area.

10:00 Maryland Portable Concrete picked up the third dumpster of concrete that was filled the previous day.

Also at 10:00 there was a conference call that lasted approximately an hour. Topics discussed included health and safety, status updates, removal of water from the trench areas, taking a sample of the water, excavation depths, and fill material. Please see below:

1. Health and Safety Update

ENTACT: Issues for this week concern heat stress (mid 90's all week) and consuming plenty of fluids. There have been no accidents or injuries. The first half of the week there was silica sampling and samples have been sent out.

The forecast for the rest of week: expect thunderstorms tomorrow afternoon and evening. May clear up Thursday and Friday but the temperatures will still be high.

Safety regarding Northrop Grumman personnel:
-Personnel are generally avoiding area G-11 but ENTACT will escort should someone need to pass through.

- Note that there is a scrap metal pick-up scheduled for Thursday 7/18 and the truck may need to pass through the G-11 work area.

2. Project Status Update

ENTACT: Today (7/16/12019) ENTACT is solely focused on excavating the sewer line and backfilling as the line is excavated to prevent water infiltration into the excavated area.

Repository: currently grading at the repository. Estimate is that is it 40-50% completed. For grading ENTACT is scrounging for dirt to try to limit any additional import needed to bring the area up to grade. Current consensus is that if areas can be lower that original plan in order to drain that's acceptable. This topic will be revisited later in the week.

G-11: The concrete foundation (slab) on surface is gone, waterline was found but not where it was expected and a cap was put on it.

Concerns with water: A small trench was excavated in the center of the pre-existing slab last evening and started to fill with water at a slow rate. This morning there was approximately 6-inches to one foot of water, so the area does recharge overnight. Bottleware will be on site by noon today to proceed with collecting water samples. As far as TAT is concerned, VOCs will be 24-hours and Pesticides/Perchlorate will be 3-day TAT.

The issues regarding the water infiltration:

1. The sample will have to be taken once the depth to excavation is penetrated and the water infiltrates to the surface and even then it won't be a controlled sample. Taking a sample from free-flowing water will not be equivalent to taking a sample from a groundwater monitoring well. There will be no way to collect a sample without turbidity influence and the samples will not correlate with the true groundwater concentration.
2. If the foundation footers are excavated as discussed and ENTACT backfills the area with clean soil as discussed, potentially that soil could be exposed and subject to becoming saturated with water flow that is potentially contaminated. The issue is cross contamination and how will that be dealt with when the new footers are installed. However, it is likely that the water contamination will be very low parts per billion compared to the soil contamination.

Some discussion questions:

What is the current excavation depth?
- The current excavation depth is unknown. The footers are approximately three feet in height, one foot thick, and 2 feet wide.

If the soil is being removed and ENTACT is backfilling immediately, how long will it take to place the footers?

- A couple of days.

Can the soil be removed without generating water?

- Yes, if the area is backfilled immediately but there is no way to avoid a small amount of water infiltrating but it will not be a pumpable amount. The waterline was dry when it was originally dug and it took a couple of hours for the water to infiltrate.

Can the G-11 area be backfilled with stone?

- If the area is filled with gravel, the new footers need to be on virgin soil for the compaction rate by standards of the county. The county will unlikely approve pour over 6-inches of gravel whether its contaminated or not because it won't reach the compaction requirement. The gravel needs to be course enough not to pick up contaminates and this will need to be reviewed with the engineers and the county. Will need to review with engineers and county.

The total cut after the asphalt and concrete was taken out was approximately 2.5 feet of soil. ENTACT has not received final elevations for the excavation yet. The footers are three-step and harder to excavate. There is about a foot difference between each tier. The plans show an elevation of 59.2' but the preliminary plan doesn't show bottom of footing elevations.

Before the end of the day info that is needed:

-A base elevation for excavation (footers look like they will all be the same depth) and the total area subject to excavation.

-A final decision for fill material. ENTACT can confirm the quarry and grain size and verify with the site.

3. Upcoming and Planned Activities

ENTACT:
The current timeline for GCL deployment is the beginning of next week. The estimated delivery rate is 500 yards per day, should there be dry weather. There is potential for thunderstorms Thursday through Monday.

4. General Project Submittals

N/A

5. Requests for Information

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N/A

6. Change Orders and/or Field Directives

N/A

7. Follow Up Action Items

N/A

Additional Comments:

EPA had no additional comments or questions regarding this project prior to their site visit and will be sending a summary of their observations.

12:00 ENTACT started to backfill the first section of the trench with Elk Mills Screenings and then the top 8-inches of Elk Mills CR6. There were a total of six loads of CR6 delivered (three remain at the staging area) and a total of six loads of Screenings delivered.

Afternoon:
ENTACT continued to work at the G-11 sewer line area excavating the material and backfilling the trench. The backfill was compacted between each layer. Overall, ENTACT removed 5 truckloads of material that was taken to the top of the hill. The trench additional time to excavate due to working around two storm sewer lines.

Two rolls of GCL were delivered to the site today.

The crew was off-site around 6:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%
Repository is 40-50% complete

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours. There is some rain anticipated tomorrow evening.

By: MRH	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-17-2019
Client:	Olin and Syngenta	**Report No.:**	30
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High of 96 degrees, low of 76 degrees. Feels like 104 degrees – excessive heat warning today.

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 7:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to complete the excavation and backfill of the sewer line and start working on the gas line at the G-11 location.

Safety discussion topic was excessive heat; take breaks and hydrate.

Morning:

The ENTACT crew continued excavation at the G-11 sewer line location from previous day.

ENTACT is operating the CAT 308E2 CR for excavation, the CAT 259D to move materials, and a gasoline powered compactor.

Afternoon:

ENTACT completed the excavation of the sewer line to the concrete platform and began backfilling. Six truckloads of material were moved to the repository.

Backfill consisted of Elk Mills Screenings and the top 8-inches Elk Mills CR6. The layers were compacted in between. There were multiple pipes encountered, one being the waterline that was encountered under the concrete slab, but since the other pipes were not in use, ATK/Northrop Grumman approved ENTACT to backfill over the pipes.

A storm moved in at approximately 1900 and ENTACT put coir logs around the trench to prevent site runoff into the trench as the trench flooded with rainwater.

Crew was offsite at approximately 1930.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.

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Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%
Repository is 40-50% complete.
G-11 trench is ~40% backfilled.

Precipitation: According to NOAA, 0.43" precipitation recorded for the past 24 hours.
Thunderstorms are anticipated tomorrow afternoon.

By: MRH **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-18-2019
Client:	Olin and Syngenta	**Report No.:**	31
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine and clouds
Temperature: High 87 degrees F, low 73 degrees F

Contractor Work Force:

ENTACT Crew – David Merideth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 4:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to complete the backfill of the sewer line and start working on the gas line at the G-11 location.

Safety discussion topic was excessive heat; take breaks and hydrate. Possible severe weather in the afternoon

Morning:

The ENTACT crew continued working at the G-11 sewer line location from previous day.

ENTACT is operating the CAT 308E2 CR for excavation, the CAT 259D to move materials, a gasoline powered compactor, and a water pump.

Upon morning arrival, the trench was filled with water from storms the previous day. ATK/Northrop Grumman approved ENTACT to use a small pump to remove the rainwater from the trench. The water was pumped across the roadway to Area 10.

While the water was being pumped out, ENTACT checked the silt fencing at other site locations. There was a tree down on the silt fencing at the repository from the storm. ENTACT removed the tree and repaired any damage to the fence.

Afternoon:

ENTACT began backfilling the sewer trench after all of the water was removed. Backfill consisted of Elk Mills CR6. The layers were compacted in between. There was no material moved to the repository today.

Two piles of Elk Mills Stone #57 and three piles of CR6 were delivered today.

The sewer line backfill was completed. Tomorrow ENTACT will start with the gas-line area and then move to the concrete platform.

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Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-18-2019
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Thunderstorms started around 1615. ENTACT placed coir logs around the two area drop inlets and the end of the trench to prevent sediment from entering the storm sewer.

Crew was offsite at approximately 1630

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%
Repository is 40-50% complete.

Precipitation: According to NOAA, 0.43” precipitation recorded for the past 24 hours.
Thunderstorms are anticipated tomorrow afternoon.

By: MRH	**Reviewed By: MRG**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-19-2019
Client:	Olin and Syngenta	**Report No.:**	32
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High of 95 degrees F, low of 77 degrees F, Heat Index is 108

Contractor Work Force:

ENTACT Crew – David Meredith, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to clean up the G-11 sewer line area and begin work on gas line near the concrete platform.

Safety discussion was heat stress. Consume fluids and find shade during breaks.

Morning:

0930 – ENTACT uncovered the gas line perpendicular to the water line. Proceeded to excavate the area.

ENTACT is operating the CAT 308E2 CR for excavation, CAT 259D to move materials, and a CAT paver.

Afternoon:

ENTACT continued to excavate the gas line and began backfilling the trench. The trench was backfilled with CR-6.

1300 – Four loads of Bio Soil from New Holland and one load of rice gravel from York Building Products, Perryville, MD was delivered to the G-11 site.

1315 – One pesticide, one perchlorate, and one set of VOC samples were taken from the concrete slab area. These samples were picked up by TestAmerica at 1450.

ENTACT finished filling the gas line and cleaned up the area. Seven truckloads of soil were moved to the repository and the dumpster is ½ full of concrete and asphalt.

Received 5 loads (~ 114 tons) of CR-6 from Elk Mills and staged for use as backfill for G-11.

The crew was off-site at 6:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-19-2019
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Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-20-2019
Client:	Olin and Syngenta	**Report No.:**	33
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High of 96 degrees F, low of 77 degrees F, Heat Index is 111

Contractor Work Force:

ENTACT Crew – David Meredeth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 9:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to start the excavation of the concrete slab at G-11. The back section goes 2.0 feet deeper than the front section. In addition, P. Porter may start excavating Area 10 across the roadway.

Safety discussion was related to underground utilities. Outside of the concrete slab, utilities are marked but it is unknown if there are old pvc lines that are not on historical plans. Additionally, heat stress will be a concern again today.

Morning:
The ENTACT crew is working at the G-11 location excavating all material from the concrete platform. The platform area will be excavated to an elevation of 58 and 60, as approved by ATK/Northrop Grumman.

ENTACT is operating the CAT 308E2 CR for excavation, a CAT 316 for excavation, and the CAT 259D to move materials.

Afternoon/Evening:

ENTACT continued to excavate the concrete platform at G-11. Around 1730, ENTACT began backfilling the back section with a combination of #10 Screenings and CR-6.

ENTACT completed work activities at the G-11 concrete platform at 2130 and cleaned up the site area. Due to anticipated rain Sunday evening, ENTACT may return to site tomorrow, 7/21/19, to prep/finish the G-11 concrete slab.

The dumpster is completely full of concrete and asphalt from excavation. 39 truckloads of material were moved to the repository.

The crew was off-site at 9:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.

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Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-21-2019
Client:	Olin and Syngenta	**Report No.:**	34
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine
Temperature: High of 96 degrees F, low of 77 degrees F, Heat Index is 114

Contractor Work Force:

ENTACT Crew – David Meredeth, Kevin King, and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 9:00 AM End: 3:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to finish the G-11 area due to potential rain this evening.

Safety discussion was related to heat stress. There is an excessive heat warning today.

Morning:

ENTACT backfilled and compacted the G-11 building area. Fill material consisted of the remaining #10 Screening and CR-6. May need more loads if the facility requests the area to be raised.

ENTACT is operating the CAT 308E2 CR for excavation, a CAT 316 for excavation, a CAT 259D to move materials, and a CAT paver.

Afternoon:

ENTACT consolidated and tarped the Maryland Bio Blend soil pile.

Two 8-inch, ~60 ft roof drain extensions were installed as authorized by Daniel Thrash. The drain pipes will extend two 6-inch roof drains beyond the excavation area which previously emptied in to the concrete swale that ENTACT removed.

The coir logs were reinstalled around the drop inlets in anticipation of rain this evening and the G-11 area was cleaned up.

The crew was off-site at 3:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-21-2019
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Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: MRH	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-22-2019
Client:	Olin and Syngenta	**Report No.:**	35
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunshine, cloudy late with weather moving in
Temperature: High of 96 degrees F, low of 75 degree F

Contractor Work Force:

ENTACT Crew – Kevin King and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 3:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to complete cleanup at G-11, maintenance on erosion control measures, and preparation for work on Tuesday, July 23, 2019.

Safety discussion was related to line of fire and swing radius with heavy equipment.

Morning:

The ENTACT crew began with completing some maintenance of erosion control devices at area 7. At this location, overnight rains had washed sediment to over half the height of the erosion logs. The material was shoveled away from the erosion control device.

ENTACT is operating the CAT 308E2 CR for excavation and CAT 316 to load broken concrete from the G-11 area into a roll-off dumpster. The dumpster that was filled over the weekend was hauled away this morning and a replacement was left behind. During the late morning, the crew had loaded the remaining concrete from the G-11 location into the second roll-off dumpster. This dumpster was picked up early afternoon. There is no longer a dumpster on site for concrete debris.

Afternoon:

ENTACT crew began preliminary work at area 10. The crew did not begin excavating. They were measuring and planning.

The crew received four loads of #10 screenings and four loads of CR-6 for backfilling at area 10 work.

The Maryland Department of Environment contacted Rich Zambito regarding observing erosion control measures installed on the project. I received a call from Lillian Myers with Maryland Department of Environment regarding her request to observe the erosion control measures we have installed at Elkton. We set a tentative date of July 29, 2019 for her to visit the site. She provided an email formally requesting a visit (non-inspection).

During the afternoon, storms were beginning to develop. ENTACT called their day at 3:00

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PM due to the approaching storms.

The crew was off-site at 3:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.47" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-23-2019
Client:	Olin and Syngenta	**Report No.:**	36
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy with light to moderate rain.
Temperature: High of 75 degrees F, low of 67-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 10:30 AM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for today is to complete maintenance on sediment logs deployed at Area 7. Overnight rains moved sediment up against the erosion control measures. The crew will removed the sediment that has accumulated against the sediment logs in order to comply with the storm water permit.

Morning:

The ENTACT crew began with completing some maintenance of erosion control devices at area 7. At this location, overnight rains had washed sediment to over half the height of the erosion logs. The material was shoveled away from the erosion control device.

Late morning and afternoon:

Due to overnight rains, rainy conditions, and forecast for additional rain during the afternoon, the ENTACT crew called the rest of the day a rain day. Conditions at the facility were wet and muddy.

The crew was off-site at 10:30 AM.

Construction meeting notes:

Safety:

- No safety incidents were reported for the last week. No issues to report.

Project Progress:

- Peter Porter provided information related to project progress.
- Over the weekend the crew completed the G-11 location. This included removal of the concrete and asphalt, excavating, and back filling. The crews discovered

additional underground utilities but was able to work around these without causing damage.

- The crew has been preparing and setting up for the work at Area 10 and the bio-pond. Back filling materials and bio-soil has been received and is staged adjacent to the work area.
- The repository, Area 9, is graded. There will be more grading when it dries out. The materials from G-11 will be graded prior to installation of GCL.
- Due to the wet conditions, ENTACT has not been able to start the GCL. The forecast after today is for a longer stretch of dry and sunny weather.

Submittals:

- Two additional rolls of GCL arrived last week. ENTACT will provide the appropriate documentation.

Open/Miscellaneous:

- The Maryland Department of Environment has requested a site visit to observe erosion control devices deployed at the project site. The visit is planned for Monday, July 29, 2019. Lillian Meyers of the MDE along with her supervisor will be visiting. GEI staff will accompany the visitors during the visit.
- ENTACT will be providing an updated schedule this week.

End of meeting

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 10% complete.
Work at G-11 is 90% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.97” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-24-2019
Client:	Olin and Syngenta	**Report No.:**	37
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 90 degrees F, low of 64-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King and Justin McGinnis (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to resume general grading activities at area 9. The rest of the crew will be working at area 10.

Safety Topic:

Awareness of your surroundings and others in our work area. Vehicular and pedestrian traffic in the work area. Be aware of others where we are working.

Morning:

At area 9, an ENTACT crew member is operating the Caterpillar D5K2 dozer to move soil at the repository.

At area 10, the ENTACT crew is operating the Caterpillar 316EL excavator and 308E2CR mini excavator. The crew is stripping sod/topsoil and moving material from area 10.

Afternoon:

The ENTACT crew continued with work at areas 9 and 10. The subgrade at area 9 is slowly drying. Recently placed soil is still wet. Due to the wet conditions at the repository, the GCL deployment has been delayed until Monday, July 29, 2019.

The crew has begun removing sod from the bio-pond area. This material is brought to area 9 by dump truck. Approximately 112 yards of material from the bio-pond and area 10 have been brought to area 9.

The contractor was off-site at 6:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-24-2019
Client:	Olin and Syngenta	**Report No.:**	37
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 20% complete.
Work at the Bio-pond is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.12" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-25-2019
Client:	Olin and Syngenta	**Report No.:**	38
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 97 degrees F, low of 64-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to resume general grading activities at area 9. The rest of the crew will be working at area 10 and micro-bioretention area.

Safety Topic:

Focus on your work tasks and awareness of overhead utilities.

Morning:

At area 9, an ENTACT crew member is operating the Caterpillar D5K2 dozer and grading soil to promote drying of the subgrade.

The rest of the ENTACT crew is working at location 10 and micro-bioretention area

Afternoon:

ENTACT crew resumed grading at the repository during the early afternoon. Midafternoon, the crew moved the dozer to the area 10 location.

The remainder of the crew was working on area 10 during the afternoon. Once the dozer was moved to the area, the operator graded and back bladed materials.

The contractor was off-site at 5:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 30% complete.
Work at the micro-bioretention area is 15% complete.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-25-2019
Client:	Olin and Syngenta	**Report No.:**	38
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-26-2019
Client:	Olin and Syngenta	**Report No.:**	39
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 89 degrees F, low of 63-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to continue general grading activities to accelerate drying at area 9. The rest of the crew will be working at area 10 and micro-bioretention area.

Safety Topic:

Hand safety. The crew will be working with hand tools today preparing drainage piping for the micro-bioretention area.

Morning:

At area 9, an ENTACT crew member is operating the Caterpillar D5K2 dozer and grading soil to promote drying of the subgrade.

The rest of the ENTACT crew is working at location 10 and micro-bioretention area. The crew is preparing drainage piping and other preparation tasks.

Afternoon:

ENTACT crew resumed grading at the repository during the early afternoon.

2 loads of #2 stone and 2 loads of CR-6 were received for access road improvements at the top of area 9 early afternoon.

The remainder of the crew was working on area 10 during the afternoon. The crew spent the majority of the afternoon placing and grading gravel in the east side of area 10. This gravel was previously delivered to the site and is staged adjacent to the work area. The crew was operation the Caterpillar 308 E2 CR mini excavator and the 259D skid steer to complete these tasks.

Approximately 42 cubic yards of gravel have been placed at area 10.

The contractor was off-site at 5:30 PM.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-26-2019
Client:	Olin and Syngenta	**Report No.:**	39
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-27-2019
Client:	Olin and Syngenta	**Report No.:**	40
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 88-degrees F, low of 67-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to move GCL rolls to the top of the repository area and prepare for Monday work.

Safety Topic:

Awareness and safety when handling the GCL rolls. They weigh 3,000 pounds and can easily cause bodily harm if one were to begin to roll or let loose while loading and unloading.

Morning:

At area 9, an ENTACT crew member is operating the Caterpillar D5K2 dozer and grading soil to promote drying of the subgrade.

The rest of the crew was loading GCL rolls onto the dump trucks to transport to the top of area 9. The crew moved 30 GCL rolls this morning. The GCL rolls appeared to be dry and in good condition. Each roll number matched with shipping documentation.

Afternoon:

ENTACT crew resumed grading at the repository during the early afternoon. Extra preparation work was occurring at the northwest corner of the repository. The crew will be laying GCL today at this location.

The crew partially rolled out three GCL rolls at the northwest corner of the repository. The rolls were in good condition. The crew properly deployed the rolls making sure proper overlap was occurring.

The crew was utilizing the Caterpillar 316 LE to load, unload, and deploy the GCL rolls.

The crew covered the GCL that had been partially rolled out with poly to protect it from precipitation (precipitation is not in the forecast until July 31).

Also, GEI and Peter Porter discussed the status of the erosion control devices installed at the site. After further review of the storm water permit, project specifications, review of erosion

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-27-2019
Client:	Olin and Syngenta	**Report No.:**	40
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

control device inspections completed by ENTACT, and review of the devices in the field, things look good for the Maryland Department of Environment visit on Monday, July 29, 2019.

The contractor was off-site at 5:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-28-2019
Client:	Olin and Syngenta	**Report No.:**	41
Contractor:	Entact	**Page:**	1 of 1
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 93-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – David Meredith and Justin McGinnis (operator). Artis Camon and Kevin King were off today. Peter Porter is the project manager.

Observations:

Contractor start: 9:00 AM End: 12:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to complete more preparation work for Monday.

Morning:

At area 9, the ENTACT crew operated the Caterpillar D5K2 dozer to furrow soil to speed up drying. The rest of the crew prepped another roll (roll 3222 for placement).

The contractor was off-site at 12:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-29-2019
Client:	Olin and Syngenta	**Report No.:**	42
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 92-degrees F, low of 72-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Jose Fuentes (operator), and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 6:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to partially deploy two more GCL rolls, furrow soil at area 9, and receive top soil at area 9.

Safety Topic:

Awareness of truck traffic. Our work area today will be busy with trucks brining in top soil.

Sunday work:

On Sunday (July 28, 2019) ENTACT decided to work at the site for a short time. The crew was onsite from 9:00 AM to 12:00 PM. The crew conducted general grading activities and prepped for receiving topsoil on Monday.

Morning:

ENTACT is operating the Caterpillar D5K2 dozer to continue with furrowing soils within area 9 to assist with drying.

The remaining ENTACT crew is prepping for incoming soils and deploying an additional roll (3222).

At 7:40 AM trucks from Logan and Sons Trucking began hauling loads of top soil to the area 9 location. The top soil is coming from the topsoil stockpile at the Logan and Sons yard.

At 10:00 AM, Lillian Meyers and Elizabeth Reicks with the Maryland Department of the Environment, met me at the site to tour the work areas and observe erosion control measures installed at the work areas. The visit went well. They had some comments/observations and were off-site at approximately 11:50 AM. An email was sent thanking us for the opportunity for the visit. This email has been forwarded to all included in this Daily Field Report. The comments/observations they brought up area as follows:

- Silt fence on the west side of the repository could be tightened up (there is some sagging in the silt fence, however, it is still functional).
- Gravel and soil pushed off the access road west of the repository. MDE staff brought this up.
- Gravel is staged at area 10 near a drainage culvert. Some gravel from this stockpile has moved onto the grass adjacent to the culvert and swale.
- Filter logs have been placed around to storm sewer drains at area 10. One of the filter logs has been damaged causing some of the wood chips to spill out and onto the storm sewer drain.

Peter Porter and I have discussed this and he has said ENTACT will address the items.

Afternoon:

The crew continued to receive top soil.
Grading activities continued in area 9.
The rest of the crew was busy with prepping the subgrade for deployment of additional GCL. Two additional rolls were partially deployed today. The crew utilized the Caterpillar 316 LE excavator to deploy GCL rolls.

360 cubic yards of topsoil were hauled to area 9 at the site today. Today, trucking company was running two trucks. Tomorrow, they will be running four trucks.

The crew covered exposed GCL with poly at the end of the work shift in case there is a precipitation event overnight. Current forecast calls for dry conditions through noon Wednesday.

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages: Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.
Clearing is 100% complete. Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete. Work at location 10 is 40% complete. Work at the micro-bioretention area is 15% complete. Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-29-2019
Client:	Olin and Syngenta	**Report No.:**	42
Contractor:	Entact	**Page:**	3 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
4 panels have been partially deployed at location 9. 10% complete at this area.

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-30-2019
Client:	Olin and Syngenta	**Report No.:**	43
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 94-degrees F, low of 70-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Jose Fuentes (operator), and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 6:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to continue with deploying GCL at the repository and receive topsoil.

Safety Topic:

Busy work area today. Extra trucks will be hauling topsoil. Four trucks will be hauling topsoil today. It will also be hot today so drink fluids and rest when needed.

Morning:

ENTACT is operating the Caterpillar D5K2 dozer to move topsoil at the repository. As trucks deliver topsoil, the operator spreads the soil on the deployed GCL.

The remaining ENTACT crew is prepping for incoming soils and deploying additional GCL rolls.

At 7:40 AM trucks from Logan and Sons Trucking began hauling loads of top soil to the area 9 location. The top soil is coming from the topsoil stockpile located at east of the intersection of Maryland Highways 279 and 545.

The crew deployed GCL roll 3660 as a complete panel this morning. The Caterpillar 316EL was used to assist with deployment of GCL roll.

Afternoon:

The crew continued to receive top soil.
Grading activities continued in area 9.
The rest of the crew was busy with prepping the subgrade for deployment of additional GCL. Four rolls of GCL were deployed today. The crew utilized the Caterpillar 316 LE excavator to deploy GCL rolls. Nine rolls of GCL have been deployed as of today.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-30-2019
Client:	Olin and Syngenta	**Report No.:**	43
Contractor:	Entact	**Page:**	2 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

900 cubic yards (60 truckloads) of topsoil were hauled to area 9 today.

The crew covered exposed GCL with poly at the end of the work shift in case there is a precipitation event overnight. Current forecast calls for dry conditions through noon Wednesday.

The contractor was off-site at 6:00 PM.

Construction Meeting Notes:

Safety: No incidents to report this week. Recent safety topics (and today's topic) was related to truck traffic, awareness, communication, and working in warm weather.

Project Status:

Peter Porter provided a project status:

- Inside the facility, the micro-bioretention and area 10 have been started. Peter indicated that he had hoped to be working there later today and would have the micro-bioretention area completed.
- At the repository, grade has been achieved. Prepping of the subgrade surface, laying GCL panels, and tops soil grading has begun.
- The trucking contractor will be operating 4 trucks today. Anticipate 800 to 1000 cubic yards of topsoil.
- Asphalt installation at area 10 is tentatively planned for the week of August 12, 2019.
- There are a few areas left on the hill that need backfilling and seeding. This area will be addressed in the next week or two. The crew will deploy GCL in the mornings and then work on other areas during the afternoon when topsoil is being spread over the GCL.

Miscellaneous:

- There will be a vertical test on Wednesday, July 31, 2019 where the contractor will have to be out of the repository area. Rich Zambito indicated that he would be monitoring the test closely to get the contractor back at the repository as soon as possible.
- Rich Zambito indicated that there will be a RCRA inspection by MDE on Friday this week. He did not anticipate that this would affect the work being conducted by ENTACT.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-30-2019
Client:	Olin and Syngenta	**Report No.:**	43
Contractor:	Entact	**Page:**	3 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

- Ken Rike indicated that he would be visiting the site this week.
- Kelly McIntosh indicated that he would be visiting the site next week (week of August 5)
- Carrie Hunt, Keith Roberts, and George Crouse indicated that they would be visiting the site the week of August 12.
- Jeff Carlson gave a brief overview of the MDE visit on Monday, July 29, 2019.

Meeting ended approximately 10:20 AM

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
9 Rolls of GCL have been deployed at location 9. 20% complete at this area.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-31-2019
Client:	Olin and Syngenta	**Report No.:**	44
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 88-degrees F, low of 70-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Jose Fuentes (operator), and Justin McGinnis (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 6:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to continue with deploying GCL at the repository and receive topsoil.

Safety Topic:

Multiple trucks operating and bringing topsoil to the site. Awareness of traffic.

Morning:

ENTACT is operating the Caterpillar D5K2 dozer to move topsoil at the repository. As trucks deliver topsoil, the operator grading the topsoil on the deployed GCL.

The remaining ENTACT crew is prepping for incoming soils and deploying additional GCL rolls. The crew is properly overlapping panel edges and bottoms.

At 7:40 AM trucks from Logan and Sons Trucking began hauling loads of top soil to the area 9 location. The top soil is coming from the topsoil stockpile located at east of the intersection of Maryland Highways 279 and 545 and from the Logan and Sons yard.

Afternoon:

The crew continued to receive top soil.
Grading activities continued in area 9.
The rest of the crew was prepping the subgrade for deployment of additional GCL. Six rolls of GCL were deployed today. The crew utilized the Caterpillar 316 LE excavator to deploy GCL rolls. Fifteen rolls of GCL have been deployed as of today.

795 cubic yards (53 truckloads) of topsoil were hauled to area 9 today.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	07-31-2019
Client:	Olin and Syngenta	**Report No.:**	44
Contractor:	Entact	**Page:**	2 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The crew covered exposed GCL with poly at the end of the work shift in case there is a precipitation event overnight. Current forecast calls for a chance of thunderstorms through Sunday, August 4.

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
15 Rolls of GCL have been deployed at location 9. 25% complete at this area.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-01-2019
Client:	Olin and Syngenta	**Report No.:**	45
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 85-degrees F, low of 69-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, and Jose Fuentes (operator). Artis Camon is on vacation. Peter Porter is the project manager.

Observations:

Contractor start: 6:00 AM End: 5:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to continue with deploying GCL at the repository and receive topsoil.

Safety Topic:

Multiple trucks operating and bringing topsoil to the site. Awareness of traffic. Be alert. Watch out for your co-workers.

Morning:

ENTACT is operating the Caterpillar D5K2 dozer to move topsoil at the repository. As trucks deliver topsoil, the operator grading the topsoil on the deployed GCL.

The remaining ENTACT crew is prepping for incoming soils and deploying additional GCL rolls. The crew is properly overlapping panel edges and bottoms.

Trucks from Logan and Sons Trucking are hauling loads of top soil to the area 9 location. The top soil is coming from the topsoil stockpile located at east of the intersection of Maryland Highways 279 and 545 and from the Logan and Sons yard.

Afternoon:

The crew continued to receive top soil.
Grading activities continued in area 9.
The rest of the crew was prepping the subgrade for deployment of additional GCL. Three rolls of GCL were deployed today. The crew utilized the Caterpillar 316 LE excavator to deploy GCL rolls. Eighteen rolls of GCL have been deployed as of today.

525 cubic yards (35 truckloads) of topsoil were hauled to area 9 today.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-01-2019
Client:	Olin and Syngenta	**Report No.:**	45
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The crew covered exposed GCL with poly at the end of the work shift in case there is a precipitation event overnight. Current forecast calls for a chance of thunderstorms through Sunday, August 4.

The contractor was off-site at 5:30 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 40% complete.
Work at the micro-bioretention area is 15% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
18 Rolls of GCL have been deployed at location 9. 30% complete at this area.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	August 2- 7, 2019
Client:	Olin and Syngenta	**Report No.:**	46
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: The weather during the six day stretch consisted of mostly sunny skies. On the 6th and 7th, NOAA reported a combined total of 0.49" of precipitation during the two-day period.

Temperature: Temperatures during the six day stretch ranged from the mid to upper 80's during the day to upper 60's to low 70's during the evenings.

Contractor Work Force:
ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety officer. Peter Porter is the project manager.

Observations:
Contractor start: 6:00 AM End: 6:00 PM
ENTACT crew met at the laydown area each morning for tailgate meetings where the work plans and safety topics were discussed. Work plans for this period consisted primarily of laying GCL, receiving topsoil, and grading. Also included in the workplans for the period was activities at area 10 and the micro-bioretention area.

Safety Topics included:

Slips, trips, falls, vehicle traffic awareness, pinch points (hand safety), heat safety, blind spots, line of fire (equipment awareness), complacency, and swing radius.

During this time period, the ENTACT crew has been operating the Caterpillar D5K2 dozer to move topsoil at the repository. As trucks deliver topsoil, the operator grading the topsoil on the deployed GCL.

Other ENTACT crew members were prepping for incoming soils and deploying additional GCL rolls. The crew has been properly overlapping GCL at the sides of the rolls and at the ends. Ends were sealed with additional granular bentonite.

Trucks from Logan and Sons Trucking have been hauling loads of top soil to the area 9 location. The top soil is coming from the topsoil stockpile located at east of the intersection of Maryland Highways 279 and 545 and from the Logan and Sons yard.

The crew covered exposed GCL with poly at the end of each work shift in case there is a precipitation event overnight.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	August 2- 7, 2019
Client:	Olin and Syngenta	**Report No.:**	46
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The crew focused on the repository location for most of this time period. However, on Saturday, August 3, the crew moved to the micro-bioretention area after laying GCL. The crew worked until 10:30 PM at the micro-bioretention area to complete tasks before precipitation arrived.

Installation of the GCL was completed on August 7, 2019.

Approximately 5,655 cubic yards of topsoil were received at the repository.

After completion of installation of the GCL, the crew mobilized to the area 10/micro-bioretention area.

The contractor was off-site between 5 and 6 PM each day except for August 3, 2019, when they worked until 10:30 PM (to complete tasks at the micro-bioretention area.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and the micro-bioretention area is 100% complete.
Work at location 10 is 50% complete.
Work at the micro-bioretention area is 80% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
37 Rolls of GCL have been deployed at location 9. 95% complete at this area.

Precipitation: According to NOAA, 0.49” precipitation recorded for the period.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-8-2019
Client:	Olin and Syngenta	**Report No.:**	47
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 88-degrees F, low of 68-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day to complete silt fence maintenance at area 9, continue working on area 10, and work at the micro-bioretention location.

Safety Topic:

We are nearing the end of the project. Be focused on your work.

The crew addressed silt fencing at the repository area in the morning. During the afternoon, the crew was working at the micro-bioretention area.

The crew as working with hand tools and was operating the Caterpillar 259 skid steer to assist with completion of tasks.

The crew is utilizing hand tools to shape the berms of the micro-bioretention area.

The contractor was off-site at 5:00 PM.

According to NOAA, 0.02” precipitation reported for the last 24 hours.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 50% complete.
Work at the micro-bioretention area is 70% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-8-2019
Client:	Olin and Syngenta	**Report No.:**	47
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

37 Rolls of GCL have been deployed at location 9. 95% complete at this area.

Precipitation: According to NOAA, 0.02" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-9-2019
Client:	Olin and Syngenta	**Report No.:**	48
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 87-degrees F, low of 69-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. The work plan for the day is to focus on the micro-bioretention area. Bringing a load of topsoil to area 10. Place mulch in micro-bioretention area. Seed the finished berms at micro-bioretention area and place erosion mat for stabilization.

Safety Topic:

Slips, trips, and falls. Hand safety. There will be work moving some of the rip-rap located adjacent and east of the micro-bioretention area. This exposes hands to injury.

Morning:

The crew is utilizing hand tools to prepare the berms (west and south side) for the micro-bioretention area. The crew seeded the berms and installed erosion mat over the seeded areas.

Afternoon:

The crew continued to work on the micro-bioretention area working on the eastern berm and placing mulch.

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and the micro-bioretention area is 100% complete.
Work at location 10 is 50% complete.
Work at the micro-bioretention area is 80% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-9-2019
Client:	Olin and Syngenta	**Report No.:**	48
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
37 Rolls of GCL have been deployed at location 9. 95% complete at this area

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-10-2019
Client:	Olin and Syngenta	**Report No.:**	49
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 85-degrees F, low of 69-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue working on area 10. Also, clean up of existing parking lot.

Safety Topic:

Complacency. Be aware of work area. Pay attention to all of the things you do in your tasks.

Morning:

ENTACT is operating the Caterpillar 316 LE excavator and the D5K2 dozer to move soil within area 10. The crew is working with hand tools to prepare the edges of the area. This work is occurring primarily on the north side of area 10.

Afternoon:

The crew continued with activities at area 10 preparing it for asphalt placement next week.

The crew was laying geotextile fabric in area 10 prior to placing gravel.

The crew began moving gravel into area 10 and began compaction.

The crew also worked on cleanup of the existing pavement in and adjacent to their work area.

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-10-2019
Client:	Olin and Syngenta	**Report No.:**	49
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Work at location 10 is 70% complete.
Work at the micro-bioretention area is 80% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
37 Rolls of GCL have been deployed at location 9. 95% complete at this area.
Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-12-2019
Client:	Olin and Syngenta	**Report No.:**	50
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 87-degrees F, low of 62-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue working on area 10 and cleanup of existing parking lot.

In addition, some crew members moved to area 4 to begin moving staged topsoil to areas 6 and 7.

The crew was operating a Caterpillar 259D skid steer, Caterpillar D5K2 dozer, and Caterpillar 316LE excavator.

Safety Topic:

Complacency. Be aware of work area. Pay attention to all of the things you do in your tasks.

Morning:

ENTACT is operating the Caterpillar 316 LE excavator and the D5K2 dozer to move gravel within area 10.

ENTACT crew members moving soil within area 4 and are hauling top soil staged at area 4 to area 6 and 7.

Afternoon:

The crew continued with activities at area 10 preparing it for asphalt placement next week.

The crew is continuing to move topsoil from area 4 and 5 to areas 6 and 7.

Area 6 has been backfilled. Still not seeded.

The crew was operating a Caterpillar 259D skid steer, Caterpillar D5K2 dozer, and Caterpillar 316LE excavator.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-12-2019
Client:	Olin and Syngenta	**Report No.:**	50
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 85% complete.
Work at the micro-bioretention area is 80% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
Backfilling at location 4 is 95%
Backfilling at location 6 is 100% complete.
37 Rolls of GCL have been deployed at location 9. 95% complete at this area.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-13-2019
Client:	Olin and Syngenta	**Report No.:**	51
Contractor:	Entact	**Page:**	1 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Sunny skies.
Temperature: High of 80-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 6:30 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue working on area 10 preparing for asphalt and to continue at areas 4, 6, and 7.

Safety Topic:

Complacency. Be aware of work area. Pay attention to all of the things you do in your tasks.

Morning:

ENTACT is operating the Caterpillar 316 LE excavator and the D5K2 dozer to move gravel within area 10.

ENTACT crew members moving soil within area 4 and are hauling top soil staged at area 4 to area 6 and 7.

Morning:

Area 4 has been backfilled 100%, seeded, and mulched with straw.

George Crouse of Syngenta, Carrie Hunt and Keith Roberts of Olin, Helen Robinson with GEI, and Rich Zambito of Orbital ATK were on site to tour the work areas and observe progress. The group was accompanied by Jeff Carlson of GEI and Peter Porter of ENTACT.

The group observed areas 2, 3, 4, 5, 6, 7, 8, and 9 during the tour. The punch list for finishing the project was discussed. No major questions. Carrie Hunt inquired about the extra construction materials staged at the laydown area. Peter Porter indicated that the materials would be removed during de-mobilization. She had also asked about what will happen if rill occurs on the repository before full vegetation is achieved. She asked that GEI check on this.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-13-2019
Client:	Olin and Syngenta	**Report No.:**	51
Contractor:	Entact	**Page:**	2 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Afternoon:

The crew continued with activities at area 10 preparing it for asphalt placement scheduled for August 14, 2019.

Area 6 has been seeded and mulched.

The crew has completed seeding and mulching the east berm of the micro-bioretention area. Erosion mat has been installed as well to stabilize.

The crew was operating a Caterpillar 259D skid steer, Caterpillar D5K2 dozer, and Caterpillar 316LE excavator.

The contractor was off-site at 6:30 PM.

Construction conference call notes:

Peter Porter ran the call today.

Safety topic: Peter indicated that the project has been very safe. A crew member was stung by a bee on August 12, 2019. The crew member did not miss work and is fine. Peter emphasized the need to be aware of biological hazards.

Work progress:

Peter noted that the site visit occurred today. Individuals from Syngenta, Olin, and Orbital ATK toured the work areas this morning.

Peter indicated that he hopes to finish up work this week.

Asphalt is scheduled for August 14.

Asphalt sealing is scheduled for August 17.

Hydro-seeding of area 9 is also scheduled for this week.

Restoration of area 4 was completed today. Area 6 will be seeded and mulched later today.

Areas 5, 7, and 8 will be completed later in the week.

Peter stated that he plans to be off-site by Wednesday August 21, 2019 at the latest.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-13-2019
Client:	Olin and Syngenta	**Report No.:**	51
Contractor:	Entact	**Page:**	3 of 3
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Miscellaneous:

Erosion control at area 9. There were discussions during the site visit today related to sediment movement and rill at the repository prior to full vegetation is achieved. It was decided during the call that there would be more discussion between ENTACT and GEI.

End of meeting notes.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 85% complete.
Work at the micro-bioretention area is 83% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, 4, 6, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
37 Rolls of GCL have been deployed at location 9. 95% complete at this area.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-14-2019
Client:	Olin and Syngenta	**Report No.:**	52
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.20" precipitation past 24 hours.
Temperature: High of 87-degrees F, low of 62-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Artis Camon is the Health and Safety Officer. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue working on areas 5, 7, and 8. Asphalt contractor is onsite today to lay the asphalt at area 10.

Safety Topic:

Additional workers onsite today. More vehicle traffic today. Be alert. Also, with overnight rain, there could be some slick areas where we are backfilling with topsoil. Be careful to avoid slips, trips, falls.

Morning:

The crew has begun to work on the 5, 7, and 8 areas this morning. Utilizing mini-excavator and hand tools.

8:00 am, the asphalt contractor shows up on site. They will be going through safety orientation and training prior to beginning paving activities. They will be working under visitor badges with Peter Porter and Artic Camon of ENTACT accompanying the crew.

ENTACT crew members moving soil within area 5 to areas 7 and 8. The crew is operating the Caterpillar 316 LE excavator and Kubota mini-excavator.

Late morning, a steady rain began to fall. The asphalt contractor continued working through the rain and was able to lay the first layer of asphalt. The crew will return tomorrow to complete the final layer.

The ENTACT crew was pulled from area 7 and 8 (decision by ENTACT Health and Safety Officer) due to rain and potentially hazardous work situation due to the rain. The crew shifted work activities to cleanup activities at the project site.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-14-2019
Client:	Olin and Syngenta	**Report No.:**	52
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Afternoon:

The crew continued with cleanup activities at the project site. Working on items on the punch list.

Areas 5, 7, and 8 are near 75% completion.

The contractor was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 90% complete.
Work at the micro-bioretention area is 90% complete.
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, 4, 6, and the east side of location 9 is at 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
37 Rolls of GCL have been deployed at location 9. 95% complete at this area.

Precipitation: According to NOAA, 0.20” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-15-2019
Client:	Olin and Syngenta	**Report No.:**	53
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.53" precipitation past 24 hours.
Temperature: High of 87-degrees F, low of 62-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue working on areas 5, 7, and 8. Asphalt contractor will be onsite today to finish the asphalt at area 10. Hydro-seeding contractor will also be onsite to seed and mulch the repository.

Safety Topic:

Additional workers contractors today. More vehicle traffic today. Be alert.

Morning:

The crew has begun is resuming work at areas 7 and 8 this morning. Utilizing the Kubota mini-excavator and hand tools.

The asphalt contractor, S&M Paving, Inc., is back on site to finish area 10.

The hydro-seeding contractor is on site to hydro-seed area 9. The crew received safety training prior to obtaining visitor badges and beginning work.

ENTACT crew members are working on areas 7 and 8 utilizing the Kubota mini-excavator.

The crew has begun to prepare for repairing the security fence located adjacent and south of area 7. A post-hole digger was used to dig a hole for concrete and a fence post that was removed by ENTACT.

By the end of the morning, area 8 was completed. The crew backfilled the area, seeded, and applied erosion matting to the area for stabilization and mulch.

At mid-morning, the hydro-seeding crew, LEMs Contracting, utilizing a FINN T-170 hydro-seeder, was applying seed to area 9.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-15-2019
Client:	Olin and Syngenta	**Report No.:**	53
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Afternoon:

The crew continued with work at area 7.

The asphalt contractor finished the asphalt work at area 10. Before finishing, the contractor sprayed water onto the high end (west side) of the asphalt paved area to observe how water will behave during precipitation events. The water moved toward each of the discharge points to the micro-bioretention area.

The hydro-seeding contractor was blowing straw with a FINN B-70 straw blower at area 9. Tackifier was applied after straw mulching was completed.

Areas 7, 8, 9, and 10 were completed today.

The ENTACT crew was off-site at 5:00 PM. Hydro-seeding contractor was onsite until 6:30 PM

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 90% complete (rip rap needs to be installed).
Work at G-11 is 100% complete (if orbital ATK engineering staff requests additional fill, additional may be added).
Restoration work at location 1, 2, 3, 4, 5, 6, 8 and 9 is 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
37 Rolls of GCL were deployed at location 9.

Precipitation: According to NOAA, 0.53" precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-16-2019
Client:	Olin and Syngenta	**Report No.:**	54
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.00" precipitation past 24 hours.
Temperature: High of 89-degrees F, low of 72-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King, David Meredith, Justin McGinnis, and Jose Fuentes (operator). Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to work on the punch list.

Safety Topic:

We are nearing the end of the project. Stay focused on the tasks you are working on.

Morning:

The crew worked on the fence repair adjacent to area 7, cleaning equipment in preparation for return to venders, and addressing the access roads (filling/fixing ruts).

Afternoon:

During the afternoon, the crew continued with cleanup activities along the access roads. Later in the afternoon, the crew was concentrating on finishing up at the micro-bioretention area. This area will still need some final work on Saturday (rip rap placement).

The crew is also cleaning paved driving surface adjacent to area 10 to prepare for asphalt sealant activities scheduled to occur Saturday.

Punch List:

- Areas 1 through 10 have been completed 100%
- Micro-bioretention area is at 95%. Rip rap will be placed on Saturday.
- G-11 has been completed 100%
- Access road restoration is at 85%. The crew will finish this on Saturday.
- Seal Coating of asphalt is to occur on Saturday.
- Chain posts to be repaired Saturday or Monday.
- The security fence located adjacent and south of area 7 has been repaired.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-16-2019
Client:	Olin and Syngenta	**Report No.:**	54
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

- Cleaning of the asphalt paving located adjacent and north of area 10 is occurring today. This task will be completed on Saturday.
- Removal of portable toilets will occur on Tuesday, August 20, 2019.
- Removal of equipment will occur on Monday, August 19, 2019.
- Removal of the field office will occur on Monday, August 19, 2019.
- Removal of gravel from adjacent to the field office will be completed on Monday, August 19, 2019.
- The damaged fencing reported west of the work area was not related to construction activities.
- Restoration of laydown area will occur on Monday, August 19, 2019.

The ENTACT crew was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 95% complete (rip rap needs to be installed).
Work at G-11 is 100% complete.
Restoration work at location 1, 2, 3, 4, 5, 6, 8 and 9 is 100%.
Locations 1, 2, 3, and 9 have germinated. Vegetation ranges from 40 to 60%.
37 Rolls of GCL were deployed at location 9.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-17-2019
Client:	Olin and Syngenta	**Report No.:**	55
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.00" precipitation past 24 hours.
Temperature: High of 90-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King and Jose Fuentes (operator). Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to work on the punch list. Primary focus is on the asphalt sealing adjacent to area 10.

Safety Topic:

We are nearing the end of the project. Stay focused on the tasks you are working on.

Morning:

The crew placed the rip rap associated with the micro-bioretention area. The northern berm was also seeded and stabilized/mulched with coconut blanket.

The crew worked on applying the asphalt sealant to the asphalt located adjacent and north of area 10.

Portable bathrooms and wash station have been moved to a gravel surface until Tuesday pick up.

Afternoon:

During the afternoon, the crew continued with asphalt sealing activites.

Punch List:

- Areas 1 through 10 have been completed 100%
- Micro-bioretention area is at 100%.
- G-11 has been completed 100%
- Access road restoration is at 100%.
- Seal Coating of asphalt is 100%
- Chain posts to be repaired Monday.
- The security fence located adjacent and south of area 7 has been repaired.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-17-2019
Client:	Olin and Syngenta	**Report No.:**	55
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

- Cleaning of the asphalt paving located adjacent and north of area 10 is 100%
- Removal of portable toilets will occur on Tuesday, August 20, 2019.
- Removal of equipment will occur on Monday, August 19, 2019.
- Removal of the field office will occur on Monday, August 19, 2019.
- Removal of gravel from adjacent to the field office is 95% complete. The remaining gravel will be completed on Monday, August 19, 2019.
- The damaged fencing reported west of the work area was not related to construction activities.
- Restoration of laydown area will occur on Monday, August 19, 2019.

The ENTACT crew was off-site at 5:00 PM.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 100% complete
Work at G-11 is 100% complete.
Restoration work at location 1, 2, 3, 4, 5, 6, 8 and 9 is 100%.
Locations 1, 2, 3, 4, 6, and 9 have germinated. Vegetation ranges from 40 to 65%.
37 Rolls of GCL were deployed at location 9.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-19-2019
Client:	Olin and Syngenta	**Report No.:**	56
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.18" precipitation past 24 hours.
Temperature: High of 90-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – Kevin King. Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM End: 5:00 PM

ENTACT crew met at the laydown area office for the tail gate meeting. Workplan for today is to continue to work on the punch list. Primary focus is cleaning equipment prior to vender pick-up.

Safety Topic:

We are nearing the end of the project. Stay focused on the tasks you are working on.

The dumpster and field office were picked up and removed from the site. Areas where disturbed ground surface exists were seeded.

The Caterpillar D5K2 dozer was picked up by the vender.

The chain gate pole at the entrance to the laydown area was repaired.

The remaining items on the punch list are for pick up of the Caterpillar 259 skid steer, the three portable toilets, and the wash station on Tuesday morning.

Seed germination was observed at area 5 and area 9.

Punch List:

- Areas 1 through 10 have been completed 100%
- Micro-bioretention area is at 100%.
- G-11 has been completed 100%
- Access road restoration is at 100%.
- Seal Coating of asphalt is 100%
- Chain posts repair is 100%
- The security fence located adjacent and south of area 7 has been repaired.
- Cleaning of the asphalt paving located adjacent and north of area 10 is 100%
- Removal of portable toilets will occur on Tuesday, August 20, 2019.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-19-2019
Client:	Olin and Syngenta	**Report No.:**	56
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

- Removal of equipment will occur on Monday, August 19, 2019.
- The field office has been removed.
- Removal of gravel from adjacent to the field office is 100%.
- The damaged fencing reported west of the work area was not related to construction activities.
- Restoration of laydown area is 100%.

The ENTACT crew was off-site at 5:00 PM.

Additional information provided by Peter Porter regarding work activities on August 3, 2019:

According to Peter, ENTACT excavated the micro-bioretention area. 8 loads (56 cy) were temporarily staged at area 10. On August 5, 2019, this material was hauled to the repository.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 100% complete
Work at G-11 is 100% complete.
Restoration work at location 1, 2, 3, 4, 5, 6, 7, 8 and 9 is 100%.
Locations 1, 2, 3, 4, 6, and 9 have germinated. Vegetation ranges from 40 to 65%.
37 Rolls of GCL were deployed at location 9.

Precipitation: According to NOAA, 0.18" precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-20-2019
Client:	Olin and Syngenta	**Report No.:**	57
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.00" precipitation past 24 hours.
Temperature: High of 90-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM

Peter Porter with ENTACT was on site to see that the Caterpillar 259D Skid Steer, three portable toilets, and portable wash station was removed.

Construction Meeting Notes:

Safety:

No incidents to report.

Project Progress:

Last call of the project. Perhaps another call after draft of the documentation report has been issued.

Work is complete. The punch list is complete.

Peter Porter walked the fence line with security staff. Security was satisfied with the fencing.

Peter Porter noted that the repository (area 9) had been hydro-seeded last Thursday. Seeds have germinated. There was a storm on Monday evening. There were a few rillets. ENTACT repaired the rillets and applied additional seed.

Open Issues:

Is there a certification for the second source of topsoil? We will need to get the second certification.

Entact is working with the surveyor for As Builts.

Mike Ruetten with GEI proposed that an inspection of the site should occur just after Labor Day weekend and mid-October. ENTACT has an arrangement in place with local contractor to complete minor repairs.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-20-2019
Client:	Olin and Syngenta	**Report No.:**	57
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

A discussion occurred related to placement of signs around the repository. GEI will discuss this.

End of Meeting.

Punch List:

- Areas 1 through 10 have been completed 100%
- Micro-bioretention area is at 100%.
- G-11 has been completed 100%
- Access road restoration is at 100%.
- Seal Coating of asphalt is 100%
- Chain posts repair is 100%
- The security fence located adjacent and south of area 7 has been repaired.
- Cleaning of the asphalt paving located adjacent and north of area 10 is 100%
- Portable toilets removed on Tuesday, August 20, 2019.

- Last equipment was removed Tuesday, August 20, 2019.
- The field office has been removed.
- Removal of gravel from adjacent to the field office is 100%.
- The damaged fencing reported west of the work area was not related to construction activities.
- Restoration of laydown area is 100%.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 100% complete
Work at G-11 is 100% complete.
Restoration work at location 1, 2, 3, 4, 5, 6, 7, 8 and 9 is 100%.
Locations 1, 2, 3, 4, 6, and 9 have germinated. Vegetation ranges from 40 to 65%.
37 Rolls of GCL were deployed at location 9.

Precipitation: According to NOAA, 0.00” precipitation recorded for the past 24 hours.

By: JSC **Reviewed By: MGR**

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-20-2019
Client:	Olin and Syngenta	**Report No.:**	57
Contractor:	Entact	**Page:**	3 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-21-2019
Client:	Olin and Syngenta	**Report No.:**	58
Contractor:	Entact	**Page:**	1 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Weather: Cloudy skies. According to NOAA, 0.00" precipitation past 24 hours.
Temperature: High of 90-degrees F, low of 74-degrees F

Contractor Work Force:

ENTACT Crew – Peter Porter is the project manager.

Observations:

Contractor start: 7:00 AM

Peter Porter with ENTACT was on site while the surveyor crew was on site today.

Punch List:

- Areas 1 through 10 have been completed 100%
- Micro-bioretention area is at 100%.
- G-11 has been completed 100%
- Access road restoration is at 100%.
- Seal Coating of asphalt is 100%
- Chain posts repair is 100%
- The security fence located adjacent and south of area 7 has been repaired.
- Cleaning of the asphalt paving located adjacent and north of area 10 is 100%
- Portable toilets removed on Tuesday, August 20, 2019.
- Last equipment was removed Tuesday, August 20, 2019.
- The field office has been removed.
- Removal of gravel from adjacent to the field office is 100%.
- The damaged fencing reported west of the work area was not related to construction activities.
- Restoration of laydown area is 100%.

Erosion control estimated completion percentages:
Locations 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are 100% complete.

Clearing is 100% complete.
Excavation of locations 1, 2, 3, 4, 5, 6, 7, 8, and 9 is 100% complete.
Work at location 10 is 100% complete.
Work at the micro-bioretention area is 100% complete
Work at G-11 is 100% complete.
Restoration work at location 1, 2, 3, 4, 5, 6, 7, 8 and 9 is 100%.
Locations 1, 2, 3, 4, 6, and 9 have germinated. Vegetation ranges from 40 to 65%.
37 Rolls of GCL were deployed at location 9.

FIELD OBSERVATION REPORT

Project:	Soil Consolidation and Capping-Thiokol Site	**Date:**	08-21-2019
Client:	Olin and Syngenta	**Report No.:**	58
Contractor:	Entact	**Page:**	2 of 2
Location:	Elkton, MD	**GEI Proj. No.:**	1610692

Precipitation: According to NOAA, 0.00" precipitation recorded for the past 24 hours.

By: JSC	**Reviewed By: MGR**

Construction Photolog

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 1	**DATE:** 6/8/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: North	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Laydown area at the project site.			

PHOTOGRAPH NO: 2	**DATE:** 6/8/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Caterpillar 259D skid steer operated at the project site.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 3	**DATE:** 6/8/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Caterpillar D5K2 dozer operated at the project site.			

PHOTOGRAPH NO: 4	**DATE:** 6/11/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Ford F-750 dump truck operated at the project site.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 5	**DATE:** 6/11/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: North	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Laydown area and field office.			

PHOTOGRAPH NO: 6	**DATE:** 6/12/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Clearing contractor moving felled trees at Area 9.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 7	**DATE:** 6/29/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Incinerator structure being knocked down.			

PHOTOGRAPH NO: 8	**DATE:** 7/3/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: East	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 1.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 9	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: South	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 2.			

PHOTOGRAPH NO: 10	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 3.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 11	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 4.			

PHOTOGRAPH NO: 12	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 5.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 13	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 6.			

PHOTOGRAPH NO: 14	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: Southeast	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 7.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 15	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: North	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 8.			

PHOTOGRAPH NO: 16	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: Northwest	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 17	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: North	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

PHOTOGRAPH NO: 18	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: Northwest	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 19	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: West	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

PHOTOGRAPH NO: 20	**DATE:** 8/19/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: Southwest	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

PHOTOGRAPHIC LOG

PHOTOGRAPH NO: 21	**DATE:** 8/29/2019	**GEI PROJECT NO:** 1610692	**CLIENT:** Syngenta Crop Protection/Olin Corporation
DIRECTION: East	**SITE LOCATION:** THIOKOL ROAD SITE, ELKTON, MARYLAND		
DESCRIPTION: Completed Area 9.			

Appendix B

Geotechnical Laboratory Test Results

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-009

Date: June 28, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT
Pete Porter, ENTACT

Subject: Geotechnical Testing Results for Clean Fill Materials

Specification Reference Number: Section 02315 2.01C – Excavation and Filling

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: (Cover only One Specification Section with Each Transmittal):	**Copies**
Geotechnical testing results for structural fill material and subbase aggregate from Elk Mills Quarry	1

Submittal Request

- ☐ No Approval Required/Requested
- ☒ Approval Required/Requested
- ☐ Response Required/Requested
- ☐ Revised and Resubmitted as Noted
- ☐ Information Only

Engineer Approval

- ☒ Work May Proceed
- ☐ Work May Proceed Subject to Changes Indicated
- ☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
- ☐ Work May Not Proceed.
- ☐ For Information Only

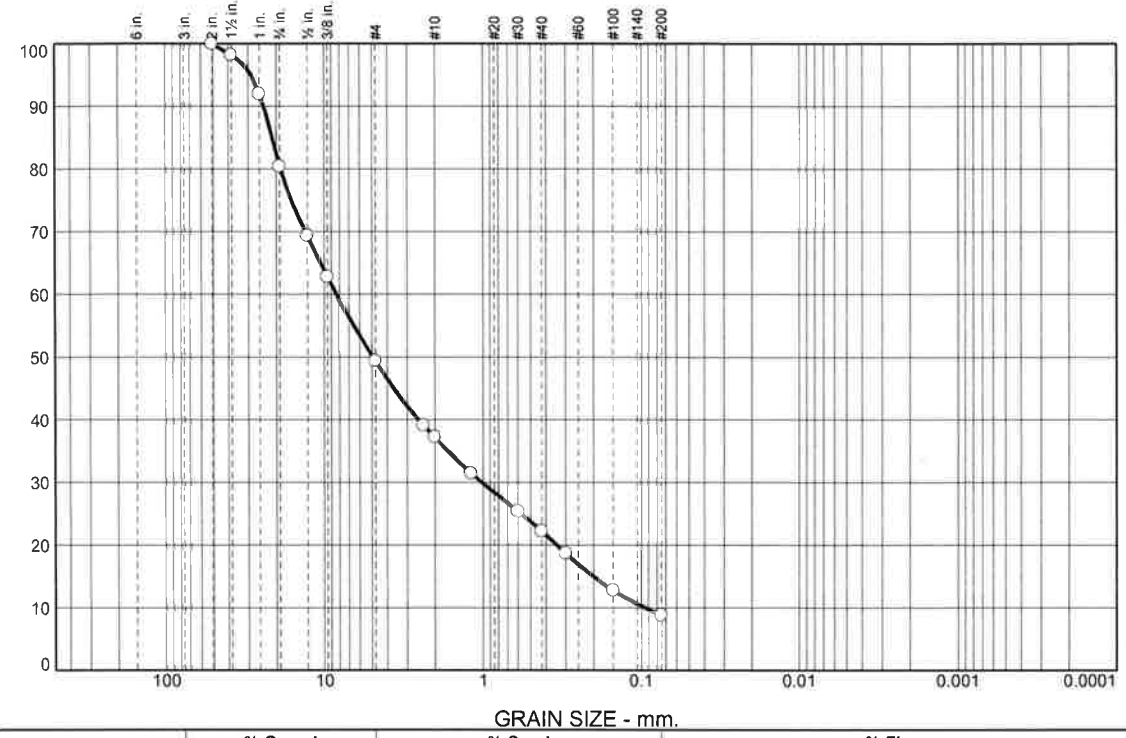
ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self
ENTACT Signature: Jenny Self
Date: June 28, 2019

Reviewer Name: Michael G Ruetten
Reviewer Signature: Michael G Ruetten
Date: 6/28/2019

* Structural fill had slightly higher fines content than specification but acceptable value for backfill in bioretention area over the geotextile.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.6	31.1	12.1	15.0	13.4	8.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0	100.0	
1.5	98.2	95.0 - 100.0	
1	91.9		
.75	80.4	70.0 - 92.0	
.5	69.3		
.375	62.8	50.0 - 70.0	
#4	49.3	35.0 - 55.0	
#8	39.1		
#10	37.2		
#16	31.4		
#30	25.4	12.0 - 25.0	
#40	22.2		
#50	18.7		
#100	12.8		
#200	8.8	0.0 - 8.0	

* MD DOT 901.01 Graded Aggregate - Base Design Range

Soil Description

Gray, Well-graded GRAVEL with silt and sand

Atterberg Limits

PL= NP LL= NP PI= NP NM= 3.3

Coefficients

D_{90}= 24.0649 D_{85}= 21.3044 D_{60}= 8.3675
D_{50}= 4.9360 D_{30}= 1.0172 D_{15}= 0.2005
D_{10}= 0.0940 C_u= 89.00 C_c= 1.32

Classification

USCS= GW-GM AASHTO= A-1-a

Remarks

Material Meets Gradation Specification and Tolerances for MD DOT Section 901.01 Graded Aggregate-Base Design Range

Source of Sample: Elk Mills, CR6
Sample Number: S-061919

Date: 6/20/2019

GEO-TECHNOLOGY ASSOCIATES, INC.
18 Boulden Circle, Suite 36
New Castle, DE 19720

Client: ENTACT, LLC
Project: Thiokol Site
Project No: 190913 **Figure**

ASTM Specifications performed may include D422, D421, D6913, D2216, D2217, and D4318.

Tested By: A. Veith **Checked By:** C. Reith

MOISTURE DENSITY RELATIONSHIP TEST
ASTM D 1557-12 Method C Modified

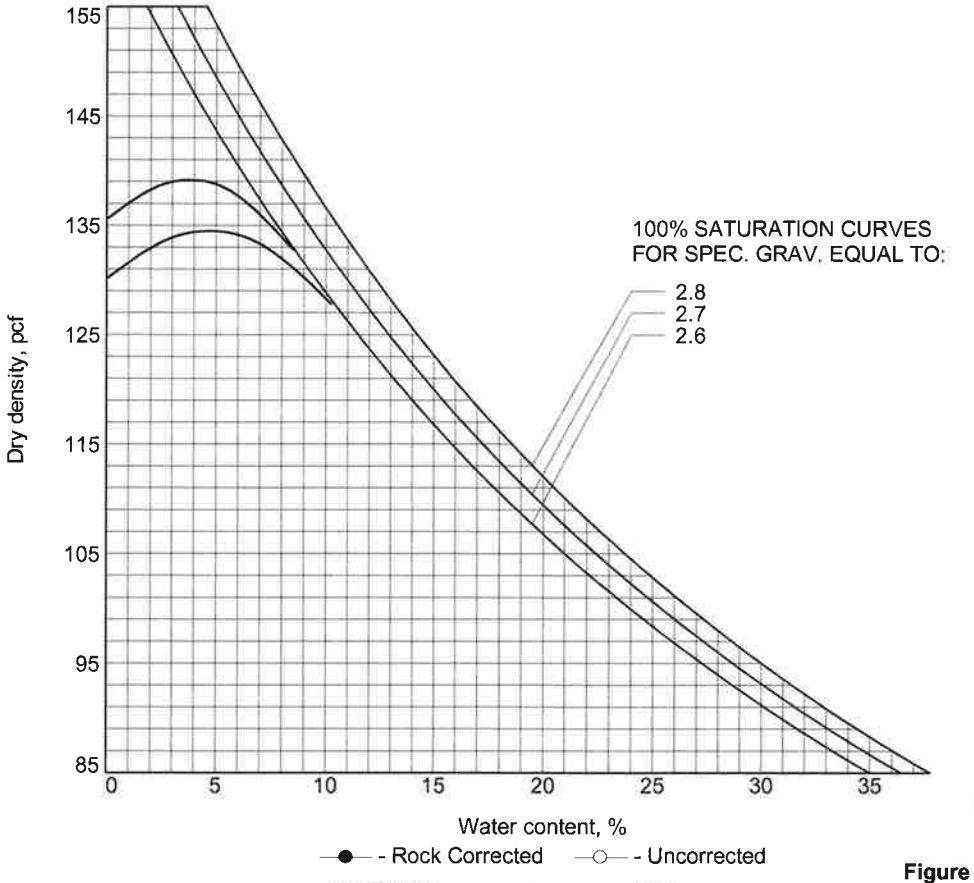
Project No.: 190913 **Date:** 6/20/2019
Project: Thiokol Site
Client: ENTACT, LLC
Source of Sample: Elk Mills, CR6
Sample Number: S-061919
Remarks: Rock Corrected Test Results for 19.6% Oversize Material Retained on the 3/4-inch Sieve

MATERIAL DESCRIPTION

Description: Gray, Well-graded GRAVEL with silt and sand

Classifications - **USCS:** GW-GM **AASHTO:** A-1-a
Nat. Moist. = 3.3 % **Sp.G. =** 2.6
Liquid Limit = NP **Plasticity Index =** NP
% < No.200 = 8.8 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 139.2 pcf	134.5 pcf
Optimum moisture = 3.8 %	4.7 %



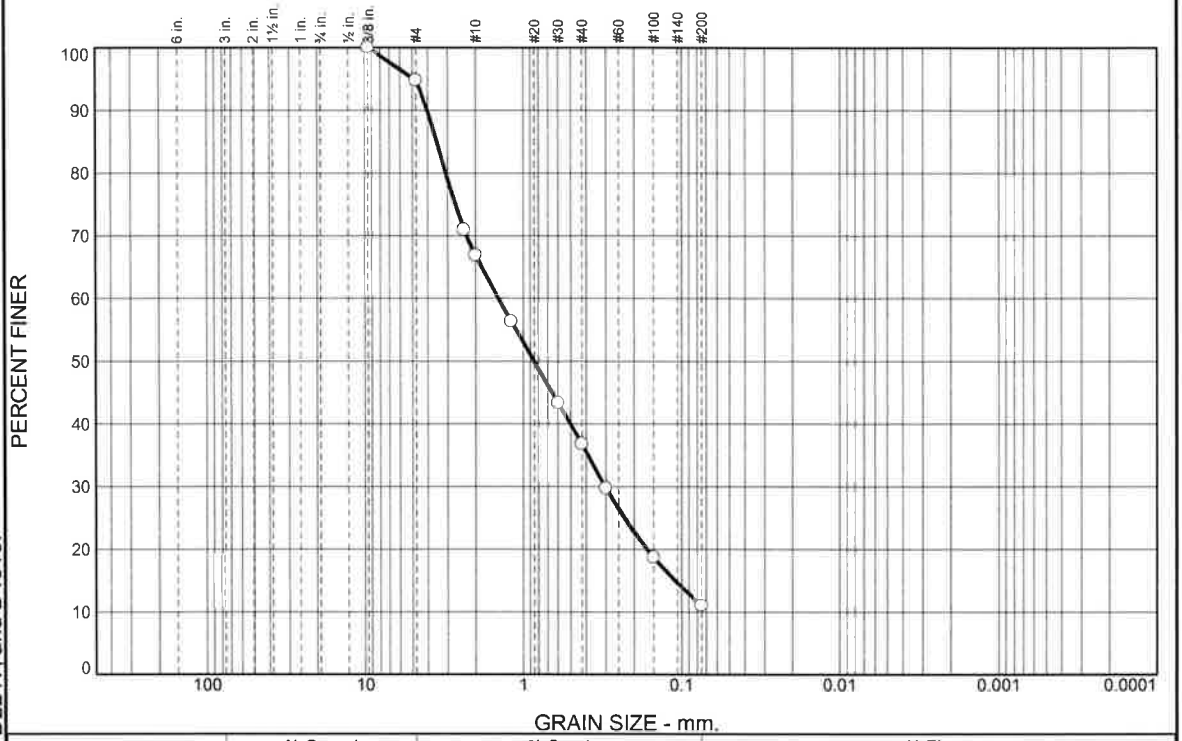
Figure

Geo-Technology Associates, Inc.

ASTM Specifications performed may include D422, D421, D6913, D2216, D2217, and D4318.

Tested By: A. Veith **Checked By:** C. Reith

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.2	27.9	30.1	25.7	11.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0	100.0	
#4	94.8	90.0 - 100.0	
#8	70.9		
#10	66.9		
#16	56.2		
#30	43.4		
#40	36.8		
#50	29.7	10.0 - 40.0	
#100	18.7		
#200	11.1	0.0 - 7.0	X

* Thiokol Site-Section 02315 Part 2.01 Soil Materials - Structural Fill

Soil Description

Gray, Poorly-graded SAND with silt

Atterberg Limits

PL= NP LL= NP PI= NP NM= 0.9

Coefficients

D_{90}= 4.0381 D_{85}= 3.5147 D_{60}= 1.4343
D_{50}= 0.8526 D_{30}= 0.3043 D_{15}= 0.1096
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Material Does Not Meet Gradation Specifications Per Section 02315 Part 2.01 Soil Materials - Structural Fill

Source of Sample: Elk Mills, Screenings
Sample Number: S-061919

Date: 6/20/2019

ASTM Specifications performed may include D422, D421, D6913, D2216, D2217, and D4318.

GEO-TECHNOLOGY ASSOCIATES, INC.
18 Boulden Circle, Suite 36
New Castle, DE 19720

Client: ENTACT, LLC
Project: Thiokol Site
Project No: 190913 **Figure**

Tested By: A. Veith **Checked By:** C. Reith

MOISTURE DENSITY RELATIONSHIP TEST
ASTM D 698 Method B Standard

Project No.: 190913 **Date:** 6/21/2019
Project: Thiokol Site
Client: ENTACT, LLC
Source of Sample: Elk Mills, Screenings
Sample Number: S-061919
Remarks:

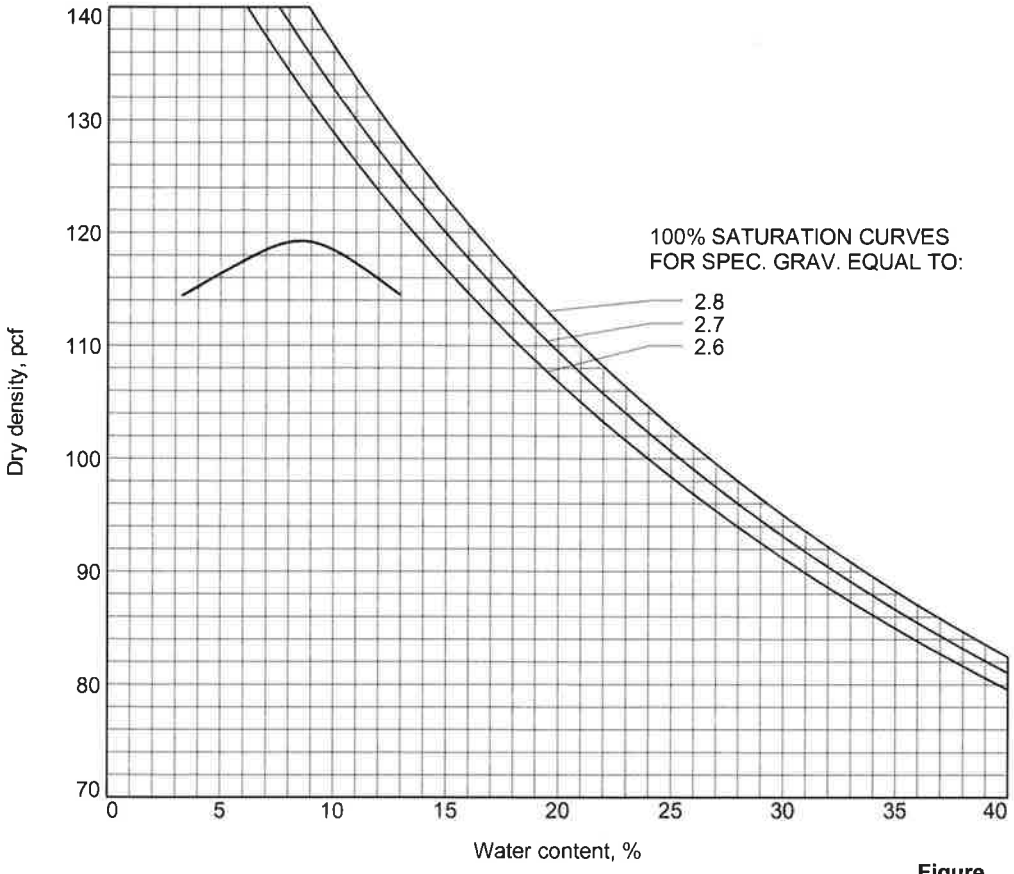
MATERIAL DESCRIPTION

Description: Gray, Poorly-graded SAND with silt

Classifications - **USCS:** SP-SM **AASHTO:** A-1-b
Nat. Moist. = 0.9 % **Sp.G. =** 2.6
Liquid Limit = NP **Plasticity Index =** NP
% < No.200 = 11.1 %

TEST RESULTS

Maximum dry density = 119.3 pcf
Optimum moisture = 8.5 %



ASTM Specifications performed may include D422, D421, D6913, D2216, D2217, and D4318.

Figure

Geo-Technology Associates, Inc.

Tested By: A. Veith **Checked By:** C. Reith

Appendix C

Geosynthetic Clay Liner

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation and Capping Pesticide and Sewer Line Areas.

I, Peter Porter, a duly authorized representative of ENTACT LLC, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository) West Side

Note: GCL placed on forest ground with exposed roots and mulch (wood chips) in some locations.

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 7/27/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter S Porter
TITLE: PM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 7/27/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter S Porter
TITLE: PM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 7-27-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey B. Carlson
TITLE: Project Professional GEI

Certificate of Acceptance Of Prepared Subgrade

GEI Consultants

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation and Capping Pesticide and Sewer Line Areas

I, Peter Ponsen duly authorized representative of ENTACT LLC, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: AREA 9

Note: GCL placed on forest floor with exposed roots and mulch (wood chips) in some locations

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 7/29/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: PM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 7/29/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: PM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 7/29/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey S. Carlson
TITLE: Project Professional 6

Certificate of Acceptance Of Prepared Subgrade

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation + Capping Pesticide and Sewer Line Areas

I, Peter Porter, a duly authorized representative of ENTACT LLC, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9

Note: GCL placed on forest ground with exposed roots and mulch (wood chips) in some locations

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 7/30/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: FPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 7/30/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: FPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 7-30-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey S. Carlson
TITLE: Project Professional GET

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

PROJECT

LOCATION: ELKTON, MD

PROJECT: Soil Consolidation + Capping Pesticide + Sewer line Areas

I, PETER PORTER, ~~a duly~~ authorized representative of ENTACT LLC, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: AREA 9

Note: GCL placed on forest floor with exposed roots and mulch (wood chips in some locations)

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 7/31/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: PETER F PORTER
TITLE: PM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 7/31/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: PETER F. PORTER
TITLE: PM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 7-31-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey S. Carlson
TITLE: Project Professional 6 EIT

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation Capping Pesticide & Sewer Line Areas

I, Peter Porter, a duly authorized representative of Entact LLC, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9

Note: GCL placed in forest floor with exposed roots and mulch (wood chips) in some locations.

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8/1/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: PM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8/1/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: PM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8/1/19

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey J. Carlson
TITLE: Project Professional Geologist

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, Maryland

PROJECT: Soil Consolidation and Capping Pesticide and Sewer Line Areas.

I, Peter Porter, a duly authorized representative of ENTACT, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository)

Note: GCL placed on forest ground with exposed roots and mulch (wood chips) in some locations

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8/2/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: ENTACT LLC, FPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8/2/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: ENTACT LLC, FPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8/2/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: Jeffrey S. Carlson
NAME: Jeffrey B. Carlson
TITLE: Project Professional GEI

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation and Capping Pesticide and Sewer Line Areas

I, Peter Porter, a duly authorized representative of ENTACT, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository)

Note: GCL placed on forest ground with exposed roots and mulch (wood chips) in some locations.

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8-3-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: ENTACT LLC, FPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8-3-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: ENTACT LLC, FPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8-3-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey S. Carlson
TITLE: Project Professional GEI

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, Maryland

PROJECT: Soil Consolidation and Capping Pesticide and Sewer line Areas

I, Peter Porter, a duly authorized representative of ENTACT, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository)

Note: GCL placed on forest ground with exposed roots and wood chips (mulch) in some locations.

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8/5/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: PETER F. PORTER
TITLE: ENTACT LLC, EPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8/5/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: PETER F. PORTER
TITLE: ENTACT LLC, EPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8/5/2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Jeffrey S. Carlson
TITLE: Project Professional GEI

Certificate of Acceptance
Of Prepared Subgrade

GEI

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: ELKTON, MD

PROJECT: Soil Consolidation and Capping Pesticide and Sewer Line Area

I, Peter Porter, a duly authorized representative of ENTACT, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository) East
Note: GCL placed on forest floor with exposed roots and mulch (wood chips) in some locations

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8-6-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: [signature]
NAME: Peter F. Porter
TITLE: Entact LLC, EPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8-6-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: [signature]
NAME: Peter F. Porter
TITLE: Entact LLC, EPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8-6-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: [signature]
NAME: Jeffrey S. Carlson
TITLE: Project Professional GET

Certificate of Acceptance
Of Prepared Subgrade

GEI Consultants

GEOSYNTHETICS CONTRACTOR

NAME: ENTACT

ADDRESS: _____

_____

PROJECT

LOCATION: Elkton, MD

PROJECT: Soil Consolidation and Capping Pesticide and Sewer line Area

I, Peter Porter, a duly authorized representative of ENTACT, have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the GCL. I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation, and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only.

Area Accepted: Area 9 (Repository) East side
Note: GCL placed on forest floor with exposed roots and mulch (wood chips) in some locations

SUBGRADE RELEASED BY:

GENERAL CONTRACTOR
DATE: 8-7-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F Porter
TITLE: Ienstec, LLC, EPM

SUBGRADE ACCEPTED BY:

GEOSYNTHETICS CONTRACTOR
DATE: 8-7-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: _____
NAME: Peter F. Porter
TITLE: Ienstec LLC, EPM

SUBGRADE OBSERVED BY:

CQA CONSULTANT
DATE: 8-7-2019

AUTHORIZED REPRESENTATIVE:
SIGNATURE: Jeffrey S. Carlson
NAME: Jeffrey S. Carlson
TITLE: Project Professional GEI

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-008

Date: June 25, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT

Subject: GCL Manufacturing QC Test Data Package

Specification Reference Number: Section 02413 1.03 – GCL

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: **(Cover only One Specification Section with Each Transmittal):** **Copies**

Product Certifications, GCL Order Packing List and MQA Tracking Form, GCL Manufacturing Quality Control Test Data, Bentonite Clay Certifications, and Raw Material Test Results for the following shipments:

GCL Order No. 55037366	1
GCL Order No. 55037367	1
GCL Order No. 55037368	1

Submittal Request

☐ No Approval Required/Requested

☒ Approval Required/Requested

☐ Response Required/Requested

☐ Revised and Resubmitted as Noted

☐ Information Only

Engineer Approval

☐ Work May Proceed

☐ Work May Proceed Subject to Changes Indicated

☐ Work May Not Proceed Indicated Part(s). Re-submittal Required

☐ Work May Not Proceed.

☐ For Information Only

ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self

ENTACT Signature: Jenny Self

Date: June 25, 2019

Reviewer Name: _____

Reviewer Signature: _____

Date: _____

CETCO
Colloid Environmental Technologies Company LLC

GRI GEI GII GSI GAI GCI
GAI-LAP accredited

Date: 24-Jun-2019 12:36
Purchase Order: 1055
ORDER NUMBER: 55037366

EASTERN GEOSYSTEMS
21 W LEE ST

BALTIMORE,MD,21201

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to EASTERN GEOSYSTEMS .

The enclosed data package includes results for all MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once every 250,000 sq./ft. of GCL produced, unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO® accepts responsibility for our GCL should the index flux/hydraulic conductivity test produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO® will replace the nonconforming material at no charge.

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037366
PREPARED FOR: EASTERN GEOSYSTEMS

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

CETCO
Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037366
PREPARED FOR: EASTERN GEOSYSTEMS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	3.5 - lbs/in
ASTM D5890	Bentonite Free Swell	1 per 50 Tons	24 - ml
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D5891	Bentonite Fluid Loss	1 per 50 Tons	18 - ml
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needless and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55037366

GCL								GEOTEXTILE			CLAY
BENTOMAT® DN								01-9514	01-8991		CG 50-BLK-CV
Order	**GCL Lot#**	**GCL Roll#**	**Length**	**Width**	**Weight**	**Sq. ft**	**Roll # Tested**	**Cap1 Roll #**	**Base1 Roll #**		**Clay Lot #**
55037366	CV-14-2018	1259	150	14.5	2889	2175	1249	2025344365	J20471780		50098317B
55037366	CV-14-2018	1290	150	14.5	2848	2175	1285	2025394274	J20471829		50098317B
55037366	CV-22-2018	2556	150	14.5	2891	2175	2556	2025467423	2025480671		50105640A
55037366	CV-29-2018	3211	150	14.5	2860	2175	3205	2025598805	2025588061		50113071A
55037366	CV-32-2018	3660	150	14.5	2947	2175	3649	2025609369	2025620328		50113293A
55037366	CV-32-2018	3666	150	14.5	2946	2175	3649	2025609425	2025620331		50113293B
55037366	CV-33-2018	4147	150	14.5	2924	2175	4145	2025638818	2025602687		50116841A
55037366	CV-33-2018	4148	150	14.5	2930	2175	4145	2025638818	2025602687		50116841A
55037366	CV-34-2018	4395	150	14.5	2890	2175	4386	2025662731	2025620386		50116844B
55037366	CV-34-2018	4396	150	14.5	2896	2175	4386	2025662775	2025620386		50116844B
55037366	CV-34-2018	4397	150	14.5	2889	2175	4386	2025662775	2025620386		50116844B
55037366	CV-34-2018	4403	150	14.5	2899	2175	4386	2025662785	2025620400		50116844B
					Total Sq Ft:	26100		Total Number of Rolls Certified: 12			

CETCO
Colloid Environmental Technologies Company LLC

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55037366 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength			
		ASTM Test Method:	ASTM D5993	ASTM D6768	ASTM D6496			
		Required Value:	.75 - lbs/sq ft	50 - lbs/in	3.5 - lbs/in			
BENTOMAT® DN	CV-14-2018	1249	.84	101.8	14.3			
BENTOMAT® DN	CV-14-2018	1285	.89	90.36	14			
BENTOMAT® DN	CV-22-2018	2556	.85	80.4	7.4			
BENTOMAT® DN	CV-29-2018	3205	.86	77.3	6.9			
BENTOMAT® DN	CV-32-2018	3649	.89	76.8	7			
BENTOMAT® DN	CV-33-2018	4145	.86	71.6	8.1			
BENTOMAT® DN	CV-34-2018	4386	.89	64.8	6.4			

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55037366 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 - ml
50098317B	9.4	27	15.2
50105640A	8.8	28	13.5
50113071A	9.18	27	14
50113293A	8.6	26	15
50113293B	8.7	26	14
50116841A	8.1	29	15.4
50116844B	6.8	24	14.2

CETCO
Colloid Environmental Technologies Company LLC

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55037366 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	J20471780	6.1	157
01-8991	J20471829	6	216.7
01-8991	2025480671	6.79	180.05
01-8991	2025588061	6.59	225.51
01-8991	2025620328	6.63	215.01
01-8991	2025620331	6.68	209.25
01-8991	2025602687	6.61	205.38
01-8991	2025620386	6.79	190.53
01-8991	2025620400	6.25	201.89

COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	2025344365	6.97	130.7
01-9514	2025394274	6.62	159.84
01-9514	2025467423	6.53	104.49
01-9514	2025598805	6.94	110.14
01-9514	2025609369	7.33	90.93
01-9514	2025609425	6.84	127.15
01-9514	2025638818	7.26	173.09
01-9514	2025662731	6.87	88.03
01-9514	2025662775	7.2	141.32
01-9514	2025662785	7.16	137.35

Certifications from our suppliers are on file at our production facility.

CETCO
Colloid Environmental Technologies Company LLC

GRI GEI GII GSI GAI GCI
GAI-LAP accredited

Date: 24-Jun-2019 12:19
Purchase Order: 1055
ORDER NUMBER: 55037367

EASTERN GEOSYSTEMS
21 W LEE ST

BALTIMORE,MD,21201

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to EASTERN GEOSYSTEMS .

The enclosed data package includes results for all MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once every 250,000 sq./ft. of GCL produced, unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO® accepts responsibility for our GCL should the index flux/hydraulic conductivity test produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO® will replace the nonconforming material at no charge.

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037367
PREPARED FOR: EASTERN GEOSYSTEMS

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

CETCO
Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037367
PREPARED FOR: EASTERN GEOSYSTEMS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	3.5 - lbs/in
ASTM D5890	Bentonite Free Swell	1 per 50 Tons	24 - ml
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D5891	Bentonite Fluid Loss	1 per 50 Tons	18 - ml
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needless and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55037367

GCL								GEOTEXTILE			CLAY
BENTOMAT® DN								01-9514	01-8991		CG 50-BLK-CV
Order	**GCL Lot#**	**GCL Roll#**	**Length**	**Width**	**Weight**	**Sq. ft**	**Roll # Tested**	**Cap1 Roll #**	**Base1 Roll #**		**Clay Lot #**
55037367	CV-14-2018	1115	150	14.5	2882	2175	1098	2025387169	J20471797		50098315B
55037367	CV-16-2018	1980	150	14.5	2848	2175	1963	2025454914	J20471857		50100259B
55037367	CV-19-2018	2500	150	14.5	2795	2175	2488	2025454983	2025480681		50102995B
55037367	CV-20-2018	2547	150	14.5	2869	2175	2538	2025454982	2025323638		50103993B
55037367	CV-20-2018	2550	150	14.5	2878	2175	2538	2025502933	2025480676		50103994A
55037367	CV-20-2018	2551	150	14.5	2880	2175	2538	2025502933	2025480676		50103994A
55037367	CV-29-2018	3209	150	14.5	2883	2175	3205	2025598805	2025588061		50113071A
55037367	CV-33-2018	4152	150	14.5	2947	2175	4145	2025638823	2025602687		50116841A
55037367	CV-34-2018	4399	150	14.5	2875	2175	4386	2025662775	2025620400		50116844B
55037367	CV-34-2018	4400	150	14.5	3014	2175	4386	2025662775	2025620400		50116844B
55037367	CV-34-2018	4401	150	14.5	2893	2175	4386	2025662775	2025620400		50116844B
55037367	CV-34-2018	4402	150	14.5	2911	2175	4386	2025662775	2025620400		50116844B
					Total Sq Ft:	26100		Total Number of Rolls Certified: 12			

CETCO
Colloid Environmental Technologies Company LLC

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55037367 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength			
		ASTM Test Method:	ASTM D5993	ASTM D6768	ASTM D6496			
		Required Value:	.75 - lbs/sq ft	50 - lbs/in	3.5 - lbs/in			
BENTOMAT® DN	CV-14-2018	1098	.89	70.6	9.5			
BENTOMAT® DN	CV-16-2018	1963	.88	92.6	14.5			
BENTOMAT® DN	CV-19-2018	2488	.95	74.8	7.4			
BENTOMAT® DN	CV-20-2018	2538	.89	70.11	7.7			
BENTOMAT® DN	CV-29-2018	3205	.86	77.3	6.9			
BENTOMAT® DN	CV-33-2018	4145	.86	71.6	8.1			
BENTOMAT® DN	CV-34-2018	4386	.89	64.8	6.4			

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55037367 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 - ml
50098315B	9.2	27	11.3
50100259B	10	25	14.98
50102995B	7.4	27	12.5
50103993B	11.3	24	14.8
50103994A	7.1	31	13.9
50113071A	9.18	27	14
50116841A	8.1	29	15.4
50116844B	6.8	24	14.2

CETCO
Colloid Environmental Technologies Company LLC

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55037367 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	J20471797	6.2	206.7
01-8991	J20471857	6.3	197.8
01-8991	2025480681	6.57	188.16
01-8991	2025323638	6.79	183.5
01-8991	2025480676	6.74	206.19
01-8991	2025588061	6.59	225.51
01-8991	2025602687	6.61	205.38
01-8991	2025620400	6.25	201.89

COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	2025387169	7.46	151.24
01-9514	2025454914	7.4	100.66
01-9514	2025454983	6.59	127.48
01-9514	2025454982	6.59	127.48
01-9514	2025502933	6.74	119.09
01-9514	2025598805	6.94	110.14
01-9514	2025638823	6.31	134.24
01-9514	2025662775	7.2	141.32

Certifications from our suppliers are on file at our production facility.

CETCO
Colloid Environmental Technologies Company LLC

GRI GEI GII GSI GAI GCI
GAI-LAP accredited

Date: 24-Jun-2019 12:19
Purchase Order: 1055
ORDER NUMBER: 55037368

EASTERN GEOSYSTEMS
21 W LEE ST

BALTIMORE,MD,21201

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to EASTERN GEOSYSTEMS .

The enclosed data package includes results for all MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once every 250,000 sq./ft. of GCL produced, unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO® accepts responsibility for our GCL should the index flux/hydraulic conductivity test produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO® will replace the nonconforming material at no charge.

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

Colloid Environmental Technologies Company LLC

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037368
PREPARED FOR: EASTERN GEOSYSTEMS

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

CETCO
Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 1055
ORDER NUMBER: 55037368
PREPARED FOR: EASTERN GEOSYSTEMS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	3.5 - lbs/in
ASTM D5890	Bentonite Free Swell	1 per 50 Tons	24 - ml
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D5891	Bentonite Fluid Loss	1 per 50 Tons	18 - ml
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needless and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55037368

GCL								GEOTEXTILE			CLAY
BENTOMAT® DN								01-9514	01-8991		CG 50-BLK-CV
Order	**GCL Lot#**	**GCL Roll#**	**Length**	**Width**	**Weight**	**Sq. ft**	**Roll # Tested**	**Cap1 Roll #**	**Base1 Roll #**		**Clay Lot #**
55037368	CV-20-2018	2535	150	14.5	2820	2175	2531	2025467446	2025480677		50103992B
55037368	CV-20-2018	2541	150	14.5	2840	2175	2538	2025467560	2025323638		50103993B
55037368	CV-20-2018	2542	150	14.5	2839	2175	2538	2025467560	2025323638		50103993B
55037368	CV-20-2018	2549	150	14.5	2872	2175	2538	2025454982	2025323638		50103994A
55037368	CV-29-2018	3218	150	14.5	2870	2175	3205	2025598773	2025588067		50113071A
55037368	CV-29-2018	3220	150	14.5	2866	2175	3205	2025598773	2025588067		50113071A
55037368	CV-29-2018	3222	150	14.5	2838	2175	3205	2025598819	2025588067		50113071A
55037368	CV-33-2018	4150	150	14.5	2924	2175	4145	2025638818	2025602687		50116841A
55037368	CV-33-2018	4154	150	14.5	2979	2175	4145	2025638823	2025602687		50116841A
55037368	CV-33-2018	4155	150	14.5	2979	2175	4145	2025638823	2025602687		50116841A
55037368	CV-33-2018	4156	150	14.5	2968	2175	4145	2025638823	2025602671		50116841A
55037368	CV-33-2018	4159	150	14.5	2918	2175	4145	2025645156	2025602671		50116841A
					Total Sq Ft:	26100		Total Number of Rolls Certified: 12			

CETCO
Colloid Environmental Technologies Company LLC

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55037368 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength			
	ASTM Test Method:		ASTM D5993	ASTM D6768	ASTM D6496			
	Required Value:		.75 - lbs/sq ft	50 - lbs/in	3.5 - lbs/in			
BENTOMAT® DN	CV-20-2018	2531	.87	95.2	14.1			
BENTOMAT® DN	CV-20-2018	2538	.89	70.11	7.7			
BENTOMAT® DN	CV-29-2018	3205	.86	77.3	6.9			
BENTOMAT® DN	CV-33-2018	4145	.86	71.6	8.1			

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55037368 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 - ml
50103992B	10.3	25	14.1
50103993B	11.3	24	14.8
50103994A	7.1	31	13.9
50113071A	9.18	27	14
50116841A	8.1	29	15.4

CETCO
Colloid Environmental Technologies Company LLC

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55037368 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	2025480677	6.74	206.19
01-8991	2025323638	6.79	183.5
01-8991	2025588067	6.65	207.95
01-8991	2025602687	6.61	205.38
01-8991	2025602671	6.67	209.47

COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	2025467446	7.11	107.37
01-9514	2025467560	7.02	124.58
01-9514	2025454982	6.59	127.48
01-9514	2025598773	6.79	96.18
01-9514	2025598819	7.19	114.66
01-9514	2025638818	7.26	173.09
01-9514	2025638823	6.31	134.24
01-9514	2025645156	6.64	169.5

Certifications from our suppliers are on file at our production facility.

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-011

Date: July 23, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT
Pete Porter, ENTACT

Subject: GCL Manufacturing QC Test Data Package

Specification Reference Number: Section 02413 1.03 – GCL

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: **(Cover only One Specification Section with Each Transmittal):** **Copies**

Product Certifications, GCL Order Packing List and MQA Tracking Form, GCL Manufacturing Quality Control Test Data, Bentonite Clay Certifications, and Raw Material Test Results for the following shipments:

GCL Order No. 55038030 1

Submittal Request	**Engineer Approval**
☐ No Approval Required/Requested	☐ Work May Proceed
☒ Approval Required/Requested	☐ Work May Proceed Subject to Changes Indicated
☐ Response Required/Requested	☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
☐ Revised and Resubmitted as Noted	☐ Work May Not Proceed.
☐ Information Only	☐ For Information Only

ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self Reviewer Name: _____

ENTACT Signature: Jenny Self Reviewer Signature: _____

Date: July 23, 2019 Date: _____

CETCO
Colloid Environmental Technologies Company LLC

GRI GEI GII GSI GAI GCI
GAI-LAP accredited

Date: 23-Jul-2019 04:13
Purchase Order: 1059
ORDER NUMBER: 55038030

EASTERN GEOSYSTEMS
21 W LEE ST

BALTIMORE,MD,21201

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to EASTERN GEOSYSTEMS .

The enclosed data package includes results for all MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once every 250,000 sq./ft. of GCL produced, unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO® accepts responsibility for our GCL should the index flux/hydraulic conductivity test produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO® will replace the nonconforming material at no charge.

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME:
CUSTOMER P.O.: 1059
ORDER NUMBER: 55038030
PREPARED FOR: EASTERN GEOSYSTEMS

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

CETCO
Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 1059
ORDER NUMBER: 55038030
PREPARED FOR: EASTERN GEOSYSTEMS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	3.5 - lbs/in
ASTM D5890	Bentonite Free Swell	1 per 50 Tons	24 - ml
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D5891	Bentonite Fluid Loss	1 per 50 Tons	18 - ml
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needless and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Cartersville Plant

CETCO
Colloid Environmental Technologies Company LLC

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55038030

GCL								GEOTEXTILE			CLAY
BENTOMAT® DN								01-9514	01-8991		CG 50-BLK-CV
Order	**GCL Lot#**	**GCL Roll#**	**Length**	**Width**	**Weight**	**Sq. ft**	**Roll # Tested**	**Cap1 Roll #**	**Base1 Roll #**		**Clay Lot #**
55038030	CV-20-2018	2553	150	14.5	2863	2175	2538	2025502933	2025480676		50103994A
55038030	CV-33-2018	4153	150	14.5	2968	2175	4145	2025638823	2025602687		50116841A
					Total Sq Ft:	4350		Total Number of Rolls Certified: 2			

CETCO
Colloid Environmental Technologies Company LLC

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55038030 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength			
		ASTM Test Method:	ASTM D5993	ASTM D6768	ASTM D6496			
		Required Value:	.75 - lbs/sq ft	50 - lbs/in	3.5 - lbs/in			
BENTOMAT® DN	CV-20-2018	2538	.89	70.1	7.7			
BENTOMAT® DN	CV-33-2018	4145	.86	71.6	8.1			

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55038030 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 - ml
50103994A	7.1	31	13.9
50116841A	8.1	29	15.4

CETCO
Colloid Environmental Technologies Company LLC

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55038030 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	2025480676	6.74	206.19
01-8991	2025602687	6.61	205.38

COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	2025502933	6.74	119.09
01-9514	2025638823	6.31	134.24

Certifications from our suppliers are on file at our production facility.

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-008

Date: June 25, 2019
To: Mike Ruetten, GEI
From: Jenny Self, ENTACT
cc: Adam Ewert, ENTACT

Subject: GCL Manufacturing QC Test Data Package
Specification Reference Number: Section 02413 1.03 – GCL

Drawing Number: None
Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information
Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: **(Cover only One Specification Section with Each Transmittal):** **Copies**

Product Certifications, GCL Order Packing List and MQA Tracking Form, GCL Manufacturing Quality Control Test Data, Bentonite Clay Certifications, and Raw Material Test Results for the following shipments:

GCL Order No. 55037366
GCL Order No. 55037367
GCL Order No. 55037368

* GCL free Swell testing done @ lower frequency[1] than specification, however data and product is approved.

Submittal Request	Engineer Approval
☐ No Approval Required/Requested	☒ Work May Proceed
☒ Approval Required/Requested	☐ Work May Proceed Subject to Changes Indicated
☐ Response Required/Requested	☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
☐ Revised and Resubmitted as Noted	☐ Work May Not Proceed.
☐ Information Only	☐ For Information Only

ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self
ENTACT Signature: Jenny Self
Date: June 25, 2019

Reviewer Name: MICHAEL RUETTEN
Reviewer Signature: Michael C Ruetten
Date: June 26, 2019

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-005

Date: May 21, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT

Subject: Geosynthetics Product Data Sheets

Specification Reference Number: Section 02413 1.03A – GCL
Section 02415 1.03A – Geotextile

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: (Cover only One Specification Section with Each Transmittal):	**Copies**
GCL – Solmax BentoLiner NSL GCL Certificate of Compliance and Product Data Sheet	1
Geotextile – LM 1200 ENV Product Data Sheet	1

Submittal Request

- ☐ No Approval Required/Requested
- ☒ Approval Required/Requested
- ☐ Response Required/Requested
- ☐ Revised and Resubmitted as Noted
- ☐ Information Only

Engineer Approval

- ☒ Work May Proceed
- ☐ Work May Proceed Subject to Changes Indicated
- ☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
- ☐ Work May Not Proceed.
- ☐ For Information Only

ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self
ENTACT Signature: Jenny Self
Date: May 21, 2019

Reviewer Name: Michael Ruetten
Reviewer Signature: Michael C Ruetten
Date: May 24, 2019

SOLMAX

May 15, 2019

Dan Harris
IWT Cargo-Guard

Project: Thiokol Elkton Site Soil Consolidation and Capping

RE: BentoLiner NSL GCL

Certification of Compliance

The undersigned, being qualified and authorized to do so, hereby certifies that Solmax BentoLiner NSL GCL will meet the physical properties listed in the attached BentoLiner NSL Geosynthetic Clay Liner datasheet.

Sincerely,

Tariq Jbara
Technical Support Specialist

T • 281-443-8564

GSE ENVIRONMENTAL, LLC
19103 GUNDLE ROAD
HOUSTON, TEXAS 77073

SOLMAX.COM • GSEWORLD.COM

TAJ

PRODUCT DATA SHEET

GSE BentoLiner NSL Geosynthetic Clay Liner

GSE BentoLiner "NSL" is a needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

[*]

AT THE CORE:

This composite clay liner is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

Product Specifications

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV[1]
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	3.1 oz/yd² MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area[2]	ASTM D 5993	1/40,000 ft²	0.75 lb/ft² MARV
Tensile Strength[3]	ASTM D 6768	1/40,000 ft²	30 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632[4]	1/40,000 ft²	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity[5]	ASTM D 5887	1/Week	5 x 10^{-9} cm/sec max
Index Flux[5]	ASTM D 5887	1/Week	1 x 10^{-8} m³/m²/sec max
Internal Shear Strength[6]	ASTM D 6243	Periodically	500 psf Typical
	TYPICAL ROLL DIMENSIONS		
Width x Length[7]	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:

- [1] Minimum Average Roll Value.
- [2] At 0% moisture content.
- [3] Tested in machine direction.
- [4] Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- [5] Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
- [6] Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- [7] Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

[DURABILITY RUNS DEEP] For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information. Specifications subject to change without notice. GSE and other trademarks in this document are registered trademarks of GSE Lining Technology, LLC in the United States and certain foreign countries. REV 13 JUN 2012

PRODUCT DATA SHEET

LM 1200 ENV

LM 1200 ENV is a nonwoven geotextile fabric manufactured from Polypropylene Staple Fiber. The fibers are randomly oriented and form a cohesive / stabilized needle punched fabric, for use in many applications. LM 1200 ENV resists ultra violet deterioration, rotting, and biological degradation and is inert to commonly encountered soil chemicals.

PROPERTY	TEST METHOD	MARV English	MARV Metric
Grab Tensile	ASTM D-4632	330 lbs/ft	1470 N/m
Fabric Weight	ASTM D-3776	12oz/sy	340 Grams/sm
Elongation	ASTM D-4632	50%	50%
CBR Puncture	ASTM D-6241	900 lbs	4000 N
Trapezoidal Tear	ASTM D-4533	125 lbs	556 N
UV Resistance (500 hrs)	ASTM D-4355	70%	70%
Apparent Opening Size (AOS)*	ASTM D-4751	100 US Std. Sieve	0.150 mm
Permittivity	ASTM D-4491	1.0 sec^{-1}	1.0 sec^{-1}
Water Flow Rate	ASTM D-4491	75 gpm/ft^2	3055 lpm/m^2

***Minimum Average Roll Value**
****Typical Average Roll Value**

Disclaimer: L & M Supply assumes no liability for the completeness or accuracy of this information or the ultimate use of this information. L & M Supply disclaims any and all implied, expressed, or statutory standards, guarantees, or warranties. This includes without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to equipment, materials, or information furnished herewith. This document should not be construed as engineering advice. Always consult the project engineer for project specific requirements. The end user assumes sole responsibility for the use of this information and product. The property values listed above are subject to change without notice.

Unless otherwise noted, this certification is based on testing conducted by our Quality Assurance & Quality Control testing laboratories at the time of manufacturing. L & M Supply Co., Inc. issued this letter of certification to indicate our commitment to providing our customers with a quality product which will meet or exceed the minimum average roll values in accordance with the applicable American Society for Testing and Materials (ASTM) test method.

L & M Supply Co., Inc. P. O. Box 640 Willacoochee, GA 31650
Direct Phone: 912-534-6071 - Toll Free: 800-948-7870 - Fax: 912-534-6254
Website: www.landmsupplyco.com

Initial Roll Inventory

GEI

Project Name: Elkton Soil Consolidation/Capping QA/QC Monitor: Jeff Carlson

Project Number: 161 0609 2 Material Type: GCL Bentomat

	Roll Number	Lot Number (Number on roll)	Width/Length	Conf. Sample (Yes/No)	Certificate Sheet (Yes/No)	Date Shipped to Lab	Lab Pass/ Fail	Visual Inspection/Remarks
1	1382	CV-14-2018 : 1259						
2	1382	CV-14-2018 : 1240						
3	1460	CV-22-2018 : 3556						
4	1499	CV-29-2018 : 3211						
5	1529	CV-34-2018 : 4397						
6	1529	CV-32-2018 : 3666						
7	1529	CV-33-2018 : 4148						
8	1529	CV-33-2018 : 4148						
9	1529	CV-34-2018 : 4395						
10	1529	CV-34-2018 : 4396						
11	1529	CV-34-2018 : 4403						
12	1529	CV-32-2018 : 3660						
1	1529	CV-33-2018 : 4159						
2	1416	CV-20-2018 : 2535						
3	1416	CV-20-2018 : 2541						
4	1416	CV-20-2018 : 2542						
5	1416	CV-20-2018 : 2549						
6	1529	CV-33-2018 : 4156						
7	1499	CV-29-2018 : 3220						
8	1499	CV-29-2018 : 3222						
9	1529	CV-33-2018 : 4150						
10	1529	CV-33-2018 : 4154						
11	1529	CV-33-2018 : 4155						
12	1499	CV-29-2018 : 3218						

Initial Roll Inventory

GEI

Project Name: Elkton

Project Number: 1610692

QA/QC Monitor: JSC

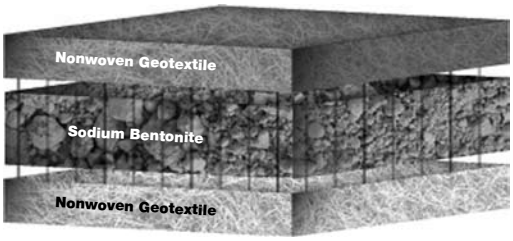
Material Type: GCL Bentomat

	Roll Number	Lot Number (Numbers only)	Width/Length	Conf. Sample (Yes/No)	Certificate Sheet (Yes/No)	Date Shipped to Lab	Lab Pass/ Fail	Visual Inspection/Remarks
(1)	1529	CV-34-2018:4402						
(2)	1382	CV-14-2018:1116						
(3)	1582	CV-16-2018:1980						
(4)	1416	CV-19-2018:2500						
(5)	1416	CV-20-2018:2547						
(6)	1529	CV-34-2018:4401						
(7)	1416	CV-20-2018:2551						
(8)	1499	CV-29-2018:3209						
(9)	1529	CV-33-2018:4152						
(10)	1529	CV-34-2018:4399						
(11)	1529	CV-34-2018:4400						
(12)	1416	CV-20-2018:2550						
(1)	1416	CV-20-2018:2553						
(2)	1529	CV-33-2018:4153						

BENTOMAT® DN

TECHNICAL DATA

BENTOMAT® DN is commonly used in some of the most demanding applications including landfills where slopes are as steep as 1.5H:1V. This GCL is reinforced and consists of a layer of sodium bentonite between two heavier weight non-woven geotextiles, making this GCL suitable for applications requiring high internal and interface shear strength.



BENTOMAT® DN certified properties

Material Property	ASTM Test Method	Test Frequency	Required Values
Bentonite Swell Index[1]	D 5890	1 per 50 tonnes	24mL/2g min.
Bentonite Fluid Loss[1]	D 5891	1 per 50 tonnes	18mL max.
Bentonite Mass/Area[2]	D 5993	4,000m²	3.6kg/m² min.
GCL Tensile Strength[3]	D 6768	20,000m²	88N/cm MARV
GCL Peel Strength[4]	D 6496	4,000m²	500N/m min.
GCL Index Flux[4]	D 5887	Weekly	1 x 10^{-8} m³/m²/sec max.
GCL Hydraulic Conductivity[4]	D 5887	Weekly	5 x 10^{-9} cm/sec max.
GCL Hydrated Internal Shear Strength[5]	D 5321 D 6243	Periodic	24kPa typ @ 976kg/m²

Bentomat DN is a reinforced GCL consisting of a layer of granular sodium bentonite between two nonwoven geotextiles, which are needlepunched together.

Notes

1. Bentonite property tests performed at a bentonite processing facility before shipment to CETCO GCL production facilities.
2. Bentonite mass/area reported at 0 percent moisture content.
3. All tensile strength testing is performed in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon requst, tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.
4. Index flux and permeability testing with deaired distilled/deionized water at 552kPa cell pressure, 531kPa headwater pressure and 517kPa tailwater pressure. Reported value is equivalent to 1 x 10^{-8} m^3/m^2/sec. This flux value is equivalent to a permeability of 5 x 10^{-9} cm/sec for typical GCL thickness. Actual flux values vary with field condition pressures. The last 20 weekly values prior to the end of the production date of the supplied GCL may be provided.
5. Peak values measured at 10kPa normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products and test conditions must be used to verify internal and interface strength of the proposed design.

CETCO has developed an edge enhancement system that eliminates the need to use additional granular sodium bentonite within the overlap area of the seam. This edge enhancement is known as SuperGroove™, and it comes standard on both longitudinal edges of Bentomat®DN. It should be noted that SuperGroove™ does not appear on the end-of-roll overlaps and recommend the continued use of supplemental bentonite for all end-of-roll seams.

Appendix D

Seeding Mixtures

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-010

Date: July 22, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT
Pete Porter, ENTACT

Subject: Seed Product Data for Woodland Seed Mix and Bioretention Basin Seed

Specification Reference Number: Section 02925 1.05A – Final Landscaping

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☒ Product Data ☐ Sample ☐ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: **(Cover only One Specification Section with Each Transmittal):** **Copies**

Product data for Woodland Seed Mix #10 and Bioretention Basin seed	1

Submittal Request

☐ No Approval Required/Requested
☒ Approval Required/Requested
☐ Response Required/Requested
☐ Revised and Resubmitted as Noted
☐ Information Only

Engineer Approval

☐ Work May Proceed
☐ Work May Proceed Subject to Changes Indicated
☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
☐ Work May Not Proceed.
☒ For Information Only

ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self
ENTACT Signature: Jenny Self
Date: July 22, 2019

Reviewer Name: Michael Ruetten
Reviewer Signature: Michael Ruetten
Date: 7-22-2019

Appendix E

Construction Documentation: As-Built Drawings

ENTACT, LLC
1 East Oak Hill Drive, Suite 102
Westmont, Illinois 60559
(630) 986-2900
(630) 986-0653 (fax)

ENTACT
www.entact.com

Transmittal

Syngenta Crop Protection / Olin Corporation and GEI Consultants
Thiokol Elkton Site Soil Consolidation and Capping Project, Elkton, Maryland

Transmittal Number: ENT-E8561-T-013

Date: September 18, 2019

To: Mike Ruetten, GEI

From: Jenny Self, ENTACT

cc: Adam Ewert, ENTACT
Pete Porter, ENTACT

Subject: As-built Construction Drawings

Specification Reference Number: Section 01050 1.05 – Field Engineering and Surveying

Drawing Number: None

Submittal Type: ☐ Plan ☐ Shop Drawing ☐ Product Data ☐ Sample ☒ Information

Contains Variation to Contract: ☒ No ☐ Yes (If YES, Provide Description)

Description of Documents Transmitted: **(Cover only One Specification Section with Each Transmittal):** **Copies**

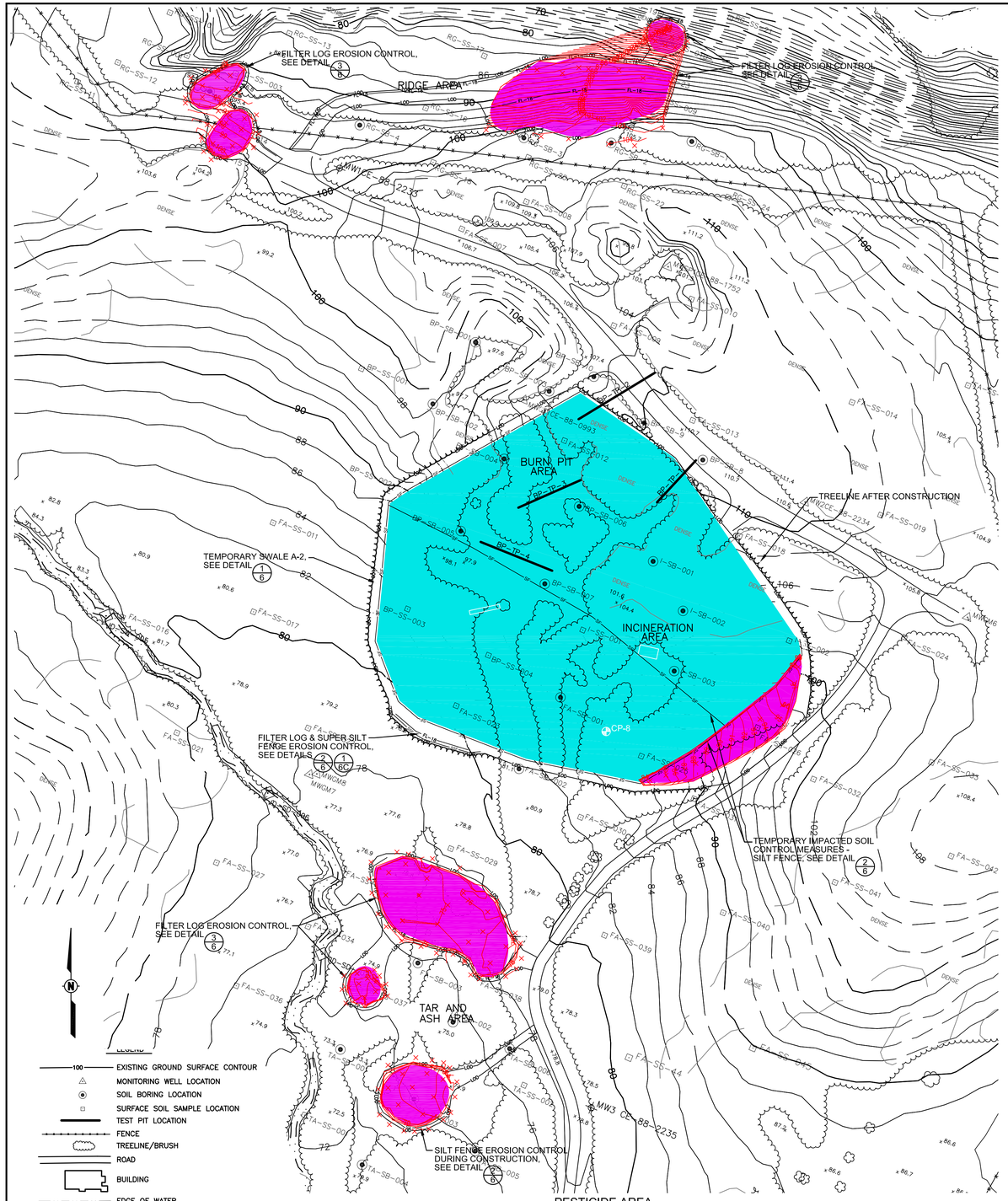
As-built construction drawings for excavation and capping, restoration and paving (pdf and AutoCAD files) 1

Submittal Request	**Engineer Approval**
☐ No Approval Required/Requested	☐ Work May Proceed
☒ Approval Required/Requested	☐ Work May Proceed Subject to Changes Indicated
☐ Response Required/Requested	☐ Work May Not Proceed Indicated Part(s). Re-submittal Required
☐ Revised and Resubmitted as Noted	☐ Work May Not Proceed.
☐ Information Only	☐ For Information Only

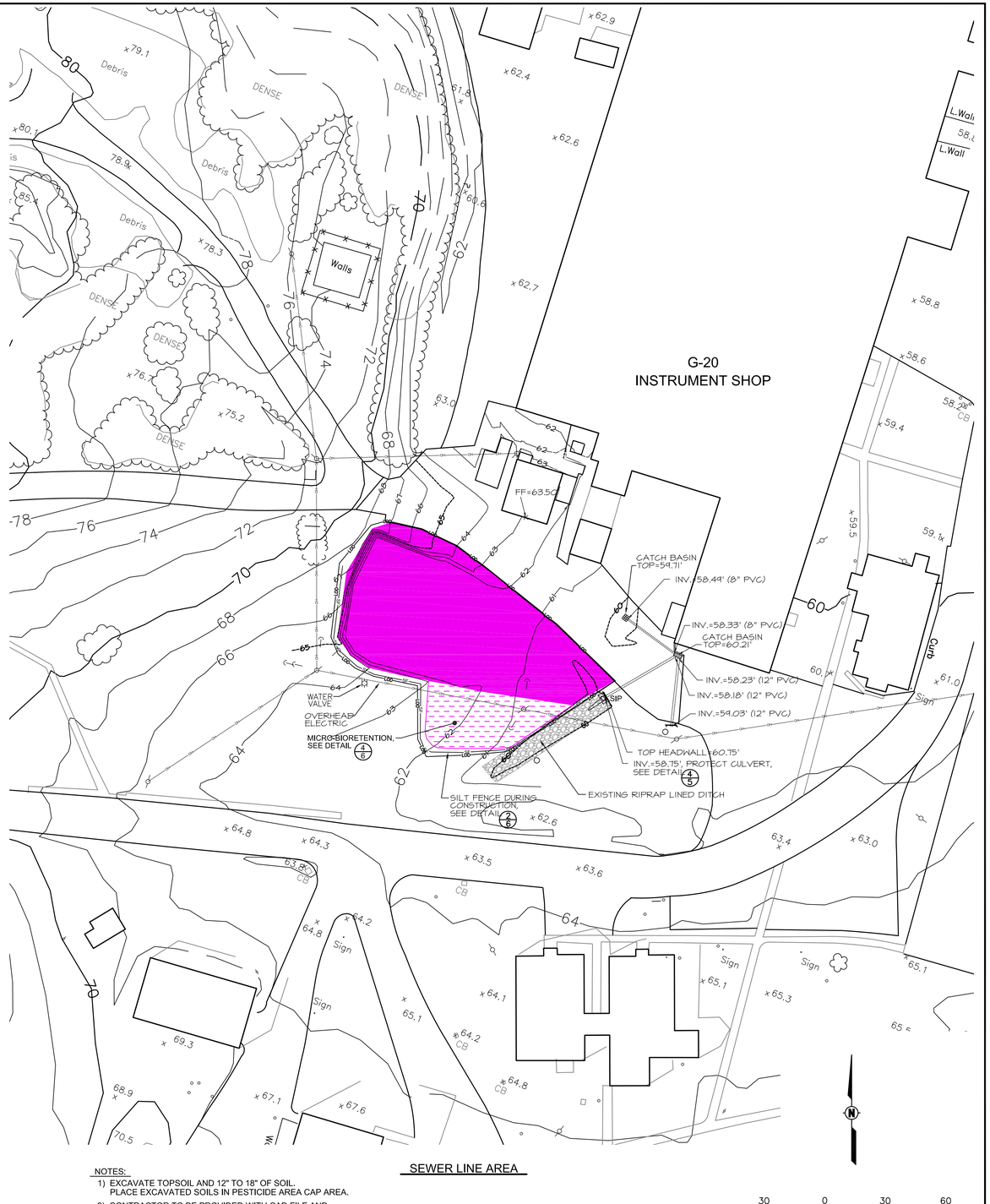
ENTACT verifies that (i) ENTACT has complied with the requirements of Contract Documents in preparation, review and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws, regulations and governing agencies.

ENTACT Name: Jenny Self
ENTACT Signature: Jenny Self
Date: September 18, 2019

Reviewer Name: _____
Reviewer Signature: _____
Date: _____



NOTES:
1) EXCAVATE TOPSOIL AND 12" TO 18" OF SOIL. PLACE EXCAVATED SOILS IN PESTICIDE AREA CAP AREA.
2) CONTRACTOR TO BE PROVIDED WITH CAD FILE AND SURFACE FILE FOR CONSTRUCTION AREAS AND LIMITS.



NOTES:
1) EXCAVATE TOPSOIL AND 12" TO 18" OF SOIL. PLACE EXCAVATED SOILS IN PESTICIDE AREA CAP AREA.
2) CONTRACTOR TO BE PROVIDED WITH CAD FILE AND SURFACE FILE FOR CONSTRUCTION AREAS AND LIMITS.

NO.	DATE	ISSUE/REVISION	APP
0	10/1/18	FINAL REGULATORY REVIEW	MGR

Attention: 0 1" — If this scale bar does not measure 1" then drawing is not original scale.

Designed: MGR
Checked: KRM
Drawn: KJC
Submittal Date: 6/15/2018

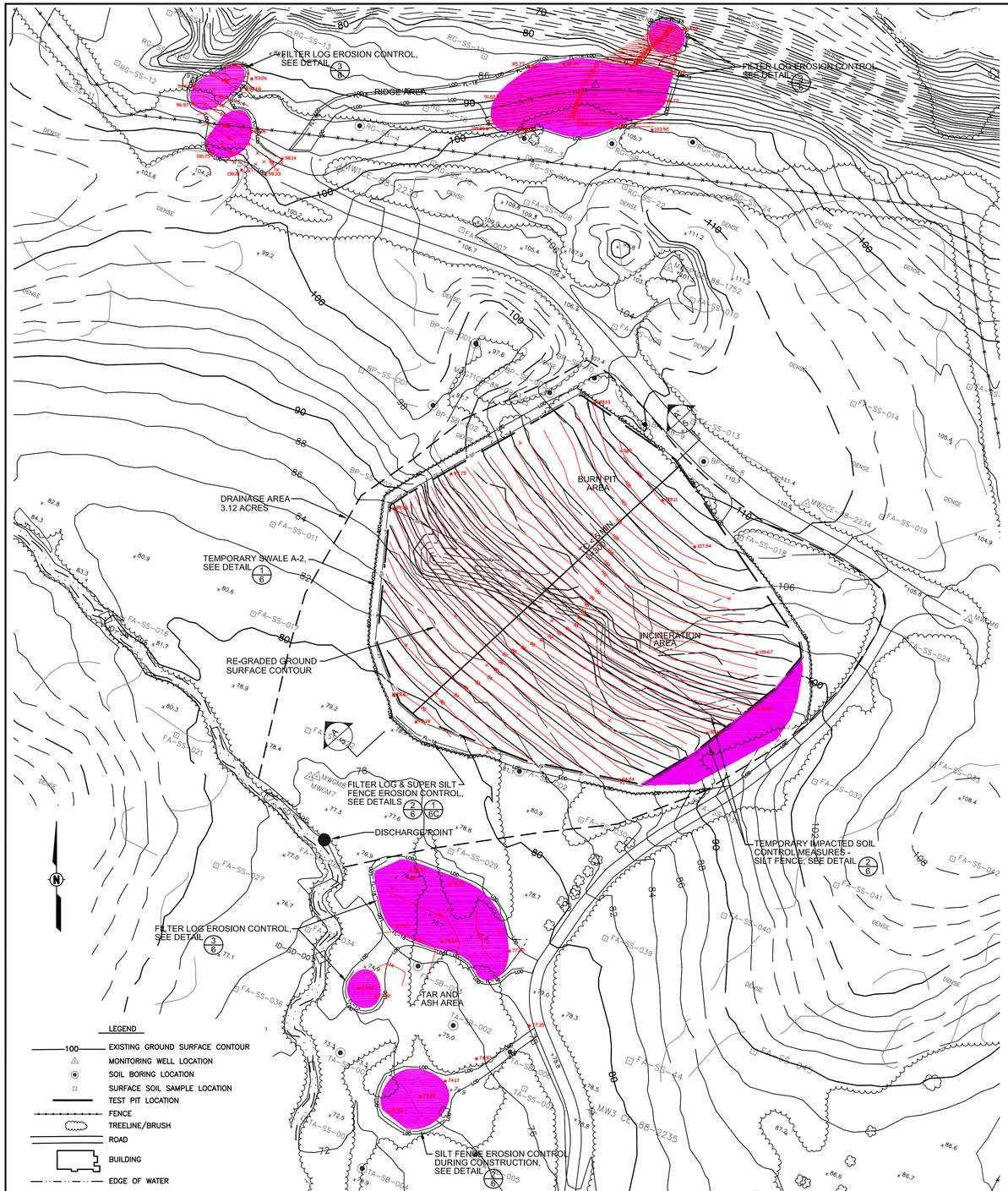
GEI Consultants
100 Campbell Blvd., Suite 103
Exton, Pennsylvania 19341
484-872-7000

DWG. NO. F-ESD-3

EXCAVATION PLAN ASBUILT

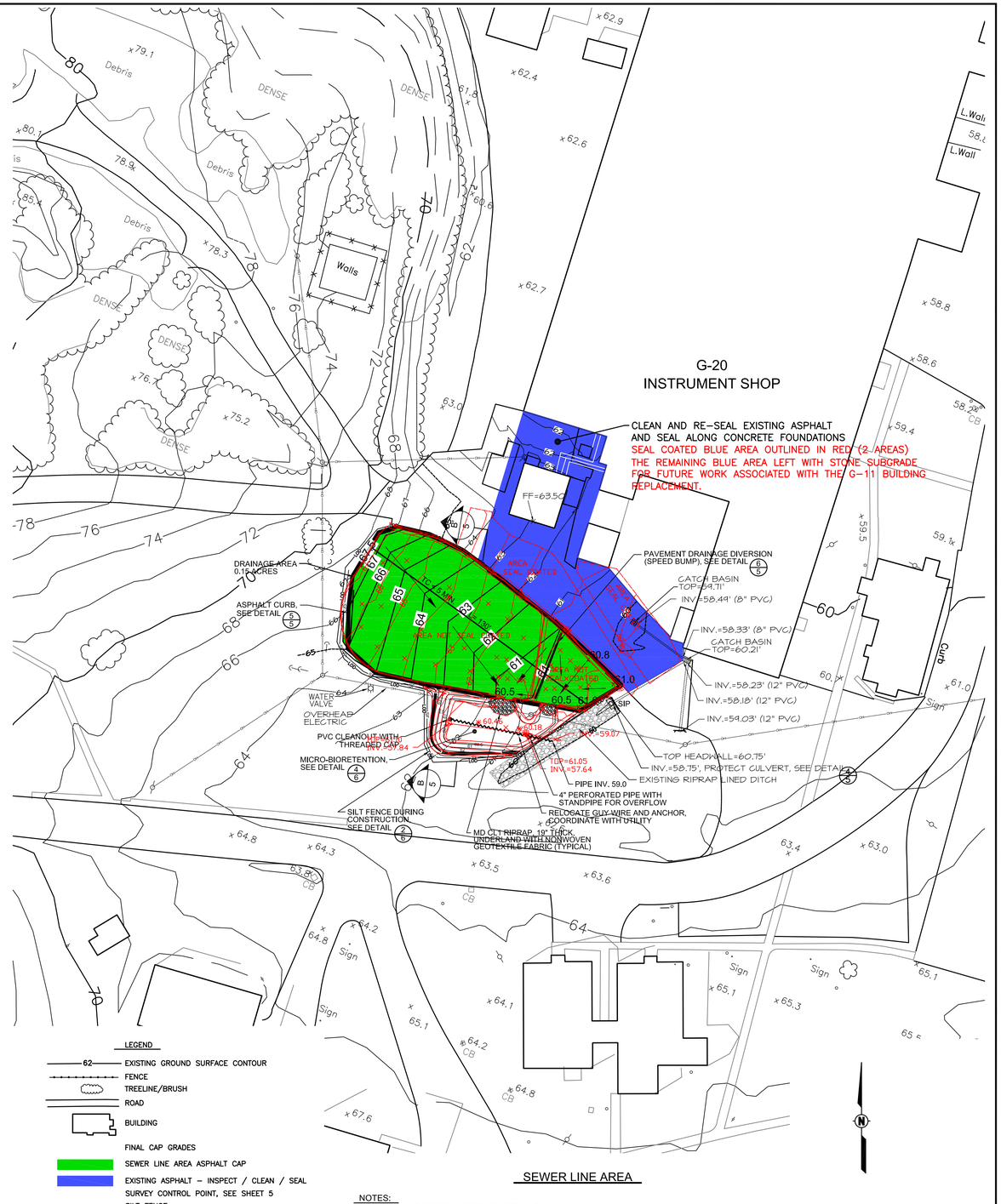
SHEET NO. 3

M:\Projects\2171115.00 GEI ATK Elkton Control and Topo\Surveys\CAD\F-ESD-3_Excavation-Plan ASBUILT



NOTES:

1) EXCAVATE TOPSOIL AND 12" TO 18" OF SOIL. PLACE EXCAVATED SOILS IN PESTICIDE AREA CAP AREA. SEED ALL DISTURBED AREAS.
2) CONTRACTOR TO BE PROVIDED WITH CAD FILE AND SURFACE FILE FOR CONSTRUCTION AREAS AND LIMITS.



SEWER LINE AREA

NOTES:

1) CLEAN AND RESEAL EXISTING ASPHALT. CONSTRUCT ASPHALT CAP. SEED ALL DISTURBED AREAS.
2) CONTRACTOR TO BE PROVIDED WITH CAD FILE AND SURFACE FILE FOR CONSTRUCTION AREAS AND LIMITS.

Attention:

0 1"

If this scale bar does not measure 1" then drawing is not original scale.

NO.	DATE	ISSUE/REVISION	APP
0	10/1/18	FINAL REGULATORY REVIEW	MGR

Designed: MGR
Checked: KRM
Drawn: KJC
Submittal Date: 6/15/2018

GEI Consultants
100 Campbell Blvd., Suite 103
Exton, Pennsylvania 19341
484-872-7000

CAPPING, RESTORATION AND PAVING PLAN ASBUILT

DWG. NO. F-ESD-4

SHEET NO. 4

M:\Projects\2171115.00 GEI ATK Elkton Control and Topo\Surveys\CAD\F-ESD-4_Capping-Restoration-Paving-Plan asbuilt

APPENDIX D-2

Photograph Log

South of Capped Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

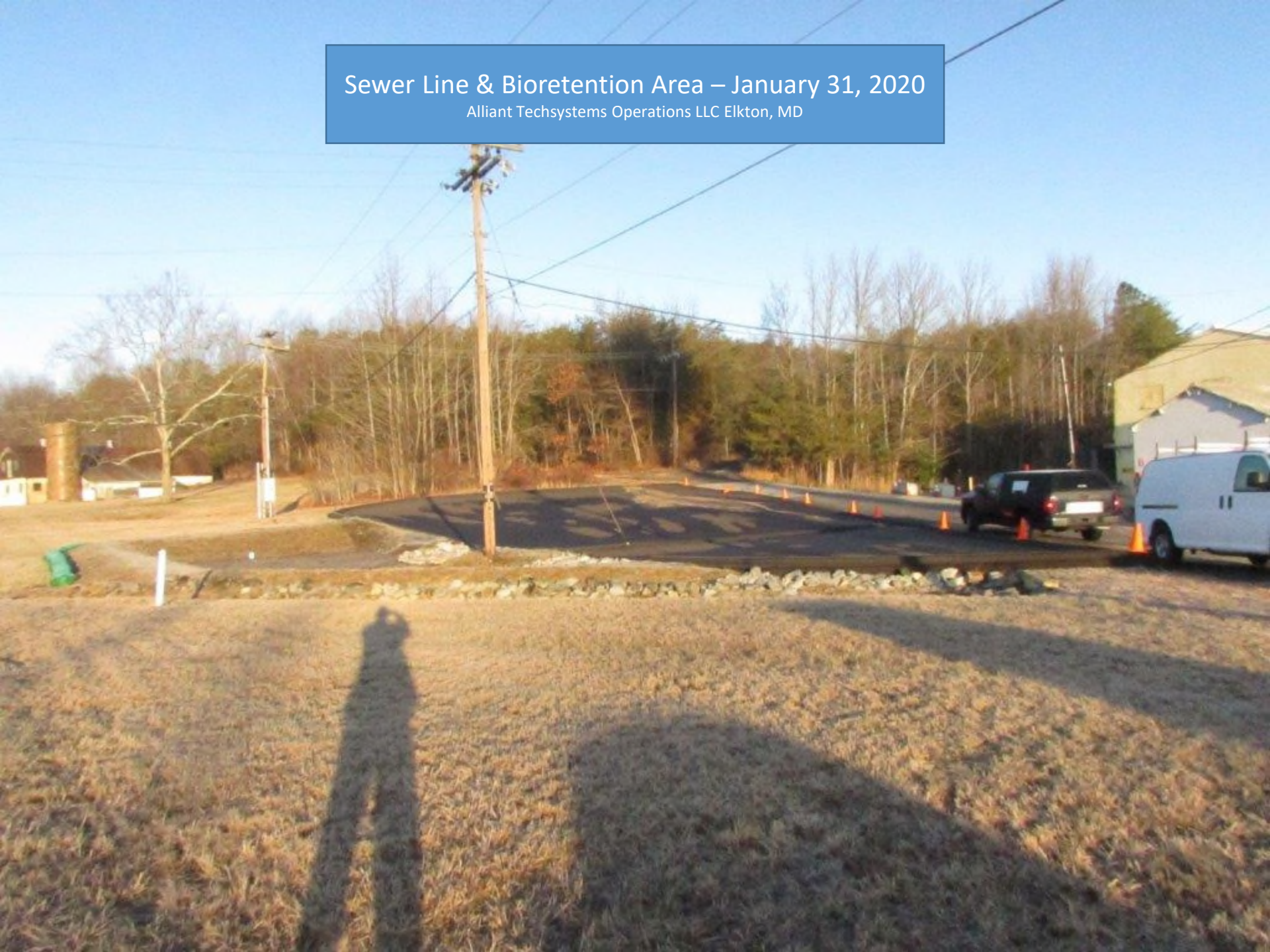
South of Capped Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

South of Capped Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

South of Capped Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

Capped Area – January 31, 2020

Alliant Techsystems Operations LLC Elkton, MD


Sewer Line & Bioretention Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

Sewer Line & Bioretention Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

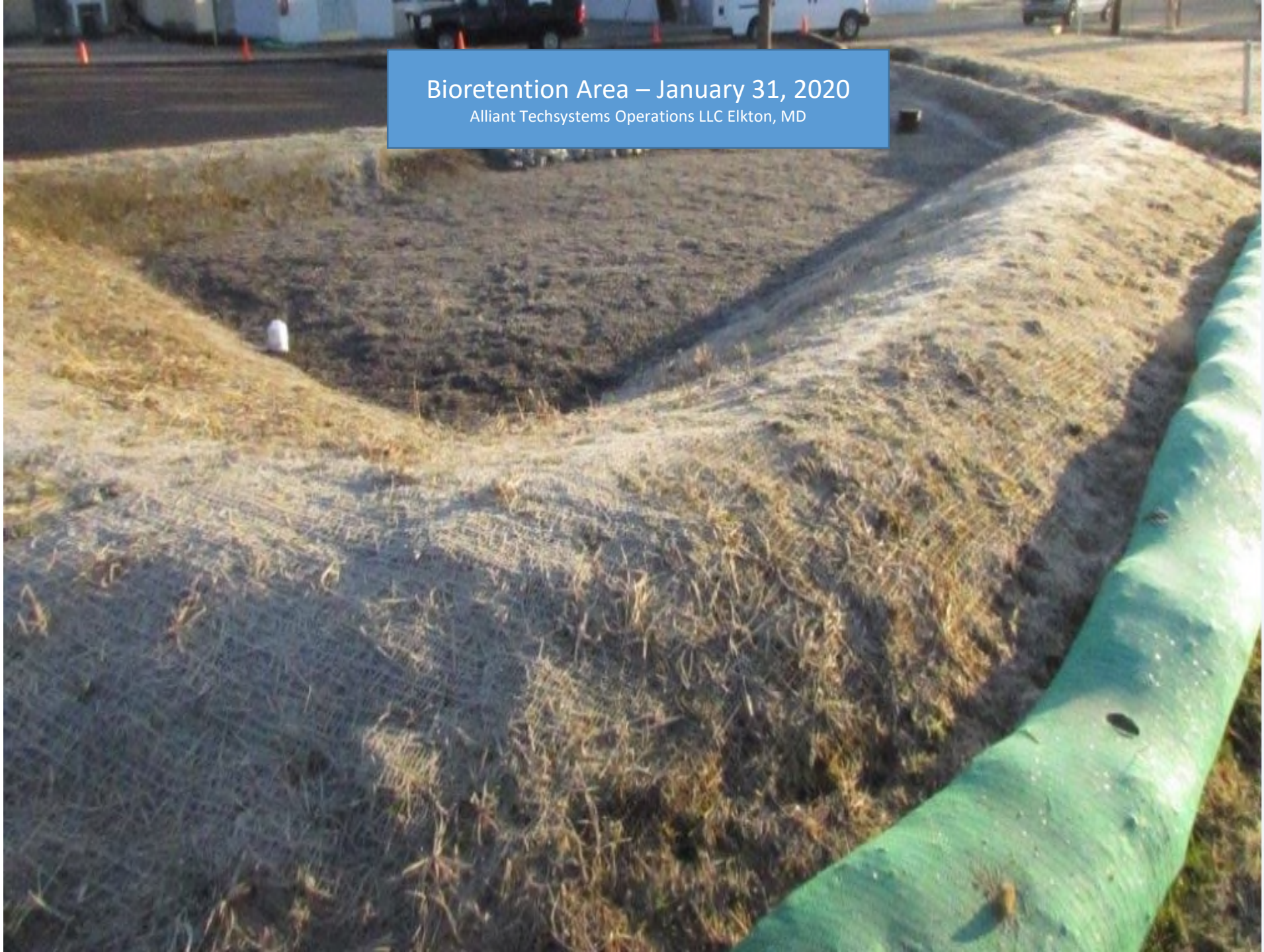
Sewer Line Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

Bioretention Area – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

Bioretention Underdrain – January 31, 2020
Alliant Techsystems Operations LLC Elkton, MD

Bioretention Area – January 31, 2020

Alliant Techsystems Operations LLC Elkton, MD



Bioretention Area – January 31, 2020

Alliant Techsystems Operations LLC Elkton, MD

Bioretention Area – January 31, 2020

Alliant Techsystems Operations LLC Elkton, MD

APPENDIX E

Analytical Reports

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181769-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
4/1/2020 2:21:22 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-181769-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-181769-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 3/19/2020 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.7º C and 5.2º C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples GM-1B (031720) (680-181769-1), GM-4B (031720) (680-181769-2), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4), GM-14S (031720) (680-181769-5), GM-15M (031720) (680-181769-6), DUP-01 (031720) (680-181769-7) and Trip Blank (680-181769-8) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/28/2020 and 04/01/2020.

Reanalysis of the following samples were performed outside of the analytical holding time due to high surrogate failures with hits in the samples: GM-1B (031720) (680-181769-1), GM-4B (031720) (680-181769-2), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4), GM-14S (031720) (680-181769-5), GM-15M (031720) (680-181769-6) and DUP-01 (031720) (680-181769-7). Re-extraction and/or re-analysis was performed outside of holding time with acceptable results. Both sets of results have been reported.

Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (680-181769-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-612986.

The laboratory control sample (LCS) for analytical batch 680-612986 recovered outside control limits for the following analytes: 2,2-Dichloropropane, Vinyl acetate and Bromomethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-612986 recovered outside control limits for the following analytes: 2,2-Dichloropropane and Bromomethane. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL

Samples GM-1B (031720) (680-181769-1), GM-4B (031720) (680-181769-2), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4), GM-14S (031720) (680-181769-5) and DUP-01 (031720) (680-181769-7) were analyzed for Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/23/2020 and analyzed on 03/24/2020.

Job ID: 680-181769-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples GM-1B (031720) (680-181769-1), GM-4B (031720) (680-181769-2), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4), GM-14S (031720) (680-181769-5), GM-15M (031720) (680-181769-6) and DUP-01 (031720) (680-181769-7) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/24/2020 and 03/25/2020.

The results for the source sample and the matrix spike / matrix spike duplicate (MS/MSD) associated with analytical batch 550-206182 for Perchlorate by method EPA 314.0 could not be reported due to the analyte exceeding the high end of the instrument calibration range. As such, reanalysis at a dilution was required and no results could be reported for the associated source sample. The results for the batch laboratory control sample / laboratory sample control duplicate (LCS/LCSD) met method acceptance criteria and may be used to verify accuracy and precision. Therefore, sample following sample results have been reported and qualified with cn flags.

GM-4B (031720) (680-181769-2), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4), GM-14S (031720) (680-181769-5), GM-15M (031720) (680-181769-6) and DUP-01 (031720) (680-181769-7)

Sample GM-1B (031720) (680-181769-1)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples GM-1B (031720) (680-181769-1), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4) and DUP-01 (031720) (680-181769-7) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/20/2020 and analyzed on 03/22/2020 and 03/24/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples GM-1B (031720) (680-181769-1), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4) and DUP-01 (031720) (680-181769-7) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 03/26/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples GM-1B (031720) (680-181769-1), GM-10S (031720) (680-181769-3), GM-14M (031720) (680-181769-4) and DUP-01 (031720) (680-181769-7) were analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 03/27/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181769-1	GM-1B (031720)	Water	03/17/20 12:20	03/19/20 08:45	
680-181769-2	GM-4B (031720)	Water	03/17/20 13:40	03/19/20 08:45	
680-181769-3	GM-10S (031720)	Water	03/17/20 14:30	03/19/20 08:45	
680-181769-4	GM-14M (031720)	Water	03/17/20 10:30	03/19/20 08:45	
680-181769-5	GM-14S (031720)	Water	03/17/20 10:05	03/19/20 08:45	
680-181769-6	GM-15M (031720)	Water	03/17/20 12:15	03/19/20 08:45	
680-181769-7	DUP-01 (031720)	Water	03/17/20 12:00	03/19/20 08:45	
680-181769-8	Trip Blank	Water	03/17/20 00:00	03/19/20 08:45	

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
5030B	Purge and Trap	SW846	TAL SAV

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.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

GC/MS Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

HPLC/IC

Qualifier	Qualifier Description
cn	Refer to Case Narrative for further detail

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720) — Lab Sample ID: 680-181769-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.6		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.0		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	3.3		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	2.6		2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	50		1.0	0.48	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene - RA	1.6	H	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	0.81	J H	1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	2.2	H	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total - RA	1.6	J H	2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - RA	41	H	1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	2.3		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	1.7		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	94		10	3.1	ug/L	10		314.0	Total/NA
Total Organic Carbon	0.53	J	1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: GM-4B (031720) — Lab Sample ID: 680-181769-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methyl tert-butyl ether	0.80	J	10	0.30	ug/L	1		8260B	Total/NA
Trichloroethene	5.1		1.0	0.48	ug/L	1		8260B	Total/NA
Trichlorofluoromethane	0.93	J	1.0	0.42	ug/L	1		8260B	Total/NA
Methyl tert-butyl ether - RA	0.70	J H	10	0.30	ug/L	1		8260B	Total/NA
Trichloroethene - RA	4.3	H	1.0	0.48	ug/L	1		8260B	Total/NA
Trichlorofluoromethane - RA	0.67	J H	1.0	0.42	ug/L	1		8260B	Total/NA
1,4-Dioxane	0.40		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	1.0	cn	1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-10S (031720) — Lab Sample ID: 680-181769-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	5.1		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	1.0		1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	33		1.0	0.36	ug/L	1		8260B	Total/NA
Trichloroethene	12		1.0	0.48	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	3.9	H	1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane - RA	0.83	J H	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	25	H	1.0	0.36	ug/L	1		8260B	Total/NA
Trichloroethene - RA	11	H	1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	4.7		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	5.1		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	20	cn	1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-14M (031720) — Lab Sample ID: 680-181769-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	190		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	6.7		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.74	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	21		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	190		2.0	0.37	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.82	J	1.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	1.8		1.0	0.37	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-14M (031720) (Continued)
Lab Sample ID: 680-181769-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	59		1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride	10		1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene - RA	140	H	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	5.3	H	1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane - RA	0.60	J H	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	15	H	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total - RA	140	H	2.0	0.37	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene - RA	0.74	J H	1.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane - RA	1.5	H	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - RA	51	H	1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride - RA	8.8	H	1.0	0.50	ug/L	1		8260B	Total/NA
1,4-Dioxane	3.0		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	6.0		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Dissolved Iron	8800		50	17	ug/L	1		6010C	Dissolved
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: GM-14S (031720)
Lab Sample ID: 680-181769-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	0.68	J	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	35		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	6.3		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	3.4		1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	47		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	35		2.0	0.37	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.89	J	1.0	0.74	ug/L	1		8260B	Total/NA
Toluene	2.0		1.0	0.48	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	6.6		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	160		1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride	5.3		1.0	0.50	ug/L	1		8260B	Total/NA
Chloroform - RA	0.52	J H	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene - RA	24	H	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	4.9	H	1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane - RA	2.5	H	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	35	H	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total - RA	24	H	2.0	0.37	ug/L	1		8260B	Total/NA
Toluene - RA	1.7	H	1.0	0.48	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane - RA	4.5	H	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - RA	130	H	1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride - RA	4.7	H	1.0	0.50	ug/L	1		8260B	Total/NA
1,4-Dioxane	7.3		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	6.1	cn	1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-15M (031720)
Lab Sample ID: 680-181769-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.77	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	1.5	J	2.0	0.37	ug/L	1		8260B	Total/NA
Methyl tert-butyl ether	0.66	J	10	0.30	ug/L	1		8260B	Total/NA
1,1,2,2-Tetrachloroethane	11		1.0	0.62	ug/L	1		8260B	Total/NA
Tetrachloroethene	2.1		1.0	0.74	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.69	J	1.0	0.37	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-15M (031720) (Continued)
Lab Sample ID: 680-181769-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	4.0		1.0	0.48	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene - RA	0.55	J H	1.0	0.41	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total - RA	1.1	J H	2.0	0.37	ug/L	1		8260B	Total/NA
Methyl tert-butyl ether - RA	0.66	J H	10	0.30	ug/L	1		8260B	Total/NA
1,1,2,2-Tetrachloroethane - RA	11	H	1.0	0.62	ug/L	1		8260B	Total/NA
Tetrachloroethene - RA	1.6	H	1.0	0.74	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene - RA	0.53	J H	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - RA	3.8	H	1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	32	cn	1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: DUP-01 (031720)
Lab Sample ID: 680-181769-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	190		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	6.8		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.73	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	20		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	190		2.0	0.37	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.89	J	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	58		1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride	9.7		1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene - RA	130	H	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	4.9	H	1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane - RA	0.70	J H	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	15	H	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total - RA	130	H	2.0	0.37	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene - RA	0.65	J H	1.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane - RA	1.4	H	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - RA	50	H	1.0	0.48	ug/L	1		8260B	Total/NA
Vinyl chloride - RA	8.5	H	1.0	0.50	ug/L	1		8260B	Total/NA
1,4-Dioxane	2.8		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	5.8		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Dissolved Iron	8800		50	17	ug/L	1		6010C	Dissolved
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: Trip Blank
Lab Sample ID: 680-181769-8

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 19:13	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 19:13	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 19:13	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 19:13	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 19:13	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 19:13	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 19:13	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 19:13	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 19:13	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
cis-1,2-Dichloroethene	**2.6**		1.0	0.41	ug/L			03/28/20 19:13	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 19:13	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 19:13	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 19:13	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 19:13	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 19:13	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 19:13	1
1,1-Dichloroethane	**1.0**		1.0	0.38	ug/L			03/28/20 19:13	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
1,1-Dichloroethene	**3.3**		1.0	0.36	ug/L			03/28/20 19:13	1
1,2-Dichloroethene, Total	**2.6**		2.0	0.37	ug/L			03/28/20 19:13	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 19:13	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 19:13	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 19:13	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 19:13	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 19:13	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 19:13	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 19:13	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:13	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 19:13	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 19:13	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 19:13	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 19:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 19:13	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 19:13	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 19:13	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Trichloroethene	**50**		1.0	0.48	ug/L			03/28/20 19:13	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 19:13	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:13	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 19:13	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 19:13	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 19:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*119*		*80 - 120*		*03/28/20 19:13*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 19:13*	*1*
Dibromofluoromethane (Surr)	*142*	*X*	*80 - 122*		*03/28/20 19:13*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/28/20 19:13*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 02:45	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 02:45	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 02:45	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 02:45	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 02:45	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 02:45	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 02:45	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 02:45	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
cis-1,2-Dichloroethene	**1.6**	**H**	1.0	0.41	ug/L			04/01/20 02:45	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 02:45	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 02:45	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 02:45	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 02:45	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 02:45	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 02:45	1
1,1-Dichloroethane	**0.81**	**J H**	1.0	0.38	ug/L			04/01/20 02:45	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
1,1-Dichloroethene	**2.2**	**H**	1.0	0.36	ug/L			04/01/20 02:45	1
1,2-Dichloroethene, Total	**1.6**	**J H**	2.0	0.37	ug/L			04/01/20 02:45	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 02:45	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 02:45	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 02:45	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 02:45	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 02:45	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 02:45	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 02:45	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 02:45	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 02:45	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 02:45	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 02:45	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 02:45	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 02:45	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 02:45	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Trichloroethene	**41**	**H**	1.0	0.48	ug/L			04/01/20 02:45	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 02:45	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 02:45	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 02:45	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 02:45	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 02:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 02:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*04/01/20 02:45*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/01/20 02:45*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/01/20 02:45*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**2.3**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:02	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*81*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:02*	*1*
Terphenyl-d14	*80*			*03/23/20 14:46*	*03/24/20 03:02*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**1.7**		1.0	0.40	mg/L			03/26/20 17:49	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**94**		10	3.1	ug/L			03/25/20 05:29	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/20/20 13:04	03/22/20 14:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.53**	**J**	1.0	0.50	mg/L			03/27/20 05:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 19:37	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 19:37	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 19:37	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 19:37	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 19:37	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 19:37	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 19:37	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 19:37	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 19:37	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 19:37	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 19:37	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 19:37	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 19:37	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 19:37	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 19:37	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 19:37	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 19:37	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 19:37	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 19:37	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 19:37	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 19:37	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 19:37	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 19:37	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 19:37	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 19:37	1
Methyl tert-butyl ether	**0.80**	**J**	10	0.30	ug/L			03/28/20 19:37	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:37	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 19:37	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 19:37	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 19:37	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 19:37	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 19:37	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 19:37	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 19:37	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 19:37	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 19:37	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Trichloroethene	**5.1**		1.0	0.48	ug/L			03/28/20 19:37	1
Trichlorofluoromethane	**0.93**	**J**	1.0	0.42	ug/L			03/28/20 19:37	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 19:37	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:37	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 19:37	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 19:37	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 19:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*121*	*X*	*80 - 120*		*03/28/20 19:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*03/28/20 19:37*	*1*
Dibromofluoromethane (Surr)	*143*	*X*	*80 - 122*		*03/28/20 19:37*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/28/20 19:37*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:08	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:08	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:08	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:08	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:08	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:08	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:08	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:08	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
cis-1,2-Dichloroethene	<1.0	H	1.0	0.41	ug/L			04/01/20 03:08	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:08	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:08	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:08	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:08	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:08	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:08	1
1,1-Dichloroethane	<1.0	H	1.0	0.38	ug/L			04/01/20 03:08	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
1,1-Dichloroethene	<1.0	H	1.0	0.36	ug/L			04/01/20 03:08	1
1,2-Dichloroethene, Total	<2.0	H	2.0	0.37	ug/L			04/01/20 03:08	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:08	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:08	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:08	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:08	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:08	1
Methyl tert-butyl ether	**0.70**	**J H**	10	0.30	ug/L			04/01/20 03:08	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:08	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:08	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:08	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:08	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:08	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:08	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:08	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:08	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:08	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:08	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Trichloroethene	**4.3**	**H**	1.0	0.48	ug/L			04/01/20 03:08	1
Trichlorofluoromethane	**0.67**	**J H**	1.0	0.42	ug/L			04/01/20 03:08	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:08	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:08	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:08	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:08	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 03:08*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/01/20 03:08*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 03:08*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/01/20 03:08*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**0.40**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:23	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*89*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:23*	*1*
Terphenyl-d14	*88*			*03/23/20 14:46*	*03/24/20 03:23*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.0**	**cn**	1.0	0.31	ug/L			03/24/20 03:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:00	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:00	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 20:00	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:00	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:00	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:00	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 20:00	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:00	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:00	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 20:00	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:00	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:00	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:00	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:00	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:00	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:00	1
1,1-Dichloroethane	**5.1**		1.0	0.38	ug/L			03/28/20 20:00	1
1,2-Dichloroethane	**1.0**		1.0	0.50	ug/L			03/28/20 20:00	1
1,1-Dichloroethene	**33**		1.0	0.36	ug/L			03/28/20 20:00	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 20:00	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:00	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:00	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 20:00	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:00	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:00	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:00	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:00	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:00	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:00	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:00	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:00	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:00	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:00	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 20:00	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 20:00	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Trichloroethene	**12**		1.0	0.48	ug/L			03/28/20 20:00	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:00	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:00	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:00	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 20:00	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*117*		*80 - 120*		*03/28/20 20:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:00*	*1*
Dibromofluoromethane (Surr)	*139*	*X*	*80 - 122*		*03/28/20 20:00*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*03/28/20 20:00*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:31	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:31	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:31	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:31	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:31	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:31	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:31	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:31	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
cis-1,2-Dichloroethene	<1.0	H	1.0	0.41	ug/L			04/01/20 03:31	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:31	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:31	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:31	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:31	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:31	1
1,1-Dichloroethane	**3.9**	**H**	1.0	0.38	ug/L			04/01/20 03:31	1
1,2-Dichloroethane	**0.83**	**J H**	1.0	0.50	ug/L			04/01/20 03:31	1
1,1-Dichloroethene	**25**	**H**	1.0	0.36	ug/L			04/01/20 03:31	1
1,2-Dichloroethene, Total	<2.0	H	2.0	0.37	ug/L			04/01/20 03:31	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:31	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:31	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:31	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:31	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:31	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 03:31	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:31	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:31	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:31	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:31	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:31	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:31	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:31	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:31	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Trichloroethene	**11**	**H**	1.0	0.48	ug/L			04/01/20 03:31	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:31	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:31	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:31	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:31	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 03:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*04/01/20 03:31*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)

Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 03:31*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/01/20 03:31*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**4.7**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:45	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*83*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:45*	*1*
Terphenyl-d14	*83*			*03/23/20 14:46*	*03/24/20 03:45*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.1**		1.0	0.40	mg/L			03/26/20 18:02	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**20**	**cn**	1.0	0.31	ug/L			03/24/20 03:27	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/20/20 13:04	03/24/20 12:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/27/20 06:30	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:24	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:24	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:24	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 20:24	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:24	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:24	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:24	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 20:24	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 20:24	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:24	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:24	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
cis-1,2-Dichloroethene	**190**		1.0	0.41	ug/L			03/28/20 20:24	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:24	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:24	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:24	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:24	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:24	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:24	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:24	1
1,1-Dichloroethane	**6.7**		1.0	0.38	ug/L			03/28/20 20:24	1
1,2-Dichloroethane	**0.74**	**J**	1.0	0.50	ug/L			03/28/20 20:24	1
1,1-Dichloroethene	**21**		1.0	0.36	ug/L			03/28/20 20:24	1
1,2-Dichloroethene, Total	**190**		2.0	0.37	ug/L			03/28/20 20:24	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:24	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:24	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 20:24	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:24	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:24	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:24	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:24	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:24	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:24	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:24	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:24	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:24	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:24	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:24	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 20:24	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 20:24	1
trans-1,2-Dichloroethene	**0.82**	**J**	1.0	0.37	ug/L			03/28/20 20:24	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
1,1,1-Trichloroethane	**1.8**		1.0	0.37	ug/L			03/28/20 20:24	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Trichloroethene	**59**		1.0	0.48	ug/L			03/28/20 20:24	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:24	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:24	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:24	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 20:24	1
Vinyl chloride	**10**		1.0	0.50	ug/L			03/28/20 20:24	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*119*		*80 - 120*		*03/28/20 20:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:24*	*1*
Dibromofluoromethane (Surr)	*135*	*X*	*80 - 122*		*03/28/20 20:24*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/28/20 20:24*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:55	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:55	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:55	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:55	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:55	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:55	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:55	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:55	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:55	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:55	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
cis-1,2-Dichloroethene	**140**	**H**	1.0	0.41	ug/L			04/01/20 03:55	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:55	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:55	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:55	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:55	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:55	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:55	1
1,1-Dichloroethane	**5.3**	**H**	1.0	0.38	ug/L			04/01/20 03:55	1
1,2-Dichloroethane	**0.60**	**J H**	1.0	0.50	ug/L			04/01/20 03:55	1
1,1-Dichloroethene	**15**	**H**	1.0	0.36	ug/L			04/01/20 03:55	1
1,2-Dichloroethene, Total	**140**	**H**	2.0	0.37	ug/L			04/01/20 03:55	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:55	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:55	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:55	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:55	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:55	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 03:55	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:55	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:55	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:55	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:55	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:55	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:55	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:55	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:55	1
trans-1,2-Dichloroethene	**0.74**	**J H**	1.0	0.37	ug/L			04/01/20 03:55	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
1,1,1-Trichloroethane	**1.5**	**H**	1.0	0.37	ug/L			04/01/20 03:55	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Trichloroethene	**51**	**H**	1.0	0.48	ug/L			04/01/20 03:55	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:55	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:55	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:55	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:55	1
Vinyl chloride	**8.8**	**H**	1.0	0.50	ug/L			04/01/20 03:55	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 03:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 03:55*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)

Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 03:55*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/01/20 03:55*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**3.0**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:06	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*76*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:06*	*1*
Terphenyl-d14	*52*			*03/23/20 14:46*	*03/24/20 04:06*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**6.0**		1.0	0.40	mg/L			03/26/20 18:15	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0	cn	1.0	0.31	ug/L			03/24/20 03:50	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**8800**		50	17	ug/L		03/20/20 13:04	03/22/20 14:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.7**		1.0	0.50	mg/L			03/27/20 06:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:48	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:48	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:48	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 20:48	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:48	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:48	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:48	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 20:48	1
Chloroform	**0.68**	**J**	1.0	0.50	ug/L			03/28/20 20:48	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:48	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:48	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
cis-1,2-Dichloroethene	**35**		1.0	0.41	ug/L			03/28/20 20:48	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:48	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:48	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:48	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:48	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:48	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:48	1
1,1-Dichloroethane	**6.3**		1.0	0.38	ug/L			03/28/20 20:48	1
1,2-Dichloroethane	**3.4**		1.0	0.50	ug/L			03/28/20 20:48	1
1,1-Dichloroethene	**47**		1.0	0.36	ug/L			03/28/20 20:48	1
1,2-Dichloroethene, Total	**35**		2.0	0.37	ug/L			03/28/20 20:48	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:48	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:48	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 20:48	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:48	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:48	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:48	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:48	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:48	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:48	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:48	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:48	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:48	1
Tetrachloroethene	**0.89**	**J**	1.0	0.74	ug/L			03/28/20 20:48	1
Toluene	**2.0**		1.0	0.48	ug/L			03/28/20 20:48	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
1,1,1-Trichloroethane	**6.6**		1.0	0.37	ug/L			03/28/20 20:48	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Trichloroethene	**160**		1.0	0.48	ug/L			03/28/20 20:48	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:48	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:48	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:48	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 20:48	1
Vinyl chloride	**5.3**		1.0	0.50	ug/L			03/28/20 20:48	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*115*		*80 - 120*		*03/28/20 20:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:48*	*1*
Dibromofluoromethane (Surr)	*133*	*X*	*80 - 122*		*03/28/20 20:48*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/28/20 20:48*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 04:18	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 04:18	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:18	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 04:18	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 04:18	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 04:18	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 04:18	1
Chloroform	**0.52**	**J H**	1.0	0.50	ug/L			04/01/20 04:18	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 04:18	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:18	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
cis-1,2-Dichloroethene	**24**	**H**	1.0	0.41	ug/L			04/01/20 04:18	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 04:18	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 04:18	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 04:18	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:18	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 04:18	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 04:18	1
1,1-Dichloroethane	**4.9**	**H**	1.0	0.38	ug/L			04/01/20 04:18	1
1,2-Dichloroethane	**2.5**	**H**	1.0	0.50	ug/L			04/01/20 04:18	1
1,1-Dichloroethene	**35**	**H**	1.0	0.36	ug/L			04/01/20 04:18	1
1,2-Dichloroethene, Total	**24**	**H**	2.0	0.37	ug/L			04/01/20 04:18	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 04:18	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 04:18	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 04:18	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 04:18	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 04:18	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 04:18	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:18	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 04:18	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 04:18	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:18	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:18	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 04:18	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 04:18	1
Toluene	**1.7**	**H**	1.0	0.48	ug/L			04/01/20 04:18	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
1,1,1-Trichloroethane	**4.5**	**H**	1.0	0.37	ug/L			04/01/20 04:18	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Trichloroethene	**130**	**H**	1.0	0.48	ug/L			04/01/20 04:18	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 04:18	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:18	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 04:18	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 04:18	1
Vinyl chloride	**4.7**	**H**	1.0	0.50	ug/L			04/01/20 04:18	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 04:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*80 - 120*		*04/01/20 04:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*04/01/20 04:18*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 04:18*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/01/20 04:18*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.3**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:27	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:27*	*1*
Terphenyl-d14	*74*			*03/23/20 14:46*	*03/24/20 04:27*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**6.1**	**cn**	1.0	0.31	ug/L			03/24/20 04:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 21:11	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 21:11	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 21:11	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 21:11	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 21:11	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 21:11	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 21:11	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 21:11	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 21:11	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
cis-1,2-Dichloroethene	**0.77**	**J**	1.0	0.41	ug/L			03/28/20 21:11	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 21:11	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 21:11	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 21:11	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 21:11	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 21:11	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 21:11	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 21:11	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 21:11	1
1,2-Dichloroethene, Total	**1.5**	**J**	2.0	0.37	ug/L			03/28/20 21:11	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 21:11	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 21:11	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 21:11	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 21:11	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 21:11	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 21:11	1
Methyl tert-butyl ether	**0.66**	**J**	10	0.30	ug/L			03/28/20 21:11	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:11	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 21:11	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 21:11	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 21:11	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 21:11	1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,1,2,2-Tetrachloroethane	**11**		1.0	0.62	ug/L			03/28/20 21:11	1
Tetrachloroethene	**2.1**		1.0	0.74	ug/L			03/28/20 21:11	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 21:11	1
trans-1,2-Dichloroethene	**0.69**	**J**	1.0	0.37	ug/L			03/28/20 21:11	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Trichloroethene	**4.0**		1.0	0.48	ug/L			03/28/20 21:11	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 21:11	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:11	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 21:11	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 21:11	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*117*		*80 - 120*		*03/28/20 21:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*		*03/28/20 21:11*	*1*
Dibromofluoromethane (Surr)	*134*	*X*	*80 - 122*		*03/28/20 21:11*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/28/20 21:11*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 04:41	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:41	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 04:41	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 04:41	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 04:41	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 04:41	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 04:41	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:41	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
cis-1,2-Dichloroethene	**0.55**	**J H**	1.0	0.41	ug/L			04/01/20 04:41	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 04:41	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 04:41	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 04:41	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 04:41	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 04:41	1
1,1-Dichloroethane	<1.0	H	1.0	0.38	ug/L			04/01/20 04:41	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
1,1-Dichloroethene	<1.0	H	1.0	0.36	ug/L			04/01/20 04:41	1
1,2-Dichloroethene, Total	**1.1**	**J H**	2.0	0.37	ug/L			04/01/20 04:41	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 04:41	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 04:41	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 04:41	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 04:41	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 04:41	1
Methyl tert-butyl ether	**0.66**	**J H**	10	0.30	ug/L			04/01/20 04:41	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:41	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 04:41	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 04:41	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:41	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:41	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1,2,2-Tetrachloroethane	**11**	**H**	1.0	0.62	ug/L			04/01/20 04:41	1
Tetrachloroethene	**1.6**	**H**	1.0	0.74	ug/L			04/01/20 04:41	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:41	1
trans-1,2-Dichloroethene	**0.53**	**J H**	1.0	0.37	ug/L			04/01/20 04:41	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Trichloroethene	**3.8**	**H**	1.0	0.48	ug/L			04/01/20 04:41	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 04:41	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:41	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 04:41	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 04:41	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 04:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/01/20 04:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 04:41*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 04:41*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/01/20 04:41*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	32	cn	1.0	0.31	ug/L			03/24/20 05:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)

Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 21:35	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 21:35	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 21:35	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 21:35	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 21:35	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 21:35	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 21:35	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 21:35	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 21:35	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 21:35	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 21:35	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
cis-1,2-Dichloroethene	**190**		1.0	0.41	ug/L			03/28/20 21:35	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 21:35	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 21:35	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 21:35	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 21:35	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 21:35	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 21:35	1
1,1-Dichloroethane	**6.8**		1.0	0.38	ug/L			03/28/20 21:35	1
1,2-Dichloroethane	**0.73**	**J**	1.0	0.50	ug/L			03/28/20 21:35	1
1,1-Dichloroethene	**20**		1.0	0.36	ug/L			03/28/20 21:35	1
1,2-Dichloroethene, Total	**190**		2.0	0.37	ug/L			03/28/20 21:35	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 21:35	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 21:35	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 21:35	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 21:35	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 21:35	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 21:35	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 21:35	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:35	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 21:35	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 21:35	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 21:35	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 21:35	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 21:35	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 21:35	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 21:35	1
trans-1,2-Dichloroethene	**0.89**	**J**	1.0	0.37	ug/L			03/28/20 21:35	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Trichloroethene	**58**		1.0	0.48	ug/L			03/28/20 21:35	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 21:35	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:35	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 21:35	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 21:35	1
Vinyl chloride	**9.7**		1.0	0.50	ug/L			03/28/20 21:35	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 21:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*118*		*80 - 120*		*03/28/20 21:35*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/28/20 21:35*	*1*
Dibromofluoromethane (Surr)	*132*	*X*	*80 - 122*		*03/28/20 21:35*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/28/20 21:35*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 05:04	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 05:04	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 05:04	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 05:04	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 05:04	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 05:04	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 05:04	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 05:04	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 05:04	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 05:04	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
cis-1,2-Dichloroethene	**130**	**H**	1.0	0.41	ug/L			04/01/20 05:04	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 05:04	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 05:04	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 05:04	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 05:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 05:04	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 05:04	1
1,1-Dichloroethane	**4.9**	**H**	1.0	0.38	ug/L			04/01/20 05:04	1
1,2-Dichloroethane	**0.70**	**J H**	1.0	0.50	ug/L			04/01/20 05:04	1
1,1-Dichloroethene	**15**	**H**	1.0	0.36	ug/L			04/01/20 05:04	1
1,2-Dichloroethene, Total	**130**	**H**	2.0	0.37	ug/L			04/01/20 05:04	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 05:04	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 05:04	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 05:04	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 05:04	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 05:04	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 05:04	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 05:04	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 05:04	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 05:04	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 05:04	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 05:04	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 05:04	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 05:04	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 05:04	1
trans-1,2-Dichloroethene	**0.65**	**J H**	1.0	0.37	ug/L			04/01/20 05:04	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
1,1,1-Trichloroethane	**1.4**	**H**	1.0	0.37	ug/L			04/01/20 05:04	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Trichloroethene	**50**	**H**	1.0	0.48	ug/L			04/01/20 05:04	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 05:04	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 05:04	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 05:04	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 05:04	1
Vinyl chloride	**8.5**	**H**	1.0	0.50	ug/L			04/01/20 05:04	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 05:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 05:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 05:04*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)

Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 05:04*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/01/20 05:04*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**2.8**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:48	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*72*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:48*	*1*
Terphenyl-d14	*46*			*03/23/20 14:46*	*03/24/20 04:48*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.8**		1.0	0.40	mg/L			03/26/20 18:27	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0	cn	1.0	0.31	ug/L			03/24/20 05:45	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**8800**		50	17	ug/L		03/20/20 13:04	03/22/20 14:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.7**		1.0	0.50	mg/L			03/27/20 07:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: Trip Blank
Date Collected: 03/17/20 00:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 16:04	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 16:04	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 16:04	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 16:04	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 16:04	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 16:04	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 16:04	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 16:04	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 16:04	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 16:04	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 16:04	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 16:04	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 16:04	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 16:04	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 16:04	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 16:04	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 16:04	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 16:04	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 16:04	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 16:04	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 16:04	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 16:04	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 16:04	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 16:04	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 16:04	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 16:04	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 16:04	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 16:04	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 16:04	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 16:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: Trip Blank
Date Collected: 03/17/20 00:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 16:04	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 16:04	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 16:04	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 16:04	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 16:04	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 16:04	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*125*	*X*	*80 - 120*		*03/28/20 16:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*03/28/20 16:04*	*1*
Dibromofluoromethane (Surr)	*160*	*X*	*80 - 122*		*03/28/20 16:04*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/28/20 16:04*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181769-1	GM-1B (031720)	119	108	142 X	98
680-181769-1 - RA	GM-1B (031720)	104	100	98	100
680-181769-2	GM-4B (031720)	121 X	110	143 X	96
680-181769-2 - RA	GM-4B (031720)	105	95	99	99
680-181769-3	GM-10S (031720)	117	108	139 X	99
680-181769-3 - RA	GM-10S (031720)	104	98	99	100
680-181769-4	GM-14M (031720)	119	108	135 X	95
680-181769-4 - RA	GM-14M (031720)	104	97	100	101
680-181769-5	GM-14S (031720)	115	108	133 X	96
680-181769-5 - RA	GM-14S (031720)	103	98	99	102
680-181769-6	GM-15M (031720)	117	109	134 X	94
680-181769-6 - RA	GM-15M (031720)	102	97	100	99
680-181769-7	DUP-01 (031720)	118	107	132 X	94
680-181769-7 - RA	DUP-01 (031720)	105	97	100	102
680-181769-8	Trip Blank	125 X	111	160 X	95
LCS 680-612986/4	Lab Control Sample	110	103	106	102
LCS 680-613487/5	Lab Control Sample	105	109	110	103
LCSD 680-612986/5	Lab Control Sample Dup	109	100	104	100
LCSD 680-613487/6	Lab Control Sample Dup	107	107	110	104
MB 680-612986/10	Method Blank	106	106	118	96
MB 680-613487/11	Method Blank	107	97	99	99

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
		NBZ	TPHL
Lab Sample ID	Client Sample ID	(41-144)	
680-181769-1	GM-1B (031720)	81	80
680-181769-2	GM-4B (031720)	89	88
680-181769-3	GM-10S (031720)	83	83
680-181769-4	GM-14M (031720)	76	52
680-181769-5	GM-14S (031720)	81	74
680-181769-7	DUP-01 (031720)	72	46
LCS 460-683060/2-A	Lab Control Sample	69	71
LCSD 460-683060/3-A	Lab Control Sample Dup	79	76
MB 460-683060/1-A	Method Blank	74	80

Surrogate Legend

NBZ = Nitrobenzene-d5
TPHL = Terphenyl-d14

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-612986/10
Matrix: Water
Analysis Batch: 612986

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 15:17	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 15:17	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 15:17	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 15:17	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 15:17	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 15:17	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 15:17	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 15:17	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 15:17	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 15:17	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/28/20 15:17	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 15:17	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 15:17	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 15:17	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 15:17	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 15:17	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 15:17	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 15:17	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 15:17	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 15:17	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 15:17	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 15:17	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 15:17	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 15:17	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 15:17	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 15:17	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 15:17	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 15:17	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 15:17	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 15:17	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 15:17	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 15:17	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 15:17	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 15:17	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 15:17	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 15:17	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 15:17	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 15:17	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 15:17	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 15:17	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 15:17	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 15:17	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 15:17	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 15:17	1

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

Lab Sample ID: MB 680-612986/10
Matrix: Water
Analysis Batch: 612986

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 15:17	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 15:17	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 15:17	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 15:17	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 15:17	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 15:17	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 15:17	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 15:17	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 15:17	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 15:17	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 15:17	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/28/20 15:17	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 15:17	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 15:17	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 15:17	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 15:17	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 15:17	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 15:17	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 15:17	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/28/20 15:17*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/28/20 15:17*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*03/28/20 15:17*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/28/20 15:17*	*1*

Lab Sample ID: LCS 680-612986/4
Matrix: Water
Analysis Batch: 612986

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	282		ug/L		113	70 - 135
Benzene	50.0	52.5		ug/L		105	80 - 120
Bromobenzene	50.0	57.3		ug/L		115	80 - 121
Bromochloromethane	50.0	51.0		ug/L		102	80 - 120
Bromodichloromethane	50.0	51.6		ug/L		103	80 - 120
Bromoform	50.0	59.8		ug/L		120	74 - 126
Bromomethane	50.0	65.4	*	ug/L		131	62 - 130
2-Butanone	250	273		ug/L		109	80 - 131
Carbon disulfide	50.0	48.6		ug/L		97	80 - 120
Carbon tetrachloride	50.0	55.0		ug/L		110	76 - 123
Chlorobenzene	50.0	54.5		ug/L		109	80 - 120
Chloroethane	50.0	57.0		ug/L		114	66 - 135
2-Chloroethyl vinyl ether	50.0	50.6		ug/L		101	71 - 135
Chloroform	50.0	50.3		ug/L		101	80 - 120
Chloromethane	50.0	46.3		ug/L		93	69 - 131
2-Chlorotoluene	50.0	56.4		ug/L		113	80 - 120

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

Lab Sample ID: LCS 680-612986/4
Matrix: Water
Analysis Batch: 612986

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	56.1		ug/L		112	80 - 120
cis-1,2-Dichloroethene	50.0	52.3		ug/L		105	80 - 120
cis-1,3-Dichloropropene	50.0	54.7		ug/L		109	80 - 120
Dibromochloromethane	50.0	53.0		ug/L		106	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	53.4		ug/L		107	71 - 134
1,2-Dibromoethane	50.0	54.3		ug/L		109	80 - 120
Dibromomethane	50.0	52.8		ug/L		106	80 - 120
1,2-Dichlorobenzene	50.0	52.9		ug/L		106	80 - 120
1,3-Dichlorobenzene	50.0	54.6		ug/L		109	80 - 120
1,4-Dichlorobenzene	50.0	52.4		ug/L		105	80 - 120
Dichlorodifluoromethane	50.0	65.1		ug/L		130	47 - 155
1,1-Dichloroethane	50.0	51.9		ug/L		104	80 - 120
1,2-Dichloroethane	50.0	51.1		ug/L		102	80 - 120
1,1-Dichloroethene	50.0	55.7		ug/L		111	76 - 120
1,2-Dichloroethene, Total	100	105		ug/L		105	80 - 120
1,2-Dichloropropane	50.0	51.0		ug/L		102	80 - 120
1,3-Dichloropropane	50.0	52.5		ug/L		105	80 - 120
2,2-Dichloropropane	50.0	65.8	*	ug/L		132	76 - 126
1,1-Dichloropropene	50.0	54.4		ug/L		109	80 - 120
Ethylbenzene	50.0	54.8		ug/L		110	80 - 120
Hexachlorobutadiene	50.0	59.5		ug/L		119	60 - 140
2-Hexanone	250	268		ug/L		107	74 - 127
Isopropylbenzene	50.0	55.7		ug/L		111	80 - 120
Methylene Chloride	50.0	46.2		ug/L		92	80 - 120
4-Methyl-2-pentanone	250	267		ug/L		107	76 - 124
Methyl tert-butyl ether	50.0	53.3		ug/L		107	80 - 120
m-Xylene & p-Xylene	50.0	54.5		ug/L		109	80 - 120
n-Butylbenzene	50.0	47.4		ug/L		95	80 - 120
N-Propylbenzene	50.0	57.1		ug/L		114	80 - 120
o-Xylene	50.0	55.8		ug/L		112	80 - 120
p-Isopropyltoluene	50.0	53.3		ug/L		107	80 - 120
sec-Butylbenzene	50.0	54.7		ug/L		109	80 - 120
Styrene	50.0	57.7		ug/L		115	80 - 120
tert-Butylbenzene	50.0	54.7		ug/L		109	80 - 121
1,1,1,2-Tetrachloroethane	50.0	60.6		ug/L		121	80 - 121
1,1,2,2-Tetrachloroethane	50.0	56.7		ug/L		113	80 - 120
Tetrachloroethene	50.0	56.7		ug/L		113	80 - 121
Toluene	50.0	52.7		ug/L		105	80 - 113
trans-1,2-Dichloroethene	50.0	52.5		ug/L		105	80 - 120
trans-1,3-Dichloropropene	50.0	56.3		ug/L		113	80 - 120
1,2,3-Trichlorobenzene	50.0	60.5		ug/L		121	61 - 141
1,2,4-Trichlorobenzene	50.0	57.1		ug/L		114	68 - 128
1,1,1-Trichloroethane	50.0	53.4		ug/L		107	80 - 120
1,1,2-Trichloroethane	50.0	52.9		ug/L		106	80 - 120
Trichloroethene	50.0	55.5		ug/L		111	80 - 120
Trichlorofluoromethane	50.0	59.0		ug/L		118	60 - 141
1,2,3-Trichloropropane	50.0	55.9		ug/L		112	80 - 123
1,2,4-Trimethylbenzene	50.0	55.5		ug/L		111	80 - 120
1,3,5-Trimethylbenzene	50.0	53.5		ug/L		107	80 - 120

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

Lab Sample ID: LCS 680-612986/4
Matrix: Water
Analysis Batch: 612986

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	140	*	ug/L		140	67 - 135
Vinyl chloride	50.0	50.1		ug/L		100	71 - 128
Xylenes, Total	100	110		ug/L		110	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*
Dibromofluoromethane (Surr)	*106*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 680-612986/5
Matrix: Water
Analysis Batch: 612986

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
Acetone	250	257		ug/L		103	70 - 135	10	30
Benzene	50.0	51.7		ug/L		103	80 - 120	1	20
Bromobenzene	50.0	57.6		ug/L		115	80 - 121	1	20
Bromochloromethane	50.0	50.4		ug/L		101	80 - 120	1	20
Bromodichloromethane	50.0	50.6		ug/L		101	80 - 120	2	20
Bromoform	50.0	58.9		ug/L		118	74 - 126	1	20
Bromomethane	50.0	67.1	*	ug/L		134	62 - 130	2	20
2-Butanone	250	260		ug/L		104	80 - 131	5	20
Carbon disulfide	50.0	48.3		ug/L		97	80 - 120	1	20
Carbon tetrachloride	50.0	54.7		ug/L		109	76 - 123	1	20
Chlorobenzene	50.0	54.3		ug/L		109	80 - 120	0	20
Chloroethane	50.0	57.3		ug/L		115	66 - 135	0	20
2-Chloroethyl vinyl ether	50.0	48.7		ug/L		97	71 - 135	4	50
Chloroform	50.0	50.1		ug/L		100	80 - 120	0	20
Chloromethane	50.0	46.7		ug/L		93	69 - 131	1	30
2-Chlorotoluene	50.0	56.5		ug/L		113	80 - 120	0	20
4-Chlorotoluene	50.0	57.1		ug/L		114	80 - 120	2	20
cis-1,2-Dichloroethene	50.0	51.4		ug/L		103	80 - 120	2	20
cis-1,3-Dichloropropene	50.0	54.5		ug/L		109	80 - 120	0	20
Dibromochloromethane	50.0	52.6		ug/L		105	80 - 121	1	20
1,2-Dibromo-3-Chloropropane	50.0	51.8		ug/L		104	71 - 134	3	20
1,2-Dibromoethane	50.0	53.6		ug/L		107	80 - 120	1	20
Dibromomethane	50.0	51.4		ug/L		103	80 - 120	3	20
1,2-Dichlorobenzene	50.0	53.2		ug/L		106	80 - 120	1	20
1,3-Dichlorobenzene	50.0	54.5		ug/L		109	80 - 120	0	20
1,4-Dichlorobenzene	50.0	52.4		ug/L		105	80 - 120	0	20
Dichlorodifluoromethane	50.0	64.5		ug/L		129	47 - 155	1	40
1,1-Dichloroethane	50.0	50.0		ug/L		100	80 - 120	4	20
1,2-Dichloroethane	50.0	50.1		ug/L		100	80 - 120	2	50
1,1-Dichloroethene	50.0	53.0		ug/L		106	76 - 120	5	20
1,2-Dichloroethene, Total	100	102		ug/L		102	80 - 120	2	20
1,2-Dichloropropane	50.0	50.0		ug/L		100	80 - 120	2	20
1,3-Dichloropropane	50.0	51.0		ug/L		102	80 - 120	3	20

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

Lab Sample ID: LCSD 680-612986/5
Matrix: Water
Analysis Batch: 612986

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
2,2-Dichloropropane	50.0	64.8	*	ug/L		130	76 - 126	1	20
1,1-Dichloropropene	50.0	54.1		ug/L		108	80 - 120	1	20
Ethylbenzene	50.0	55.1		ug/L		110	80 - 120	1	20
Hexachlorobutadiene	50.0	59.7		ug/L		119	60 - 140	0	20
2-Hexanone	250	260		ug/L		104	74 - 127	3	20
Isopropylbenzene	50.0	56.2		ug/L		112	80 - 120	1	20
Methylene Chloride	50.0	46.0		ug/L		92	80 - 120	0	20
4-Methyl-2-pentanone	250	260		ug/L		104	76 - 124	3	20
Methyl tert-butyl ether	50.0	51.7		ug/L		103	80 - 120	3	20
m-Xylene & p-Xylene	50.0	55.8		ug/L		112	80 - 120	2	20
n-Butylbenzene	50.0	47.9		ug/L		96	80 - 120	1	20
N-Propylbenzene	50.0	57.0		ug/L		114	80 - 120	0	20
o-Xylene	50.0	56.0		ug/L		112	80 - 120	0	30
p-Isopropyltoluene	50.0	53.6		ug/L		107	80 - 120	1	20
sec-Butylbenzene	50.0	55.1		ug/L		110	80 - 120	1	20
Styrene	50.0	57.9		ug/L		116	80 - 120	0	20
tert-Butylbenzene	50.0	54.8		ug/L		110	80 - 121	0	20
1,1,1,2-Tetrachloroethane	50.0	60.5		ug/L		121	80 - 121	0	20
1,1,2,2-Tetrachloroethane	50.0	55.7		ug/L		111	80 - 120	2	20
Tetrachloroethene	50.0	57.2		ug/L		114	80 - 121	1	20
Toluene	50.0	53.0		ug/L		106	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	50.9		ug/L		102	80 - 120	3	20
trans-1,3-Dichloropropene	50.0	55.4		ug/L		111	80 - 120	2	30
1,2,3-Trichlorobenzene	50.0	59.6		ug/L		119	61 - 141	2	20
1,2,4-Trichlorobenzene	50.0	58.4		ug/L		117	68 - 128	2	20
1,1,1-Trichloroethane	50.0	53.2		ug/L		106	80 - 120	1	20
1,1,2-Trichloroethane	50.0	51.1		ug/L		102	80 - 120	4	20
Trichloroethene	50.0	54.6		ug/L		109	80 - 120	2	20
Trichlorofluoromethane	50.0	59.3		ug/L		119	60 - 141	0	20
1,2,3-Trichloropropane	50.0	56.5		ug/L		113	80 - 123	1	30
1,2,4-Trimethylbenzene	50.0	55.6		ug/L		111	80 - 120	0	20
1,3,5-Trimethylbenzene	50.0	54.4		ug/L		109	80 - 120	2	20
Vinyl acetate	100	135		ug/L		135	67 - 135	4	20
Vinyl chloride	50.0	49.8		ug/L		100	71 - 128	1	20
Xylenes, Total	100	112		ug/L		112	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*109*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*
Dibromofluoromethane (Surr)	*104*		*80 - 122*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*

Lab Sample ID: MB 680-613487/11
Matrix: Water
Analysis Batch: 613487

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 00:48	1

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

Lab Sample ID: MB 680-613487/11
Matrix: Water
Analysis Batch: 613487

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 00:48	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 00:48	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 00:48	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 00:48	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 00:48	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 00:48	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 00:48	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 00:48	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 00:48	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 00:48	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 00:48	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 00:48	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 00:48	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 00:48	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 00:48	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 00:48	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 00:48	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 00:48	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 00:48	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 00:48	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 00:48	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 00:48	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 00:48	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 00:48	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 00:48	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 00:48	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/01/20 00:48	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 00:48	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 00:48	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 00:48	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 00:48	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 00:48	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 00:48	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 00:48	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 00:48	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 00:48	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 00:48	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 00:48	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 00:48	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 00:48	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 00:48	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 00:48	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 00:48	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 00:48	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 00:48	1

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

Lab Sample ID: MB 680-613487/11
Matrix: Water
Analysis Batch: 613487

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 00:48	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 00:48	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 00:48	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 00:48	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 00:48	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 00:48	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 00:48	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 00:48	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 00:48	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/01/20 00:48	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 00:48	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 00:48	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 00:48	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 00:48	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 00:48	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 00:48	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 00:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/01/20 00:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 00:48*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 00:48*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/01/20 00:48*	*1*

Lab Sample ID: LCS 680-613487/5
Matrix: Water
Analysis Batch: 613487

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	327		ug/L		131	70 - 135
Benzene	50.0	54.4		ug/L		109	80 - 120
Bromobenzene	50.0	52.4		ug/L		105	80 - 121
Bromochloromethane	50.0	55.8		ug/L		112	80 - 120
Bromodichloromethane	50.0	54.7		ug/L		109	80 - 120
Bromoform	50.0	54.4		ug/L		109	74 - 126
Bromomethane	50.1	54.1		ug/L		108	62 - 130
2-Butanone	250	306		ug/L		122	80 - 131
Carbon disulfide	50.0	49.6		ug/L		99	80 - 120
Carbon tetrachloride	50.0	48.5		ug/L		97	76 - 123
Chlorobenzene	50.0	51.2		ug/L		102	80 - 120
Chloroethane	50.0	54.8		ug/L		110	66 - 135
2-Chloroethyl vinyl ether	50.0	58.9		ug/L		118	71 - 135
Chloroform	50.0	53.3		ug/L		107	80 - 120
Chloromethane	50.0	52.4		ug/L		105	69 - 131
2-Chlorotoluene	50.0	52.0		ug/L		104	80 - 120
4-Chlorotoluene	50.0	52.8		ug/L		106	80 - 120
cis-1,2-Dichloroethene	50.0	54.4		ug/L		109	80 - 120

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

Lab Sample ID: LCS 680-613487/5
Matrix: Water
Analysis Batch: 613487

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	56.3		ug/L		113	80 - 120
Dibromochloromethane	50.0	55.2		ug/L		110	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	56.0		ug/L		112	71 - 134
1,2-Dibromoethane	50.0	57.0		ug/L		114	80 - 120
Dibromomethane	50.0	56.7		ug/L		113	80 - 120
1,2-Dichlorobenzene	50.0	52.4		ug/L		105	80 - 120
1,3-Dichlorobenzene	50.0	51.3		ug/L		103	80 - 120
1,4-Dichlorobenzene	50.0	49.9		ug/L		100	80 - 120
Dichlorodifluoromethane	50.1	49.1		ug/L		98	47 - 155
1,1-Dichloroethane	50.0	52.1		ug/L		104	80 - 120
1,2-Dichloroethane	50.0	54.7		ug/L		109	80 - 120
1,1-Dichloroethene	50.0	49.7		ug/L		99	76 - 120
1,2-Dichloroethene, Total	100	108		ug/L		108	80 - 120
1,2-Dichloropropane	50.0	56.9		ug/L		114	80 - 120
1,3-Dichloropropane	50.0	57.3		ug/L		115	80 - 120
2,2-Dichloropropane	50.0	47.9		ug/L		96	76 - 126
1,1-Dichloropropene	50.0	51.2		ug/L		102	80 - 120
Ethylbenzene	50.0	51.6		ug/L		103	80 - 120
Hexachlorobutadiene	50.0	49.1		ug/L		98	60 - 140
2-Hexanone	250	317		ug/L		127	74 - 127
Isopropylbenzene	50.0	50.9		ug/L		102	80 - 120
Methylene Chloride	50.0	49.9		ug/L		100	80 - 120
4-Methyl-2-pentanone	250	307		ug/L		123	76 - 124
Methyl tert-butyl ether	50.0	53.9		ug/L		108	80 - 120
m-Xylene & p-Xylene	50.0	52.5		ug/L		105	80 - 120
n-Butylbenzene	50.0	50.6		ug/L		101	80 - 120
N-Propylbenzene	50.0	51.3		ug/L		103	80 - 120
o-Xylene	50.0	51.6		ug/L		103	80 - 120
p-Isopropyltoluene	50.0	50.0		ug/L		100	80 - 120
sec-Butylbenzene	50.0	49.7		ug/L		99	80 - 120
Styrene	50.0	56.3		ug/L		113	80 - 120
tert-Butylbenzene	50.0	49.8		ug/L		100	80 - 121
1,1,1,2-Tetrachloroethane	50.0	52.7		ug/L		105	80 - 121
1,1,2,2-Tetrachloroethane	50.0	53.8		ug/L		108	80 - 120
Tetrachloroethene	50.0	49.9		ug/L		100	80 - 121
Toluene	50.0	53.4		ug/L		107	80 - 113
trans-1,2-Dichloroethene	50.0	53.1		ug/L		106	80 - 120
trans-1,3-Dichloropropene	50.0	58.0		ug/L		116	80 - 120
1,2,3-Trichlorobenzene	50.0	55.0		ug/L		110	61 - 141
1,2,4-Trichlorobenzene	50.0	54.0		ug/L		108	68 - 128
1,1,1-Trichloroethane	50.0	49.4		ug/L		99	80 - 120
1,1,2-Trichloroethane	50.0	56.2		ug/L		112	80 - 120
Trichloroethene	50.0	53.8		ug/L		108	80 - 120
Trichlorofluoromethane	50.0	47.7		ug/L		95	60 - 141
1,2,3-Trichloropropane	50.0	54.7		ug/L		109	80 - 123
1,2,4-Trimethylbenzene	50.0	51.5		ug/L		103	80 - 120
1,3,5-Trimethylbenzene	50.0	50.3		ug/L		101	80 - 120
Vinyl acetate	100	121		ug/L		121	67 - 135
Vinyl chloride	50.1	51.9		ug/L		104	71 - 128

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

Lab Sample ID: LCS 680-613487/5
Matrix: Water
Analysis Batch: 613487

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	104		ug/L		104	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*105*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*

Lab Sample ID: LCSD 680-613487/6
Matrix: Water
Analysis Batch: 613487

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
Acetone			250	312		ug/L		125	70 - 135	5	30
Benzene			50.0	54.9		ug/L		110	80 - 120	1	20
Bromobenzene			50.0	53.0		ug/L		106	80 - 121	1	20
Bromochloromethane			50.0	56.4		ug/L		113	80 - 120	1	20
Bromodichloromethane			50.0	54.6		ug/L		109	80 - 120	0	20
Bromoform			50.0	53.8		ug/L		108	74 - 126	1	20
Bromomethane			50.1	58.2		ug/L		116	62 - 130	7	20
2-Butanone			250	299		ug/L		120	80 - 131	2	20
Carbon disulfide			50.0	51.1		ug/L		102	80 - 120	3	20
Carbon tetrachloride			50.0	50.3		ug/L		101	76 - 123	3	20
Chlorobenzene			50.0	52.1		ug/L		104	80 - 120	2	20
Chloroethane			50.0	55.8		ug/L		112	66 - 135	2	20
2-Chloroethyl vinyl ether			50.0	55.6		ug/L		111	71 - 135	6	50
Chloroform			50.0	53.7		ug/L		107	80 - 120	1	20
Chloromethane			50.0	53.3		ug/L		107	69 - 131	2	30
2-Chlorotoluene			50.0	52.8		ug/L		106	80 - 120	1	20
4-Chlorotoluene			50.0	54.0		ug/L		108	80 - 120	2	20
cis-1,2-Dichloroethene			50.0	54.6		ug/L		109	80 - 120	0	20
cis-1,3-Dichloropropene			50.0	56.5		ug/L		113	80 - 120	0	20
Dibromochloromethane			50.0	54.5		ug/L		109	80 - 121	1	20
1,2-Dibromo-3-Chloropropane			50.0	56.2		ug/L		112	71 - 134	0	20
1,2-Dibromoethane			50.0	56.2		ug/L		112	80 - 120	2	20
Dibromomethane			50.0	55.6		ug/L		111	80 - 120	2	20
1,2-Dichlorobenzene			50.0	52.3		ug/L		105	80 - 120	0	20
1,3-Dichlorobenzene			50.0	51.9		ug/L		104	80 - 120	1	20
1,4-Dichlorobenzene			50.0	50.7		ug/L		101	80 - 120	2	20
Dichlorodifluoromethane			50.1	51.2		ug/L		102	47 - 155	4	40
1,1-Dichloroethane			50.0	52.9		ug/L		106	80 - 120	1	20
1,2-Dichloroethane			50.0	53.3		ug/L		107	80 - 120	3	50
1,1-Dichloroethene			50.0	51.5		ug/L		103	76 - 120	4	20
1,2-Dichloroethene, Total			100	108		ug/L		108	80 - 120	1	20
1,2-Dichloropropane			50.0	56.6		ug/L		113	80 - 120	1	20
1,3-Dichloropropane			50.0	57.0		ug/L		114	80 - 120	1	20
2,2-Dichloropropane			50.0	48.1		ug/L		96	76 - 126	0	20
1,1-Dichloropropene			50.0	52.8		ug/L		106	80 - 120	3	20

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

Lab Sample ID: LCSD 680-613487/6
Matrix: Water
Analysis Batch: 613487

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
Ethylbenzene			50.0	52.9		ug/L		106	80 - 120	3	20
Hexachlorobutadiene			50.0	52.0		ug/L		104	60 - 140	6	20
2-Hexanone			250	316		ug/L		126	74 - 127	0	20
Isopropylbenzene			50.0	52.2		ug/L		104	80 - 120	2	20
Methylene Chloride			50.0	50.0		ug/L		100	80 - 120	0	20
4-Methyl-2-pentanone			250	302		ug/L		121	76 - 124	2	20
Methyl tert-butyl ether			50.0	53.3		ug/L		107	80 - 120	1	20
m-Xylene & p-Xylene			50.0	53.4		ug/L		107	80 - 120	2	20
n-Butylbenzene			50.0	52.7		ug/L		105	80 - 120	4	20
N-Propylbenzene			50.0	52.9		ug/L		106	80 - 120	3	20
o-Xylene			50.0	52.6		ug/L		105	80 - 120	2	30
p-Isopropyltoluene			50.0	51.0		ug/L		102	80 - 120	2	20
sec-Butylbenzene			50.0	51.5		ug/L		103	80 - 120	4	20
Styrene			50.0	57.0		ug/L		114	80 - 120	1	20
tert-Butylbenzene			50.0	51.0		ug/L		102	80 - 121	2	20
1,1,1,2-Tetrachloroethane			50.0	52.9		ug/L		106	80 - 121	0	20
1,1,2,2-Tetrachloroethane			50.0	53.5		ug/L		107	80 - 120	0	20
Tetrachloroethene			50.0	51.4		ug/L		103	80 - 121	3	20
Toluene			50.0	54.4		ug/L		109	80 - 113	2	20
trans-1,2-Dichloroethene			50.0	53.7		ug/L		107	80 - 120	1	20
trans-1,3-Dichloropropene			50.0	57.5		ug/L		115	80 - 120	1	30
1,2,3-Trichlorobenzene			50.0	55.1		ug/L		110	61 - 141	0	20
1,2,4-Trichlorobenzene			50.0	55.3		ug/L		111	68 - 128	2	20
1,1,1-Trichloroethane			50.0	50.4		ug/L		101	80 - 120	2	20
1,1,2-Trichloroethane			50.0	56.0		ug/L		112	80 - 120	0	20
Trichloroethene			50.0	54.5		ug/L		109	80 - 120	1	20
Trichlorofluoromethane			50.0	49.5		ug/L		99	60 - 141	4	20
1,2,3-Trichloropropane			50.0	53.7		ug/L		107	80 - 123	2	30
1,2,4-Trimethylbenzene			50.0	52.4		ug/L		105	80 - 120	2	20
1,3,5-Trimethylbenzene			50.0	51.5		ug/L		103	80 - 120	2	20
Vinyl acetate			100	119		ug/L		119	67 - 135	2	20
Vinyl chloride			50.1	53.6		ug/L		107	71 - 128	3	20
Xylenes, Total			100	106		ug/L		106	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*107*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-683060/1-A
Matrix: Water
Analysis Batch: 683150

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 683060

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 00:34	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 00:34	1

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	74		41 - 144	03/23/20 14:46	03/24/20 00:34	1
Terphenyl-d14	80			03/23/20 14:46	03/24/20 00:34	1

Lab Sample ID: LCS 460-683060/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 683150 — **Prep Batch: 683060**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	0.800	0.221	J	ug/L		28	10 - 150
Naphthalene	0.800	0.400		ug/L		50	33 - 124

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5	69		41 - 144
Terphenyl-d14	71		

Lab Sample ID: LCSD 460-683060/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 683150 — **Prep Batch: 683060**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	0.800	0.247	J	ug/L		31	10 - 150	11	30
Naphthalene	0.800	0.425		ug/L		53	33 - 124	6	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Nitrobenzene-d5	79		41 - 144
Terphenyl-d14	76		

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-612634/33 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 612634

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			03/26/20 15:55	1

Lab Sample ID: LCS 680-612634/34 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 612634

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	10.0	9.72		mg/L		97	90 - 110

Lab Sample ID: LCSD 680-612634/35 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 612634

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	10.0	9.80		mg/L		98	90 - 110	1	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206182/1002
Matrix: Water
Analysis Batch: 206182

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/23/20 23:15	1

Lab Sample ID: LCS 550-206182/4
Matrix: Water
Analysis Batch: 206182

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.7		ug/L		99	85 - 115

Lab Sample ID: LCSD 550-206182/5
Matrix: Water
Analysis Batch: 206182

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
Perchlorate	25.0	25.2		ug/L		101	85 - 115	2	15

Lab Sample ID: MB 550-206574/1002
Matrix: Water
Analysis Batch: 206574

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/24/20 22:37	1

Lab Sample ID: LCS 550-206574/4
Matrix: Water
Analysis Batch: 206574

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.4		ug/L		98	85 - 115

Lab Sample ID: LCSD 550-206574/5
Matrix: Water
Analysis Batch: 206574

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
Perchlorate	25.0	24.6		ug/L		98	85 - 115	1	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-611858/1-A
Matrix: Water
Analysis Batch: 612092

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611858

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/20/20 13:04	03/22/20 12:56	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-611858/2-A
Matrix: Water
Analysis Batch: 612092

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611858

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Dissolved Iron			5010	4820		ug/L		96	80 - 120		

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613177/2
Matrix: Water
Analysis Batch: 613177

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/27/20 04:31	1

Lab Sample ID: LCS 680-613177/3
Matrix: Water
Analysis Batch: 613177

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon			20.0	19.6		mg/L		98	80 - 120		

Lab Sample ID: LCSD 680-613177/4
Matrix: Water
Analysis Batch: 613177

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon			20.0	19.8		mg/L		99	80 - 120	1	25

Lab Sample ID: 680-181769-1 MS
Matrix: Water
Analysis Batch: 613177

Client Sample ID: GM-1B (031720)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon	0.53	J	20.0	20.4		mg/L		99	80 - 120		

Lab Sample ID: 680-181769-1 MSD
Matrix: Water
Analysis Batch: 613177

Client Sample ID: GM-1B (031720)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	0.53	J	20.0	20.4		mg/L		99	80 - 120	0	25

GC/MS VOA

Analysis Batch: 612986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	8260B	
680-181769-2	GM-4B (031720)	Total/NA	Water	8260B	
680-181769-3	GM-10S (031720)	Total/NA	Water	8260B	
680-181769-4	GM-14M (031720)	Total/NA	Water	8260B	
680-181769-5	GM-14S (031720)	Total/NA	Water	8260B	
680-181769-6	GM-15M (031720)	Total/NA	Water	8260B	
680-181769-7	DUP-01 (031720)	Total/NA	Water	8260B	
680-181769-8	Trip Blank	Total/NA	Water	8260B	
MB 680-612986/10	Method Blank	Total/NA	Water	8260B	
LCS 680-612986/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-612986/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1 - RA	GM-1B (031720)	Total/NA	Water	8260B	
680-181769-2 - RA	GM-4B (031720)	Total/NA	Water	8260B	
680-181769-3 - RA	GM-10S (031720)	Total/NA	Water	8260B	
680-181769-4 - RA	GM-14M (031720)	Total/NA	Water	8260B	
680-181769-5 - RA	GM-14S (031720)	Total/NA	Water	8260B	
680-181769-6 - RA	GM-15M (031720)	Total/NA	Water	8260B	
680-181769-7 - RA	DUP-01 (031720)	Total/NA	Water	8260B	
MB 680-613487/11	Method Blank	Total/NA	Water	8260B	
LCS 680-613487/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613487/6	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 683060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	3510C	
680-181769-2	GM-4B (031720)	Total/NA	Water	3510C	
680-181769-3	GM-10S (031720)	Total/NA	Water	3510C	
680-181769-4	GM-14M (031720)	Total/NA	Water	3510C	
680-181769-5	GM-14S (031720)	Total/NA	Water	3510C	
680-181769-7	DUP-01 (031720)	Total/NA	Water	3510C	
MB 460-683060/1-A	Method Blank	Total/NA	Water	3510C	
LCS 460-683060/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-683060/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 683150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	8270D SIM	683060
680-181769-2	GM-4B (031720)	Total/NA	Water	8270D SIM	683060
680-181769-3	GM-10S (031720)	Total/NA	Water	8270D SIM	683060
680-181769-4	GM-14M (031720)	Total/NA	Water	8270D SIM	683060
680-181769-5	GM-14S (031720)	Total/NA	Water	8270D SIM	683060
680-181769-7	DUP-01 (031720)	Total/NA	Water	8270D SIM	683060
MB 460-683060/1-A	Method Blank	Total/NA	Water	8270D SIM	683060
LCS 460-683060/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	683060
LCSD 460-683060/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	683060

HPLC/IC

Analysis Batch: 206182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-2	GM-4B (031720)	Total/NA	Water	314.0	
680-181769-3	GM-10S (031720)	Total/NA	Water	314.0	
680-181769-4	GM-14M (031720)	Total/NA	Water	314.0	
680-181769-5	GM-14S (031720)	Total/NA	Water	314.0	
680-181769-6	GM-15M (031720)	Total/NA	Water	314.0	
680-181769-7	DUP-01 (031720)	Total/NA	Water	314.0	
MB 550-206182/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206182/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206182/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 206574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	314.0	
MB 550-206574/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206574/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206574/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 612634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	300.0-1993 R2.1	
680-181769-3	GM-10S (031720)	Total/NA	Water	300.0-1993 R2.1	
680-181769-4	GM-14M (031720)	Total/NA	Water	300.0-1993 R2.1	
680-181769-7	DUP-01 (031720)	Total/NA	Water	300.0-1993 R2.1	
MB 680-612634/33	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-612634/34	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-612634/35	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 611858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Dissolved	Water	3005A	
680-181769-3	GM-10S (031720)	Dissolved	Water	3005A	
680-181769-4	GM-14M (031720)	Dissolved	Water	3005A	
680-181769-7	DUP-01 (031720)	Dissolved	Water	3005A	
MB 680-611858/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-611858/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 612092

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Dissolved	Water	6010C	611858
680-181769-4	GM-14M (031720)	Dissolved	Water	6010C	611858
680-181769-7	DUP-01 (031720)	Dissolved	Water	6010C	611858
MB 680-611858/1-A	Method Blank	Total Recoverable	Water	6010C	611858
LCS 680-611858/2-A	Lab Control Sample	Total Recoverable	Water	6010C	611858

Analysis Batch: 612356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-3	GM-10S (031720)	Dissolved	Water	6010C	611858

QC Association Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

General Chemistry

Analysis Batch: 613177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181769-1	GM-1B (031720)	Total/NA	Water	5310 B-2011	
680-181769-3	GM-10S (031720)	Total/NA	Water	5310 B-2011	
680-181769-4	GM-14M (031720)	Total/NA	Water	5310 B-2011	
680-181769-7	DUP-01 (031720)	Total/NA	Water	5310 B-2011	
MB 680-613177/2	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613177/3	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613177/4	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
680-181769-1 MS	GM-1B (031720)	Total/NA	Water	5310 B-2011	
680-181769-1 MSD	GM-1B (031720)	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-1B (031720)
Lab Sample ID: 680-181769-1
Date Collected: 03/17/20 12:20
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 19:13	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 02:45	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 03:02	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 17:49	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		10			206574	03/25/20 05:29	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	611858	03/20/20 13:04	AJR	TAL SAV
Dissolved	Analysis	6010C		1			612092	03/22/20 14:09	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613177	03/27/20 05:39	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-4B (031720)
Lab Sample ID: 680-181769-2
Date Collected: 03/17/20 13:40
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 19:37	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 03:08	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 03:23	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206182	03/24/20 03:04	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-10S (031720)
Lab Sample ID: 680-181769-3
Date Collected: 03/17/20 14:30
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 20:00	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 03:31	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 03:45	MME	TAL EDI
	Instrument ID: CBNAMS9									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-10S (031720)
Lab Sample ID: 680-181769-3

Date Collected: 03/17/20 14:30
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 18:02	UI	TAL SAV
Total/NA	Analysis	314.0		1			206182	03/24/20 03:27	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	611858	03/20/20 13:04	AJR	TAL SAV
Dissolved	Analysis	6010C		1			612356	03/24/20 12:17	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613177	03/27/20 06:30	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-14M (031720)
Lab Sample ID: 680-181769-4

Date Collected: 03/17/20 10:30
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 20:24	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 03:55	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 04:06	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 18:15	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206182	03/24/20 03:50	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	611858	03/20/20 13:04	AJR	TAL SAV
Dissolved	Analysis	6010C		1			612092	03/22/20 14:14	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613177	03/27/20 06:48	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-14S (031720)
Lab Sample ID: 680-181769-5

Date Collected: 03/17/20 10:05
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 20:48	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 04:18	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 04:27	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206182	03/24/20 04:13	NEL	TAL PHX
	Instrument ID: IC4									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-15M (031720)
Lab Sample ID: 680-181769-6

Date Collected: 03/17/20 12:15
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 21:11	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 04:41	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Analysis	314.0		1			206182	03/24/20 05:22	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: DUP-01 (031720)
Lab Sample ID: 680-181769-7

Date Collected: 03/17/20 12:00
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 21:35	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613487	04/01/20 05:04	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 04:48	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 18:27	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206182	03/24/20 05:45	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	611858	03/20/20 13:04	AJR	TAL SAV
Dissolved	Analysis	6010C		1			612092	03/22/20 14:28	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613177	03/27/20 07:05	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: Trip Blank
Lab Sample ID: 680-181769-8

Date Collected: 03/17/20 00:00
Matrix: Water
Date Received: 03/19/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	612986	03/28/20 16:04	P1C	TAL SAV
	Instrument ID: CMSA2									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Chain of Custody Record

397787 eurofins | Environment Testing TestAmerica

Baltimore #201

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-17-20	COC No:
Company Name: Arcadis	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD, 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO # 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	8260 B - VOC	8270D SIM 1,4 Dioxane	314.0 Perchlorate	6010C - Dissolved Iron	SM5310 TOC	300 ORGFM Sulfate	Sample Specific Notes:
GM-1B (031720)	3-17-20	1220	G	GW	11	1		3	2	1	1	3	1	Dissolved Iron = filtered
GM-4B (031720)		1340			6			3	2	1				
GM-10S (031720)		1430			11	1		3	2	1	1	3	1	
GM-14M (031720)		1030			11	1		3	2	1	1	3	1	
GM-14S (031720)		1005			6			3	2	1				
GM-15M (031720)		1215			4			3		1				
DUP-01 (031720)	3-17-20	1200	G	GW	11	1		3	2	1	1	3	1	
Trip Blank	-	-	-	-	2			2						

680-181769 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

4.8/5.2, 1.3/1.7

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Arcadis	3-18/0600		3/18/20 16:00	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	E+A	3/18/20 1700			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
				SAV	3-19-2020 / 0845

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604701.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181769-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 3/31/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-1B (031720) (680-181769-1)	3/17/20	12:20 Eastern		Water			X	1	
GM-4B (031720) (680-181769-2)	3/17/20	13:40 Eastern		Water			X	1	
GM-10S (031720) (680-181769-3)	3/17/20	14:30 Eastern		Water			X	1	
GM-14M (031720) (680-181769-4)	3/17/20	10:30 Eastern		Water			X	1	
GM-14S (031720) (680-181769-5)	3/17/20	10:05 Eastern		Water			X	1	
GM-15M (031720) (680-181769-6)	3/17/20	12:15 Eastern		Water			X	1	
DUP-01 (031720) (680-181769-7)	3/17/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		3-19-20 1700				
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3/20/20 9130	Company TA-PHL

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
	Yes	1.7c

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181769-1

Login Number: 181769

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Laughlin, Paul D

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181769-1

Login Number: 181769
List Number: 3
Creator: Rivera, Kenneth

List Source: Eurofins TestAmerica, Edison
List Creation: 03/21/20 06:49 PM

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	1164462
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	4.1°C, IR #11
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: ARCADIS U.S., Inc.

Job Number: 680-181769-1

Login Number: 181769
List Number: 2
Creator: Gravlin, Andrea

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/20/20 09:41 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
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?	False	
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.	False	Check done at department level as required.

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181769-1
Project/Site: ATK Orbital, Elkton MD

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181809-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Jerry Lanier

Authorized for release by:
4/6/2020 4:25:41 PM

Jerry Lanier, Project Manager I
(912)250-0281
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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-181809-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-181809-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 3/20/2020 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.9º C and 3.5º C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples GM-9M (031820) (680-181809-1), MW-1 (031820) (680-181809-2), MW-2 (031820) (680-181809-3), MW-5 (031820) (680-181809-4), MW-10 (031820) (680-181809-5), MW-12 (031820) (680-181809-6), MW-13 (031820) (680-181809-7), MW-23 (031820) (680-181809-8), GM-24 (031820) (680-181809-9), EB-01 (031820) (680-181809-10) and Trip Blank (680-181809-11) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/30/2020 and 03/31/2020.

The trip blank for 680-613134 contained Acetone above1/2RL. None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Bromomethane is reported with an E flag in the batch QC because the top one points were dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported.

The laboratory control sample (LCS) for analytical batch 680-613140 recovered outside control limits for the following analytes: Bromomethane and Chloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-613140 recovered outside control limits for the following analytes: Bromomethane, Chloroethane and trans-1,3-Dichloropropene. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613134, and 680-613341.

Refer to the QC report for details.

Samples MW-1 (031820) (680-181809-2)[5X], MW-2 (031820) (680-181809-3)[100X] and MW-13 (031820) (680-181809-7)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (AQUEOUS)
Sample EB-01 (031820) (680-181809-10) was analyzed for Semivolatile Organic Compounds (Aqueous) in accordance with EPA SW-846

Job ID: 680-181809-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

Method 8270D. The samples were prepared on 03/25/2020 and analyzed on 03/27/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL

Samples GM-9M (031820) (680-181809-1), GM-24 (031820) (680-181809-9) and EB-01 (031820) (680-181809-10) were analyzed for Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/23/2020 and analyzed on 03/24/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples GM-9M (031820) (680-181809-1), MW-1 (031820) (680-181809-2), MW-2 (031820) (680-181809-3), MW-5 (031820) (680-181809-4), MW-10 (031820) (680-181809-5), MW-12 (031820) (680-181809-6), MW-13 (031820) (680-181809-7), MW-23 (031820) (680-181809-8), GM-24 (031820) (680-181809-9) and EB-01 (031820) (680-181809-10) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/24/2020, 03/25/2020 and 04/01/2020.

Samples GM-9M (031820) (680-181809-1)[100X], MW-1 (031820) (680-181809-2)[200X], MW-2 (031820) (680-181809-3)[100X], MW-5 (031820) (680-181809-4)[10X], MW-10 (031820) (680-181809-5)[10X], MW-12 (031820) (680-181809-6)[100X], MW-13 (031820) (680-181809-7)[10X] and GM-24 (031820) (680-181809-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples MW-2 (031820) (680-181809-3), MW-12 (031820) (680-181809-6) and EB-01 (031820) (680-181809-10) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/25/2020 and analyzed on 03/26/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples MW-2 (031820) (680-181809-3), MW-12 (031820) (680-181809-6) and EB-01 (031820) (680-181809-10) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 03/26/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples MW-2 (031820) (680-181809-3), MW-12 (031820) (680-181809-6) and EB-01 (031820) (680-181809-10) were analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 03/30/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181809-1	GM-9M (031820)	Water	03/18/20 09:40	03/20/20 09:00	
680-181809-2	MW-1 (031820)	Water	03/18/20 13:50	03/20/20 09:00	
680-181809-3	MW-2 (031820)	Water	03/18/20 12:35	03/20/20 09:00	
680-181809-4	MW-5 (031820)	Water	03/18/20 14:55	03/20/20 09:00	
680-181809-5	MW-10 (031820)	Water	03/18/20 13:20	03/20/20 09:00	
680-181809-6	MW-12 (031820)	Water	03/18/20 14:40	03/20/20 09:00	
680-181809-7	MW-13 (031820)	Water	03/18/20 11:10	03/20/20 09:00	
680-181809-8	MW-23 (031820)	Water	03/18/20 12:10	03/20/20 09:00	
680-181809-9	GM-24 (031820)	Water	03/18/20 10:10	03/20/20 09:00	
680-181809-10	EB-01 (031820)	Water	03/18/20 17:00	03/20/20 09:00	
680-181809-11	Trip Blank	Water	03/18/20 00:00	03/20/20 09:00	

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV

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.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-9M (031820) — Lab Sample ID: 680-181809-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.79	J	1.0	0.33	ug/L	1		8260B	Total/NA
Chloroform	0.91	J	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	2.2		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	16		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	2.9		1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	63		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	2.3		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	11		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	120		1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	7.4		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	620		100	31	ug/L	100		314.0	Total/NA

Client Sample ID: MW-1 (031820) — Lab Sample ID: 680-181809-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	1.3		1.0	0.26	ug/L	1		8260B	Total/NA
Chloroform	4.6		1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	0.70	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	36		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.69	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	140		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	0.70	J	2.0	0.37	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.93	J	1.0	0.74	ug/L	1		8260B	Total/NA
Trichloroethene	9.8		1.0	0.48	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane - DL	250		5.0	1.9	ug/L	5		8260B	Total/NA
Perchlorate	1900		200	63	ug/L	200		314.0	Total/NA

Client Sample ID: MW-2 (031820) — Lab Sample ID: 680-181809-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.47	J	1.0	0.43	ug/L	1		8260B	Total/NA
Chlorobenzene	62		1.0	0.26	ug/L	1		8260B	Total/NA
Chloroform	2.3		1.0	0.50	ug/L	1		8260B	Total/NA
o-Xylene	0.85	J	1.0	0.23	ug/L	1		8260B	Total/NA
Tetrachloroethene	1.0		1.0	0.74	ug/L	1		8260B	Total/NA
Toluene	0.99	J	1.0	0.48	ug/L	1		8260B	Total/NA
Trichloroethene	9.1		1.0	0.48	ug/L	1		8260B	Total/NA
1,2,3-Trichloropropane	1.1		1.0	0.39	ug/L	1		8260B	Total/NA
Vinyl chloride	5.6		1.0	0.50	ug/L	1		8260B	Total/NA
Xylenes, Total	0.85	J	1.0	0.23	ug/L	1		8260B	Total/NA
Chloroethane - DL	730		500	250	ug/L	100		8260B	Total/NA
1,1-Dichloroethane - DL	4000		100	38	ug/L	100		8260B	Total/NA
1,1-Dichloroethene - DL	120		100	36	ug/L	100		8260B	Total/NA
1,1,1-Trichloroethane - DL	11000		100	37	ug/L	100		8260B	Total/NA
Sulfate	5.3		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	490		100	31	ug/L	100		314.0	Total/NA
Total Organic Carbon	2.5		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: MW-5 (031820) — Lab Sample ID: 680-181809-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	0.28	J	1.0	0.26	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-5 (031820) (Continued)

Lab Sample ID: 680-181809-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	17		1.0	0.41	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	17		2.0	0.37	ug/L	1		8260B	Total/NA
Tetrachloroethene	84		1.0	0.74	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.37	J	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	110		1.0	0.48	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	3.6		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	2.5		1.0	0.36	ug/L	1		8260B	Total/NA
Perchlorate	110		10	3.1	ug/L	10		314.0	Total/NA

Client Sample ID: MW-10 (031820)

Lab Sample ID: 680-181809-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.48	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	0.48	J	2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	4.3		1.0	0.48	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - RA	3.2		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene - RA	4.2		1.0	0.36	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane - RA	8.3		1.0	0.37	ug/L	1		8260B	Total/NA
Perchlorate	110		10	3.1	ug/L	10		314.0	Total/NA

Client Sample ID: MW-12 (031820)

Lab Sample ID: 680-181809-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	1.0		1.0	0.37	ug/L	1		8260B	Total/NA
Sulfate	18		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	640		100	31	ug/L	100		314.0	Total/NA
Total Organic Carbon	1.4		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: MW-13 (031820)

Lab Sample ID: 680-181809-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	9.7	J	10	4.1	ug/L	10		8260B	Total/NA
1,2-Dichloroethene, Total	9.7	J	20	3.7	ug/L	10		8260B	Total/NA
Trichloroethene	32		10	4.8	ug/L	10		8260B	Total/NA
Perchlorate	76		10	3.1	ug/L	10		314.0	Total/NA

Client Sample ID: MW-23 (031820)

Lab Sample ID: 680-181809-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	6.0		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	3.9		1.0	0.36	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	20		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	0.94	J	1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	15		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-24 (031820)

Lab Sample ID: 680-181809-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	7.2		1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	0.44		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	160		10	3.1	ug/L	10		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: EB-01 (031820)
Lab Sample ID: 680-181809-10

No Detections.

Client Sample ID: Trip Blank
Lab Sample ID: 680-181809-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.3	J	10	7.0	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-9M (031820)
Date Collected: 03/18/20 09:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 15:36	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 15:36	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 15:36	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 15:36	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 15:36	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 15:36	1
Carbon tetrachloride	**0.79**	**J**	1.0	0.33	ug/L			03/30/20 15:36	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 15:36	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 15:36	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 15:36	1
Chloroform	**0.91**	**J**	1.0	0.50	ug/L			03/30/20 15:36	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 15:36	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 15:36	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
cis-1,2-Dichloroethene	**2.2**		1.0	0.41	ug/L			03/30/20 15:36	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 15:36	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 15:36	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 15:36	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 15:36	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 15:36	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 15:36	1
1,1-Dichloroethane	**16**		1.0	0.38	ug/L			03/30/20 15:36	1
1,2-Dichloroethane	**2.9**		1.0	0.50	ug/L			03/30/20 15:36	1
1,1-Dichloroethene	**63**		1.0	0.36	ug/L			03/30/20 15:36	1
1,2-Dichloroethene, Total	**2.3**		2.0	0.37	ug/L			03/30/20 15:36	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 15:36	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 15:36	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 15:36	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 15:36	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 15:36	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 15:36	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 15:36	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:36	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 15:36	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 15:36	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 15:36	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 15:36	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 15:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-9M (031820)

Date Collected: 03/18/20 09:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 15:36	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 15:36	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 15:36	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 15:36	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
1,1,1-Trichloroethane	**11**		1.0	0.37	ug/L			03/30/20 15:36	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 15:36	1
Trichloroethene	**120**		1.0	0.48	ug/L			03/30/20 15:36	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 15:36	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 15:36	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:36	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 15:36	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 15:36	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 15:36	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 15:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 15:36*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 15:36*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 15:36*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 15:36*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.4**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*82*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:09*	*1*
Terphenyl-d14	*82*			*03/23/20 14:46*	*03/24/20 05:09*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**620**		100	31	ug/L			03/25/20 05:52	100

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-1 (031820)
Date Collected: 03/18/20 13:50
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 11:42	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 11:42	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 11:42	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 11:42	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 11:42	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 11:42	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Chlorobenzene	**1.3**		1.0	0.26	ug/L			03/30/20 11:42	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 11:42	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 11:42	1
Chloroform	**4.6**		1.0	0.50	ug/L			03/30/20 11:42	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 11:42	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 11:42	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
cis-1,2-Dichloroethene	**0.70**	**J**	1.0	0.41	ug/L			03/30/20 11:42	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 11:42	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 11:42	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 11:42	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 11:42	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 11:42	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 11:42	1
1,1-Dichloroethane	**36**		1.0	0.38	ug/L			03/30/20 11:42	1
1,2-Dichloroethane	**0.69**	**J**	1.0	0.50	ug/L			03/30/20 11:42	1
1,1-Dichloroethene	**140**		1.0	0.36	ug/L			03/30/20 11:42	1
1,2-Dichloroethene, Total	**0.70**	**J**	2.0	0.37	ug/L			03/30/20 11:42	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 11:42	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 11:42	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 11:42	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 11:42	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 11:42	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 11:42	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 11:42	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 11:42	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 11:42	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 11:42	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 11:42	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 11:42	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-1 (031820)
Date Collected: 03/18/20 13:50
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 11:42	1
Tetrachloroethene	**0.93**	**J**	1.0	0.74	ug/L			03/30/20 11:42	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 11:42	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 11:42	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Trichloroethene	**9.8**		1.0	0.48	ug/L			03/30/20 11:42	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 11:42	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 11:42	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 11:42	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 11:42	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 11:42	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 11:42	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 11:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 11:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 11:42*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/30/20 11:42*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 11:42*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**250**		5.0	1.9	ug/L			03/31/20 18:43	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/31/20 18:43*	*5*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*		*03/31/20 18:43*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/31/20 18:43*	*5*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*03/31/20 18:43*	*5*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1900**		200	63	ug/L			03/25/20 06:15	200

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-2 (031820)

Lab Sample ID: 680-181809-3

Date Collected: 03/18/20 12:35

Matrix: Water

Date Received: 03/20/20 09:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:05	1
Benzene	**0.47**	**J**	1.0	0.43	ug/L			03/30/20 12:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:05	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:05	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:05	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Chlorobenzene	**62**		1.0	0.26	ug/L			03/30/20 12:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 12:05	1
Chloroform	**2.3**		1.0	0.50	ug/L			03/30/20 12:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 12:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 12:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:05	1
o-Xylene	**0.85**	**J**	1.0	0.23	ug/L			03/30/20 12:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:05	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:05	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-2 (031820)

Date Collected: 03/18/20 12:35
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**1.0**		1.0	0.74	ug/L			03/30/20 12:05	1
Toluene	**0.99**	**J**	1.0	0.48	ug/L			03/30/20 12:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 12:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Trichloroethene	**9.1**		1.0	0.48	ug/L			03/30/20 12:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:05	1
1,2,3-Trichloropropane	**1.1**		1.0	0.39	ug/L			03/30/20 12:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:05	1
Vinyl chloride	**5.6**		1.0	0.50	ug/L			03/30/20 12:05	1
Xylenes, Total	**0.85**	**J**	1.0	0.23	ug/L			03/30/20 12:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 12:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 12:05*	*1*
Dibromofluoromethane (Surr)	*81*		*80 - 122*		*03/30/20 12:05*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*03/30/20 12:05*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	**730**		500	250	ug/L			03/31/20 19:06	100
1,1-Dichloroethane	**4000**		100	38	ug/L			03/31/20 19:06	100
1,1-Dichloroethene	**120**		100	36	ug/L			03/31/20 19:06	100
1,1,1-Trichloroethane	**11000**		100	37	ug/L			03/31/20 19:06	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/31/20 19:06*	*100*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*03/31/20 19:06*	*100*
Dibromofluoromethane (Surr)	*106*		*80 - 122*		*03/31/20 19:06*	*100*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*03/31/20 19:06*	*100*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.3**		1.0	0.40	mg/L			03/26/20 20:34	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**490**		100	31	ug/L			03/25/20 06:38	100

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**2.5**		1.0	0.50	mg/L			03/30/20 13:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-5 (031820)

Lab Sample ID: 680-181809-4

Date Collected: 03/18/20 14:55

Matrix: Water

Date Received: 03/20/20 09:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:29	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:29	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:29	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:29	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:29	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Chlorobenzene	**0.28**	**J**	1.0	0.26	ug/L			03/30/20 12:29	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:29	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 12:29	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:29	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:29	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
cis-1,2-Dichloroethene	**17**		1.0	0.41	ug/L			03/30/20 12:29	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:29	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:29	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:29	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:29	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:29	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:29	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
1,2-Dichloroethene, Total	**17**		2.0	0.37	ug/L			03/30/20 12:29	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:29	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:29	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:29	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:29	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:29	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:29	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:29	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:29	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 12:29	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:29	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:29	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:29	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-5 (031820)
Date Collected: 03/18/20 14:55
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:29	1
Tetrachloroethene	**84**		1.0	0.74	ug/L			03/30/20 12:29	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 12:29	1
trans-1,2-Dichloroethene	**0.37**	**J**	1.0	0.37	ug/L			03/30/20 12:29	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 12:29	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Trichloroethene	**110**		1.0	0.48	ug/L			03/30/20 12:29	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:29	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 12:29	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:29	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:29	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:29	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 12:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 12:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 12:29*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 12:29*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 12:29*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	**3.6**		1.0	0.38	ug/L			03/31/20 15:12	1
1,1-Dichloroethene	**2.5**		1.0	0.36	ug/L			03/31/20 15:12	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/31/20 15:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 15:12*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*03/31/20 15:12*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 122*		*03/31/20 15:12*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*03/31/20 15:12*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		10	3.1	ug/L			03/25/20 07:01	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-10 (031820)
Date Collected: 03/18/20 13:20
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:52	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:52	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:52	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:52	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:52	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 12:52	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:52	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 12:52	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:52	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:52	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
cis-1,2-Dichloroethene	**0.48**	**J**	1.0	0.41	ug/L			03/30/20 12:52	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:52	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:52	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:52	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:52	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:52	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:52	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
1,2-Dichloroethene, Total	**0.48**	**J**	2.0	0.37	ug/L			03/30/20 12:52	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:52	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:52	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:52	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:52	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:52	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:52	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:52	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:52	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 12:52	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:52	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:52	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:52	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1

Client Sample ID: MW-10 (031820)
Date Collected: 03/18/20 13:20
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:52	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 12:52	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 12:52	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 12:52	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Trichloroethene	**4.3**		1.0	0.48	ug/L			03/30/20 12:52	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:52	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 12:52	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:52	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:52	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:52	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 12:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 12:52*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 12:52*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 122*		*03/30/20 12:52*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 12:52*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	**3.2**		1.0	0.38	ug/L			03/31/20 16:45	1
1,1-Dichloroethene	**4.2**		1.0	0.36	ug/L			03/31/20 16:45	1
1,1,1-Trichloroethane	**8.3**		1.0	0.37	ug/L			03/31/20 16:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/31/20 16:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*73 - 131*		*03/31/20 16:45*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 122*		*03/31/20 16:45*	*1*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*		*03/31/20 16:45*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		10	3.1	ug/L			03/25/20 07:24	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-12 (031820)
Date Collected: 03/18/20 14:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 13:15	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 13:15	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:15	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 13:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 13:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 13:15	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 13:15	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 13:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 13:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 13:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 13:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 13:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 13:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 13:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 13:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 13:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 13:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 13:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 13:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 13:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 13:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 13:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 13:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 13:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 13:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 13:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 13:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 13:15	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 13:15	1

Client Sample ID: MW-12 (031820)
Date Collected: 03/18/20 14:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 13:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 13:15	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 13:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
1,1,1-Trichloroethane	**1.0**		1.0	0.37	ug/L			03/30/20 13:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 13:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 13:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 13:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 13:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 13:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 13:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 13:15*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/30/20 13:15*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*03/30/20 13:15*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**18**		1.0	0.40	mg/L			03/26/20 20:46	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**640**		100	31	ug/L			03/25/20 07:47	100

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.4**		1.0	0.50	mg/L			03/30/20 14:49	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-13 (031820)
Date Collected: 03/18/20 11:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 14:10	10
Benzene	<10		10	4.3	ug/L			03/30/20 14:10	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 14:10	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 14:10	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 14:10	10
Bromoform	<10		10	4.3	ug/L			03/30/20 14:10	10
Bromomethane	<50		50	25	ug/L			03/30/20 14:10	10
2-Butanone	<100		100	34	ug/L			03/30/20 14:10	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 14:10	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 14:10	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 14:10	10
Chloroethane	<50		50	25	ug/L			03/30/20 14:10	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L			03/30/20 14:10	10
Chloroform	<10		10	5.0	ug/L			03/30/20 14:10	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 14:10	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 14:10	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 14:10	10
cis-1,2-Dichloroethene	**9.7**	**J**	10	4.1	ug/L			03/30/20 14:10	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 14:10	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 14:10	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 14:10	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 14:10	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 14:10	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 14:10	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 14:10	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 14:10	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 14:10	10
1,1-Dichloroethane	<10		10	3.8	ug/L			03/30/20 14:10	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 14:10	10
1,1-Dichloroethene	<10		10	3.6	ug/L			03/30/20 14:10	10
1,2-Dichloroethene, Total	**9.7**	**J**	20	3.7	ug/L			03/30/20 14:10	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 14:10	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 14:10	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 14:10	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 14:10	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 14:10	10
2-Hexanone	<100		100	20	ug/L			03/30/20 14:10	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 14:10	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 14:10	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 14:10	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 14:10	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 14:10	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 14:10	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 14:10	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 14:10	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 14:10	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 14:10	10
Styrene	<10		10	2.7	ug/L			03/30/20 14:10	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-13 (031820)
Date Collected: 03/18/20 11:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 14:10	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 14:10	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 14:10	10
Toluene	<10		10	4.8	ug/L			03/30/20 14:10	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 14:10	10
trans-1,3-Dichloropropene	<10		10	4.2	ug/L			03/30/20 14:10	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 14:10	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 14:10	10
1,1,1-Trichloroethane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 14:10	10
Trichloroethene	**32**		10	4.8	ug/L			03/30/20 14:10	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 14:10	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 14:10	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 14:10	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 14:10	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 14:10	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 14:10	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 14:10	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 14:10*	*10*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*		*03/30/20 14:10*	*10*
Dibromofluoromethane (Surr)	*101*		*80 - 122*		*03/30/20 14:10*	*10*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/30/20 14:10*	*10*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**76**		10	3.1	ug/L			03/25/20 08:55	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-23 (031820)
Date Collected: 03/18/20 12:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 13:39	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 13:39	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:39	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 13:39	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 13:39	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 13:39	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:39	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 13:39	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 13:39	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 13:39	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 13:39	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 13:39	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 13:39	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 13:39	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 13:39	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 13:39	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 13:39	1
1,1-Dichloroethane	**6.0**		1.0	0.38	ug/L			03/30/20 13:39	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
1,1-Dichloroethene	**3.9**		1.0	0.36	ug/L			03/30/20 13:39	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 13:39	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 13:39	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 13:39	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 13:39	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 13:39	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 13:39	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 13:39	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:39	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 13:39	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 13:39	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 13:39	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 13:39	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 13:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-23 (031820)
Date Collected: 03/18/20 12:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 13:39	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 13:39	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 13:39	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 13:39	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
1,1,1-Trichloroethane	**20**		1.0	0.37	ug/L			03/30/20 13:39	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Trichloroethene	**0.94**	**J**	1.0	0.48	ug/L			03/30/20 13:39	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 13:39	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 13:39	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:39	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 13:39	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 13:39	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 13:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 13:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 13:39*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 13:39*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 13:39*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**15**		1.0	0.31	ug/L			03/24/20 08:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-24 (031820)
Date Collected: 03/18/20 10:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 14:49	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 14:49	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 14:49	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 14:49	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 14:49	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 14:49	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 14:49	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 14:49	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 14:49	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 14:49	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 14:49	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 14:49	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 14:49	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 14:49	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 14:49	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 14:49	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 14:49	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 14:49	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 14:49	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 14:49	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 14:49	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 14:49	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 14:49	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 14:49	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 14:49	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 14:49	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:49	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 14:49	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 14:49	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 14:49	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 14:49	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 14:49	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-24 (031820)

Date Collected: 03/18/20 10:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 14:49	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 14:49	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 14:49	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 14:49	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Trichloroethene	**7.2**		1.0	0.48	ug/L			03/30/20 14:49	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 14:49	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 14:49	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:49	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 14:49	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 14:49	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 14:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 14:49*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 14:49*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 14:49*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 14:49*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**0.44**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*83*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:30*	*1*
Terphenyl-d14	*85*			*03/23/20 14:46*	*03/24/20 05:30*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**160**		10	3.1	ug/L			04/01/20 22:55	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 16:00	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 16:00	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 16:00	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 16:00	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 16:00	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 16:00	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 16:00	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 16:00	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 16:00	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 16:00	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 16:00	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 16:00	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 16:00	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 16:00	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 16:00	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 16:00	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 16:00	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 16:00	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 16:00	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 16:00	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 16:00	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 16:00	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 16:00	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 16:00	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 16:00	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 16:00	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:00	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 16:00	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 16:00	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 16:00	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 16:00	1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 16:00	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 16:00	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 16:00	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 16:00	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 16:00	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:00	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 16:00	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 16:00	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 16:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:00*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:00*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:00*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*84*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:52*	*1*
Terphenyl-d14	*90*			*03/23/20 14:46*	*03/24/20 05:52*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
Acenaphthylene	<9.8		9.8	0.83	ug/L		03/25/20 13:30	03/27/20 19:36	1
Acetophenone	<9.8		9.8	0.56	ug/L		03/25/20 13:30	03/27/20 19:36	1
Anthracene	<9.8		9.8	0.67	ug/L		03/25/20 13:30	03/27/20 19:36	1
Atrazine	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzaldehyde	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[a]anthracene	<9.8		9.8	0.54	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[a]pyrene	<9.8		9.8	0.69	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[b]fluoranthene	<9.8		9.8	2.5	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[g,h,i]perylene	<9.8		9.8	0.85	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[k]fluoranthene	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,1'-Biphenyl	<9.8		9.8	0.57	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-chloroethoxy)methane	<9.8		9.8	0.92	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-chloroethyl)ether	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
bis (2-chloroisopropyl) ether	<9.8		9.8	0.76	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-ethylhexyl) phthalate	<9.8		9.8	1.6	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Bromophenyl phenyl ether	<9.8		9.8	0.75	ug/L		03/25/20 13:30	03/27/20 19:36	1
Butyl benzyl phthalate	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
Caprolactam	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
Carbazole	<9.8		9.8	0.69	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chloroaniline	<20		20	2.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chloro-3-methylphenol	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Chloronaphthalene	<9.8		9.8	0.78	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Chlorophenol	<9.8		9.8	0.85	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chlorophenyl phenyl ether	<9.8		9.8	0.82	ug/L		03/25/20 13:30	03/27/20 19:36	1
Chrysene	<9.8		9.8	0.50	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dibenz(a,h)anthracene	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dibenzofuran	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,2-Dichlorobenzene	<9.8		9.8	0.52	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,3-Dichlorobenzene	<9.8		9.8	0.58	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,4-Dichlorobenzene	<9.8		9.8	0.53	ug/L		03/25/20 13:30	03/27/20 19:36	1
3,3'-Dichlorobenzidine	<59		59	29	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dichlorophenol	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Diethyl phthalate	<9.8		9.8	0.86	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dimethylphenol	<9.8		9.8	3.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dimethyl phthalate	<9.8		9.8	0.97	ug/L		03/25/20 13:30	03/27/20 19:36	1
Di-n-butyl phthalate	<9.8		9.8	0.81	ug/L		03/25/20 13:30	03/27/20 19:36	1
4,6-Dinitro-2-methylphenol	<49		49	9.8	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dinitrophenol	<49		49	9.8	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dinitrotoluene	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,6-Dinitrotoluene	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Di-n-octyl phthalate	<9.8		9.8	1.4	ug/L		03/25/20 13:30	03/27/20 19:36	1
Fluoranthene	<9.8		9.8	0.72	ug/L		03/25/20 13:30	03/27/20 19:36	1
Fluorene	<9.8		9.8	0.94	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorobenzene	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorobutadiene	<9.8		9.8	0.60	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorocyclopentadiene	<9.8		9.8	2.4	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachloroethane	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
Indeno[1,2,3-cd]pyrene	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
Isophorone	<9.8		9.8	0.88	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Methylnaphthalene	<9.8		9.8	0.76	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Methylphenol	<9.8		9.8	0.87	ug/L		03/25/20 13:30	03/27/20 19:36	1
3 & 4 Methylphenol	<9.8		9.8	1.3	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Nitroaniline	<49		49	1.3	ug/L		03/25/20 13:30	03/27/20 19:36	1
3-Nitroaniline	<49		49	4.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Nitroaniline	<49		49	4.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
Nitrobenzene	<9.8		9.8	0.71	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Nitrophenol	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Nitrophenol	<49		49	1.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
N-Nitrosodi-n-propylamine	<9.8		9.8	0.70	ug/L		03/25/20 13:30	03/27/20 19:36	1
N-Nitrosodiphenylamine	<9.8		9.8	0.90	ug/L		03/25/20 13:30	03/27/20 19:36	1
Pentachlorophenol	<49		49	2.0	ug/L		03/25/20 13:30	03/27/20 19:36	1
Phenanthrene	<9.8		9.8	0.75	ug/L		03/25/20 13:30	03/27/20 19:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	<9.8		9.8	0.81	ug/L		03/25/20 13:30	03/27/20 19:36	1
Pyrene	<9.8		9.8	0.61	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,2,4-Trichlorobenzene	<9.8		9.8	0.55	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4,5-Trichlorophenol	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4,6-Trichlorophenol	<9.8		9.8	0.83	ug/L		03/25/20 13:30	03/27/20 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*79*		*32 - 113*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
2-Fluorophenol	*69*		*26 - 109*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Nitrobenzene-d5	*74*		*32 - 118*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Phenol-d5	*72*		*27 - 110*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Terphenyl-d14	*83*		*10 - 126*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
2,4,6-Tribromophenol	*86*		*39 - 124*	*03/25/20 13:30*	*03/27/20 19:36*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			03/26/20 20:59	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/24/20 10:20	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 19:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: Trip Blank
Date Collected: 03/18/20 00:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-11
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.3	J	10	7.0	ug/L			03/30/20 14:57	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 14:57	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 14:57	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 14:57	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 14:57	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 14:57	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 14:57	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 14:57	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 14:57	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 14:57	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 14:57	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 14:57	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 14:57	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 14:57	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 14:57	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 14:57	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 14:57	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 14:57	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 14:57	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 14:57	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 14:57	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 14:57	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 14:57	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 14:57	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:57	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 14:57	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 14:57	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 14:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: Trip Blank
Date Collected: 03/18/20 00:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 14:57	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 14:57	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 14:57	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:57	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 14:57	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 14:57	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 14:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/30/20 14:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*03/30/20 14:57*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 122*		*03/30/20 14:57*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*03/30/20 14:57*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181809-1	GM-9M (031820)	105	107	108	96
680-181809-2	MW-1 (031820)	105	105	107	95
680-181809-2 - DL	MW-1 (031820)	106	101	107	103
680-181809-3	MW-2 (031820)	107	104	81	97
680-181809-3 - DL	MW-2 (031820)	108	100	106	101
680-181809-4	MW-5 (031820)	104	104	108	96
680-181809-4 - RA	MW-5 (031820)	107	97	104	105
680-181809-5	MW-10 (031820)	105	106	109	95
680-181809-5 - RA	MW-10 (031820)	106	99	104	107
680-181809-6	MW-12 (031820)	105	106	107	97
680-181809-7	MW-13 (031820)	104	101	101	98
680-181809-8	MW-23 (031820)	104	105	108	95
680-181809-9	GM-24 (031820)	105	107	108	95
680-181809-10	EB-01 (031820)	105	107	108	95
680-181809-11	Trip Blank	108	96	97	102
LCS 680-613134/4	Lab Control Sample	107	108	110	101
LCS 680-613140/4	Lab Control Sample	110	106	111	106
LCS 680-613341/1002	Lab Control Sample	104	111	117	104
LCSD 680-613134/5	Lab Control Sample Dup	107	106	108	100
LCSD 680-613140/5	Lab Control Sample Dup	113	109	113	107
LCSD 680-613341/4	Lab Control Sample Dup	103	115	116	102
MB 680-613134/10	Method Blank	106	97	100	100
MB 680-613140/10	Method Blank	106	104	108	94
MB 680-613341/9	Method Blank	107	96	105	105

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	NBZ	PHL	TPHL	TBP
Lab Sample ID	Client Sample ID	(32-113)	(26-109)	(32-118)	(27-110)	(10-126)	(39-124)
680-181809-10	EB-01 (031820)	79	69	74	72	83	86
LCS 680-612480/18-A	Lab Control Sample	83	68	73	72	100	92
MB 680-612480/17-A	Method Blank	83	75	83	76	95	89

Surrogate Legend

FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPHL = Terphenyl-d14
TBP = 2,4,6-Tribromophenol

Surrogate Summary

Client: ARCADIS U.S., Inc. Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		NBZ	TPHL								
Lab Sample ID	Client Sample ID	(41-144)									
680-181809-1	GM-9M (031820)	82	82								
680-181809-9	GM-24 (031820)	83	85								
680-181809-10	EB-01 (031820)	84	90								
LCS 460-683060/2-A	Lab Control Sample	69	71								
LCSD 460-683060/3-A	Lab Control Sample Dup	79	76								
MB 460-683060/1-A	Method Blank	74	80								

Surrogate Legend

NBZ = Nitrobenzene-d5

TPHL = Terphenyl-d14

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613134/10
Matrix: Water
Analysis Batch: 613134

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 10:40	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 10:40	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 10:40	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 10:40	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 10:40	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 10:40	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 10:40	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 10:40	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 10:40	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 10:40	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 10:40	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 10:40	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 10:40	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 10:40	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 10:40	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 10:40	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 10:40	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 10:40	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 10:40	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 10:40	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 10:40	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 10:40	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 10:40	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 10:40	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 10:40	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 10:40	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 10:40	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 10:40	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 10:40	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 10:40	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 10:40	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 10:40	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 10:40	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 10:40	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 10:40	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 10:40	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 10:40	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 10:40	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 10:40	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:40	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 10:40	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 10:40	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 10:40	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 10:40	1

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

Lab Sample ID: MB 680-613134/10
Matrix: Water
Analysis Batch: 613134

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 10:40	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 10:40	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:40	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 10:40	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 10:40	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 10:40	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 10:40	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 10:40	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:40	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:40	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 10:40	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 10:40	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 10:40	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 10:40	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:40	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 10:40	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 10:40	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 10:40	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 10:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/30/20 10:40*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*03/30/20 10:40*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*03/30/20 10:40*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*03/30/20 10:40*	*1*

Lab Sample ID: LCS 680-613134/4
Matrix: Water
Analysis Batch: 613134

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	298		ug/L		119	70 - 135
Benzene	50.0	55.3		ug/L		111	80 - 120
Bromobenzene	50.0	51.4		ug/L		103	80 - 121
Bromochloromethane	50.0	55.9		ug/L		112	80 - 120
Bromodichloromethane	50.0	55.9		ug/L		112	80 - 120
Bromoform	50.0	54.0		ug/L		108	74 - 126
Bromomethane	50.1	54.1		ug/L		108	62 - 130
2-Butanone	250	288		ug/L		115	80 - 131
Carbon disulfide	50.0	53.8		ug/L		108	80 - 120
Carbon tetrachloride	50.0	54.4		ug/L		109	76 - 123
Chlorobenzene	50.0	51.0		ug/L		102	80 - 120
Chloroethane	50.0	49.9		ug/L		100	66 - 135
2-Chloroethyl vinyl ether	50.0	56.1		ug/L		112	71 - 135
Chloroform	50.0	54.1		ug/L		108	80 - 120
Chloromethane	50.0	52.3		ug/L		105	69 - 131
2-Chlorotoluene	50.0	52.1		ug/L		104	80 - 120

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

Lab Sample ID: LCS 680-613134/4
Matrix: Water
Analysis Batch: 613134

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	53.1		ug/L		106	80 - 120
cis-1,2-Dichloroethene	50.0	56.2		ug/L		112	80 - 120
cis-1,3-Dichloropropene	50.0	57.2		ug/L		114	80 - 120
Dibromochloromethane	50.0	54.9		ug/L		110	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	53.7		ug/L		107	71 - 134
1,2-Dibromoethane	50.0	56.1		ug/L		112	80 - 120
Dibromomethane	50.0	55.7		ug/L		111	80 - 120
1,2-Dichlorobenzene	50.0	50.6		ug/L		101	80 - 120
1,3-Dichlorobenzene	50.0	51.1		ug/L		102	80 - 120
1,4-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120
Dichlorodifluoromethane	50.1	50.1		ug/L		100	47 - 155
1,1-Dichloroethane	50.0	53.3		ug/L		107	80 - 120
1,2-Dichloroethane	50.0	54.8		ug/L		110	80 - 120
1,1-Dichloroethene	50.0	55.1		ug/L		110	76 - 120
1,2-Dichloroethene, Total	100	112		ug/L		112	80 - 120
1,2-Dichloropropane	50.0	55.6		ug/L		111	80 - 120
1,3-Dichloropropane	50.0	56.3		ug/L		113	80 - 120
2,2-Dichloropropane	50.0	57.9		ug/L		116	76 - 126
1,1-Dichloropropene	50.0	55.9		ug/L		112	80 - 120
Ethylbenzene	50.0	52.9		ug/L		106	80 - 120
Hexachlorobutadiene	50.0	52.4		ug/L		105	60 - 140
2-Hexanone	250	298		ug/L		119	74 - 127
Isopropylbenzene	50.0	52.9		ug/L		106	80 - 120
Methylene Chloride	50.0	49.2		ug/L		98	80 - 120
4-Methyl-2-pentanone	250	294		ug/L		117	76 - 124
Methyl tert-butyl ether	50.0	53.5		ug/L		107	80 - 120
m-Xylene & p-Xylene	50.0	52.8		ug/L		106	80 - 120
n-Butylbenzene	50.0	54.6		ug/L		109	80 - 120
N-Propylbenzene	50.0	53.5		ug/L		107	80 - 120
o-Xylene	50.0	52.0		ug/L		104	80 - 120
p-Isopropyltoluene	50.0	52.2		ug/L		104	80 - 120
sec-Butylbenzene	50.0	52.5		ug/L		105	80 - 120
Styrene	50.0	55.5		ug/L		111	80 - 120
tert-Butylbenzene	50.0	51.3		ug/L		103	80 - 121
1,1,1,2-Tetrachloroethane	50.0	52.0		ug/L		104	80 - 121
1,1,2,2-Tetrachloroethane	50.0	52.5		ug/L		105	80 - 120
Tetrachloroethene	50.0	53.4		ug/L		107	80 - 121
Toluene	50.0	54.4		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	55.5		ug/L		111	80 - 120
trans-1,3-Dichloropropene	50.0	58.5		ug/L		117	80 - 120
1,2,3-Trichlorobenzene	50.0	52.4		ug/L		105	61 - 141
1,2,4-Trichlorobenzene	50.0	52.7		ug/L		105	68 - 128
1,1,1-Trichloroethane	50.0	54.0		ug/L		108	80 - 120
1,1,2-Trichloroethane	50.0	54.6		ug/L		109	80 - 120
Trichloroethene	50.0	55.4		ug/L		111	80 - 120
Trichlorofluoromethane	50.0	55.0		ug/L		110	60 - 141
1,2,3-Trichloropropane	50.0	52.1		ug/L		104	80 - 123
1,2,4-Trimethylbenzene	50.0	51.5		ug/L		103	80 - 120
1,3,5-Trimethylbenzene	50.0	51.7		ug/L		103	80 - 120

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

Lab Sample ID: LCS 680-613134/4
Matrix: Water
Analysis Batch: 613134

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	132		ug/L		132	67 - 135
Vinyl chloride	50.1	55.1		ug/L		110	71 - 128
Xylenes, Total	100	105		ug/L		105	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*107*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*

Lab Sample ID: LCSD 680-613134/5
Matrix: Water
Analysis Batch: 613134

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
Acetone	250	301		ug/L		120	70 - 135	1	30
Benzene	50.0	53.9		ug/L		108	80 - 120	3	20
Bromobenzene	50.0	51.4		ug/L		103	80 - 121	0	20
Bromochloromethane	50.0	54.1		ug/L		108	80 - 120	3	20
Bromodichloromethane	50.0	53.4		ug/L		107	80 - 120	4	20
Bromoform	50.0	52.8		ug/L		106	74 - 126	2	20
Bromomethane	50.1	53.8		ug/L		107	62 - 130	1	20
2-Butanone	250	284		ug/L		114	80 - 131	1	20
Carbon disulfide	50.0	53.7		ug/L		107	80 - 120	0	20
Carbon tetrachloride	50.0	54.2		ug/L		108	76 - 123	1	20
Chlorobenzene	50.0	50.8		ug/L		102	80 - 120	0	20
Chloroethane	50.0	51.1		ug/L		102	66 - 135	2	20
2-Chloroethyl vinyl ether	50.0	54.9		ug/L		110	71 - 135	2	50
Chloroform	50.0	52.9		ug/L		106	80 - 120	2	20
Chloromethane	50.0	50.8		ug/L		102	69 - 131	3	30
2-Chlorotoluene	50.0	52.0		ug/L		104	80 - 120	0	20
4-Chlorotoluene	50.0	52.8		ug/L		106	80 - 120	1	20
cis-1,2-Dichloroethene	50.0	55.7		ug/L		111	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	55.0		ug/L		110	80 - 120	4	20
Dibromochloromethane	50.0	52.6		ug/L		105	80 - 121	4	20
1,2-Dibromo-3-Chloropropane	50.0	53.2		ug/L		106	71 - 134	1	20
1,2-Dibromoethane	50.0	54.4		ug/L		109	80 - 120	3	20
Dibromomethane	50.0	53.5		ug/L		107	80 - 120	4	20
1,2-Dichlorobenzene	50.0	50.1		ug/L		100	80 - 120	1	20
1,3-Dichlorobenzene	50.0	50.5		ug/L		101	80 - 120	1	20
1,4-Dichlorobenzene	50.0	48.6		ug/L		97	80 - 120	1	20
Dichlorodifluoromethane	50.1	51.0		ug/L		102	47 - 155	2	40
1,1-Dichloroethane	50.0	52.7		ug/L		105	80 - 120	1	20
1,2-Dichloroethane	50.0	52.9		ug/L		106	80 - 120	4	50
1,1-Dichloroethene	50.0	55.6		ug/L		111	76 - 120	1	20
1,2-Dichloroethene, Total	100	111		ug/L		111	80 - 120	0	20
1,2-Dichloropropane	50.0	54.2		ug/L		108	80 - 120	3	20
1,3-Dichloropropane	50.0	54.1		ug/L		108	80 - 120	4	20

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

Lab Sample ID: LCSD 680-613134/5
Matrix: Water
Analysis Batch: 613134

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
2,2-Dichloropropane	50.0	57.3		ug/L		115	76 - 126	1	20
1,1-Dichloropropene	50.0	55.8		ug/L		112	80 - 120	0	20
Ethylbenzene	50.0	53.2		ug/L		106	80 - 120	0	20
Hexachlorobutadiene	50.0	55.1		ug/L		110	60 - 140	5	20
2-Hexanone	250	288		ug/L		115	74 - 127	3	20
Isopropylbenzene	50.0	53.9		ug/L		108	80 - 120	2	20
Methylene Chloride	50.0	48.1		ug/L		96	80 - 120	2	20
4-Methyl-2-pentanone	250	286		ug/L		115	76 - 124	3	20
Methyl tert-butyl ether	50.0	52.4		ug/L		105	80 - 120	2	20
m-Xylene & p-Xylene	50.0	54.0		ug/L		108	80 - 120	2	20
n-Butylbenzene	50.0	55.5		ug/L		111	80 - 120	2	20
N-Propylbenzene	50.0	54.4		ug/L		109	80 - 120	2	20
o-Xylene	50.0	51.9		ug/L		104	80 - 120	0	30
p-Isopropyltoluene	50.0	52.8		ug/L		106	80 - 120	1	20
sec-Butylbenzene	50.0	53.8		ug/L		108	80 - 120	2	20
Styrene	50.0	54.9		ug/L		110	80 - 120	1	20
tert-Butylbenzene	50.0	52.7		ug/L		105	80 - 121	3	20
1,1,1,2-Tetrachloroethane	50.0	51.8		ug/L		104	80 - 121	0	20
1,1,2,2-Tetrachloroethane	50.0	51.0		ug/L		102	80 - 120	3	20
Tetrachloroethene	50.0	54.4		ug/L		109	80 - 121	2	20
Toluene	50.0	53.3		ug/L		107	80 - 113	2	20
trans-1,2-Dichloroethene	50.0	55.4		ug/L		111	80 - 120	0	20
trans-1,3-Dichloropropene	50.0	56.4		ug/L		113	80 - 120	4	30
1,2,3-Trichlorobenzene	50.0	52.4		ug/L		105	61 - 141	0	20
1,2,4-Trichlorobenzene	50.0	53.8		ug/L		108	68 - 128	2	20
1,1,1-Trichloroethane	50.0	53.8		ug/L		108	80 - 120	1	20
1,1,2-Trichloroethane	50.0	52.8		ug/L		106	80 - 120	3	20
Trichloroethene	50.0	54.3		ug/L		109	80 - 120	2	20
Trichlorofluoromethane	50.0	56.2		ug/L		112	60 - 141	2	20
1,2,3-Trichloropropane	50.0	51.3		ug/L		103	80 - 123	2	30
1,2,4-Trimethylbenzene	50.0	51.7		ug/L		103	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	52.2		ug/L		104	80 - 120	1	20
Vinyl acetate	100	128		ug/L		128	67 - 135	3	20
Vinyl chloride	50.1	55.6		ug/L		111	71 - 128	1	20
Xylenes, Total	100	106		ug/L		106	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*107*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*
Dibromofluoromethane (Surr)	*108*		*80 - 122*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 10:55	1

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

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 10:55	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 10:55	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 10:55	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 10:55	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 10:55	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 10:55	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 10:55	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 10:55	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 10:55	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 10:55	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 10:55	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 10:55	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 10:55	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 10:55	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 10:55	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 10:55	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 10:55	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 10:55	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 10:55	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 10:55	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 10:55	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 10:55	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 10:55	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:55	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 10:55	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 10:55	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 10:55	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1

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

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 10:55	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 10:55	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 10:55	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:55	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 10:55	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 10:55	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 10:55	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/30/20 10:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 10:55*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 10:55*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 10:55*	*1*

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	261		ug/L		104	70 - 135
Benzene	50.0	53.3		ug/L		107	80 - 120
Bromobenzene	50.0	55.0		ug/L		110	80 - 121
Bromochloromethane	50.0	54.4		ug/L		109	80 - 120
Bromodichloromethane	50.0	56.1		ug/L		112	80 - 120
Bromoform	50.0	60.0		ug/L		120	74 - 126
Bromomethane	50.0	110	E *	ug/L		221	62 - 130
2-Butanone	250	271		ug/L		108	80 - 131
Carbon disulfide	50.0	52.3		ug/L		105	80 - 120
Carbon tetrachloride	50.0	54.2		ug/L		108	76 - 123
Chlorobenzene	50.0	54.0		ug/L		108	80 - 120
Chloroethane	50.0	69.5	*	ug/L		139	66 - 135
2-Chloroethyl vinyl ether	50.0	57.3		ug/L		115	71 - 135
Chloroform	50.0	53.9		ug/L		108	80 - 120
Chloromethane	50.0	50.1		ug/L		100	69 - 131
2-Chlorotoluene	50.0	54.3		ug/L		109	80 - 120
4-Chlorotoluene	50.0	54.1		ug/L		108	80 - 120
cis-1,2-Dichloroethene	50.0	54.0		ug/L		108	80 - 120

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

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	58.0		ug/L		116	80 - 120
Dibromochloromethane	50.0	58.2		ug/L		116	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	56.0		ug/L		112	71 - 134
1,2-Dibromoethane	50.0	56.8		ug/L		114	80 - 120
Dibromomethane	50.0	54.2		ug/L		108	80 - 120
1,2-Dichlorobenzene	50.0	54.0		ug/L		108	80 - 120
1,3-Dichlorobenzene	50.0	53.7		ug/L		107	80 - 120
1,4-Dichlorobenzene	50.0	52.6		ug/L		105	80 - 120
Dichlorodifluoromethane	50.0	51.7		ug/L		103	47 - 155
1,1-Dichloroethane	50.0	53.2		ug/L		106	80 - 120
1,2-Dichloroethane	50.0	53.9		ug/L		108	80 - 120
1,1-Dichloroethene	50.0	51.9		ug/L		104	76 - 120
1,2-Dichloroethene, Total	100	108		ug/L		108	80 - 120
1,2-Dichloropropane	50.0	54.9		ug/L		110	80 - 120
1,3-Dichloropropane	50.0	55.0		ug/L		110	80 - 120
2,2-Dichloropropane	50.0	59.0		ug/L		118	76 - 126
1,1-Dichloropropene	50.0	54.3		ug/L		109	80 - 120
Ethylbenzene	50.0	54.6		ug/L		109	80 - 120
Hexachlorobutadiene	50.0	55.8		ug/L		112	60 - 140
2-Hexanone	250	273		ug/L		109	74 - 127
Isopropylbenzene	50.0	55.2		ug/L		110	80 - 120
Methylene Chloride	50.0	49.0		ug/L		98	80 - 120
4-Methyl-2-pentanone	250	271		ug/L		108	76 - 124
Methyl tert-butyl ether	50.0	54.3		ug/L		109	80 - 120
m-Xylene & p-Xylene	50.0	54.7		ug/L		109	80 - 120
n-Butylbenzene	50.0	52.8		ug/L		106	80 - 120
N-Propylbenzene	50.0	54.6		ug/L		109	80 - 120
o-Xylene	50.0	55.2		ug/L		110	80 - 120
p-Isopropyltoluene	50.0	53.9		ug/L		108	80 - 120
sec-Butylbenzene	50.0	54.4		ug/L		109	80 - 120
Styrene	50.0	57.2		ug/L		114	80 - 120
tert-Butylbenzene	50.0	54.6		ug/L		109	80 - 121
1,1,1,2-Tetrachloroethane	50.0	56.4		ug/L		113	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.6		ug/L		111	80 - 120
Tetrachloroethene	50.0	55.4		ug/L		111	80 - 121
Toluene	50.0	54.6		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	53.7		ug/L		107	80 - 120
trans-1,3-Dichloropropene	50.0	58.5		ug/L		117	80 - 120
1,2,3-Trichlorobenzene	50.0	58.1		ug/L		116	61 - 141
1,2,4-Trichlorobenzene	50.0	58.6		ug/L		117	68 - 128
1,1,1-Trichloroethane	50.0	53.9		ug/L		108	80 - 120
1,1,2-Trichloroethane	50.0	55.8		ug/L		112	80 - 120
Trichloroethene	50.0	54.4		ug/L		109	80 - 120
Trichlorofluoromethane	50.0	52.5		ug/L		105	60 - 141
1,2,3-Trichloropropane	50.0	53.9		ug/L		108	80 - 123
1,2,4-Trimethylbenzene	50.0	56.2		ug/L		112	80 - 120
1,3,5-Trimethylbenzene	50.0	55.6		ug/L		111	80 - 120
Vinyl acetate	100	121		ug/L		121	67 - 135
Vinyl chloride	50.0	49.7		ug/L		99	71 - 128

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

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	110		ug/L		110	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*
Dibromofluoromethane (Surr)	*111*		*80 - 122*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*

Lab Sample ID: LCSD 680-613140/5
Matrix: Water
Analysis Batch: 613140

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
Acetone			250	267		ug/L		107	70 - 135	2	30
Benzene			50.0	55.1		ug/L		110	80 - 120	3	20
Bromobenzene			50.0	56.0		ug/L		112	80 - 121	2	20
Bromochloromethane			50.0	56.1		ug/L		112	80 - 120	3	20
Bromodichloromethane			50.0	58.1		ug/L		116	80 - 120	4	20
Bromoform			50.0	60.1		ug/L		120	74 - 126	0	20
Bromomethane			50.0	117	E *	ug/L		234	62 - 130	6	20
2-Butanone			250	283		ug/L		113	80 - 131	5	20
Carbon disulfide			50.0	53.7		ug/L		107	80 - 120	3	20
Carbon tetrachloride			50.0	55.6		ug/L		111	76 - 123	3	20
Chlorobenzene			50.0	55.3		ug/L		111	80 - 120	2	20
Chloroethane			50.0	71.4	*	ug/L		143	66 - 135	3	20
2-Chloroethyl vinyl ether			50.0	59.2		ug/L		118	71 - 135	3	50
Chloroform			50.0	55.4		ug/L		111	80 - 120	3	20
Chloromethane			50.0	50.6		ug/L		101	69 - 131	1	30
2-Chlorotoluene			50.0	54.9		ug/L		110	80 - 120	1	20
4-Chlorotoluene			50.0	54.7		ug/L		109	80 - 120	1	20
cis-1,2-Dichloroethene			50.0	55.5		ug/L		111	80 - 120	3	20
cis-1,3-Dichloropropene			50.0	59.6		ug/L		119	80 - 120	3	20
Dibromochloromethane			50.0	60.6		ug/L		121	80 - 121	4	20
1,2-Dibromo-3-Chloropropane			50.0	56.4		ug/L		113	71 - 134	1	20
1,2-Dibromoethane			50.0	58.8		ug/L		118	80 - 120	3	20
Dibromomethane			50.0	56.6		ug/L		113	80 - 120	4	20
1,2-Dichlorobenzene			50.0	54.4		ug/L		109	80 - 120	1	20
1,3-Dichlorobenzene			50.0	54.1		ug/L		108	80 - 120	1	20
1,4-Dichlorobenzene			50.0	52.7		ug/L		105	80 - 120	0	20
Dichlorodifluoromethane			50.0	52.7		ug/L		105	47 - 155	2	40
1,1-Dichloroethane			50.0	55.0		ug/L		110	80 - 120	3	20
1,2-Dichloroethane			50.0	55.8		ug/L		112	80 - 120	3	50
1,1-Dichloroethene			50.0	53.8		ug/L		108	76 - 120	4	20
1,2-Dichloroethene, Total			100	111		ug/L		111	80 - 120	3	20
1,2-Dichloropropane			50.0	56.6		ug/L		113	80 - 120	3	20
1,3-Dichloropropane			50.0	57.0		ug/L		114	80 - 120	4	20
2,2-Dichloropropane			50.0	59.5		ug/L		119	76 - 126	1	20
1,1-Dichloropropene			50.0	55.7		ug/L		111	80 - 120	3	20

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

Lab Sample ID: LCSD 680-613140/5
Matrix: Water
Analysis Batch: 613140

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
Ethylbenzene	50.0	55.3		ug/L		111	80 - 120	1	20
Hexachlorobutadiene	50.0	58.2		ug/L		116	60 - 140	4	20
2-Hexanone	250	282		ug/L		113	74 - 127	3	20
Isopropylbenzene	50.0	56.1		ug/L		112	80 - 120	2	20
Methylene Chloride	50.0	50.9		ug/L		102	80 - 120	4	20
4-Methyl-2-pentanone	250	280		ug/L		112	76 - 124	3	20
Methyl tert-butyl ether	50.0	56.3		ug/L		113	80 - 120	4	20
m-Xylene & p-Xylene	50.0	55.5		ug/L		111	80 - 120	1	20
n-Butylbenzene	50.0	54.1		ug/L		108	80 - 120	2	20
N-Propylbenzene	50.0	55.6		ug/L		111	80 - 120	2	20
o-Xylene	50.0	56.0		ug/L		112	80 - 120	1	30
p-Isopropyltoluene	50.0	54.8		ug/L		110	80 - 120	2	20
sec-Butylbenzene	50.0	55.1		ug/L		110	80 - 120	1	20
Styrene	50.0	58.1		ug/L		116	80 - 120	2	20
tert-Butylbenzene	50.0	55.5		ug/L		111	80 - 121	2	20
1,1,1,2-Tetrachloroethane	50.0	57.2		ug/L		114	80 - 121	1	20
1,1,2,2-Tetrachloroethane	50.0	55.6		ug/L		111	80 - 120	0	20
Tetrachloroethene	50.0	56.4		ug/L		113	80 - 121	2	20
Toluene	50.0	56.3		ug/L		113	80 - 113	3	20
trans-1,2-Dichloroethene	50.0	55.8		ug/L		112	80 - 120	4	20
trans-1,3-Dichloropropene	50.0	60.3	*	ug/L		121	80 - 120	3	30
1,2,3-Trichlorobenzene	50.0	60.0		ug/L		120	61 - 141	3	20
1,2,4-Trichlorobenzene	50.0	58.7		ug/L		117	68 - 128	0	20
1,1,1-Trichloroethane	50.0	55.4		ug/L		111	80 - 120	3	20
1,1,2-Trichloroethane	50.0	57.6		ug/L		115	80 - 120	3	20
Trichloroethene	50.0	56.2		ug/L		112	80 - 120	3	20
Trichlorofluoromethane	50.0	53.4		ug/L		107	60 - 141	2	20
1,2,3-Trichloropropane	50.0	54.8		ug/L		110	80 - 123	2	30
1,2,4-Trimethylbenzene	50.0	57.1		ug/L		114	80 - 120	2	20
1,3,5-Trimethylbenzene	50.0	56.7		ug/L		113	80 - 120	2	20
Vinyl acetate	100	125		ug/L		125	67 - 135	3	20
Vinyl chloride	50.0	50.4		ug/L		101	71 - 128	1	20
Xylenes, Total	100	112		ug/L		112	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*113*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*113*		*80 - 122*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/31/20 13:14	1
Benzene	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1

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

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/31/20 13:14	1
Bromoform	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Butanone	<10		10	3.4	ug/L			03/31/20 13:14	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/31/20 13:14	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/31/20 13:14	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/31/20 13:14	1
Chloroform	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/31/20 13:14	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/31/20 13:14	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/31/20 13:14	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/31/20 13:14	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/31/20 13:14	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/31/20 13:14	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/31/20 13:14	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/31/20 13:14	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/31/20 13:14	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/31/20 13:14	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/31/20 13:14	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/31/20 13:14	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/31/20 13:14	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/31/20 13:14	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/31/20 13:14	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Hexanone	<10		10	2.0	ug/L			03/31/20 13:14	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/31/20 13:14	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/31/20 13:14	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/31/20 13:14	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/31/20 13:14	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/31/20 13:14	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
Styrene	<1.0		1.0	0.27	ug/L			03/31/20 13:14	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/31/20 13:14	1

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

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/31/20 13:14	1
Toluene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/31/20 13:14	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/31/20 13:14	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/31/20 13:14	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/31/20 13:14	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/31/20 13:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 13:14*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*03/31/20 13:14*	*1*
Dibromofluoromethane (Surr)	*105*		*80 - 122*		*03/31/20 13:14*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*03/31/20 13:14*	*1*

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	284		ug/L		114	70 - 135
Benzene	50.0	55.8		ug/L		112	80 - 120
Bromobenzene	50.0	51.3		ug/L		103	80 - 121
Bromochloromethane	50.0	56.5		ug/L		113	80 - 120
Bromodichloromethane	50.0	56.8		ug/L		114	80 - 120
Bromoform	50.0	51.8		ug/L		104	74 - 126
Bromomethane	50.0	55.2		ug/L		110	62 - 130
2-Butanone	250	278		ug/L		111	80 - 131
Carbon disulfide	50.0	55.7		ug/L		111	80 - 120
Carbon tetrachloride	50.0	54.5		ug/L		109	76 - 123
Chlorobenzene	50.0	52.4		ug/L		105	80 - 120
Chloroethane	50.0	63.3		ug/L		127	66 - 135
2-Chloroethyl vinyl ether	50.0	61.7		ug/L		123	71 - 135
Chloroform	50.0	57.7		ug/L		115	80 - 120
Chloromethane	50.0	69.4	*	ug/L		139	69 - 131
2-Chlorotoluene	50.0	50.7		ug/L		101	80 - 120
4-Chlorotoluene	50.0	51.1		ug/L		102	80 - 120
cis-1,2-Dichloroethene	50.0	60.6	*	ug/L		121	80 - 120
cis-1,3-Dichloropropene	50.0	61.3	*	ug/L		123	80 - 120
Dibromochloromethane	50.0	53.3		ug/L		107	80 - 121

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

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromo-3-Chloropropane	50.0	53.2		ug/L		106	71 - 134
1,2-Dibromoethane	50.0	55.1		ug/L		110	80 - 120
Dibromomethane	50.0	57.2		ug/L		114	80 - 120
1,2-Dichlorobenzene	50.0	50.4		ug/L		101	80 - 120
1,3-Dichlorobenzene	50.0	49.7		ug/L		99	80 - 120
1,4-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120
Dichlorodifluoromethane	50.0	64.5		ug/L		129	47 - 155
1,1-Dichloroethane	50.0	59.6		ug/L		119	80 - 120
1,2-Dichloroethane	50.0	61.0	*	ug/L		122	80 - 120
1,1-Dichloroethene	50.0	58.6		ug/L		117	76 - 120
1,2-Dichloroethene, Total	100	121	*	ug/L		121	80 - 120
1,2-Dichloropropane	50.0	58.7		ug/L		117	80 - 120
1,3-Dichloropropane	50.0	56.3		ug/L		113	80 - 120
2,2-Dichloropropane	50.0	72.3	*	ug/L		145	76 - 126
1,1-Dichloropropene	50.0	56.1		ug/L		112	80 - 120
Ethylbenzene	50.0	51.7		ug/L		103	80 - 120
Hexachlorobutadiene	50.0	46.1		ug/L		92	60 - 140
2-Hexanone	250	271		ug/L		108	74 - 127
Isopropylbenzene	50.0	50.1		ug/L		100	80 - 120
Methylene Chloride	50.0	55.2		ug/L		110	80 - 120
4-Methyl-2-pentanone	250	275		ug/L		110	76 - 124
Methyl tert-butyl ether	50.0	58.1		ug/L		116	80 - 120
m-Xylene & p-Xylene	50.0	50.7		ug/L		101	80 - 120
n-Butylbenzene	50.0	51.9		ug/L		104	80 - 120
N-Propylbenzene	50.0	50.6		ug/L		101	80 - 120
o-Xylene	50.0	52.4		ug/L		105	80 - 120
p-Isopropyltoluene	50.0	49.5		ug/L		99	80 - 120
sec-Butylbenzene	50.0	49.9		ug/L		100	80 - 120
Styrene	50.0	52.0		ug/L		104	80 - 120
tert-Butylbenzene	50.0	50.0		ug/L		100	80 - 121
1,1,1,2-Tetrachloroethane	50.0	54.0		ug/L		108	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.1		ug/L		110	80 - 120
Tetrachloroethene	50.0	51.5		ug/L		103	80 - 121
Toluene	50.0	53.6		ug/L		107	80 - 113
trans-1,2-Dichloroethene	50.0	60.1		ug/L		120	80 - 120
trans-1,3-Dichloropropene	50.0	59.4		ug/L		119	80 - 120
1,2,3-Trichlorobenzene	50.0	50.3		ug/L		101	61 - 141
1,2,4-Trichlorobenzene	50.0	50.7		ug/L		101	68 - 128
1,1,1-Trichloroethane	50.0	56.6		ug/L		113	80 - 120
1,1,2-Trichloroethane	50.0	56.2		ug/L		112	80 - 120
Trichloroethene	50.0	52.6		ug/L		105	80 - 120
Trichlorofluoromethane	50.0	58.6		ug/L		117	60 - 141
1,2,3-Trichloropropane	50.0	51.8		ug/L		104	80 - 123
1,2,4-Trimethylbenzene	50.0	51.2		ug/L		102	80 - 120
1,3,5-Trimethylbenzene	50.0	50.9		ug/L		102	80 - 120
Vinyl acetate	100	152	*	ug/L		152	67 - 135
Vinyl chloride	50.0	59.2		ug/L		118	71 - 128
Xylenes, Total	100	103		ug/L		103	80 - 120

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

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*104*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*
Dibromofluoromethane (Surr)	*117*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 680-613341/4
Matrix: Water
Analysis Batch: 613341

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
Acetone	250	326		ug/L		130	70 - 135	14	30
Benzene	50.0	56.2		ug/L		112	80 - 120	1	20
Bromobenzene	50.0	52.0		ug/L		104	80 - 121	1	20
Bromochloromethane	50.0	60.1		ug/L		120	80 - 120	6	20
Bromodichloromethane	50.0	58.2		ug/L		116	80 - 120	2	20
Bromoform	50.0	53.8		ug/L		108	74 - 126	4	20
Bromomethane	50.0	72.1	* *1	ug/L		144	62 - 130	26	20
2-Butanone	250	318		ug/L		127	80 - 131	13	20
Carbon disulfide	50.0	55.0		ug/L		110	80 - 120	1	20
Carbon tetrachloride	50.0	52.2		ug/L		104	76 - 123	4	20
Chlorobenzene	50.0	52.0		ug/L		104	80 - 120	1	20
Chloroethane	50.0	62.6		ug/L		125	66 - 135	1	20
2-Chloroethyl vinyl ether	50.0	63.2		ug/L		126	71 - 135	2	50
Chloroform	50.0	57.9		ug/L		116	80 - 120	0	20
Chloromethane	50.0	51.8		ug/L		104	69 - 131	29	30
2-Chlorotoluene	50.0	50.5		ug/L		101	80 - 120	0	20
4-Chlorotoluene	50.0	51.3		ug/L		103	80 - 120	0	20
cis-1,2-Dichloroethene	50.0	60.9	*	ug/L		122	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	62.0	*	ug/L		124	80 - 120	1	20
Dibromochloromethane	50.0	56.6		ug/L		113	80 - 121	6	20
1,2-Dibromo-3-Chloropropane	50.0	56.7		ug/L		113	71 - 134	6	20
1,2-Dibromoethane	50.0	61.0	*	ug/L		122	80 - 120	10	20
Dibromomethane	50.0	60.2		ug/L		120	80 - 120	5	20
1,2-Dichlorobenzene	50.0	50.7		ug/L		101	80 - 120	0	20
1,3-Dichlorobenzene	50.0	50.4		ug/L		101	80 - 120	2	20
1,4-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120	0	20
Dichlorodifluoromethane	50.0	60.5		ug/L		121	47 - 155	6	40
1,1-Dichloroethane	50.0	59.0		ug/L		118	80 - 120	1	20
1,2-Dichloroethane	50.0	62.4	*	ug/L		125	80 - 120	2	50
1,1-Dichloroethene	50.0	56.8		ug/L		114	76 - 120	3	20
1,2-Dichloroethene, Total	100	119		ug/L		119	80 - 120	1	20
1,2-Dichloropropane	50.0	59.4		ug/L		119	80 - 120	1	20
1,3-Dichloropropane	50.0	61.3	*	ug/L		123	80 - 120	8	20
2,2-Dichloropropane	50.0	67.0	*	ug/L		134	76 - 126	8	20
1,1-Dichloropropene	50.0	53.8		ug/L		108	80 - 120	4	20
Ethylbenzene	50.0	50.7		ug/L		101	80 - 120	2	20
Hexachlorobutadiene	50.0	43.1		ug/L		86	60 - 140	7	20
2-Hexanone	250	327	*	ug/L		131	74 - 127	19	20

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

Lab Sample ID: LCSD 680-613341/4
Matrix: Water
Analysis Batch: 613341

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
Isopropylbenzene	50.0	49.3		ug/L		99	80 - 120	2	20
Methylene Chloride	50.0	57.2		ug/L		114	80 - 120	4	20
4-Methyl-2-pentanone	250	329	*	ug/L		132	76 - 124	18	20
Methyl tert-butyl ether	50.0	63.4	*	ug/L		127	80 - 120	9	20
m-Xylene & p-Xylene	50.0	50.8		ug/L		102	80 - 120	0	20
n-Butylbenzene	50.0	49.2		ug/L		98	80 - 120	5	20
N-Propylbenzene	50.0	49.8		ug/L		100	80 - 120	2	20
o-Xylene	50.0	52.8		ug/L		106	80 - 120	1	30
p-Isopropyltoluene	50.0	48.9		ug/L		98	80 - 120	1	20
sec-Butylbenzene	50.0	48.4		ug/L		97	80 - 120	3	20
Styrene	50.0	52.1		ug/L		104	80 - 120	0	20
tert-Butylbenzene	50.0	48.7		ug/L		97	80 - 121	3	20
1,1,1,2-Tetrachloroethane	50.0	53.5		ug/L		107	80 - 121	1	20
1,1,2,2-Tetrachloroethane	50.0	61.6	*	ug/L		123	80 - 120	11	20
Tetrachloroethene	50.0	53.2		ug/L		106	80 - 121	3	20
Toluene	50.0	55.0		ug/L		110	80 - 113	3	20
trans-1,2-Dichloroethene	50.0	58.0		ug/L		116	80 - 120	3	20
trans-1,3-Dichloropropene	50.0	62.9	*	ug/L		126	80 - 120	6	30
1,2,3-Trichlorobenzene	50.0	51.8		ug/L		104	61 - 141	3	20
1,2,4-Trichlorobenzene	50.0	51.4		ug/L		103	68 - 128	1	20
1,1,1-Trichloroethane	50.0	55.2		ug/L		110	80 - 120	3	20
1,1,2-Trichloroethane	50.0	59.6		ug/L		119	80 - 120	6	20
Trichloroethene	50.0	53.8		ug/L		108	80 - 120	2	20
Trichlorofluoromethane	50.0	55.7		ug/L		111	60 - 141	5	20
1,2,3-Trichloropropane	50.0	53.5		ug/L		107	80 - 123	3	30
1,2,4-Trimethylbenzene	50.0	51.6		ug/L		103	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	50.7		ug/L		101	80 - 120	0	20
Vinyl acetate	100	165	*	ug/L		165	67 - 135	8	20
Vinyl chloride	50.0	57.5		ug/L		115	71 - 128	3	20
Xylenes, Total	100	104		ug/L		104	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*115*		*73 - 131*
Dibromofluoromethane (Surr)	*116*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-612480/17-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 612480

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<10		10	0.76	ug/L		03/25/20 13:30	03/27/20 15:51	1
Acenaphthylene	<10		10	0.85	ug/L		03/25/20 13:30	03/27/20 15:51	1
Acetophenone	<10		10	0.57	ug/L		03/25/20 13:30	03/27/20 15:51	1
Anthracene	<10		10	0.69	ug/L		03/25/20 13:30	03/27/20 15:51	1
Atrazine	<10		10	1.2	ug/L		03/25/20 13:30	03/27/20 15:51	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-612480/17-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 612480

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzaldehyde	<10		10	1.1	ug/L		03/25/20 13:30	03/27/20 15:51	1
Benzo[a]anthracene	<10		10	0.55	ug/L		03/25/20 13:30	03/27/20 15:51	1
Benzo[a]pyrene	<10		10	0.71	ug/L		03/25/20 13:30	03/27/20 15:51	1
Benzo[b]fluoranthene	<10		10	2.6	ug/L		03/25/20 13:30	03/27/20 15:51	1
Benzo[g,h,i]perylene	<10		10	0.87	ug/L		03/25/20 13:30	03/27/20 15:51	1
Benzo[k]fluoranthene	<10		10	1.2	ug/L		03/25/20 13:30	03/27/20 15:51	1
1,1'-Biphenyl	<10		10	0.58	ug/L		03/25/20 13:30	03/27/20 15:51	1
Bis(2-chloroethoxy)methane	<10		10	0.94	ug/L		03/25/20 13:30	03/27/20 15:51	1
Bis(2-chloroethyl)ether	<10		10	1.1	ug/L		03/25/20 13:30	03/27/20 15:51	1
bis (2-chloroisopropyl) ether	<10		10	0.78	ug/L		03/25/20 13:30	03/27/20 15:51	1
Bis(2-ethylhexyl) phthalate	<10		10	1.6	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Bromophenyl phenyl ether	<10		10	0.77	ug/L		03/25/20 13:30	03/27/20 15:51	1
Butyl benzyl phthalate	<10		10	1.2	ug/L		03/25/20 13:30	03/27/20 15:51	1
Caprolactam	<10		10	0.79	ug/L		03/25/20 13:30	03/27/20 15:51	1
Carbazole	<10		10	0.71	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Chloroaniline	<20		20	2.2	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Chloro-3-methylphenol	<10		10	1.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Chloronaphthalene	<10		10	0.80	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Chlorophenol	<10		10	0.87	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Chlorophenyl phenyl ether	<10		10	0.84	ug/L		03/25/20 13:30	03/27/20 15:51	1
Chrysene	<10		10	0.51	ug/L		03/25/20 13:30	03/27/20 15:51	1
Dibenz(a,h)anthracene	<10		10	1.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
Dibenzofuran	<10		10	0.79	ug/L		03/25/20 13:30	03/27/20 15:51	1
1,2-Dichlorobenzene	<10		10	0.53	ug/L		03/25/20 13:30	03/27/20 15:51	1
1,3-Dichlorobenzene	<10		10	0.59	ug/L		03/25/20 13:30	03/27/20 15:51	1
1,4-Dichlorobenzene	<10		10	0.54	ug/L		03/25/20 13:30	03/27/20 15:51	1
3,3'-Dichlorobenzidine	<60		60	30	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4-Dichlorophenol	<10		10	1.1	ug/L		03/25/20 13:30	03/27/20 15:51	1
Diethyl phthalate	<10		10	0.88	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4-Dimethylphenol	<10		10	4.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
Dimethyl phthalate	<10		10	0.99	ug/L		03/25/20 13:30	03/27/20 15:51	1
Di-n-butyl phthalate	<10		10	0.83	ug/L		03/25/20 13:30	03/27/20 15:51	1
4,6-Dinitro-2-methylphenol	<50		50	10	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4-Dinitrophenol	<50		50	10	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4-Dinitrotoluene	<10		10	1.2	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,6-Dinitrotoluene	<10		10	1.1	ug/L		03/25/20 13:30	03/27/20 15:51	1
Di-n-octyl phthalate	<10		10	1.4	ug/L		03/25/20 13:30	03/27/20 15:51	1
Fluoranthene	<10		10	0.74	ug/L		03/25/20 13:30	03/27/20 15:51	1
Fluorene	<10		10	0.96	ug/L		03/25/20 13:30	03/27/20 15:51	1
Hexachlorobenzene	<10		10	0.79	ug/L		03/25/20 13:30	03/27/20 15:51	1
Hexachlorobutadiene	<10		10	0.62	ug/L		03/25/20 13:30	03/27/20 15:51	1
Hexachlorocyclopentadiene	<10		10	2.5	ug/L		03/25/20 13:30	03/27/20 15:51	1
Hexachloroethane	<10		10	0.76	ug/L		03/25/20 13:30	03/27/20 15:51	1
Indeno[1,2,3-cd]pyrene	<10		10	1.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
Isophorone	<10		10	0.90	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Methylnaphthalene	<10		10	0.78	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Methylphenol	<10		10	0.89	ug/L		03/25/20 13:30	03/27/20 15:51	1
3 & 4 Methylphenol	<10		10	1.3	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Nitroaniline	<50		50	1.3	ug/L		03/25/20 13:30	03/27/20 15:51	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-612480/17-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 612480

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3-Nitroaniline	<50		50	5.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Nitroaniline	<50		50	5.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
Nitrobenzene	<10		10	0.73	ug/L		03/25/20 13:30	03/27/20 15:51	1
2-Nitrophenol	<10		10	0.76	ug/L		03/25/20 13:30	03/27/20 15:51	1
4-Nitrophenol	<50		50	1.9	ug/L		03/25/20 13:30	03/27/20 15:51	1
N-Nitrosodi-n-propylamine	<10		10	0.72	ug/L		03/25/20 13:30	03/27/20 15:51	1
N-Nitrosodiphenylamine	<10		10	0.92	ug/L		03/25/20 13:30	03/27/20 15:51	1
Pentachlorophenol	<50		50	2.0	ug/L		03/25/20 13:30	03/27/20 15:51	1
Phenanthrene	<10		10	0.77	ug/L		03/25/20 13:30	03/27/20 15:51	1
Phenol	<10		10	0.83	ug/L		03/25/20 13:30	03/27/20 15:51	1
Pyrene	<10		10	0.63	ug/L		03/25/20 13:30	03/27/20 15:51	1
1,2,4-Trichlorobenzene	<10		10	0.56	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4,5-Trichlorophenol	<10		10	1.2	ug/L		03/25/20 13:30	03/27/20 15:51	1
2,4,6-Trichlorophenol	<10		10	0.85	ug/L		03/25/20 13:30	03/27/20 15:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*83*		*32 - 113*	*03/25/20 13:30*	*03/27/20 15:51*	*1*
2-Fluorophenol	*75*		*26 - 109*	*03/25/20 13:30*	*03/27/20 15:51*	*1*
Nitrobenzene-d5	*83*		*32 - 118*	*03/25/20 13:30*	*03/27/20 15:51*	*1*
Phenol-d5	*76*		*27 - 110*	*03/25/20 13:30*	*03/27/20 15:51*	*1*
Terphenyl-d14	*95*		*10 - 126*	*03/25/20 13:30*	*03/27/20 15:51*	*1*
2,4,6-Tribromophenol	*89*		*39 - 124*	*03/25/20 13:30*	*03/27/20 15:51*	*1*

Lab Sample ID: LCS 680-612480/18-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612480

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	100	96.1		ug/L		96	48 - 130
Acenaphthylene	100	87.2		ug/L		87	48 - 130
Anthracene	100	86.0		ug/L		86	49 - 130
Atrazine	100	74.3		ug/L		74	39 - 130
Benzaldehyde	100	72.9		ug/L		73	14 - 130
Benzo[a]anthracene	100	89.2		ug/L		89	44 - 130
Benzo[a]pyrene	100	81.9		ug/L		82	44 - 130
Benzo[b]fluoranthene	100	90.4		ug/L		90	43 - 130
Benzo[g,h,i]perylene	100	86.4		ug/L		86	41 - 130
Benzo[k]fluoranthene	100	86.8		ug/L		87	40 - 130
1,1'-Biphenyl	100	83.8		ug/L		84	45 - 130
Bis(2-chloroethoxy)methane	100	72.4		ug/L		72	47 - 130
Bis(2-chloroethyl)ether	100	73.1		ug/L		73	32 - 130
bis (2-chloroisopropyl) ether	100	69.4		ug/L		69	26 - 130
Bis(2-ethylhexyl) phthalate	100	88.9		ug/L		89	45 - 130
4-Bromophenyl phenyl ether	100	80.2		ug/L		80	47 - 130
Butyl benzyl phthalate	100	91.2		ug/L		91	50 - 130
Caprolactam	100	88.2		ug/L		88	26 - 130
Carbazole	100	88.4		ug/L		88	54 - 130
4-Chloroaniline	100	67.3		ug/L		67	42 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-612480/18-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612480

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chloro-3-methylphenol	100	76.3		ug/L		76	47 - 130
2-Chloronaphthalene	100	85.1		ug/L		85	44 - 130
2-Chlorophenol	100	74.1		ug/L		74	39 - 130
4-Chlorophenyl phenyl ether	100	85.8		ug/L		86	45 - 130
Chrysene	100	88.7		ug/L		89	47 - 130
Dibenz(a,h)anthracene	100	84.5		ug/L		85	41 - 130
Dibenzofuran	100	83.6		ug/L		84	50 - 130
1,2-Dichlorobenzene	100	62.0		ug/L		62	31 - 130
1,3-Dichlorobenzene	100	62.5		ug/L		62	30 - 130
1,4-Dichlorobenzene	100	62.4		ug/L		62	31 - 130
3,3'-Dichlorobenzidine	100	80.7		ug/L		81	46 - 130
2,4-Dichlorophenol	100	78.2		ug/L		78	44 - 130
Diethyl phthalate	100	90.8		ug/L		91	53 - 130
2,4-Dimethylphenol	100	72.7		ug/L		73	37 - 130
Dimethyl phthalate	100	91.2		ug/L		91	53 - 130
Di-n-butyl phthalate	100	86.5		ug/L		87	51 - 130
4,6-Dinitro-2-methylphenol	200	170		ug/L		85	42 - 130
2,4-Dinitrophenol	200	205		ug/L		103	31 - 130
2,4-Dinitrotoluene	100	89.2		ug/L		89	52 - 130
2,6-Dinitrotoluene	100	84.7		ug/L		85	52 - 130
Di-n-octyl phthalate	100	92.9		ug/L		93	42 - 130
Fluoranthene	100	86.3		ug/L		86	47 - 130
Fluorene	100	91.2		ug/L		91	50 - 130
Hexachlorobenzene	100	85.5		ug/L		86	43 - 130
Hexachlorobutadiene	100	56.8		ug/L		57	27 - 130
Hexachlorocyclopentadiene	100	29.9		ug/L		30	11 - 130
Hexachloroethane	100	60.2		ug/L		60	29 - 130
Indeno[1,2,3-cd]pyrene	100	88.8		ug/L		89	31 - 130
Isophorone	100	78.3		ug/L		78	47 - 130
2-Methylnaphthalene	100	71.2		ug/L		71	40 - 130
2-Methylphenol	100	74.3		ug/L		74	40 - 130
3 & 4 Methylphenol	100	77.4		ug/L		77	42 - 130
2-Nitroaniline	100	88.9		ug/L		89	51 - 130
3-Nitroaniline	100	89.4		ug/L		89	53 - 130
4-Nitroaniline	100	89.0		ug/L		89	49 - 130
Nitrobenzene	100	72.0		ug/L		72	43 - 130
2-Nitrophenol	100	74.0		ug/L		74	43 - 130
4-Nitrophenol	200	184		ug/L		92	44 - 130
N-Nitrosodi-n-propylamine	100	77.9		ug/L		78	42 - 130
N-Nitrosodiphenylamine	100	84.5		ug/L		84	50 - 130
Pentachlorophenol	200	172		ug/L		86	33 - 130
Phenanthrene	100	85.3		ug/L		85	51 - 130
Phenol	100	64.2		ug/L		64	35 - 130
Pyrene	100	90.0		ug/L		90	52 - 130
1,2,4-Trichlorobenzene	100	67.3		ug/L		67	33 - 130
2,4,5-Trichlorophenol	100	89.9		ug/L		90	48 - 130
2,4,6-Trichlorophenol	100	88.2		ug/L		88	47 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-612480/18-A
Matrix: Water
Analysis Batch: 612901

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612480

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	83		32 - 113
2-Fluorophenol	68		26 - 109
Nitrobenzene-d5	73		32 - 118
Phenol-d5	72		27 - 110
Terphenyl-d14	100		10 - 126
2,4,6-Tribromophenol	92		39 - 124

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-683060/1-A
Matrix: Water
Analysis Batch: 683150

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 683060

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 00:34	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	74		41 - 144	03/23/20 14:46	03/24/20 00:34	1
Terphenyl-d14	80			03/23/20 14:46	03/24/20 00:34	1

Lab Sample ID: LCS 460-683060/2-A
Matrix: Water
Analysis Batch: 683150

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 683060

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,4-Dioxane			0.800	0.221	J	ug/L		28	10 - 150		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5	69		41 - 144
Terphenyl-d14	71		

Lab Sample ID: LCSD 460-683060/3-A
Matrix: Water
Analysis Batch: 683150

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 683060

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane			0.800	0.247	J	ug/L		31	10 - 150	11	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Nitrobenzene-d5	79		41 - 144
Terphenyl-d14	76		

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-612634/33
Matrix: Water
Analysis Batch: 612634

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			03/26/20 15:55	1

Lab Sample ID: LCS 680-612634/34
Matrix: Water
Analysis Batch: 612634

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	10.0	9.72		mg/L		97	90 - 110

Lab Sample ID: LCSD 680-612634/35
Matrix: Water
Analysis Batch: 612634

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	10.0	9.80		mg/L		98	90 - 110	1	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206182/1002
Matrix: Water
Analysis Batch: 206182

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/23/20 23:15	1

Lab Sample ID: LCS 550-206182/4
Matrix: Water
Analysis Batch: 206182

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.7		ug/L		99	85 - 115

Lab Sample ID: LCSD 550-206182/5
Matrix: Water
Analysis Batch: 206182

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
Perchlorate	25.0	25.2		ug/L		101	85 - 115	2	15

Lab Sample ID: MB 550-206574/1002
Matrix: Water
Analysis Batch: 206574

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/24/20 22:37	1

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: LCS 550-206574/4
Matrix: Water
Analysis Batch: 206574

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	24.4		ug/L		98	85 - 115		

Lab Sample ID: LCSD 550-206574/5
Matrix: Water
Analysis Batch: 206574

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
Perchlorate			25.0	24.6		ug/L		98	85 - 115	1	15

Lab Sample ID: 680-181809-7 MS
Matrix: Water
Analysis Batch: 206574

Client Sample ID: MW-13 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	76		250	332		ug/L		102	80 - 120		

Lab Sample ID: 680-181809-7 MSD
Matrix: Water
Analysis Batch: 206574

Client Sample ID: MW-13 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	76		250	324		ug/L		99	80 - 120	2	15

Lab Sample ID: MB 550-207036/1002
Matrix: Water
Analysis Batch: 207036

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			04/01/20 21:01	1

Lab Sample ID: LCS 550-207036/4
Matrix: Water
Analysis Batch: 207036

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	24.1		ug/L		96	85 - 115		

Lab Sample ID: LCSD 550-207036/5
Matrix: Water
Analysis Batch: 207036

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
Perchlorate			25.0	24.1		ug/L		96	85 - 115	0	15

Lab Sample ID: 680-181809-9 MS
Matrix: Water
Analysis Batch: 207036

Client Sample ID: GM-24 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	160		250	413		ug/L		102	80 - 120		

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: 680-181809-9 MSD
Matrix: Water
Analysis Batch: 207036

Client Sample ID: GM-24 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	160		250	412		ug/L		102	80 - 120	0	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-612538/1-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 19:37	1

Lab Sample ID: LCS 680-612538/2-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Iron	5010	4910		ug/L		98	80 - 120

Lab Sample ID: 680-181809-10 MS
Matrix: Water
Analysis Batch: 612837

Client Sample ID: EB-01 (031820)
Prep Type: Dissolved
Prep Batch: 612538

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Iron	<50		5010	4960		ug/L		99	75 - 125

Lab Sample ID: 680-181809-10 MSD
Matrix: Water
Analysis Batch: 612837

Client Sample ID: EB-01 (031820)
Prep Type: Dissolved
Prep Batch: 612538

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Iron	<50		5010	4890		ug/L		98	75 - 125	1	20

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613440/3
Matrix: Water
Analysis Batch: 613440

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 12:48	1

Lab Sample ID: LCS 680-613440/4
Matrix: Water
Analysis Batch: 613440

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	19.9		mg/L		100	80 - 120

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCSD 680-613440/5
Matrix: Water
Analysis Batch: 613440

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon			20.0	19.9		mg/L		99	80 - 120	0	25

Lab Sample ID: 680-181809-3 MS
Matrix: Water
Analysis Batch: 613440

Client Sample ID: MW-2 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon	2.5		20.0	22.5		mg/L		100	80 - 120		

Lab Sample ID: 680-181809-3 MSD
Matrix: Water
Analysis Batch: 613440

Client Sample ID: MW-2 (031820)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	2.5		20.0	22.4		mg/L		99	80 - 120	1	25

GC/MS VOA

Analysis Batch: 613134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-7	MW-13 (031820)	Total/NA	Water	8260B	
680-181809-11	Trip Blank	Total/NA	Water	8260B	
MB 680-613134/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613134/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613134/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-1	GM-9M (031820)	Total/NA	Water	8260B	
680-181809-2	MW-1 (031820)	Total/NA	Water	8260B	
680-181809-3	MW-2 (031820)	Total/NA	Water	8260B	
680-181809-4	MW-5 (031820)	Total/NA	Water	8260B	
680-181809-5	MW-10 (031820)	Total/NA	Water	8260B	
680-181809-6	MW-12 (031820)	Total/NA	Water	8260B	
680-181809-8	MW-23 (031820)	Total/NA	Water	8260B	
680-181809-9	GM-24 (031820)	Total/NA	Water	8260B	
680-181809-10	EB-01 (031820)	Total/NA	Water	8260B	
MB 680-613140/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613140/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613140/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-2 - DL	MW-1 (031820)	Total/NA	Water	8260B	
680-181809-3 - DL	MW-2 (031820)	Total/NA	Water	8260B	
680-181809-4 - RA	MW-5 (031820)	Total/NA	Water	8260B	
680-181809-5 - RA	MW-10 (031820)	Total/NA	Water	8260B	
MB 680-613341/9	Method Blank	Total/NA	Water	8260B	
LCS 680-613341/1002	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613341/4	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 612480

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-10	EB-01 (031820)	Total/NA	Water	3520C	
MB 680-612480/17-A	Method Blank	Total/NA	Water	3520C	
LCS 680-612480/18-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 612901

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-10	EB-01 (031820)	Total/NA	Water	8270D	612480
MB 680-612480/17-A	Method Blank	Total/NA	Water	8270D	612480
LCS 680-612480/18-A	Lab Control Sample	Total/NA	Water	8270D	612480

Prep Batch: 683060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-1	GM-9M (031820)	Total/NA	Water	3510C	
680-181809-9	GM-24 (031820)	Total/NA	Water	3510C	
680-181809-10	EB-01 (031820)	Total/NA	Water	3510C	
MB 460-683060/1-A	Method Blank	Total/NA	Water	3510C	

GC/MS Semi VOA (Continued)

Prep Batch: 683060 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 460-683060/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-683060/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 683150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-1	GM-9M (031820)	Total/NA	Water	8270D SIM	683060
680-181809-9	GM-24 (031820)	Total/NA	Water	8270D SIM	683060
680-181809-10	EB-01 (031820)	Total/NA	Water	8270D SIM	683060
MB 460-683060/1-A	Method Blank	Total/NA	Water	8270D SIM	683060
LCS 460-683060/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	683060
LCSD 460-683060/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	683060

HPLC/IC

Analysis Batch: 206182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-8	MW-23 (031820)	Total/NA	Water	314.0	
680-181809-10	EB-01 (031820)	Total/NA	Water	314.0	
MB 550-206182/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206182/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206182/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 206574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-1	GM-9M (031820)	Total/NA	Water	314.0	
680-181809-2	MW-1 (031820)	Total/NA	Water	314.0	
680-181809-3	MW-2 (031820)	Total/NA	Water	314.0	
680-181809-4	MW-5 (031820)	Total/NA	Water	314.0	
680-181809-5	MW-10 (031820)	Total/NA	Water	314.0	
680-181809-6	MW-12 (031820)	Total/NA	Water	314.0	
680-181809-7	MW-13 (031820)	Total/NA	Water	314.0	
MB 550-206574/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206574/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206574/5	Lab Control Sample Dup	Total/NA	Water	314.0	
680-181809-7 MS	MW-13 (031820)	Total/NA	Water	314.0	
680-181809-7 MSD	MW-13 (031820)	Total/NA	Water	314.0	

Analysis Batch: 207036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-9	GM-24 (031820)	Total/NA	Water	314.0	
MB 550-207036/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-207036/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-207036/5	Lab Control Sample Dup	Total/NA	Water	314.0	
680-181809-9 MS	GM-24 (031820)	Total/NA	Water	314.0	
680-181809-9 MSD	GM-24 (031820)	Total/NA	Water	314.0	

Analysis Batch: 612634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-3	MW-2 (031820)	Total/NA	Water	300.0-1993 R2.1	
680-181809-6	MW-12 (031820)	Total/NA	Water	300.0-1993 R2.1	
680-181809-10	EB-01 (031820)	Total/NA	Water	300.0-1993 R2.1	

HPLC/IC (Continued)

Analysis Batch: 612634 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-612634/33	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-612634/34	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-612634/35	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 612538

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-3	MW-2 (031820)	Dissolved	Water	3005A	
680-181809-6	MW-12 (031820)	Dissolved	Water	3005A	
680-181809-10	EB-01 (031820)	Dissolved	Water	3005A	
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-181809-10 MS	EB-01 (031820)	Dissolved	Water	3005A	
680-181809-10 MSD	EB-01 (031820)	Dissolved	Water	3005A	

Analysis Batch: 612837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-3	MW-2 (031820)	Dissolved	Water	6010C	612538
680-181809-6	MW-12 (031820)	Dissolved	Water	6010C	612538
680-181809-10	EB-01 (031820)	Dissolved	Water	6010C	612538
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	6010C	612538
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	6010C	612538
680-181809-10 MS	EB-01 (031820)	Dissolved	Water	6010C	612538
680-181809-10 MSD	EB-01 (031820)	Dissolved	Water	6010C	612538

General Chemistry

Analysis Batch: 613440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181809-3	MW-2 (031820)	Total/NA	Water	5310 B-2011	
680-181809-6	MW-12 (031820)	Total/NA	Water	5310 B-2011	
680-181809-10	EB-01 (031820)	Total/NA	Water	5310 B-2011	
MB 680-613440/3	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613440/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613440/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
680-181809-3 MS	MW-2 (031820)	Total/NA	Water	5310 B-2011	
680-181809-3 MSD	MW-2 (031820)	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-9M (031820)
Lab Sample ID: 680-181809-1

Date Collected: 03/18/20 09:40
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 15:36	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 05:09	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		100			206574	03/25/20 05:52	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: MW-1 (031820)
Lab Sample ID: 680-181809-2

Date Collected: 03/18/20 13:50
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 11:42	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	8260B	DL	5	5 mL	5 mL	613341	03/31/20 18:43	Y1S	TAL SAV
	Instrument ID: CMSP2									
Total/NA	Analysis	314.0		200			206574	03/25/20 06:15	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: MW-2 (031820)
Lab Sample ID: 680-181809-3

Date Collected: 03/18/20 12:35
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 12:05	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	8260B	DL	100	5 mL	5 mL	613341	03/31/20 19:06	Y1S	TAL SAV
	Instrument ID: CMSP2									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 20:34	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		100			206574	03/25/20 06:38	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:11	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 13:54	RKJ	TAL SAV
	Instrument ID: TOC7									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: MW-5 (031820)
Lab Sample ID: 680-181809-4
Date Collected: 03/18/20 14:55
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 12:29	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613341	03/31/20 15:12	Y1S	TAL SAV
	Instrument ID: CMSP2									
Total/NA	Analysis	314.0		10			206574	03/25/20 07:01	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: MW-10 (031820)
Lab Sample ID: 680-181809-5
Date Collected: 03/18/20 13:20
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 12:52	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	8260B	RA	1	5 mL	5 mL	613341	03/31/20 16:45	Y1S	TAL SAV
	Instrument ID: CMSP2									
Total/NA	Analysis	314.0		10			206574	03/25/20 07:24	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: MW-12 (031820)
Lab Sample ID: 680-181809-6
Date Collected: 03/18/20 14:40
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 13:15	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 20:46	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		100			206574	03/25/20 07:47	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:15	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 14:49	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: MW-13 (031820)
Lab Sample ID: 680-181809-7
Date Collected: 03/18/20 11:10
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	613134	03/30/20 14:10	UI	TAL SAV
	Instrument ID: CMSB									
Total/NA	Analysis	314.0		10			206574	03/25/20 08:55	NEL	TAL PHX
	Instrument ID: IC4									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-23 (031820)

Lab Sample ID: 680-181809-8

Date Collected: 03/18/20 12:10
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 13:39	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	314.0		1			206182	03/24/20 08:48	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-24 (031820)

Lab Sample ID: 680-181809-9

Date Collected: 03/18/20 10:10
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 14:49	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 05:30	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		10			207036	04/01/20 22:55	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: EB-01 (031820)

Lab Sample ID: 680-181809-10

Date Collected: 03/18/20 17:00
Matrix: Water
Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613140	03/30/20 16:00	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3520C			1024.9 mL	1 mL	612480	03/25/20 13:30	CMJ	TAL SAV
Total/NA	Analysis	8270D		1			612901	03/27/20 19:36	DBM	TAL SAV
	Instrument ID: CMSE									
Total/NA	Prep	3510C			250 mL	2 mL	683060	03/23/20 14:46	ATF	TAL EDI
Total/NA	Analysis	8270D SIM		1			683150	03/24/20 05:52	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	612634	03/26/20 20:59	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206182	03/24/20 10:20	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 19:47	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 15:06	RKJ	TAL SAV
	Instrument ID: TOC7									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: Trip Blank
Lab Sample ID: 680-181809-11

Date Collected: 03/18/20 00:00
Matrix: Water

Date Received: 03/20/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613134	03/30/20 14:57	UI	TAL SAV
	Instrument ID: CMSB									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Chain of Custody Record

397788 eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-18-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd, Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling:
Project Name: ATK Orbital				Job / SDG No.:
Site: Elkton, MD				
PO# 300447 69				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs 8260B	1,4-Dioxane	Perchlorate 314.0	Sulfate 300	SM5310 TOC	6010C Dissolved iron	8270D SVOC	Sample Specific Notes:
GM-9M (031820)	3-18-20	940	G	GW	6			3	2	1					iron is filtered
MW-1 (031820)		1350			4			3		1					
MW-2 (031820)		1235			11	1		3	X	1	1	3	1		
MW-5 (031820)		1455			4			3		1					
MW-10 (031820)		1320			4			3		1					
MW-12 (031820)		1440			11	1		3	X	1	1	3	1		
MW-13 (031820)		1110			4			3		1					
MW-23 (031820)		1210			4			3		1					
GM-24 (031820)		1010		GW	6			3	2	1					
EB-01 (031820)	3-18-20	1700	G		16	1		6	2	2	1	3	1	1	
Trip Blank					2			2							

680-181809 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time	Received by	Company	Date/Time
Relinquished by:	Arcadis	3-19-2000			03.20.2020 0900
Relinquished by:			Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: 3.1/0.5	Company: (cf) 3.5/0.9°c	Date/Time:

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604853.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181809-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/1/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-9M (031820) (680-181809-1)	3/18/20	09:40 Eastern		Water			X	1	
MW-1 (031820) (680-181809-2)	3/18/20	13:50 Eastern		Water			X	1	
MW-2 (031820) (680-181809-3)	3/18/20	12:35 Eastern		Water			X	1	
MW-5 (031820) (680-181809-4)	3/18/20	14:55 Eastern		Water			X	1	
MW-10 (031820) (680-181809-5)	3/18/20	13:20 Eastern		Water			X	1	
MW-12 (031820) (680-181809-6)	3/18/20	14:40 Eastern		Water			X	1	
MW-13 (031820) (680-181809-7)	3/18/20	11:10 Eastern		Water			X	1	
MW-23 (031820) (680-181809-8)	3/18/20	12:10 Eastern		Water			X	1	
GM-24 (031820) (680-181809-9)	3/18/20	10:10 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-20-20 1730	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-21-20 0910	Company DAPRX

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: RE SAT (1.4C)

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604853.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181809-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/1/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
EB-01 (031820) (680-181809-10)	3/18/20	17:00 Eastern		Water			X	2	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the labo

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 3-20-20 1730	Company TA	Received by: [signature]	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 2-21-20 0910	Company TAPHO
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: RESAT 1.4°C		

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181809-1

Login Number: 181809

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Banda, Christy S

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181809-1

Login Number: 181809
List Number: 3
Creator: Rivera, Kenneth

List Source: Eurofins TestAmerica, Edison
List Creation: 03/21/20 06:49 PM

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	1164472
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	4.9°C, IR #11
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: ARCADIS U.S., Inc.

Job Number: 680-181809-1

Login Number: 181809
List Number: 2
Creator: Doerr, Bret C

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/21/20 09:52 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181809-1
Project/Site: ATK Orbital, Elkton MD

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181894-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
4/3/2020 4:54:40 PM

Jerry Lanier, Project Manager I
(912)250-0281
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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-181894-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-181894-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 3/21/2020 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.3º C and 3.4º C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples GM-21M (031920) (680-181894-1), GM-21S (031920) (680-181894-2), GM-22M (031920) (680-181894-3), GM-22S (031920) (680-181894-4), GM-26M (031920) (680-181894-5), GM-26S (031920) (680-181894-6), GM-31M (031920) (680-181894-7), GM-31S (031920) (680-181894-8), DUP-02 (031920) (680-181894-9) and Trip Blank (680-181894-10) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/30/2020, 03/31/2020 and 04/02/2020.

The method blank for preparation batch 613695 contained n-Butylbenzene above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Bromomethane is reported with an E flag in the batch QC because the top one points were dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported.

The laboratory control sample (LCS) for analytical batch 680-613128 recovered outside control limits for the following analytes: 2,2-Dichloropropane, 1,1,1,2-Tetrachloroethane, Vinyl acetate and Bromomethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-613128 recovered outside control limits for the following analytes: Bromomethane, Dibromomethane,trans-1,3-Dichloropropene, 2,2-Dichloropropane, Ethylene Dibromide, Bromoform, 1,1,1,2-Tetrachloroethane and Vinyl acetate. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample (LCS) for analytical batch 680-613140 recovered outside control limits for the following analytes: Bromomethane and Chloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-613140 recovered outside control limits for the following analytes: Bromomethane, Chloroethane and trans-1,3-Dichloropropene. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample and/or the laboratory control sample duplicate (LCS/LCSD) for analytical batch 680-613695 recovered outside control limits for the following analyte(s): Bromomethane and Chloroethane. These analytes have been identified as a poor

Job ID: 680-181894-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed.

The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 680-613612 recovered outside control limits for the following analytes: sec-Butylbenzene and 1,2-Dibromo-3-Chloropropane.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-613128.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613341, 680-613612, and 680-613695.

Refer to the QC report for details.

Samples GM-21M (031920) (680-181894-1)[5X], GM-21S (031920) (680-181894-2)[10X], GM-22M (031920) (680-181894-3)[10X] and GM-22S (031920) (680-181894-4)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL

Samples GM-21M (031920) (680-181894-1), GM-21S (031920) (680-181894-2), GM-22M (031920) (680-181894-3), GM-22S (031920) (680-181894-4), GM-26M (031920) (680-181894-5), GM-26S (031920) (680-181894-6), GM-31M (031920) (680-181894-7), GM-31S (031920) (680-181894-8) and DUP-02 (031920) (680-181894-9) were analyzed for Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/24/2020 and analyzed on 03/25/2020.

Sample GM-21S (031920) (680-181894-2)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples GM-21M (031920) (680-181894-1), GM-21S (031920) (680-181894-2), GM-22M (031920) (680-181894-3), GM-22S (031920) (680-181894-4), GM-26M (031920) (680-181894-5), GM-26S (031920) (680-181894-6), GM-31M (031920) (680-181894-7), GM-31S (031920) (680-181894-8) and DUP-02 (031920) (680-181894-9) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/25/2020 and 03/27/2020.

Samples GM-21M (031920) (680-181894-1)[50X], GM-21S (031920) (680-181894-2)[50X], GM-22M (031920) (680-181894-3)[10X], GM-22S (031920) (680-181894-4)[10X], GM-26M (031920) (680-181894-5)[10X] and GM-26S (031920) (680-181894-6)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples GM-21M (031920) (680-181894-1), GM-22M (031920) (680-181894-3) and GM-26M (031920) (680-181894-5) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/25/2020 and analyzed on 03/26/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples GM-21M (031920) (680-181894-1), GM-22M (031920) (680-181894-3) and GM-26M (031920) (680-181894-5) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 03/30/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples GM-21M (031920) (680-181894-1), GM-22M (031920) (680-181894-3) and GM-26M (031920) (680-181894-5) were analyzed for

Job ID: 680-181894-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

total organic carbon in accordance with SM 5310B. The samples were analyzed on 03/30/2020.

The low level check standard recovery associated with batch 680-613440 is outside the acceptance criteria for the following analyte(s): TOC.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181894-1	GM-21M (031920)	GW	03/19/20 13:35	03/21/20 09:50	
680-181894-2	GM-21S (031920)	GW	03/19/20 12:30	03/21/20 09:50	
680-181894-3	GM-22M (031920)	GW	03/19/20 10:55	03/21/20 09:50	
680-181894-4	GM-22S (031920)	GW	03/19/20 09:55	03/21/20 09:50	
680-181894-5	GM-26M (031920)	GW	03/19/20 14:50	03/21/20 09:50	
680-181894-6	GM-26S (031920)	GW	03/19/20 13:15	03/21/20 09:50	
680-181894-7	GM-31M (031920)	GW	03/19/20 11:10	03/21/20 09:50	
680-181894-8	GM-31S (031920)	GW	03/19/20 10:00	03/21/20 09:50	
680-181894-9	DUP-02 (031920)	GW	03/19/20 12:00	03/21/20 09:50	
680-181894-10	Trip Blank	Water	03/19/20 00:00	03/21/20 09:50	

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
5030B	Purge and Trap	SW846	TAL SAV

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.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920) — Lab Sample ID: 680-181894-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.83	J	1.0	0.33	ug/L	1		8260B	Total/NA
Chloroform	0.92	J	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	12		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.8		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.86	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	31		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	12		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	5.1		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - DL	170		5.0	2.4	ug/L	5		8260B	Total/NA
1,4-Dioxane	3.0		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	1.5		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	210		50	16	ug/L	50		314.0	Total/NA
Dissolved Iron	59		50	17	ug/L	1		6010C	Dissolved

Client Sample ID: GM-21S (031920) — Lab Sample ID: 680-181894-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	27		10	4.1	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	11		10	3.8	ug/L	10		8260B	Total/NA
1,2-Dichloroethane	5.9	J	10	5.0	ug/L	10		8260B	Total/NA
1,1-Dichloroethene	200		10	3.6	ug/L	10		8260B	Total/NA
1,2-Dichloroethene, Total	27		20	3.7	ug/L	10		8260B	Total/NA
1,1,1-Trichloroethane	72		10	3.7	ug/L	10		8260B	Total/NA
Trichloroethene	1000		10	4.8	ug/L	10		8260B	Total/NA
1,4-Dioxane	25		2.0	0.87	ug/L	5		8270D SIM	Total/NA
Perchlorate	600		50	16	ug/L	50		314.0	Total/NA

Client Sample ID: GM-22M (031920) — Lab Sample ID: 680-181894-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	23		10	4.1	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	12		10	3.8	ug/L	10		8260B	Total/NA
1,1-Dichloroethene	240		10	3.6	ug/L	10		8260B	Total/NA
1,2-Dichloroethene, Total	23		20	3.7	ug/L	10		8260B	Total/NA
1,1,1-Trichloroethane	110		10	3.7	ug/L	10		8260B	Total/NA
Trichloroethene	1100		10	4.8	ug/L	10		8260B	Total/NA
1,4-Dioxane	11		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	8.2		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	66		10	3.1	ug/L	10		314.0	Total/NA
Total Organic Carbon	0.57	J	1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: GM-22S (031920) — Lab Sample ID: 680-181894-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	17		10	4.1	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	9.6	J	10	3.8	ug/L	10		8260B	Total/NA
1,1-Dichloroethene	200		10	3.6	ug/L	10		8260B	Total/NA
1,2-Dichloroethene, Total	17	J	20	3.7	ug/L	10		8260B	Total/NA
1,1,1-Trichloroethane	77		10	3.7	ug/L	10		8260B	Total/NA
Trichloroethene	890		10	4.8	ug/L	10		8260B	Total/NA
1,4-Dioxane	10		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	55		10	3.1	ug/L	10		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920) — Lab Sample ID: 680-181894-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	2.6		1.0	0.33	ug/L	1		8260B	Total/NA
Chloroform	1.4		1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	8.0		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.1		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	17		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	8.0		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	2.6		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	120		1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	1.5		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	2.6		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	94		10	3.1	ug/L	10		314.0	Total/NA

Client Sample ID: GM-26S (031920) — Lab Sample ID: 680-181894-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	1.8		1.0	0.33	ug/L	1		8260B	Total/NA
Chloroform	0.56	J	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	6.9		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.59	J	1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.50	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	10		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	6.9		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	1.6		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	170		1.0	0.48	ug/L	1		8260B	Total/NA
1,4-Dioxane	1.5		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	130		10	3.1	ug/L	10		314.0	Total/NA

Client Sample ID: GM-31M (031920) — Lab Sample ID: 680-181894-7

No Detections.

Client Sample ID: GM-31S (031920) — Lab Sample ID: 680-181894-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	1.1		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: DUP-02 (031920) — Lab Sample ID: 680-181894-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	1.1		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: Trip Blank — Lab Sample ID: 680-181894-10

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920)

Date Collected: 03/19/20 13:35
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-1

Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 18:41	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 18:41	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 18:41	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 18:41	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 18:41	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 18:41	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 18:41	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 18:41	1
Carbon tetrachloride	**0.83**	**J**	1.0	0.33	ug/L			03/30/20 18:41	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 18:41	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 18:41	1
Chloroform	**0.92**	**J**	1.0	0.50	ug/L			03/30/20 18:41	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 18:41	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 18:41	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
cis-1,2-Dichloroethene	**12**		1.0	0.41	ug/L			03/30/20 18:41	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 18:41	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 18:41	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 18:41	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 18:41	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 18:41	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 18:41	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 18:41	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 18:41	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 18:41	1
1,1-Dichloroethane	**1.8**		1.0	0.38	ug/L			03/30/20 18:41	1
1,2-Dichloroethane	**0.86**	**J**	1.0	0.50	ug/L			03/30/20 18:41	1
1,1-Dichloroethene	**31**		1.0	0.36	ug/L			03/30/20 18:41	1
1,2-Dichloroethene, Total	**12**		2.0	0.37	ug/L			03/30/20 18:41	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 18:41	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 18:41	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:41	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 18:41	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 18:41	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 18:41	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 18:41	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 18:41	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 18:41	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 18:41	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:41	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 18:41	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 18:41	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 18:41	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 18:41	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 18:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920)
Date Collected: 03/19/20 13:35
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-1
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:41	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 18:41	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 18:41	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 18:41	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 18:41	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 18:41	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
1,1,1-Trichloroethane	**5.1**		1.0	0.37	ug/L			03/30/20 18:41	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 18:41	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 18:41	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 18:41	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:41	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 18:41	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 18:41	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 18:41	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 18:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*03/30/20 18:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 18:41*	*1*
Dibromofluoromethane (Surr)	*117*		*80 - 122*		*03/30/20 18:41*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 18:41*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**170**		5.0	2.4	ug/L			04/02/20 15:15	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/02/20 15:15*	*5*
1,2-Dichloroethane-d4 (Surr)	*115*		*73 - 131*		*04/02/20 15:15*	*5*
Dibromofluoromethane (Surr)	*115*		*80 - 122*		*04/02/20 15:15*	*5*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*		*04/02/20 15:15*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**3.0**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 02:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*71*		*41 - 144*	*03/24/20 15:33*	*03/25/20 02:35*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**1.5**		1.0	0.40	mg/L			03/30/20 13:46	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**210**		50	16	ug/L			03/27/20 01:06	50

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920)
Date Collected: 03/19/20 13:35
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-1
Matrix: GW

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	59		50	17	ug/L		03/25/20 14:00	03/26/20 20:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:23	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21S (031920)
Date Collected: 03/19/20 12:30
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-2
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 16:23	10
Benzene	<10		10	4.3	ug/L			03/30/20 16:23	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 16:23	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 16:23	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 16:23	10
Bromoform	<10		10	4.3	ug/L			03/30/20 16:23	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 16:23	10
2-Butanone	<100		100	34	ug/L			03/30/20 16:23	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 16:23	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 16:23	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 16:23	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 16:23	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L			03/30/20 16:23	10
Chloroform	<10		10	5.0	ug/L			03/30/20 16:23	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 16:23	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 16:23	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 16:23	10
cis-1,2-Dichloroethene	**27**		10	4.1	ug/L			03/30/20 16:23	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 16:23	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 16:23	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 16:23	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 16:23	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 16:23	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 16:23	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 16:23	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 16:23	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 16:23	10
1,1-Dichloroethane	**11**		10	3.8	ug/L			03/30/20 16:23	10
1,2-Dichloroethane	**5.9**	**J**	10	5.0	ug/L			03/30/20 16:23	10
1,1-Dichloroethene	**200**		10	3.6	ug/L			03/30/20 16:23	10
1,2-Dichloroethene, Total	**27**		20	3.7	ug/L			03/30/20 16:23	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 16:23	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 16:23	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 16:23	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 16:23	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 16:23	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 16:23	10
2-Hexanone	<100		100	20	ug/L			03/30/20 16:23	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 16:23	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 16:23	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 16:23	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 16:23	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 16:23	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 16:23	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 16:23	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 16:23	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 16:23	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 16:23	10
Styrene	<10		10	2.7	ug/L			03/30/20 16:23	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21S (031920)

Date Collected: 03/19/20 12:30
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-2

Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 16:23	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 16:23	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 16:23	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 16:23	10
Toluene	<10		10	4.8	ug/L			03/30/20 16:23	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 16:23	10
trans-1,3-Dichloropropene	<10	*	10	4.2	ug/L			03/30/20 16:23	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:23	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:23	10
1,1,1-Trichloroethane	**72**		10	3.7	ug/L			03/30/20 16:23	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 16:23	10
Trichloroethene	**1000**		10	4.8	ug/L			03/30/20 16:23	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 16:23	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 16:23	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 16:23	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 16:23	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 16:23	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 16:23	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 16:23	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:23*	*10*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:23*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:23*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:23*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**25**		2.0	0.87	ug/L		03/24/20 15:33	03/25/20 08:36	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/24/20 15:33*	*03/25/20 08:36*	*5*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**600**		50	16	ug/L			03/27/20 01:28	50

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22M (031920)
Date Collected: 03/19/20 10:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-3
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 16:47	10
Benzene	<10		10	4.3	ug/L			03/30/20 16:47	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 16:47	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 16:47	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 16:47	10
Bromoform	<10		10	4.3	ug/L			03/30/20 16:47	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 16:47	10
2-Butanone	<100		100	34	ug/L			03/30/20 16:47	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 16:47	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 16:47	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 16:47	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 16:47	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L			03/30/20 16:47	10
Chloroform	<10		10	5.0	ug/L			03/30/20 16:47	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 16:47	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 16:47	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 16:47	10
cis-1,2-Dichloroethene	**23**		10	4.1	ug/L			03/30/20 16:47	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 16:47	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 16:47	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 16:47	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 16:47	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 16:47	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 16:47	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 16:47	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 16:47	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 16:47	10
1,1-Dichloroethane	**12**		10	3.8	ug/L			03/30/20 16:47	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 16:47	10
1,1-Dichloroethene	**240**		10	3.6	ug/L			03/30/20 16:47	10
1,2-Dichloroethene, Total	**23**		20	3.7	ug/L			03/30/20 16:47	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 16:47	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 16:47	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 16:47	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 16:47	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 16:47	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 16:47	10
2-Hexanone	<100		100	20	ug/L			03/30/20 16:47	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 16:47	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 16:47	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 16:47	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 16:47	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 16:47	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 16:47	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 16:47	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 16:47	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 16:47	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 16:47	10
Styrene	<10		10	2.7	ug/L			03/30/20 16:47	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22M (031920)
Date Collected: 03/19/20 10:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-3
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 16:47	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 16:47	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 16:47	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 16:47	10
Toluene	<10		10	4.8	ug/L			03/30/20 16:47	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 16:47	10
trans-1,3-Dichloropropene	<10	*	10	4.2	ug/L			03/30/20 16:47	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:47	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:47	10
1,1,1-Trichloroethane	**110**		10	3.7	ug/L			03/30/20 16:47	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 16:47	10
Trichloroethene	**1100**		10	4.8	ug/L			03/30/20 16:47	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 16:47	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 16:47	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 16:47	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 16:47	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 16:47	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 16:47	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 16:47	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:47*	*10*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/30/20 16:47*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:47*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:47*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**11**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:17*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.2**		1.0	0.40	mg/L			03/30/20 13:58	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**66**		10	3.1	ug/L			03/27/20 01:51	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.57**	**J**	1.0	0.50	mg/L			03/30/20 15:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22S (031920)
Date Collected: 03/19/20 09:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-4
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 17:10	10
Benzene	<10		10	4.3	ug/L			03/30/20 17:10	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 17:10	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 17:10	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 17:10	10
Bromoform	<10		10	4.3	ug/L			03/30/20 17:10	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 17:10	10
2-Butanone	<100		100	34	ug/L			03/30/20 17:10	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 17:10	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 17:10	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 17:10	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 17:10	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L			03/30/20 17:10	10
Chloroform	<10		10	5.0	ug/L			03/30/20 17:10	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 17:10	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 17:10	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 17:10	10
cis-1,2-Dichloroethene	**17**		10	4.1	ug/L			03/30/20 17:10	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 17:10	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 17:10	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 17:10	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 17:10	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 17:10	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 17:10	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 17:10	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 17:10	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 17:10	10
1,1-Dichloroethane	**9.6**	**J**	10	3.8	ug/L			03/30/20 17:10	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 17:10	10
1,1-Dichloroethene	**200**		10	3.6	ug/L			03/30/20 17:10	10
1,2-Dichloroethene, Total	**17**	**J**	20	3.7	ug/L			03/30/20 17:10	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 17:10	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 17:10	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 17:10	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 17:10	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 17:10	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 17:10	10
2-Hexanone	<100		100	20	ug/L			03/30/20 17:10	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 17:10	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 17:10	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 17:10	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 17:10	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 17:10	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 17:10	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 17:10	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 17:10	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 17:10	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 17:10	10
Styrene	<10		10	2.7	ug/L			03/30/20 17:10	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22S (031920)

Date Collected: 03/19/20 09:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-4

Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 17:10	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 17:10	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 17:10	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 17:10	10
Toluene	<10		10	4.8	ug/L			03/30/20 17:10	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 17:10	10
trans-1,3-Dichloropropene	<10	*	10	4.2	ug/L			03/30/20 17:10	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 17:10	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 17:10	10
1,1,1-Trichloroethane	**77**		10	3.7	ug/L			03/30/20 17:10	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 17:10	10
Trichloroethene	**890**		10	4.8	ug/L			03/30/20 17:10	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 17:10	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 17:10	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 17:10	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 17:10	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 17:10	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 17:10	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 17:10	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 17:10*	*10*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/30/20 17:10*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 17:10*	*10*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:10*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**10**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:38*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**55**		10	3.1	ug/L			03/27/20 02:14	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)
Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 16:44	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 16:44	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 16:44	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 16:44	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 16:44	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 16:44	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 16:44	1
Carbon tetrachloride	**2.6**		1.0	0.33	ug/L			03/30/20 16:44	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 16:44	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 16:44	1
Chloroform	**1.4**		1.0	0.50	ug/L			03/30/20 16:44	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 16:44	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 16:44	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
cis-1,2-Dichloroethene	**8.0**		1.0	0.41	ug/L			03/30/20 16:44	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 16:44	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 16:44	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 16:44	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 16:44	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 16:44	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 16:44	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 16:44	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 16:44	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 16:44	1
1,1-Dichloroethane	**1.1**		1.0	0.38	ug/L			03/30/20 16:44	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
1,1-Dichloroethene	**17**		1.0	0.36	ug/L			03/30/20 16:44	1
1,2-Dichloroethene, Total	**8.0**		2.0	0.37	ug/L			03/30/20 16:44	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 16:44	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 16:44	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 16:44	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 16:44	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 16:44	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 16:44	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 16:44	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 16:44	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 16:44	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 16:44	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:44	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 16:44	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 16:44	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 16:44	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 16:44	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 16:44	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)

Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5

Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 16:44	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 16:44	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 16:44	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 16:44	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 16:44	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 16:44	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
1,1,1-Trichloroethane	**2.6**		1.0	0.37	ug/L			03/30/20 16:44	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 16:44	1
Trichloroethene	**120**		1.0	0.48	ug/L			03/31/20 15:58	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 16:44	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 16:44	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:44	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 16:44	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 16:44	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 16:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*80 - 120*		*03/30/20 16:44*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 15:58*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:44*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*03/31/20 15:58*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*03/30/20 16:44*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 122*		*03/31/20 15:58*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 16:44*	*1*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*		*03/31/20 15:58*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**1.5**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*75*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:59*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**2.6**		1.0	0.40	mg/L			03/30/20 14:11	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**94**		10	3.1	ug/L			03/27/20 02:37	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)
Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5
Matrix: GW

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:58	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26S (031920)
Date Collected: 03/19/20 13:15
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-6
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:07	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:07	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:07	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:07	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 17:07	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 17:07	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:07	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:07	1
Carbon tetrachloride	**1.8**		1.0	0.33	ug/L			03/30/20 17:07	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:07	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 17:07	1
Chloroform	**0.56**	**J**	1.0	0.50	ug/L			03/30/20 17:07	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:07	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:07	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
cis-1,2-Dichloroethene	**6.9**		1.0	0.41	ug/L			03/30/20 17:07	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:07	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:07	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:07	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 17:07	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 17:07	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:07	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:07	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:07	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:07	1
1,1-Dichloroethane	**0.59**	**J**	1.0	0.38	ug/L			03/30/20 17:07	1
1,2-Dichloroethane	**0.50**	**J**	1.0	0.50	ug/L			03/30/20 17:07	1
1,1-Dichloroethene	**10**		1.0	0.36	ug/L			03/30/20 17:07	1
1,2-Dichloroethene, Total	**6.9**		2.0	0.37	ug/L			03/30/20 17:07	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:07	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:07	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:07	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:07	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:07	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:07	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:07	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:07	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:07	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:07	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:07	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:07	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:07	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:07	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:07	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:07	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26S (031920)
Date Collected: 03/19/20 13:15
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-6
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:07	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:07	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:07	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:07	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:07	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:07	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
1,1,1-Trichloroethane	**1.6**		1.0	0.37	ug/L			03/30/20 17:07	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:07	1
Trichloroethene	**170**		1.0	0.48	ug/L			03/30/20 17:07	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:07	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:07	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:07	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:07	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:07	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:07	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 17:07*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:07*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*03/30/20 17:07*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:07*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**1.5**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 04:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*41 - 144*	*03/24/20 15:33*	*03/25/20 04:21*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**130**		10	3.1	ug/L			03/27/20 03:00	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31M (031920)
Date Collected: 03/19/20 11:10
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-7
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:31	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:31	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:31	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 17:31	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 17:31	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:31	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:31	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:31	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 17:31	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:31	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:31	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 17:31	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:31	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:31	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:31	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 17:31	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 17:31	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:31	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:31	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:31	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 17:31	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 17:31	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 17:31	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:31	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:31	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:31	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:31	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:31	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:31	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:31	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:31	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:31	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:31	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:31	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:31	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:31	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31M (031920)
Date Collected: 03/19/20 11:10
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-7
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:31	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:31	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:31	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:31	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:31	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:31	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:31	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:31	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:31	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/30/20 17:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:31*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*03/30/20 17:31*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:31*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 04:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*63*		*41 - 144*	*03/24/20 15:33*	*03/25/20 04:42*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/25/20 04:20	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31S (031920)
Date Collected: 03/19/20 10:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-8
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:54	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:54	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:54	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 17:54	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 17:54	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:54	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:54	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:54	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 17:54	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:54	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:54	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 17:54	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:54	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:54	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:54	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 17:54	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 17:54	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:54	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:54	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:54	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 17:54	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 17:54	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 17:54	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:54	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:54	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:54	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:54	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:54	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:54	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:54	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:54	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:54	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:54	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:54	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:54	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:54	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31S (031920)
Date Collected: 03/19/20 10:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-8
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:54	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:54	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:54	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:54	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:54	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:54	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:54	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:54	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:54	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 17:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:54*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*03/30/20 17:54*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:54*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 05:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*73*		*41 - 144*	*03/24/20 15:33*	*03/25/20 05:03*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.1**		1.0	0.31	ug/L			03/25/20 04:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: DUP-02 (031920)
Date Collected: 03/19/20 12:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-9
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 18:18	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 18:18	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 18:18	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 18:18	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 18:18	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 18:18	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 18:18	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 18:18	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 18:18	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 18:18	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 18:18	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 18:18	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 18:18	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 18:18	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 18:18	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 18:18	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 18:18	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 18:18	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 18:18	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 18:18	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 18:18	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 18:18	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 18:18	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 18:18	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 18:18	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:18	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 18:18	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 18:18	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 18:18	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 18:18	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 18:18	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 18:18	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:18	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 18:18	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 18:18	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 18:18	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 18:18	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: DUP-02 (031920)
Date Collected: 03/19/20 12:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-9
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:18	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 18:18	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 18:18	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 18:18	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 18:18	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 18:18	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:18	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 18:18	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 18:18	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 18:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 18:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 18:18*	*1*
Dibromofluoromethane (Surr)	*116*		*80 - 122*		*03/30/20 18:18*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 18:18*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 05:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*66*		*41 - 144*	*03/24/20 15:33*	*03/25/20 05:24*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.1**		1.0	0.31	ug/L			03/25/20 05:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: Trip Blank

Lab Sample ID: 680-181894-10

Date Collected: 03/19/20 00:00

Matrix: Water

Date Received: 03/21/20 09:50

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 15:57	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 15:57	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 15:57	1
Bromoform	<1.0	*	1.0	0.43	ug/L			03/30/20 15:57	1
Bromomethane	<5.0	* *1	5.0	2.5	ug/L			03/30/20 15:57	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 15:57	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 15:57	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 15:57	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 15:57	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 15:57	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 15:57	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 15:57	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 15:57	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 15:57	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 15:57	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 15:57	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 15:57	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 15:57	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 15:57	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 15:57	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 15:57	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 15:57	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 15:57	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 15:57	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 15:57	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 15:57	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 15:57	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 15:57	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 15:57	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 15:57	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 15:57	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 15:57	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:57	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 15:57	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 15:57	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 15:57	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 15:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: Trip Blank
Date Collected: 03/19/20 00:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 15:57	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 15:57	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 15:57	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 15:57	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 15:57	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 15:57	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:57	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 15:57	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 15:57	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 15:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 15:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 15:57*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*03/30/20 15:57*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 15:57*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: GW

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181894-1	GM-21M (031920)	102	106	117	95
680-181894-1 - DL	GM-21M (031920)	106	115	115	111
680-181894-2	GM-21S (031920)	105	107	108	95
680-181894-3	GM-22M (031920)	105	108	108	95
680-181894-4	GM-22S (031920)	104	108	108	96
680-181894-5	GM-26M (031920)	101	107	120	94
680-181894-5	GM-26M (031920)	107	98	106	106
680-181894-6	GM-26S (031920)	104	107	118	96
680-181894-7	GM-31M (031920)	108	107	120	96
680-181894-8	GM-31S (031920)	107	107	119	96
680-181894-9	DUP-02 (031920)	107	105	116	95

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181894-10	Trip Blank	107	105	119	94
LCS 680-613128/4	Lab Control Sample	116	108	114	103
LCS 680-613140/4	Lab Control Sample	110	106	111	106
LCS 680-613341/1002	Lab Control Sample	104	111	117	104
LCS 680-613695/4	Lab Control Sample	110	104	107	110
LCSD 680-613128/5	Lab Control Sample Dup	115	114	117	104
LCSD 680-613140/5	Lab Control Sample Dup	113	109	113	107
LCSD 680-613341/4	Lab Control Sample Dup	103	115	116	102
LCSD 680-613695/5	Lab Control Sample Dup	110	105	110	111
MB 680-613128/10	Method Blank	108	103	120	96
MB 680-613140/10	Method Blank	106	104	108	94
MB 680-613341/9	Method Blank	107	96	105	105
MB 680-613695/10	Method Blank	105	106	107	99

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: GW

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		NBZ
Lab Sample ID	Client Sample ID	(41-144)
680-181894-1	GM-21M (031920)	71

Surrogate Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Matrix: GW
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		NBZ
Lab Sample ID	Client Sample ID	(41-144)
680-181894-2	GM-21S (031920)	81
680-181894-3	GM-22M (031920)	81
680-181894-4	GM-22S (031920)	79
680-181894-5	GM-26M (031920)	75
680-181894-6	GM-26S (031920)	79
680-181894-7	GM-31M (031920)	63
680-181894-8	GM-31S (031920)	73
680-181894-9	DUP-02 (031920)	66

Surrogate Legend

NBZ = Nitrobenzene-d5

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		NBZ
Lab Sample ID	Client Sample ID	(41-144)
LCS 460-683327/2-A	Lab Control Sample	70
LCSD 460-683327/3-A	Lab Control Sample Dup	78
MB 460-683327/1-A	Method Blank	80

Surrogate Legend

NBZ = Nitrobenzene-d5

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613128/10
Matrix: Water
Analysis Batch: 613128

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 10:57	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 10:57	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 10:57	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 10:57	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 10:57	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 10:57	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 10:57	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 10:57	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 10:57	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 10:57	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 10:57	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 10:57	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 10:57	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 10:57	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 10:57	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 10:57	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 10:57	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 10:57	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 10:57	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 10:57	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 10:57	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 10:57	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 10:57	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 10:57	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 10:57	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 10:57	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 10:57	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 10:57	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 10:57	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 10:57	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 10:57	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 10:57	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 10:57	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 10:57	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 10:57	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 10:57	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 10:57	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 10:57	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 10:57	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:57	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 10:57	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 10:57	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 10:57	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 10:57	1

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

Lab Sample ID: MB 680-613128/10
Matrix: Water
Analysis Batch: 613128

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 10:57	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 10:57	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:57	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 10:57	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 10:57	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 10:57	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 10:57	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 10:57	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:57	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:57	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 10:57	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 10:57	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 10:57	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 10:57	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:57	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 10:57	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 10:57	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 10:57	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 10:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/30/20 10:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*03/30/20 10:57*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*03/30/20 10:57*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 10:57*	*1*

Lab Sample ID: LCS 680-613128/4
Matrix: Water
Analysis Batch: 613128

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	294		ug/L		118	70 - 135
Benzene	50.0	55.6		ug/L		111	80 - 120
Bromobenzene	50.0	60.2		ug/L		120	80 - 121
Bromochloromethane	50.0	55.2		ug/L		110	80 - 120
Bromodichloromethane	50.0	55.7		ug/L		111	80 - 120
Bromoform	50.0	62.0		ug/L		124	74 - 126
Bromomethane	50.0	89.9	*	ug/L		180	62 - 130
2-Butanone	250	276		ug/L		110	80 - 131
Carbon disulfide	50.0	52.0		ug/L		104	80 - 120
Carbon tetrachloride	50.0	59.7		ug/L		119	76 - 123
Chlorobenzene	50.0	57.2		ug/L		114	80 - 120
Chloroethane	50.0	58.5		ug/L		117	66 - 135
2-Chloroethyl vinyl ether	50.0	51.4		ug/L		103	71 - 135
Chloroform	50.0	54.3		ug/L		109	80 - 120
Chloromethane	50.0	48.8		ug/L		98	69 - 131
2-Chlorotoluene	50.0	57.6		ug/L		115	80 - 120

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

Lab Sample ID: LCS 680-613128/4
Matrix: Water
Analysis Batch: 613128

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	57.6		ug/L		115	80 - 120
cis-1,2-Dichloroethene	50.0	55.9		ug/L		112	80 - 120
cis-1,3-Dichloropropene	50.0	57.7		ug/L		115	80 - 120
Dibromochloromethane	50.0	56.3		ug/L		113	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	52.5		ug/L		105	71 - 134
1,2-Dibromoethane	50.0	57.1		ug/L		114	80 - 120
Dibromomethane	50.0	56.7		ug/L		113	80 - 120
1,2-Dichlorobenzene	50.0	54.5		ug/L		109	80 - 120
1,3-Dichlorobenzene	50.0	54.0		ug/L		108	80 - 120
1,4-Dichlorobenzene	50.0	52.1		ug/L		104	80 - 120
Dichlorodifluoromethane	50.0	60.2		ug/L		120	47 - 155
1,1-Dichloroethane	50.0	54.5		ug/L		109	80 - 120
1,2-Dichloroethane	50.0	53.8		ug/L		108	80 - 120
1,1-Dichloroethene	50.0	58.9		ug/L		118	76 - 120
1,2-Dichloroethene, Total	100	113		ug/L		113	80 - 120
1,2-Dichloropropane	50.0	54.4		ug/L		109	80 - 120
1,3-Dichloropropane	50.0	54.3		ug/L		109	80 - 120
2,2-Dichloropropane	50.0	70.8	*	ug/L		142	76 - 126
1,1-Dichloropropene	50.0	57.9		ug/L		116	80 - 120
Ethylbenzene	50.0	57.3		ug/L		115	80 - 120
Hexachlorobutadiene	50.0	60.6		ug/L		121	60 - 140
2-Hexanone	250	262		ug/L		105	74 - 127
Isopropylbenzene	50.0	58.1		ug/L		116	80 - 120
Methylene Chloride	50.0	49.6		ug/L		99	80 - 120
4-Methyl-2-pentanone	250	264		ug/L		106	76 - 124
Methyl tert-butyl ether	50.0	54.5		ug/L		109	80 - 120
m-Xylene & p-Xylene	50.0	57.2		ug/L		114	80 - 120
n-Butylbenzene	50.0	48.1		ug/L		96	80 - 120
N-Propylbenzene	50.0	58.6		ug/L		117	80 - 120
o-Xylene	50.0	58.6		ug/L		117	80 - 120
p-Isopropyltoluene	50.0	54.1		ug/L		108	80 - 120
sec-Butylbenzene	50.0	56.1		ug/L		112	80 - 120
Styrene	50.0	60.0		ug/L		120	80 - 120
tert-Butylbenzene	50.0	55.9		ug/L		112	80 - 121
1,1,1,2-Tetrachloroethane	50.0	63.6	*	ug/L		127	80 - 121
1,1,2,2-Tetrachloroethane	50.0	56.9		ug/L		114	80 - 120
Tetrachloroethene	50.0	60.7		ug/L		121	80 - 121
Toluene	50.0	55.7		ug/L		111	80 - 113
trans-1,2-Dichloroethene	50.0	57.0		ug/L		114	80 - 120
trans-1,3-Dichloropropene	50.0	58.7		ug/L		117	80 - 120
1,2,3-Trichlorobenzene	50.0	60.7		ug/L		121	61 - 141
1,2,4-Trichlorobenzene	50.0	59.3		ug/L		119	68 - 128
1,1,1-Trichloroethane	50.0	57.2		ug/L		114	80 - 120
1,1,2-Trichloroethane	50.0	55.4		ug/L		111	80 - 120
Trichloroethene	50.0	59.3		ug/L		119	80 - 120
Trichlorofluoromethane	50.0	61.4		ug/L		123	60 - 141
1,2,3-Trichloropropane	50.0	55.3		ug/L		111	80 - 123
1,2,4-Trimethylbenzene	50.0	56.2		ug/L		112	80 - 120
1,3,5-Trimethylbenzene	50.0	55.2		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613128/4
Matrix: Water
Analysis Batch: 613128

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	144	*	ug/L		144	67 - 135
Vinyl chloride	50.0	53.4		ug/L		107	71 - 128
Xylenes, Total	100	116		ug/L		116	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*116*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*114*		*80 - 122*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*

Lab Sample ID: LCSD 680-613128/5
Matrix: Water
Analysis Batch: 613128

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
Acetone	250	326		ug/L		130	70 - 135	10	30
Benzene	50.0	54.8		ug/L		110	80 - 120	1	20
Bromobenzene	50.0	60.7		ug/L		121	80 - 121	1	20
Bromochloromethane	50.0	53.6		ug/L		107	80 - 120	3	20
Bromodichloromethane	50.0	57.3		ug/L		115	80 - 120	3	20
Bromoform	50.0	65.1	*	ug/L		130	74 - 126	5	20
Bromomethane	50.0	111	* E *1	ug/L		221	62 - 130	21	20
2-Butanone	250	291		ug/L		116	80 - 131	5	20
Carbon disulfide	50.0	49.5		ug/L		99	80 - 120	5	20
Carbon tetrachloride	50.0	56.5		ug/L		113	76 - 123	6	20
Chlorobenzene	50.0	57.5		ug/L		115	80 - 120	0	20
Chloroethane	50.0	54.9		ug/L		110	66 - 135	6	20
2-Chloroethyl vinyl ether	50.0	54.8		ug/L		110	71 - 135	7	50
Chloroform	50.0	54.7		ug/L		109	80 - 120	1	20
Chloromethane	50.0	46.8		ug/L		94	69 - 131	4	30
2-Chlorotoluene	50.0	56.9		ug/L		114	80 - 120	1	20
4-Chlorotoluene	50.0	57.1		ug/L		114	80 - 120	1	20
cis-1,2-Dichloroethene	50.0	56.4		ug/L		113	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	59.7		ug/L		119	80 - 120	4	20
Dibromochloromethane	50.0	59.5		ug/L		119	80 - 121	6	20
1,2-Dibromo-3-Chloropropane	50.0	56.2		ug/L		112	71 - 134	7	20
1,2-Dibromoethane	50.0	60.6	*	ug/L		121	80 - 120	6	20
Dibromomethane	50.0	60.3	*	ug/L		121	80 - 120	6	20
1,2-Dichlorobenzene	50.0	55.9		ug/L		112	80 - 120	3	20
1,3-Dichlorobenzene	50.0	55.4		ug/L		111	80 - 120	3	20
1,4-Dichlorobenzene	50.0	53.4		ug/L		107	80 - 120	2	20
Dichlorodifluoromethane	50.0	56.1		ug/L		112	47 - 155	7	40
1,1-Dichloroethane	50.0	54.2		ug/L		108	80 - 120	1	20
1,2-Dichloroethane	50.0	56.4		ug/L		113	80 - 120	5	50
1,1-Dichloroethene	50.0	56.8		ug/L		114	76 - 120	4	20
1,2-Dichloroethene, Total	100	112		ug/L		112	80 - 120	1	20
1,2-Dichloropropane	50.0	56.5		ug/L		113	80 - 120	4	20
1,3-Dichloropropane	50.0	58.7		ug/L		117	80 - 120	8	20

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

Lab Sample ID: LCSD 680-613128/5
Matrix: Water
Analysis Batch: 613128

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
2,2-Dichloropropane	50.0	69.0	*	ug/L		138	76 - 126	3	20
1,1-Dichloropropene	50.0	55.3		ug/L		111	80 - 120	5	20
Ethylbenzene	50.0	56.5		ug/L		113	80 - 120	1	20
Hexachlorobutadiene	50.0	59.6		ug/L		119	60 - 140	2	20
2-Hexanone	250	279		ug/L		112	74 - 127	6	20
Isopropylbenzene	50.0	56.2		ug/L		112	80 - 120	3	20
Methylene Chloride	50.0	51.3		ug/L		103	80 - 120	3	20
4-Methyl-2-pentanone	250	287		ug/L		115	76 - 124	8	20
Methyl tert-butyl ether	50.0	58.9		ug/L		118	80 - 120	8	20
m-Xylene & p-Xylene	50.0	56.5		ug/L		113	80 - 120	1	20
n-Butylbenzene	50.0	46.5		ug/L		93	80 - 120	3	20
N-Propylbenzene	50.0	56.9		ug/L		114	80 - 120	3	20
o-Xylene	50.0	57.6		ug/L		115	80 - 120	2	30
p-Isopropyltoluene	50.0	53.0		ug/L		106	80 - 120	2	20
sec-Butylbenzene	50.0	53.9		ug/L		108	80 - 120	4	20
Styrene	50.0	59.6		ug/L		119	80 - 120	1	20
tert-Butylbenzene	50.0	54.3		ug/L		109	80 - 121	3	20
1,1,1,2-Tetrachloroethane	50.0	64.2	*	ug/L		128	80 - 121	1	20
1,1,2,2-Tetrachloroethane	50.0	59.9		ug/L		120	80 - 120	5	20
Tetrachloroethene	50.0	59.0		ug/L		118	80 - 121	3	20
Toluene	50.0	54.8		ug/L		110	80 - 113	2	20
trans-1,2-Dichloroethene	50.0	55.4		ug/L		111	80 - 120	3	20
trans-1,3-Dichloropropene	50.0	61.7	*	ug/L		123	80 - 120	5	30
1,2,3-Trichlorobenzene	50.0	64.3		ug/L		129	61 - 141	6	20
1,2,4-Trichlorobenzene	50.0	61.1		ug/L		122	68 - 128	3	20
1,1,1-Trichloroethane	50.0	56.2		ug/L		112	80 - 120	2	20
1,1,2-Trichloroethane	50.0	58.1		ug/L		116	80 - 120	5	20
Trichloroethene	50.0	58.0		ug/L		116	80 - 120	2	20
Trichlorofluoromethane	50.0	58.0		ug/L		116	60 - 141	6	20
1,2,3-Trichloropropane	50.0	59.9		ug/L		120	80 - 123	8	30
1,2,4-Trimethylbenzene	50.0	55.5		ug/L		111	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	53.7		ug/L		107	80 - 120	3	20
Vinyl acetate	100	152	*	ug/L		152	67 - 135	6	20
Vinyl chloride	50.0	50.0		ug/L		100	71 - 128	7	20
Xylenes, Total	100	114		ug/L		114	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*115*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*114*		*73 - 131*
Dibromofluoromethane (Surr)	*117*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 10:55	1

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

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 10:55	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 10:55	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 10:55	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 10:55	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/30/20 10:55	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 10:55	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 10:55	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 10:55	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 10:55	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 10:55	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 10:55	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 10:55	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 10:55	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 10:55	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 10:55	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 10:55	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 10:55	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 10:55	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 10:55	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 10:55	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 10:55	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 10:55	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 10:55	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 10:55	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 10:55	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:55	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 10:55	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 10:55	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 10:55	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 10:55	1

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

Lab Sample ID: MB 680-613140/10
Matrix: Water
Analysis Batch: 613140

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 10:55	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 10:55	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 10:55	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 10:55	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 10:55	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 10:55	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 10:55	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 10:55	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 10:55	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 10:55	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 10:55	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 10:55	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 10:55	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/30/20 10:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 10:55*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 10:55*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 10:55*	*1*

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	261		ug/L		104	70 - 135
Benzene	50.0	53.3		ug/L		107	80 - 120
Bromobenzene	50.0	55.0		ug/L		110	80 - 121
Bromochloromethane	50.0	54.4		ug/L		109	80 - 120
Bromodichloromethane	50.0	56.1		ug/L		112	80 - 120
Bromoform	50.0	60.0		ug/L		120	74 - 126
Bromomethane	50.0	110	E *	ug/L		221	62 - 130
2-Butanone	250	271		ug/L		108	80 - 131
Carbon disulfide	50.0	52.3		ug/L		105	80 - 120
Carbon tetrachloride	50.0	54.2		ug/L		108	76 - 123
Chlorobenzene	50.0	54.0		ug/L		108	80 - 120
Chloroethane	50.0	69.5	*	ug/L		139	66 - 135
2-Chloroethyl vinyl ether	50.0	57.3		ug/L		115	71 - 135
Chloroform	50.0	53.9		ug/L		108	80 - 120
Chloromethane	50.0	50.1		ug/L		100	69 - 131
2-Chlorotoluene	50.0	54.3		ug/L		109	80 - 120
4-Chlorotoluene	50.0	54.1		ug/L		108	80 - 120
cis-1,2-Dichloroethene	50.0	54.0		ug/L		108	80 - 120

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

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	58.0		ug/L		116	80 - 120
Dibromochloromethane	50.0	58.2		ug/L		116	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	56.0		ug/L		112	71 - 134
1,2-Dibromoethane	50.0	56.8		ug/L		114	80 - 120
Dibromomethane	50.0	54.2		ug/L		108	80 - 120
1,2-Dichlorobenzene	50.0	54.0		ug/L		108	80 - 120
1,3-Dichlorobenzene	50.0	53.7		ug/L		107	80 - 120
1,4-Dichlorobenzene	50.0	52.6		ug/L		105	80 - 120
Dichlorodifluoromethane	50.0	51.7		ug/L		103	47 - 155
1,1-Dichloroethane	50.0	53.2		ug/L		106	80 - 120
1,2-Dichloroethane	50.0	53.9		ug/L		108	80 - 120
1,1-Dichloroethene	50.0	51.9		ug/L		104	76 - 120
1,2-Dichloroethene, Total	100	108		ug/L		108	80 - 120
1,2-Dichloropropane	50.0	54.9		ug/L		110	80 - 120
1,3-Dichloropropane	50.0	55.0		ug/L		110	80 - 120
2,2-Dichloropropane	50.0	59.0		ug/L		118	76 - 126
1,1-Dichloropropene	50.0	54.3		ug/L		109	80 - 120
Ethylbenzene	50.0	54.6		ug/L		109	80 - 120
Hexachlorobutadiene	50.0	55.8		ug/L		112	60 - 140
2-Hexanone	250	273		ug/L		109	74 - 127
Isopropylbenzene	50.0	55.2		ug/L		110	80 - 120
Methylene Chloride	50.0	49.0		ug/L		98	80 - 120
4-Methyl-2-pentanone	250	271		ug/L		108	76 - 124
Methyl tert-butyl ether	50.0	54.3		ug/L		109	80 - 120
m-Xylene & p-Xylene	50.0	54.7		ug/L		109	80 - 120
n-Butylbenzene	50.0	52.8		ug/L		106	80 - 120
N-Propylbenzene	50.0	54.6		ug/L		109	80 - 120
o-Xylene	50.0	55.2		ug/L		110	80 - 120
p-Isopropyltoluene	50.0	53.9		ug/L		108	80 - 120
sec-Butylbenzene	50.0	54.4		ug/L		109	80 - 120
Styrene	50.0	57.2		ug/L		114	80 - 120
tert-Butylbenzene	50.0	54.6		ug/L		109	80 - 121
1,1,1,2-Tetrachloroethane	50.0	56.4		ug/L		113	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.6		ug/L		111	80 - 120
Tetrachloroethene	50.0	55.4		ug/L		111	80 - 121
Toluene	50.0	54.6		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	53.7		ug/L		107	80 - 120
trans-1,3-Dichloropropene	50.0	58.5		ug/L		117	80 - 120
1,2,3-Trichlorobenzene	50.0	58.1		ug/L		116	61 - 141
1,2,4-Trichlorobenzene	50.0	58.6		ug/L		117	68 - 128
1,1,1-Trichloroethane	50.0	53.9		ug/L		108	80 - 120
1,1,2-Trichloroethane	50.0	55.8		ug/L		112	80 - 120
Trichloroethene	50.0	54.4		ug/L		109	80 - 120
Trichlorofluoromethane	50.0	52.5		ug/L		105	60 - 141
1,2,3-Trichloropropane	50.0	53.9		ug/L		108	80 - 123
1,2,4-Trimethylbenzene	50.0	56.2		ug/L		112	80 - 120
1,3,5-Trimethylbenzene	50.0	55.6		ug/L		111	80 - 120
Vinyl acetate	100	121		ug/L		121	67 - 135
Vinyl chloride	50.0	49.7		ug/L		99	71 - 128

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

Lab Sample ID: LCS 680-613140/4
Matrix: Water
Analysis Batch: 613140

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	110		ug/L		110	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*
Dibromofluoromethane (Surr)	*111*		*80 - 122*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*

Lab Sample ID: LCSD 680-613140/5
Matrix: Water
Analysis Batch: 613140

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
Acetone			250	267		ug/L		107	70 - 135	2	30
Benzene			50.0	55.1		ug/L		110	80 - 120	3	20
Bromobenzene			50.0	56.0		ug/L		112	80 - 121	2	20
Bromochloromethane			50.0	56.1		ug/L		112	80 - 120	3	20
Bromodichloromethane			50.0	58.1		ug/L		116	80 - 120	4	20
Bromoform			50.0	60.1		ug/L		120	74 - 126	0	20
Bromomethane			50.0	117	E *	ug/L		234	62 - 130	6	20
2-Butanone			250	283		ug/L		113	80 - 131	5	20
Carbon disulfide			50.0	53.7		ug/L		107	80 - 120	3	20
Carbon tetrachloride			50.0	55.6		ug/L		111	76 - 123	3	20
Chlorobenzene			50.0	55.3		ug/L		111	80 - 120	2	20
Chloroethane			50.0	71.4	*	ug/L		143	66 - 135	3	20
2-Chloroethyl vinyl ether			50.0	59.2		ug/L		118	71 - 135	3	50
Chloroform			50.0	55.4		ug/L		111	80 - 120	3	20
Chloromethane			50.0	50.6		ug/L		101	69 - 131	1	30
2-Chlorotoluene			50.0	54.9		ug/L		110	80 - 120	1	20
4-Chlorotoluene			50.0	54.7		ug/L		109	80 - 120	1	20
cis-1,2-Dichloroethene			50.0	55.5		ug/L		111	80 - 120	3	20
cis-1,3-Dichloropropene			50.0	59.6		ug/L		119	80 - 120	3	20
Dibromochloromethane			50.0	60.6		ug/L		121	80 - 121	4	20
1,2-Dibromo-3-Chloropropane			50.0	56.4		ug/L		113	71 - 134	1	20
1,2-Dibromoethane			50.0	58.8		ug/L		118	80 - 120	3	20
Dibromomethane			50.0	56.6		ug/L		113	80 - 120	4	20
1,2-Dichlorobenzene			50.0	54.4		ug/L		109	80 - 120	1	20
1,3-Dichlorobenzene			50.0	54.1		ug/L		108	80 - 120	1	20
1,4-Dichlorobenzene			50.0	52.7		ug/L		105	80 - 120	0	20
Dichlorodifluoromethane			50.0	52.7		ug/L		105	47 - 155	2	40
1,1-Dichloroethane			50.0	55.0		ug/L		110	80 - 120	3	20
1,2-Dichloroethane			50.0	55.8		ug/L		112	80 - 120	3	50
1,1-Dichloroethene			50.0	53.8		ug/L		108	76 - 120	4	20
1,2-Dichloroethene, Total			100	111		ug/L		111	80 - 120	3	20
1,2-Dichloropropane			50.0	56.6		ug/L		113	80 - 120	3	20
1,3-Dichloropropane			50.0	57.0		ug/L		114	80 - 120	4	20
2,2-Dichloropropane			50.0	59.5		ug/L		119	76 - 126	1	20
1,1-Dichloropropene			50.0	55.7		ug/L		111	80 - 120	3	20

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

Lab Sample ID: LCSD 680-613140/5
Matrix: Water
Analysis Batch: 613140

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
Ethylbenzene	50.0	55.3		ug/L		111	80 - 120	1	20
Hexachlorobutadiene	50.0	58.2		ug/L		116	60 - 140	4	20
2-Hexanone	250	282		ug/L		113	74 - 127	3	20
Isopropylbenzene	50.0	56.1		ug/L		112	80 - 120	2	20
Methylene Chloride	50.0	50.9		ug/L		102	80 - 120	4	20
4-Methyl-2-pentanone	250	280		ug/L		112	76 - 124	3	20
Methyl tert-butyl ether	50.0	56.3		ug/L		113	80 - 120	4	20
m-Xylene & p-Xylene	50.0	55.5		ug/L		111	80 - 120	1	20
n-Butylbenzene	50.0	54.1		ug/L		108	80 - 120	2	20
N-Propylbenzene	50.0	55.6		ug/L		111	80 - 120	2	20
o-Xylene	50.0	56.0		ug/L		112	80 - 120	1	30
p-Isopropyltoluene	50.0	54.8		ug/L		110	80 - 120	2	20
sec-Butylbenzene	50.0	55.1		ug/L		110	80 - 120	1	20
Styrene	50.0	58.1		ug/L		116	80 - 120	2	20
tert-Butylbenzene	50.0	55.5		ug/L		111	80 - 121	2	20
1,1,1,2-Tetrachloroethane	50.0	57.2		ug/L		114	80 - 121	1	20
1,1,2,2-Tetrachloroethane	50.0	55.6		ug/L		111	80 - 120	0	20
Tetrachloroethene	50.0	56.4		ug/L		113	80 - 121	2	20
Toluene	50.0	56.3		ug/L		113	80 - 113	3	20
trans-1,2-Dichloroethene	50.0	55.8		ug/L		112	80 - 120	4	20
trans-1,3-Dichloropropene	50.0	60.3	*	ug/L		121	80 - 120	3	30
1,2,3-Trichlorobenzene	50.0	60.0		ug/L		120	61 - 141	3	20
1,2,4-Trichlorobenzene	50.0	58.7		ug/L		117	68 - 128	0	20
1,1,1-Trichloroethane	50.0	55.4		ug/L		111	80 - 120	3	20
1,1,2-Trichloroethane	50.0	57.6		ug/L		115	80 - 120	3	20
Trichloroethene	50.0	56.2		ug/L		112	80 - 120	3	20
Trichlorofluoromethane	50.0	53.4		ug/L		107	60 - 141	2	20
1,2,3-Trichloropropane	50.0	54.8		ug/L		110	80 - 123	2	30
1,2,4-Trimethylbenzene	50.0	57.1		ug/L		114	80 - 120	2	20
1,3,5-Trimethylbenzene	50.0	56.7		ug/L		113	80 - 120	2	20
Vinyl acetate	100	125		ug/L		125	67 - 135	3	20
Vinyl chloride	50.0	50.4		ug/L		101	71 - 128	1	20
Xylenes, Total	100	112		ug/L		112	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*113*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*113*		*80 - 122*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/31/20 13:14	1
Benzene	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

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

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/31/20 13:14	1
Bromoform	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Butanone	<10		10	3.4	ug/L			03/31/20 13:14	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/31/20 13:14	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/31/20 13:14	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			03/31/20 13:14	1
Chloroform	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/31/20 13:14	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/31/20 13:14	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/31/20 13:14	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/31/20 13:14	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/31/20 13:14	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/31/20 13:14	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/31/20 13:14	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/31/20 13:14	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/31/20 13:14	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/31/20 13:14	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/31/20 13:14	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/31/20 13:14	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/31/20 13:14	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/31/20 13:14	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/31/20 13:14	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/31/20 13:14	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
2-Hexanone	<10		10	2.0	ug/L			03/31/20 13:14	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/31/20 13:14	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/31/20 13:14	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/31/20 13:14	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/31/20 13:14	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/31/20 13:14	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/31/20 13:14	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
Styrene	<1.0		1.0	0.27	ug/L			03/31/20 13:14	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/31/20 13:14	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/31/20 13:14	1

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

Lab Sample ID: MB 680-613341/9
Matrix: Water
Analysis Batch: 613341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/31/20 13:14	1
Toluene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/31/20 13:14	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/31/20 13:14	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/31/20 13:14	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/31/20 13:14	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/31/20 13:14	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/31/20 13:14	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/31/20 13:14	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/31/20 13:14	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/31/20 13:14	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/31/20 13:14	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/31/20 13:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 13:14*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*03/31/20 13:14*	*1*
Dibromofluoromethane (Surr)	*105*		*80 - 122*		*03/31/20 13:14*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*03/31/20 13:14*	*1*

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	284		ug/L		114	70 - 135
Benzene	50.0	55.8		ug/L		112	80 - 120
Bromobenzene	50.0	51.3		ug/L		103	80 - 121
Bromochloromethane	50.0	56.5		ug/L		113	80 - 120
Bromodichloromethane	50.0	56.8		ug/L		114	80 - 120
Bromoform	50.0	51.8		ug/L		104	74 - 126
Bromomethane	50.0	55.2		ug/L		110	62 - 130
2-Butanone	250	278		ug/L		111	80 - 131
Carbon disulfide	50.0	55.7		ug/L		111	80 - 120
Carbon tetrachloride	50.0	54.5		ug/L		109	76 - 123
Chlorobenzene	50.0	52.4		ug/L		105	80 - 120
Chloroethane	50.0	63.3		ug/L		127	66 - 135
2-Chloroethyl vinyl ether	50.0	61.7		ug/L		123	71 - 135
Chloroform	50.0	57.7		ug/L		115	80 - 120
Chloromethane	50.0	69.4	*	ug/L		139	69 - 131
2-Chlorotoluene	50.0	50.7		ug/L		101	80 - 120
4-Chlorotoluene	50.0	51.1		ug/L		102	80 - 120
cis-1,2-Dichloroethene	50.0	60.6	*	ug/L		121	80 - 120
cis-1,3-Dichloropropene	50.0	61.3	*	ug/L		123	80 - 120
Dibromochloromethane	50.0	53.3		ug/L		107	80 - 121

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

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromo-3-Chloropropane	50.0	53.2		ug/L		106	71 - 134
1,2-Dibromoethane	50.0	55.1		ug/L		110	80 - 120
Dibromomethane	50.0	57.2		ug/L		114	80 - 120
1,2-Dichlorobenzene	50.0	50.4		ug/L		101	80 - 120
1,3-Dichlorobenzene	50.0	49.7		ug/L		99	80 - 120
1,4-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120
Dichlorodifluoromethane	50.0	64.5		ug/L		129	47 - 155
1,1-Dichloroethane	50.0	59.6		ug/L		119	80 - 120
1,2-Dichloroethane	50.0	61.0	*	ug/L		122	80 - 120
1,1-Dichloroethene	50.0	58.6		ug/L		117	76 - 120
1,2-Dichloroethene, Total	100	121	*	ug/L		121	80 - 120
1,2-Dichloropropane	50.0	58.7		ug/L		117	80 - 120
1,3-Dichloropropane	50.0	56.3		ug/L		113	80 - 120
2,2-Dichloropropane	50.0	72.3	*	ug/L		145	76 - 126
1,1-Dichloropropene	50.0	56.1		ug/L		112	80 - 120
Ethylbenzene	50.0	51.7		ug/L		103	80 - 120
Hexachlorobutadiene	50.0	46.1		ug/L		92	60 - 140
2-Hexanone	250	271		ug/L		108	74 - 127
Isopropylbenzene	50.0	50.1		ug/L		100	80 - 120
Methylene Chloride	50.0	55.2		ug/L		110	80 - 120
4-Methyl-2-pentanone	250	275		ug/L		110	76 - 124
Methyl tert-butyl ether	50.0	58.1		ug/L		116	80 - 120
m-Xylene & p-Xylene	50.0	50.7		ug/L		101	80 - 120
n-Butylbenzene	50.0	51.9		ug/L		104	80 - 120
N-Propylbenzene	50.0	50.6		ug/L		101	80 - 120
o-Xylene	50.0	52.4		ug/L		105	80 - 120
p-Isopropyltoluene	50.0	49.5		ug/L		99	80 - 120
sec-Butylbenzene	50.0	49.9		ug/L		100	80 - 120
Styrene	50.0	52.0		ug/L		104	80 - 120
tert-Butylbenzene	50.0	50.0		ug/L		100	80 - 121
1,1,1,2-Tetrachloroethane	50.0	54.0		ug/L		108	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.1		ug/L		110	80 - 120
Tetrachloroethene	50.0	51.5		ug/L		103	80 - 121
Toluene	50.0	53.6		ug/L		107	80 - 113
trans-1,2-Dichloroethene	50.0	60.1		ug/L		120	80 - 120
trans-1,3-Dichloropropene	50.0	59.4		ug/L		119	80 - 120
1,2,3-Trichlorobenzene	50.0	50.3		ug/L		101	61 - 141
1,2,4-Trichlorobenzene	50.0	50.7		ug/L		101	68 - 128
1,1,1-Trichloroethane	50.0	56.6		ug/L		113	80 - 120
1,1,2-Trichloroethane	50.0	56.2		ug/L		112	80 - 120
Trichloroethene	50.0	52.6		ug/L		105	80 - 120
Trichlorofluoromethane	50.0	58.6		ug/L		117	60 - 141
1,2,3-Trichloropropane	50.0	51.8		ug/L		104	80 - 123
1,2,4-Trimethylbenzene	50.0	51.2		ug/L		102	80 - 120
1,3,5-Trimethylbenzene	50.0	50.9		ug/L		102	80 - 120
Vinyl acetate	100	152	*	ug/L		152	67 - 135
Vinyl chloride	50.0	59.2		ug/L		118	71 - 128
Xylenes, Total	100	103		ug/L		103	80 - 120

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

Lab Sample ID: LCS 680-613341/1002
Matrix: Water
Analysis Batch: 613341

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

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*104*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*
Dibromofluoromethane (Surr)	*117*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 680-613341/4
Matrix: Water
Analysis Batch: 613341

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
Acetone	250	326		ug/L		130	70 - 135	14	30
Benzene	50.0	56.2		ug/L		112	80 - 120	1	20
Bromobenzene	50.0	52.0		ug/L		104	80 - 121	1	20
Bromochloromethane	50.0	60.1		ug/L		120	80 - 120	6	20
Bromodichloromethane	50.0	58.2		ug/L		116	80 - 120	2	20
Bromoform	50.0	53.8		ug/L		108	74 - 126	4	20
Bromomethane	50.0	72.1	* *1	ug/L		144	62 - 130	26	20
2-Butanone	250	318		ug/L		127	80 - 131	13	20
Carbon disulfide	50.0	55.0		ug/L		110	80 - 120	1	20
Carbon tetrachloride	50.0	52.2		ug/L		104	76 - 123	4	20
Chlorobenzene	50.0	52.0		ug/L		104	80 - 120	1	20
Chloroethane	50.0	62.6		ug/L		125	66 - 135	1	20
2-Chloroethyl vinyl ether	50.0	63.2		ug/L		126	71 - 135	2	50
Chloroform	50.0	57.9		ug/L		116	80 - 120	0	20
Chloromethane	50.0	51.8		ug/L		104	69 - 131	29	30
2-Chlorotoluene	50.0	50.5		ug/L		101	80 - 120	0	20
4-Chlorotoluene	50.0	51.3		ug/L		103	80 - 120	0	20
cis-1,2-Dichloroethene	50.0	60.9	*	ug/L		122	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	62.0	*	ug/L		124	80 - 120	1	20
Dibromochloromethane	50.0	56.6		ug/L		113	80 - 121	6	20
1,2-Dibromo-3-Chloropropane	50.0	56.7		ug/L		113	71 - 134	6	20
1,2-Dibromoethane	50.0	61.0	*	ug/L		122	80 - 120	10	20
Dibromomethane	50.0	60.2		ug/L		120	80 - 120	5	20
1,2-Dichlorobenzene	50.0	50.7		ug/L		101	80 - 120	0	20
1,3-Dichlorobenzene	50.0	50.4		ug/L		101	80 - 120	2	20
1,4-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120	0	20
Dichlorodifluoromethane	50.0	60.5		ug/L		121	47 - 155	6	40
1,1-Dichloroethane	50.0	59.0		ug/L		118	80 - 120	1	20
1,2-Dichloroethane	50.0	62.4	*	ug/L		125	80 - 120	2	50
1,1-Dichloroethene	50.0	56.8		ug/L		114	76 - 120	3	20
1,2-Dichloroethene, Total	100	119		ug/L		119	80 - 120	1	20
1,2-Dichloropropane	50.0	59.4		ug/L		119	80 - 120	1	20
1,3-Dichloropropane	50.0	61.3	*	ug/L		123	80 - 120	8	20
2,2-Dichloropropane	50.0	67.0	*	ug/L		134	76 - 126	8	20
1,1-Dichloropropene	50.0	53.8		ug/L		108	80 - 120	4	20
Ethylbenzene	50.0	50.7		ug/L		101	80 - 120	2	20
Hexachlorobutadiene	50.0	43.1		ug/L		86	60 - 140	7	20
2-Hexanone	250	327	*	ug/L		131	74 - 127	19	20

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

Lab Sample ID: LCSD 680-613341/4
Matrix: Water
Analysis Batch: 613341

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
Isopropylbenzene	50.0	49.3		ug/L		99	80 - 120	2	20
Methylene Chloride	50.0	57.2		ug/L		114	80 - 120	4	20
4-Methyl-2-pentanone	250	329	*	ug/L		132	76 - 124	18	20
Methyl tert-butyl ether	50.0	63.4	*	ug/L		127	80 - 120	9	20
m-Xylene & p-Xylene	50.0	50.8		ug/L		102	80 - 120	0	20
n-Butylbenzene	50.0	49.2		ug/L		98	80 - 120	5	20
N-Propylbenzene	50.0	49.8		ug/L		100	80 - 120	2	20
o-Xylene	50.0	52.8		ug/L		106	80 - 120	1	30
p-Isopropyltoluene	50.0	48.9		ug/L		98	80 - 120	1	20
sec-Butylbenzene	50.0	48.4		ug/L		97	80 - 120	3	20
Styrene	50.0	52.1		ug/L		104	80 - 120	0	20
tert-Butylbenzene	50.0	48.7		ug/L		97	80 - 121	3	20
1,1,1,2-Tetrachloroethane	50.0	53.5		ug/L		107	80 - 121	1	20
1,1,2,2-Tetrachloroethane	50.0	61.6	*	ug/L		123	80 - 120	11	20
Tetrachloroethene	50.0	53.2		ug/L		106	80 - 121	3	20
Toluene	50.0	55.0		ug/L		110	80 - 113	3	20
trans-1,2-Dichloroethene	50.0	58.0		ug/L		116	80 - 120	3	20
trans-1,3-Dichloropropene	50.0	62.9	*	ug/L		126	80 - 120	6	30
1,2,3-Trichlorobenzene	50.0	51.8		ug/L		104	61 - 141	3	20
1,2,4-Trichlorobenzene	50.0	51.4		ug/L		103	68 - 128	1	20
1,1,1-Trichloroethane	50.0	55.2		ug/L		110	80 - 120	3	20
1,1,2-Trichloroethane	50.0	59.6		ug/L		119	80 - 120	6	20
Trichloroethene	50.0	53.8		ug/L		108	80 - 120	2	20
Trichlorofluoromethane	50.0	55.7		ug/L		111	60 - 141	5	20
1,2,3-Trichloropropane	50.0	53.5		ug/L		107	80 - 123	3	30
1,2,4-Trimethylbenzene	50.0	51.6		ug/L		103	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	50.7		ug/L		101	80 - 120	0	20
Vinyl acetate	100	165	*	ug/L		165	67 - 135	8	20
Vinyl chloride	50.0	57.5		ug/L		115	71 - 128	3	20
Xylenes, Total	100	104		ug/L		104	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*115*		*73 - 131*
Dibromofluoromethane (Surr)	*116*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 14:05	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 14:05	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1

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

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 14:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 14:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 14:05	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 14:05	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 14:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 14:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 14:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 14:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 14:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 14:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 14:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 14:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 14:05	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 14:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 14:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 14:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 14:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 14:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 14:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 14:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 14:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 14:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
n-Butylbenzene	0.470	J	1.0	0.47	ug/L			04/02/20 14:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 14:05	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 14:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 14:05	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 14:05	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 14:05	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1

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

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 14:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 14:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 14:05	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 14:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 14:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*04/02/20 14:05*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/02/20 14:05*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/02/20 14:05*	*1*

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	245		ug/L		98	70 - 135
Benzene	50.0	54.3		ug/L		109	80 - 120
Bromobenzene	50.0	53.1		ug/L		106	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	54.6		ug/L		109	80 - 120
Bromoform	50.0	55.1		ug/L		110	74 - 126
Bromomethane	50.1	114	E *	ug/L		229	62 - 130
2-Butanone	250	250		ug/L		100	80 - 131
Carbon disulfide	50.0	55.4		ug/L		111	80 - 120
Carbon tetrachloride	50.0	55.4		ug/L		111	76 - 123
Chlorobenzene	50.0	53.8		ug/L		108	80 - 120
Chloroethane	50.0	74.7	*	ug/L		149	66 - 135
2-Chloroethyl vinyl ether	50.0	54.6		ug/L		109	71 - 135
Chloroform	50.0	54.1		ug/L		108	80 - 120
Chloromethane	50.0	55.6		ug/L		111	69 - 131
2-Chlorotoluene	50.0	54.6		ug/L		109	80 - 120
4-Chlorotoluene	50.0	54.7		ug/L		109	80 - 120
cis-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120
cis-1,3-Dichloropropene	50.0	56.5		ug/L		113	80 - 120
Dibromochloromethane	50.0	54.8		ug/L		110	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	52.4		ug/L		105	71 - 134
1,2-Dibromoethane	50.0	52.8		ug/L		106	80 - 120
Dibromomethane	50.0	51.4		ug/L		103	80 - 120

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

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichlorobenzene	50.0	54.0		ug/L		108	80 - 120
1,3-Dichlorobenzene	50.0	54.9		ug/L		110	80 - 120
1,4-Dichlorobenzene	50.0	53.2		ug/L		106	80 - 120
Dichlorodifluoromethane	50.1	56.9		ug/L		114	47 - 155
1,1-Dichloroethane	50.0	54.8		ug/L		110	80 - 120
1,2-Dichloroethane	50.0	52.7		ug/L		105	80 - 120
1,1-Dichloroethene	50.0	54.3		ug/L		109	76 - 120
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120
1,2-Dichloropropane	50.0	55.1		ug/L		110	80 - 120
1,3-Dichloropropane	50.0	53.1		ug/L		106	80 - 120
2,2-Dichloropropane	50.0	59.8		ug/L		120	76 - 126
1,1-Dichloropropene	50.0	56.3		ug/L		113	80 - 120
Ethylbenzene	50.0	55.7		ug/L		111	80 - 120
Hexachlorobutadiene	50.0	59.8		ug/L		120	60 - 140
2-Hexanone	250	257		ug/L		103	74 - 127
Isopropylbenzene	50.0	56.3		ug/L		113	80 - 120
Methylene Chloride	50.0	52.2		ug/L		104	80 - 120
4-Methyl-2-pentanone	250	258		ug/L		103	76 - 124
Methyl tert-butyl ether	50.0	51.8		ug/L		104	80 - 120
m-Xylene & p-Xylene	50.0	55.5		ug/L		111	80 - 120
n-Butylbenzene	50.0	57.2		ug/L		114	80 - 120
N-Propylbenzene	50.0	56.0		ug/L		112	80 - 120
o-Xylene	50.0	55.7		ug/L		111	80 - 120
p-Isopropyltoluene	50.0	57.0		ug/L		114	80 - 120
sec-Butylbenzene	50.0	55.7		ug/L		111	80 - 120
Styrene	50.0	56.9		ug/L		114	80 - 120
tert-Butylbenzene	50.0	55.6		ug/L		111	80 - 121
1,1,1,2-Tetrachloroethane	50.0	55.4		ug/L		111	80 - 121
1,1,2,2-Tetrachloroethane	50.0	52.6		ug/L		105	80 - 120
Tetrachloroethene	50.0	54.5		ug/L		109	80 - 121
Toluene	50.0	54.6		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120
trans-1,3-Dichloropropene	50.0	55.6		ug/L		111	80 - 120
1,2,3-Trichlorobenzene	50.0	57.0		ug/L		114	61 - 141
1,2,4-Trichlorobenzene	50.0	57.3		ug/L		115	68 - 128
1,1,1-Trichloroethane	50.0	54.8		ug/L		110	80 - 120
1,1,2-Trichloroethane	50.0	53.1		ug/L		106	80 - 120
Trichloroethene	50.0	54.2		ug/L		108	80 - 120
Trichlorofluoromethane	50.0	54.0		ug/L		108	60 - 141
1,2,3-Trichloropropane	50.0	50.4		ug/L		101	80 - 123
1,2,4-Trimethylbenzene	50.0	56.3		ug/L		113	80 - 120
1,3,5-Trimethylbenzene	50.0	56.3		ug/L		113	80 - 120
Vinyl acetate	100	117		ug/L		117	67 - 135
Vinyl chloride	50.1	54.4		ug/L		109	71 - 128
Xylenes, Total	100	111		ug/L		111	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*

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

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*
Dibromofluoromethane (Surr)	*107*		*80 - 122*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 680-613695/5
Matrix: Water
Analysis Batch: 613695

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
Acetone			250	253		ug/L		101	70 - 135	3	30
Benzene			50.0	54.8		ug/L		110	80 - 120	1	20
Bromobenzene			50.0	53.9		ug/L		108	80 - 121	2	20
Bromochloromethane			50.0	52.6		ug/L		105	80 - 120	1	20
Bromodichloromethane			50.0	55.6		ug/L		111	80 - 120	2	20
Bromoform			50.0	56.7		ug/L		113	74 - 126	3	20
Bromomethane			50.1	118	E *	ug/L		235	62 - 130	3	20
2-Butanone			250	259		ug/L		103	80 - 131	3	20
Carbon disulfide			50.0	55.1		ug/L		110	80 - 120	1	20
Carbon tetrachloride			50.0	55.0		ug/L		110	76 - 123	1	20
Chlorobenzene			50.0	54.6		ug/L		109	80 - 120	1	20
Chloroethane			50.0	74.5	*	ug/L		149	66 - 135	0	20
2-Chloroethyl vinyl ether			50.0	56.2		ug/L		112	71 - 135	3	50
Chloroform			50.0	54.2		ug/L		108	80 - 120	0	20
Chloromethane			50.0	54.8		ug/L		110	69 - 131	2	30
2-Chlorotoluene			50.0	54.7		ug/L		109	80 - 120	0	20
4-Chlorotoluene			50.0	54.9		ug/L		110	80 - 120	0	20
cis-1,2-Dichloroethene			50.0	55.3		ug/L		111	80 - 120	0	20
cis-1,3-Dichloropropene			50.0	57.6		ug/L		115	80 - 120	2	20
Dibromochloromethane			50.0	55.8		ug/L		112	80 - 121	2	20
1,2-Dibromo-3-Chloropropane			50.0	55.5		ug/L		111	71 - 134	6	20
1,2-Dibromoethane			50.0	53.8		ug/L		108	80 - 120	2	20
Dibromomethane			50.0	53.0		ug/L		106	80 - 120	3	20
1,2-Dichlorobenzene			50.0	55.3		ug/L		111	80 - 120	2	20
1,3-Dichlorobenzene			50.0	55.5		ug/L		111	80 - 120	1	20
1,4-Dichlorobenzene			50.0	53.6		ug/L		107	80 - 120	1	20
Dichlorodifluoromethane			50.1	55.5		ug/L		111	47 - 155	3	40
1,1-Dichloroethane			50.0	54.9		ug/L		110	80 - 120	0	20
1,2-Dichloroethane			50.0	53.6		ug/L		107	80 - 120	2	50
1,1-Dichloroethene			50.0	53.8		ug/L		108	76 - 120	1	20
1,2-Dichloroethene, Total			100	110		ug/L		110	80 - 120	0	20
1,2-Dichloropropane			50.0	55.8		ug/L		112	80 - 120	1	20
1,3-Dichloropropane			50.0	54.0		ug/L		108	80 - 120	2	20
2,2-Dichloropropane			50.0	58.8		ug/L		118	76 - 126	2	20
1,1-Dichloropropene			50.0	56.4		ug/L		113	80 - 120	0	20
Ethylbenzene			50.0	55.7		ug/L		111	80 - 120	0	20
Hexachlorobutadiene			50.0	60.4		ug/L		121	60 - 140	1	20
2-Hexanone			250	267		ug/L		107	74 - 127	4	20
Isopropylbenzene			50.0	56.1		ug/L		112	80 - 120	0	20

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

Lab Sample ID: LCSD 680-613695/5
Matrix: Water
Analysis Batch: 613695

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
Methylene Chloride	50.0	52.9		ug/L		106	80 - 120	1	20
4-Methyl-2-pentanone	250	268		ug/L		107	76 - 124	4	20
Methyl tert-butyl ether	50.0	53.4		ug/L		107	80 - 120	3	20
m-Xylene & p-Xylene	50.0	55.4		ug/L		111	80 - 120	0	20
n-Butylbenzene	50.0	57.3		ug/L		115	80 - 120	0	20
N-Propylbenzene	50.0	55.9		ug/L		112	80 - 120	0	20
o-Xylene	50.0	55.7		ug/L		111	80 - 120	0	30
p-Isopropyltoluene	50.0	57.1		ug/L		114	80 - 120	0	20
sec-Butylbenzene	50.0	55.3		ug/L		111	80 - 120	1	20
Styrene	50.0	57.5		ug/L		115	80 - 120	1	20
tert-Butylbenzene	50.0	55.5		ug/L		111	80 - 121	0	20
1,1,1,2-Tetrachloroethane	50.0	55.7		ug/L		111	80 - 121	0	20
1,1,2,2-Tetrachloroethane	50.0	54.3		ug/L		109	80 - 120	3	20
Tetrachloroethene	50.0	54.4		ug/L		109	80 - 121	0	20
Toluene	50.0	55.1		ug/L		110	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	55.1		ug/L		110	80 - 120	0	20
trans-1,3-Dichloropropene	50.0	57.1		ug/L		114	80 - 120	3	30
1,2,3-Trichlorobenzene	50.0	59.7		ug/L		119	61 - 141	5	20
1,2,4-Trichlorobenzene	50.0	60.2		ug/L		120	68 - 128	5	20
1,1,1-Trichloroethane	50.0	54.7		ug/L		109	80 - 120	0	20
1,1,2-Trichloroethane	50.0	54.5		ug/L		109	80 - 120	2	20
Trichloroethene	50.0	54.2		ug/L		108	80 - 120	0	20
Trichlorofluoromethane	50.0	53.1		ug/L		106	60 - 141	2	20
1,2,3-Trichloropropane	50.0	52.2		ug/L		104	80 - 123	3	30
1,2,4-Trimethylbenzene	50.0	56.8		ug/L		114	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	56.4		ug/L		113	80 - 120	0	20
Vinyl acetate	100	118		ug/L		118	67 - 135	1	20
Vinyl chloride	50.1	53.3		ug/L		106	71 - 128	2	20
Xylenes, Total	100	111		ug/L		111	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-683327/1-A
Matrix: Water
Analysis Batch: 683398

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 683327

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 00:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*80*		*41 - 144*	*03/24/20 15:33*	*03/25/20 00:06*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: LCS 460-683327/2-A
Matrix: Water
Analysis Batch: 683398

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 683327

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,4-Dioxane			0.800	0.329	J	ug/L		41	10 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5	*70*		*41 - 144*

Lab Sample ID: LCSD 460-683327/3-A
Matrix: Water
Analysis Batch: 683398

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 683327

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane			0.800	0.329	J	ug/L		41	10 - 150	0	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Nitrobenzene-d5	*78*		*41 - 144*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-613229/2
Matrix: Water
Analysis Batch: 613229

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			03/30/20 11:52	1

Lab Sample ID: LCS 680-613229/3
Matrix: Water
Analysis Batch: 613229

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate			10.0	10.1		mg/L		101	90 - 110		

Lab Sample ID: LCSD 680-613229/4
Matrix: Water
Analysis Batch: 613229

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate			10.0	10.2		mg/L		102	90 - 110	0	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206574/1002
Matrix: Water
Analysis Batch: 206574

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/24/20 22:37	1

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: LCS 550-206574/4
Matrix: Water
Analysis Batch: 206574

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	24.4		ug/L		98	85 - 115		

Lab Sample ID: LCSD 550-206574/5
Matrix: Water
Analysis Batch: 206574

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
Perchlorate			25.0	24.6		ug/L		98	85 - 115	1	15

Lab Sample ID: MB 550-206575/1002
Matrix: Water
Analysis Batch: 206575

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/26/20 23:34	1

Lab Sample ID: LCS 550-206575/4
Matrix: Water
Analysis Batch: 206575

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	24.7		ug/L		99	85 - 115		

Lab Sample ID: LCSD 550-206575/5
Matrix: Water
Analysis Batch: 206575

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
Perchlorate			25.0	24.5		ug/L		98	85 - 115	1	15

Lab Sample ID: 680-181894-6 MS
Matrix: GW
Analysis Batch: 206575

Client Sample ID: GM-26S (031920)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	130		250	390		ug/L		102	80 - 120		

Lab Sample ID: 680-181894-6 MSD
Matrix: GW
Analysis Batch: 206575

Client Sample ID: GM-26S (031920)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	130		250	392		ug/L		103	80 - 120	0	15

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-612538/1-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 19:37	1

Lab Sample ID: LCS 680-612538/2-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Iron	5010	4910		ug/L		98	80 - 120

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613440/3
Matrix: Water
Analysis Batch: 613440

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 12:48	1

Lab Sample ID: LCS 680-613440/4
Matrix: Water
Analysis Batch: 613440

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	19.9		mg/L		100	80 - 120

Lab Sample ID: LCSD 680-613440/5
Matrix: Water
Analysis Batch: 613440

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	20.0	19.9		mg/L		99	80 - 120	0	25

GC/MS VOA

Analysis Batch: 613128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	8260B	
680-181894-5	GM-26M (031920)	Total/NA	GW	8260B	
680-181894-6	GM-26S (031920)	Total/NA	GW	8260B	
680-181894-7	GM-31M (031920)	Total/NA	GW	8260B	
680-181894-8	GM-31S (031920)	Total/NA	GW	8260B	
680-181894-9	DUP-02 (031920)	Total/NA	GW	8260B	
680-181894-10	Trip Blank	Total/NA	Water	8260B	
MB 680-613128/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613128/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613128/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-2	GM-21S (031920)	Total/NA	GW	8260B	
680-181894-3	GM-22M (031920)	Total/NA	GW	8260B	
680-181894-4	GM-22S (031920)	Total/NA	GW	8260B	
MB 680-613140/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613140/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613140/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-5	GM-26M (031920)	Total/NA	GW	8260B	
MB 680-613341/9	Method Blank	Total/NA	Water	8260B	
LCS 680-613341/1002	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613341/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1 - DL	GM-21M (031920)	Total/NA	GW	8260B	
MB 680-613695/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613695/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613695/5	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 683327

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	3510C	
680-181894-2	GM-21S (031920)	Total/NA	GW	3510C	
680-181894-3	GM-22M (031920)	Total/NA	GW	3510C	
680-181894-4	GM-22S (031920)	Total/NA	GW	3510C	
680-181894-5	GM-26M (031920)	Total/NA	GW	3510C	
680-181894-6	GM-26S (031920)	Total/NA	GW	3510C	
680-181894-7	GM-31M (031920)	Total/NA	GW	3510C	
680-181894-8	GM-31S (031920)	Total/NA	GW	3510C	
680-181894-9	DUP-02 (031920)	Total/NA	GW	3510C	
MB 460-683327/1-A	Method Blank	Total/NA	Water	3510C	
LCS 460-683327/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-683327/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

GC/MS Semi VOA

Analysis Batch: 683398

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	8270D SIM	683327
680-181894-2	GM-21S (031920)	Total/NA	GW	8270D SIM	683327
680-181894-3	GM-22M (031920)	Total/NA	GW	8270D SIM	683327
680-181894-4	GM-22S (031920)	Total/NA	GW	8270D SIM	683327
680-181894-5	GM-26M (031920)	Total/NA	GW	8270D SIM	683327
680-181894-6	GM-26S (031920)	Total/NA	GW	8270D SIM	683327
680-181894-7	GM-31M (031920)	Total/NA	GW	8270D SIM	683327
680-181894-8	GM-31S (031920)	Total/NA	GW	8270D SIM	683327
680-181894-9	DUP-02 (031920)	Total/NA	GW	8270D SIM	683327
MB 460-683327/1-A	Method Blank	Total/NA	Water	8270D SIM	683327
LCS 460-683327/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	683327
LCSD 460-683327/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	683327

HPLC/IC

Analysis Batch: 206574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-7	GM-31M (031920)	Total/NA	GW	314.0	
680-181894-8	GM-31S (031920)	Total/NA	GW	314.0	
680-181894-9	DUP-02 (031920)	Total/NA	GW	314.0	
MB 550-206574/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206574/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206574/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 206575

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	314.0	
680-181894-2	GM-21S (031920)	Total/NA	GW	314.0	
680-181894-3	GM-22M (031920)	Total/NA	GW	314.0	
680-181894-4	GM-22S (031920)	Total/NA	GW	314.0	
680-181894-5	GM-26M (031920)	Total/NA	GW	314.0	
680-181894-6	GM-26S (031920)	Total/NA	GW	314.0	
MB 550-206575/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206575/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206575/5	Lab Control Sample Dup	Total/NA	Water	314.0	
680-181894-6 MS	GM-26S (031920)	Total/NA	GW	314.0	
680-181894-6 MSD	GM-26S (031920)	Total/NA	GW	314.0	

Analysis Batch: 613229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	300.0-1993 R2.1	
680-181894-3	GM-22M (031920)	Total/NA	GW	300.0-1993 R2.1	
680-181894-5	GM-26M (031920)	Total/NA	GW	300.0-1993 R2.1	
MB 680-613229/2	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-613229/3	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-613229/4	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 612538

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Dissolved	GW	3005A	

Metals (Continued)

Prep Batch: 612538 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-3	GM-22M (031920)	Dissolved	GW	3005A	
680-181894-5	GM-26M (031920)	Dissolved	GW	3005A	
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 612837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Dissolved	GW	6010C	612538
680-181894-3	GM-22M (031920)	Dissolved	GW	6010C	612538
680-181894-5	GM-26M (031920)	Dissolved	GW	6010C	612538
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	6010C	612538
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	6010C	612538

General Chemistry

Analysis Batch: 613440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181894-1	GM-21M (031920)	Total/NA	GW	5310 B-2011	
680-181894-3	GM-22M (031920)	Total/NA	GW	5310 B-2011	
680-181894-5	GM-26M (031920)	Total/NA	GW	5310 B-2011	
MB 680-613440/3	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613440/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613440/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-21M (031920)
Lab Sample ID: 680-181894-1
Date Collected: 03/19/20 13:35
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 18:41	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B	DL	5	5 mL	5 mL	613695	04/02/20 15:15	Y1S	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 02:35	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613229	03/30/20 13:46	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		50			206575	03/27/20 01:06	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:20	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 15:23	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-21S (031920)
Lab Sample ID: 680-181894-2
Date Collected: 03/19/20 12:30
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	613140	03/30/20 16:23	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		5			683398	03/25/20 08:36	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		50			206575	03/27/20 01:28	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-22M (031920)
Lab Sample ID: 680-181894-3
Date Collected: 03/19/20 10:55
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	613140	03/30/20 16:47	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 03:17	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613229	03/30/20 13:58	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		10			206575	03/27/20 01:51	NEL	TAL PHX
	Instrument ID: IC4									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22M (031920)

Lab Sample ID: 680-181894-3

Date Collected: 03/19/20 10:55
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:35	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 15:40	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-22S (031920)

Lab Sample ID: 680-181894-4

Date Collected: 03/19/20 09:55
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	613140	03/30/20 17:10	P1C	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 03:38	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		10			206575	03/27/20 02:14	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-26M (031920)

Lab Sample ID: 680-181894-5

Date Collected: 03/19/20 14:50
Matrix: GW
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 16:44	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B		1	5 mL	5 mL	613341	03/31/20 15:58	Y1S	TAL SAV
	Instrument ID: CMSP2									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 03:59	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613229	03/30/20 14:11	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		10			206575	03/27/20 02:37	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:39	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613440	03/30/20 15:58	RKJ	TAL SAV
	Instrument ID: TOC7									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26S (031920)

Lab Sample ID: 680-181894-6

Date Collected: 03/19/20 13:15

Matrix: GW

Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 17:07	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 04:21	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		10			206575	03/27/20 03:00	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-31M (031920)

Lab Sample ID: 680-181894-7

Date Collected: 03/19/20 11:10

Matrix: GW

Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 17:31	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 04:42	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206574	03/25/20 04:20	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-31S (031920)

Lab Sample ID: 680-181894-8

Date Collected: 03/19/20 10:00

Matrix: GW

Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 17:54	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 05:03	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206574	03/25/20 04:43	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: DUP-02 (031920)

Lab Sample ID: 680-181894-9

Date Collected: 03/19/20 12:00

Matrix: GW

Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 18:18	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Prep	3510C			250 mL	2 mL	683327	03/24/20 15:33	OXG	TAL EDI
Total/NA	Analysis	8270D SIM		1			683398	03/25/20 05:24	MME	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206574	03/25/20 05:06	NEL	TAL PHX
	Instrument ID: IC4									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: Trip Blank
Lab Sample ID: 680-181894-10
Date Collected: 03/19/20 00:00
Matrix: Water
Date Received: 03/21/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613128	03/30/20 15:57	P1C	TAL SAV
	Instrument ID: CMSA2									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Baltimore #201

Chain of Custody Record 397789

eurofins | Environment Testing TestAmerica

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-19-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd Ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD, 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO# 30044569	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOC 8260B	1,4-Dioxane	340 Perchlorate	6010C dissolved iron	SM5310 TOC	300 oRGFM Sulfate	Sample Specific Notes:
GM-21M (031920)	3-19-20	1335	G	GW	11			3	2	1	1	3	1	dissolved iron is filtered
GM-21S (031920)		1230			6			3	2	1				
GM-22M (031920)		1055			11			3	2	1	1	3	1	
GM-22S (031920)		0955			6			3	2	1				
GM-26M (031920)		1450			11			3	2	1	1	3	1	
GM-26S (031920)		1315			6			3	2	1				
GM-31M (031920)		1110			6			3	2	1				
GM-31S (031920)		1000			6			3	2	1				
DUP-02 (031920)	3-19-20	1200	G	GW	6			3	2	1				
Trip Blank					2			2						

680-181894 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: Corr'd: | Therm ID No.:

	Company	Date/Time		Company	Date/Time
Relinquished by:	Arcadis	3-20-20 0600	Received by:		3/20/20 9:50
Relinquished by:	3/20/20 1730		Received by: Banda	03-21-2020	0950
Relinquished by:			Received in Laboratory by: 2.9/3.0 (CF) 3.3		3.4°C

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605018.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-181894-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/2/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI 1,4-Dioxane	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-21M (031920) (680-181894-1)	3/19/20	13:35 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-21S (031920) (680-181894-2)	3/19/20	12:30 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-22M (031920) (680-181894-3)	3/19/20	10:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-22S (031920) (680-181894-4)	3/19/20	09:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-26M (031920) (680-181894-5)	3/19/20	14:50 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-26S (031920) (680-181894-6)	3/19/20	13:15 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-31M (031920) (680-181894-7)	3/19/20	11:10 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-31S (031920) (680-181894-8)	3/19/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
DUP-02 (031920) (680-181894-9)	3/19/20	12:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	03-23-2020 1350		via FedEx	3/24/20 1000	[illegible]
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: X Yes ∆ No	Custody Seal No.: 116448	Cooler Temperature(s) °C and Other Remarks: 4.7°C IR11

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605023.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181894-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/2/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-21M (031920) (680-181894-1)	3/19/20	13:35 Eastern		Water			X	1	
GM-21S (031920) (680-181894-2)	3/19/20	12:30 Eastern		Water			X	1	
GM-22M (031920) (680-181894-3)	3/19/20	10:55 Eastern		Water			X	1	
GM-22S (031920) (680-181894-4)	3/19/20	09:55 Eastern		Water			X	1	
GM-26M (031920) (680-181894-5)	3/19/20	14:50 Eastern		Water			X	1	
GM-26S (031920) (680-181894-6)	3/19/20	13:15 Eastern		Water			X	1	
GM-31M (031920) (680-181894-7)	3/19/20	11:10 Eastern		Water			X	1	
GM-31S (031920) (680-181894-8)	3/19/20	10:00 Eastern		Water			X	1	
DUP-02 (031920) (680-181894-9)	3/19/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 03-23-2020	Company: 1414	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: TA-PHX	Date/Time: 09:15	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 03-24-20 09:30	Company: TA PHX
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

TEMP 2-8-C

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181894-1

Login Number: 181894

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Banda, Christy S

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181894-1

Login Number: 181894
List Number: 2
Creator: Armbruster, Chris

List Source: Eurofins TestAmerica, Edison
List Creation: 03/24/20 12:01 PM

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	1164481
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.7°C IR11
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: ARCADIS U.S., Inc.

Job Number: 680-181894-1

Login Number: 181894
List Number: 3
Creator: Gravlin, Andrea

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/24/20 02:49 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
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?	False	Received project as a subcontract.
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.	False	Check done at department level as required.

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181932-1
Client Project/Site: ATK Orbital, Elkton MD
Revision: 1

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
6/16/2020 11:23:22 AM

Jerry Lanier, Project Manager I
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LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-181932-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-181932-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 03/24/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0 C.

The final report was revised to include TKN and Nitrate plus Nitrite data.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples MW-19 (032020) (680-181932-2), MW-20 (032020) (680-181932-3), MW-22 (032020) (680-181932-4), MW-25 (032020) (680-181932-5), MW-28 (032020) (680-181932-6), MW-29 (032020) (680-181932-7), DUP-03 (032020) (680-181932-8) and Trip Blank (680-181932-9) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/01/2020 and 04/02/2020.

Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (680-181932-9). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples were outside control limits: MW-25 (032020) (680-181932-5) and MW-29 (032020) (680-181932-7). Evidence of matrix interferences is not obvious.

Bromomethane is reported with an E flag in the batch QC because the top one point was dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported. (CCVIS 680-613494/3), (LCS 680-613494/4) and (LCSD 680-613494/5)

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613502 recovered outside control limits for the following analytes: 2,2-Dichloropropane and Bromomethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613494 recovered outside control limits for the following analyte: Bromomethane and Chloroethane. These analytes were biased high in the LCS/LCSD and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613689 recovered outside control limits for the following analytes: 1,1,1,2-Tetrachloroethane, 2,2-Dichloropropane and Bromomethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613502, 680-613494, and 680-613689.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 680-181932-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

PERCHLORATE (IC)

Samples MW-19 (032020) (680-181932-2), MW-20 (032020) (680-181932-3), MW-22 (032020) (680-181932-4), MW-25 (032020) (680-181932-5), MW-28 (032020) (680-181932-6), MW-29 (032020) (680-181932-7) and DUP-03 (032020) (680-181932-8) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/27/2020 and 03/28/2020.

Samples MW-19 (032020) (680-181932-2)[100X], MW-20 (032020) (680-181932-3)[100X], MW-22 (032020) (680-181932-4)[2X], MW-25 (032020) (680-181932-5)[5X], MW-28 (032020) (680-181932-6)[5X], MW-29 (032020) (680-181932-7)[100X] and DUP-03 (032020) (680-181932-8)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples MW-22 (032020) (680-181932-4), MW-25 (032020) (680-181932-5), MW-28 (032020) (680-181932-6) and DUP-03 (032020) (680-181932-8) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/25/2020 and 03/29/2020 and analyzed on 03/26/2020 and 03/30/2020.

Dissolved Iron was detected in method blank MB 680-613127/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples MW-22 (032020) (680-181932-4), MW-25 (032020) (680-181932-5), MW-28 (032020) (680-181932-6) and DUP-03 (032020) (680-181932-8) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 04/02/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL KJELDAHL NITROGEN (TKN)

Samples MW-11 (032020) (680-181932-1), MW-20 (032020) (680-181932-3), MW-22 (032020) (680-181932-4), DUP-03 (032020) (680-181932-8) and EB-01 (032020) (680-181932-10) were analyzed for total kjeldahl nitrogen (TKN) in accordance with EPA Method 351.2. The samples were prepared on 03/30/2020 and analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN

Samples MW-11 (032020) (680-181932-1), MW-20 (032020) (680-181932-3), MW-22 (032020) (680-181932-4), DUP-03 (032020) (680-181932-8) and EB-01 (032020) (680-181932-10) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 03/28/2020.

Samples MW-11 (032020) (680-181932-1)[10X] and MW-20 (032020) (680-181932-3)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL NITROGEN BY CALCULATION

Samples MW-11 (032020) (680-181932-1), MW-20 (032020) (680-181932-3), MW-22 (032020) (680-181932-4), DUP-03 (032020) (680-181932-8) and EB-01 (032020) (680-181932-10) were analyzed for total nitrogen by calculation in accordance with a calculated method. The samples were analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples MW-22 (032020) (680-181932-4), MW-25 (032020) (680-181932-5), MW-28 (032020) (680-181932-6) and DUP-03 (032020)

Job ID: 680-181932-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

(680-181932-8) were analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181932-1	MW-11 (032020)	Water	03/20/20 11:05	03/24/20 08:40	
680-181932-2	MW-19 (032020)	Water	03/20/20 12:00	03/24/20 08:40	
680-181932-3	MW-20 (032020)	Water	03/20/20 13:15	03/24/20 08:40	
680-181932-4	MW-22 (032020)	Water	03/20/20 11:40	03/24/20 08:40	
680-181932-5	MW-25 (032020)	Water	03/20/20 09:45	03/24/20 08:40	
680-181932-6	MW-28 (032020)	Water	03/20/20 10:30	03/24/20 08:40	
680-181932-7	MW-29 (032020)	Water	03/20/20 09:30	03/24/20 08:40	
680-181932-8	DUP-03 (032020)	Water	03/20/20 12:00	03/24/20 08:40	
680-181932-9	Trip Blank	Water	03/20/20 00:00	03/24/20 08:40	
680-181932-10	EB-01 (032020)	Water	03/20/20 12:00	03/24/20 08:40	

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
Total Nitrogen	Nitrogen, Total	EPA	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
Digestion	Digestion, Hot Block	MCAWW	TAL SAV

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.
SM = "Standard Methods For The Examination Of Water And Wastewater"
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340
TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-11 (032020) — Lab Sample ID: 680-181932-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nitrate Nitrite as N	2.9		0.50	0.10	mg/L	10		353.2	Total/NA
Nitrogen, Total	2.9		0.25	0.25	mg/L	1		Total Nitrogen	Total/NA

Client Sample ID: MW-19 (032020) — Lab Sample ID: 680-181932-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	3.8		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	16		1.0	0.36	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	10		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	2.6		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	890		100	31	ug/L	100		314.0	Total/NA

Client Sample ID: MW-20 (032020) — Lab Sample ID: 680-181932-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	40		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	12		1.0	0.36	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.99	J	1.0	0.74	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	37		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	2.9		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	490		100	31	ug/L	100		314.0	Total/NA
Nitrogen, Kjeldahl	1.3		0.20	0.10	mg/L	1		351.2	Total/NA
Nitrate Nitrite as N	6.2		0.50	0.10	mg/L	10		353.2	Total/NA
Nitrogen, Total	7.5		0.25	0.25	mg/L	1		Total Nitrogen	Total/NA

Client Sample ID: MW-22 (032020) — Lab Sample ID: 680-181932-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	5.8		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	27		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	9.1		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	5.8		2.0	0.37	ug/L	1		8260B	Total/NA
Tetrachloroethene	16		1.0	0.74	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	55		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	32		1.0	0.48	ug/L	1		8260B	Total/NA
Sulfate	23		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	56		2.0	0.63	ug/L	2		314.0	Total/NA
Nitrate Nitrite as N	0.55		0.050	0.010	mg/L	1		353.2	Total/NA
Total Organic Carbon	0.77	J	1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Nitrogen, Total	0.55		0.25	0.25	mg/L	1		Total Nitrogen	Total/NA

Client Sample ID: MW-25 (032020) — Lab Sample ID: 680-181932-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethene	0.52	J	1.0	0.36	ug/L	1		8260B	Total/NA
Trichloroethene	0.52	J	1.0	0.48	ug/L	1		8260B	Total/NA
Sulfate	41		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	110		5.0	1.6	ug/L	5		314.0	Total/NA
Total Organic Carbon	1.1		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-28 (032020) — Lab Sample ID: 680-181932-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.4		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	18		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	1.9		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	3.4		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	8.4		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	13		1.0	0.48	ug/L	1		8260B	Total/NA
Sulfate	20		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	150		5.0	1.6	ug/L	5		314.0	Total/NA
Dissolved Iron	9800		50	17	ug/L	1		6010C	Dissolved
Total Organic Carbon	6.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: MW-29 (032020) — Lab Sample ID: 680-181932-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.2		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	3.7		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	8.1		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	1.2	J	2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	9.6		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	14		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	2500		100	31	ug/L	100		314.0	Total/NA

Client Sample ID: DUP-03 (032020) — Lab Sample ID: 680-181932-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	6.1		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	26		1.0	0.38	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	9.4		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	6.1		2.0	0.37	ug/L	1		8260B	Total/NA
Tetrachloroethene	16		1.0	0.74	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	61		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	34		1.0	0.48	ug/L	1		8260B	Total/NA
Sulfate	23		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	58		2.0	0.63	ug/L	2		314.0	Total/NA
Dissolved Iron	55		50	17	ug/L	1		6010C	Dissolved
Nitrate Nitrite as N	0.54		0.050	0.010	mg/L	1		353.2	Total/NA
Total Organic Carbon	0.71	J	1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Nitrogen, Total	0.54		0.25	0.25	mg/L	1		Total Nitrogen	Total/NA

Client Sample ID: Trip Blank — Lab Sample ID: 680-181932-9

No Detections.

Client Sample ID: EB-01 (032020) — Lab Sample ID: 680-181932-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nitrate Nitrite as N	0.013	J	0.050	0.010	mg/L	1		353.2	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-11 (032020)

Date Collected: 03/20/20 11:05
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-1

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:25	03/31/20 12:26	1
Nitrate Nitrite as N	**2.9**		0.50	0.10	mg/L			03/28/20 12:59	10

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**2.9**		0.25	0.25	mg/L			03/31/20 13:40	1

Client Sample ID: MW-19 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-2

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 05:29	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 05:29	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 05:29	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 05:29	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 05:29	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 05:29	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/01/20 05:29	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 05:29	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 05:29	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 05:29	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 05:29	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 05:29	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 05:29	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 05:29	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 05:29	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 05:29	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 05:29	1
1,1-Dichloroethane	**3.8**		1.0	0.38	ug/L			04/01/20 05:29	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
1,1-Dichloroethene	**16**		1.0	0.36	ug/L			04/01/20 05:29	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 05:29	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 05:29	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 05:29	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 05:29	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 05:29	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 05:29	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 05:29	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 05:29	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 05:29	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 05:29	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 05:29	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 05:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-19 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 05:29	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 05:29	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 05:29	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
1,1,1-Trichloroethane	**10**		1.0	0.37	ug/L			04/01/20 05:29	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Trichloroethene	**2.6**		1.0	0.48	ug/L			04/01/20 05:29	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 05:29	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 05:29	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 05:29	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 05:29	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 05:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 05:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*04/01/20 05:29*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/01/20 05:29*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/01/20 05:29*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**890**		100	31	ug/L			03/27/20 22:08	100

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-20 (032020)

Date Collected: 03/20/20 13:15
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 21:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 21:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 21:15	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 21:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 21:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 21:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 21:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 21:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 21:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 21:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 21:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 21:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 21:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 21:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 21:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 21:15	1
1,1-Dichloroethane	**40**		1.0	0.38	ug/L			04/02/20 21:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
1,1-Dichloroethene	**12**		1.0	0.36	ug/L			04/02/20 21:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 21:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 21:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 21:15	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/02/20 21:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 21:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 21:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 21:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 21:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 21:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 21:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 21:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 21:15	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-20 (032020)

Date Collected: 03/20/20 13:15
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			04/02/20 21:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 21:15	1
Tetrachloroethene	**0.99**	**J**	1.0	0.74	ug/L			04/02/20 21:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 21:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
1,1,1-Trichloroethane	**37**		1.0	0.37	ug/L			04/02/20 21:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Trichloroethene	**2.9**		1.0	0.48	ug/L			04/02/20 21:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 21:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 21:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 21:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/02/20 21:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/02/20 21:15*	*1*
Dibromofluoromethane (Surr)	*121*		*80 - 122*		*04/02/20 21:15*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*04/02/20 21:15*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**490**		100	31	ug/L			03/27/20 23:16	100

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	**1.3**		0.20	0.10	mg/L		03/30/20 14:25	03/31/20 12:25	1
Nitrate Nitrite as N	**6.2**		0.50	0.10	mg/L			03/28/20 13:04	10

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**7.5**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-22 (032020)

Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-4

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 13:48	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 13:48	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 13:48	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 13:48	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 13:48	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 13:48	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 13:48	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 13:48	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 13:48	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
cis-1,2-Dichloroethene	**5.8**		1.0	0.41	ug/L			04/01/20 13:48	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 13:48	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 13:48	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 13:48	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 13:48	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 13:48	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 13:48	1
1,1-Dichloroethane	**27**		1.0	0.38	ug/L			04/01/20 13:48	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
1,1-Dichloroethene	**9.1**		1.0	0.36	ug/L			04/01/20 13:48	1
1,2-Dichloroethene, Total	**5.8**		2.0	0.37	ug/L			04/01/20 13:48	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 13:48	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 13:48	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 13:48	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 13:48	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 13:48	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 13:48	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 13:48	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:48	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 13:48	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 13:48	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 13:48	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 13:48	1

Client Sample ID: MW-22 (032020)

Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 13:48	1
Tetrachloroethene	**16**		1.0	0.74	ug/L			04/01/20 13:48	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 13:48	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
1,1,1-Trichloroethane	**55**		1.0	0.37	ug/L			04/01/20 13:48	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Trichloroethene	**32**		1.0	0.48	ug/L			04/01/20 13:48	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 13:48	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:48	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 13:48	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 13:48	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 13:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/01/20 13:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/01/20 13:48*	*1*
Dibromofluoromethane (Surr)	*121*		*80 - 122*		*04/01/20 13:48*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/01/20 13:48*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.0	0.40	mg/L			04/02/20 21:51	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**56**		2.0	0.63	ug/L			03/27/20 23:39	2

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:25	03/31/20 11:59	1
Nitrate Nitrite as N	**0.55**		0.050	0.010	mg/L			03/28/20 13:00	1
Total Organic Carbon	**0.77**	**J**	1.0	0.50	mg/L			03/31/20 20:18	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**0.55**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-25 (032020)

Date Collected: 03/20/20 09:45
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:12	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:12	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 14:12	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:12	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:12	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:12	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 14:12	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:12	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:12	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 14:12	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:12	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:12	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:12	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:12	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:12	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:12	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 14:12	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
1,1-Dichloroethene	**0.52**	**J**	1.0	0.36	ug/L			04/01/20 14:12	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 14:12	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:12	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:12	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 14:12	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:12	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:12	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:12	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:12	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:12	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:12	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:12	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:12	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:12	1

Client Sample ID: MW-25 (032020)
Date Collected: 03/20/20 09:45
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:12	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:12	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:12	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Trichloroethene	**0.52**	**J**	1.0	0.48	ug/L			04/01/20 14:12	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:12	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:12	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:12	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:12	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/01/20 14:12*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/01/20 14:12*	*1*
Dibromofluoromethane (Surr)	*123*	*X*	*80 - 122*		*04/01/20 14:12*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*04/01/20 14:12*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**41**		1.0	0.40	mg/L			04/02/20 22:04	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		5.0	1.6	ug/L			03/28/20 00:02	5

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.1**		1.0	0.50	mg/L			03/31/20 21:08	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-28 (032020)

Date Collected: 03/20/20 10:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:36	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:36	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 14:36	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:36	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:36	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:36	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 14:36	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:36	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:36	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
cis-1,2-Dichloroethene	**3.4**		1.0	0.41	ug/L			04/01/20 14:36	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:36	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:36	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:36	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:36	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:36	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:36	1
1,1-Dichloroethane	**18**		1.0	0.38	ug/L			04/01/20 14:36	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
1,1-Dichloroethene	**1.9**		1.0	0.36	ug/L			04/01/20 14:36	1
1,2-Dichloroethene, Total	**3.4**		2.0	0.37	ug/L			04/01/20 14:36	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:36	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:36	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 14:36	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:36	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:36	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:36	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:36	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:36	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:36	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:36	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:36	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:36	1

Client Sample ID: MW-28 (032020)
Date Collected: 03/20/20 10:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:36	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:36	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:36	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
1,1,1-Trichloroethane	**8.4**		1.0	0.37	ug/L			04/01/20 14:36	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Trichloroethene	**13**		1.0	0.48	ug/L			04/01/20 14:36	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:36	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:36	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:36	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:36	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/01/20 14:36*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/01/20 14:36*	*1*
Dibromofluoromethane (Surr)	*122*		*80 - 122*		*04/01/20 14:36*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/01/20 14:36*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**20**		1.0	0.40	mg/L			04/02/20 22:17	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**150**		5.0	1.6	ug/L			03/28/20 00:25	5

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**9800**		50	17	ug/L		03/25/20 14:00	03/26/20 20:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**6.3**		1.0	0.50	mg/L			03/31/20 21:24	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-29 (032020)

Date Collected: 03/20/20 09:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:59	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:59	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 14:59	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:59	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:59	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:59	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 14:59	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:59	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:59	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
cis-1,2-Dichloroethene	**1.2**		1.0	0.41	ug/L			04/01/20 14:59	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:59	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:59	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:59	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:59	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:59	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:59	1
1,1-Dichloroethane	**3.7**		1.0	0.38	ug/L			04/01/20 14:59	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
1,1-Dichloroethene	**8.1**		1.0	0.36	ug/L			04/01/20 14:59	1
1,2-Dichloroethene, Total	**1.2**	**J**	2.0	0.37	ug/L			04/01/20 14:59	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:59	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:59	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 14:59	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:59	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:59	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:59	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:59	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:59	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:59	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:59	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:59	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-29 (032020)

Date Collected: 03/20/20 09:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:59	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:59	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:59	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
1,1,1-Trichloroethane	**9.6**		1.0	0.37	ug/L			04/01/20 14:59	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Trichloroethene	**14**		1.0	0.48	ug/L			04/01/20 14:59	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:59	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:59	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:59	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:59	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/01/20 14:59*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/01/20 14:59*	*1*
Dibromofluoromethane (Surr)	*124*	*X*	*80 - 122*		*04/01/20 14:59*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*04/01/20 14:59*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**2500**		100	31	ug/L			03/28/20 00:48	100

Client Sample ID: DUP-03 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-8

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 15:23	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 15:23	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 15:23	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 15:23	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 15:23	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 15:23	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 15:23	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 15:23	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 15:23	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
cis-1,2-Dichloroethene	**6.1**		1.0	0.41	ug/L			04/01/20 15:23	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 15:23	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 15:23	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 15:23	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 15:23	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 15:23	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 15:23	1
1,1-Dichloroethane	**26**		1.0	0.38	ug/L			04/01/20 15:23	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
1,1-Dichloroethene	**9.4**		1.0	0.36	ug/L			04/01/20 15:23	1
1,2-Dichloroethene, Total	**6.1**		2.0	0.37	ug/L			04/01/20 15:23	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 15:23	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 15:23	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 15:23	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 15:23	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 15:23	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 15:23	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 15:23	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 15:23	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 15:23	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 15:23	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 15:23	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 15:23	1

Client Sample ID: DUP-03 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 15:23	1
Tetrachloroethene	**16**		1.0	0.74	ug/L			04/01/20 15:23	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 15:23	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
1,1,1-Trichloroethane	**61**		1.0	0.37	ug/L			04/01/20 15:23	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Trichloroethene	**34**		1.0	0.48	ug/L			04/01/20 15:23	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 15:23	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 15:23	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 15:23	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 15:23	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 15:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*80 - 120*		*04/01/20 15:23*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/01/20 15:23*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*04/01/20 15:23*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/01/20 15:23*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.0	0.40	mg/L			04/02/20 20:23	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**58**		2.0	0.63	ug/L			03/28/20 01:11	2

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**55**		50	17	ug/L		03/25/20 14:00	03/26/20 20:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:25	03/31/20 12:00	1
Nitrate Nitrite as N	**0.54**		0.050	0.010	mg/L			03/28/20 16:00	1
Total Organic Carbon	**0.71**	**J**	1.0	0.50	mg/L			03/31/20 21:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**0.54**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: Trip Blank

Date Collected: 03/20/20 00:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-9

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 13:01	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 13:01	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 13:01	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 13:01	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 13:01	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 13:01	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 13:01	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 13:01	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 13:01	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 13:01	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 13:01	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 13:01	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 13:01	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 13:01	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 13:01	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 13:01	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 13:01	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/01/20 13:01	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 13:01	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 13:01	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 13:01	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 13:01	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 13:01	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 13:01	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 13:01	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 13:01	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:01	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 13:01	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 13:01	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 13:01	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: Trip Blank
Date Collected: 03/20/20 00:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 13:01	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 13:01	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 13:01	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:01	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 13:01	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 13:01	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 13:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/01/20 13:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/01/20 13:01*	*1*
Dibromofluoromethane (Surr)	*125*	*X*	*80 - 122*		*04/01/20 13:01*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/01/20 13:01*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: EB-01 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-10

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:24	03/31/20 11:28	1
Nitrate Nitrite as N	**0.013**	**J**	0.050	0.010	mg/L			03/28/20 13:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	<0.25		0.25	0.25	mg/L			03/31/20 13:40	1

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181932-2	MW-19 (032020)	105	107	107	97
680-181932-3	MW-20 (032020)	112	103	121	94
680-181932-4	MW-22 (032020)	112	108	121	95
680-181932-5	MW-25 (032020)	108	105	123 X	96
680-181932-6	MW-28 (032020)	108	103	122	95
680-181932-7	MW-29 (032020)	109	103	124 X	94
680-181932-8	DUP-03 (032020)	110	104	119	93
680-181932-9	Trip Blank	112	104	125 X	93
LCS 680-613494/4	Lab Control Sample	111	108	113	109
LCS 680-613502/4	Lab Control Sample	110	103	109	99
LCS 680-613689/4	Lab Control Sample	113	108	115	104
LCSD 680-613494/5	Lab Control Sample Dup	110	107	113	108
LCSD 680-613502/5	Lab Control Sample Dup	109	101	108	96
LCSD 680-613689/5	Lab Control Sample Dup	112	106	114	105
MB 680-613494/10	Method Blank	105	106	105	96
MB 680-613502/9	Method Blank	109	95	119	95
MB 680-613689/9	Method Blank	109	95	118	100

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613494/10
Matrix: Water
Analysis Batch: 613494

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 00:01	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 00:01	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 00:01	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 00:01	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 00:01	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 00:01	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 00:01	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 00:01	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 00:01	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 00:01	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 00:01	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 00:01	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 00:01	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 00:01	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 00:01	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 00:01	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 00:01	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 00:01	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 00:01	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 00:01	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 00:01	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 00:01	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 00:01	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 00:01	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 00:01	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 00:01	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 00:01	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/01/20 00:01	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 00:01	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 00:01	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 00:01	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 00:01	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 00:01	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 00:01	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 00:01	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 00:01	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 00:01	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 00:01	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 00:01	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 00:01	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 00:01	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 00:01	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 00:01	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 00:01	1

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

Lab Sample ID: MB 680-613494/10
Matrix: Water
Analysis Batch: 613494

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 00:01	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 00:01	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 00:01	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 00:01	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 00:01	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 00:01	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 00:01	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 00:01	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 00:01	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 00:01	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 00:01	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/01/20 00:01	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 00:01	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 00:01	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 00:01	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 00:01	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 00:01	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 00:01	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 00:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 00:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*04/01/20 00:01*	*1*
Dibromofluoromethane (Surr)	*105*		*80 - 122*		*04/01/20 00:01*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*04/01/20 00:01*	*1*

Lab Sample ID: LCS 680-613494/4
Matrix: Water
Analysis Batch: 613494

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	277		ug/L		111	70 - 135
Benzene	50.0	54.7		ug/L		109	80 - 120
Bromobenzene	50.0	55.5		ug/L		111	80 - 121
Bromochloromethane	50.0	55.1		ug/L		110	80 - 120
Bromodichloromethane	50.0	57.2		ug/L		114	80 - 120
Bromoform	50.0	59.4		ug/L		119	74 - 126
Bromomethane	50.1	113	E *	ug/L		226	62 - 130
2-Butanone	250	285		ug/L		114	80 - 131
Carbon disulfide	50.0	52.8		ug/L		106	80 - 120
Carbon tetrachloride	50.0	53.5		ug/L		107	76 - 123
Chlorobenzene	50.0	54.6		ug/L		109	80 - 120
Chloroethane	50.0	71.0	*	ug/L		142	66 - 135
2-Chloroethyl vinyl ether	50.0	59.0		ug/L		118	71 - 135
Chloroform	50.0	55.4		ug/L		111	80 - 120
Chloromethane	50.0	52.8		ug/L		105	69 - 131
2-Chlorotoluene	50.0	55.1		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613494/4
Matrix: Water
Analysis Batch: 613494

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	55.2		ug/L		110	80 - 120
cis-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120
cis-1,3-Dichloropropene	50.0	58.9		ug/L		118	80 - 120
Dibromochloromethane	50.0	59.2		ug/L		118	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	58.3		ug/L		117	71 - 134
1,2-Dibromoethane	50.0	58.3		ug/L		117	80 - 120
Dibromomethane	50.0	55.5		ug/L		111	80 - 120
1,2-Dichlorobenzene	50.0	55.2		ug/L		110	80 - 120
1,3-Dichlorobenzene	50.0	54.8		ug/L		110	80 - 120
1,4-Dichlorobenzene	50.0	53.7		ug/L		107	80 - 120
Dichlorodifluoromethane	50.1	57.1		ug/L		114	47 - 155
1,1-Dichloroethane	50.0	54.5		ug/L		109	80 - 120
1,2-Dichloroethane	50.0	55.4		ug/L		111	80 - 120
1,1-Dichloroethene	50.0	52.5		ug/L		105	76 - 120
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120
1,2-Dichloropropane	50.0	56.1		ug/L		112	80 - 120
1,3-Dichloropropane	50.0	57.0		ug/L		114	80 - 120
2,2-Dichloropropane	50.0	58.4		ug/L		117	76 - 126
1,1-Dichloropropene	50.0	54.6		ug/L		109	80 - 120
Ethylbenzene	50.0	54.8		ug/L		110	80 - 120
Hexachlorobutadiene	50.0	58.0		ug/L		116	60 - 140
2-Hexanone	250	296		ug/L		118	74 - 127
Isopropylbenzene	50.0	54.8		ug/L		110	80 - 120
Methylene Chloride	50.0	50.8		ug/L		102	80 - 120
4-Methyl-2-pentanone	250	293		ug/L		117	76 - 124
Methyl tert-butyl ether	50.0	55.4		ug/L		111	80 - 120
m-Xylene & p-Xylene	50.0	54.7		ug/L		109	80 - 120
n-Butylbenzene	50.0	54.1		ug/L		108	80 - 120
N-Propylbenzene	50.0	55.0		ug/L		110	80 - 120
o-Xylene	50.0	55.7		ug/L		111	80 - 120
p-Isopropyltoluene	50.0	55.3		ug/L		111	80 - 120
sec-Butylbenzene	50.0	54.3		ug/L		109	80 - 120
Styrene	50.0	57.9		ug/L		116	80 - 120
tert-Butylbenzene	50.0	55.1		ug/L		110	80 - 121
1,1,1,2-Tetrachloroethane	50.0	56.4		ug/L		113	80 - 121
1,1,2,2-Tetrachloroethane	50.0	58.2		ug/L		116	80 - 120
Tetrachloroethene	50.0	55.0		ug/L		110	80 - 121
Toluene	50.0	55.9		ug/L		112	80 - 113
trans-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120
trans-1,3-Dichloropropene	50.0	59.7		ug/L		119	80 - 120
1,2,3-Trichlorobenzene	50.0	60.8		ug/L		122	61 - 141
1,2,4-Trichlorobenzene	50.0	59.8		ug/L		120	68 - 128
1,1,1-Trichloroethane	50.0	53.3		ug/L		107	80 - 120
1,1,2-Trichloroethane	50.0	57.9		ug/L		116	80 - 120
Trichloroethene	50.0	54.9		ug/L		110	80 - 120
Trichlorofluoromethane	50.0	51.7		ug/L		103	60 - 141
1,2,3-Trichloropropane	50.0	56.2		ug/L		112	80 - 123
1,2,4-Trimethylbenzene	50.0	57.0		ug/L		114	80 - 120
1,3,5-Trimethylbenzene	50.0	56.4		ug/L		113	80 - 120

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

Lab Sample ID: LCS 680-613494/4
Matrix: Water
Analysis Batch: 613494

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	124		ug/L		124	67 - 135
Vinyl chloride	50.1	50.9		ug/L		102	71 - 128
Xylenes, Total	100	110		ug/L		110	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*111*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*113*		*80 - 122*
4-Bromofluorobenzene (Surr)	*109*		*80 - 120*

Lab Sample ID: LCSD 680-613494/5
Matrix: Water
Analysis Batch: 613494

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
Acetone	250	270		ug/L		108	70 - 135	2	30
Benzene	50.0	54.7		ug/L		109	80 - 120	0	20
Bromobenzene	50.0	55.4		ug/L		111	80 - 121	0	20
Bromochloromethane	50.0	55.1		ug/L		110	80 - 120	0	20
Bromodichloromethane	50.0	57.4		ug/L		115	80 - 120	0	20
Bromoform	50.0	58.8		ug/L		118	74 - 126	1	20
Bromomethane	50.1	117	E *	ug/L		234	62 - 130	3	20
2-Butanone	250	282		ug/L		113	80 - 131	1	20
Carbon disulfide	50.0	52.3		ug/L		105	80 - 120	1	20
Carbon tetrachloride	50.0	53.3		ug/L		107	76 - 123	0	20
Chlorobenzene	50.0	54.0		ug/L		108	80 - 120	1	20
Chloroethane	50.0	70.1	*	ug/L		140	66 - 135	1	20
2-Chloroethyl vinyl ether	50.0	58.3		ug/L		117	71 - 135	1	50
Chloroform	50.0	55.0		ug/L		110	80 - 120	1	20
Chloromethane	50.0	52.3		ug/L		105	69 - 131	1	30
2-Chlorotoluene	50.0	54.6		ug/L		109	80 - 120	1	20
4-Chlorotoluene	50.0	54.8		ug/L		110	80 - 120	1	20
cis-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120	0	20
cis-1,3-Dichloropropene	50.0	58.6		ug/L		117	80 - 120	0	20
Dibromochloromethane	50.0	59.1		ug/L		118	80 - 121	0	20
1,2-Dibromo-3-Chloropropane	50.0	57.3		ug/L		115	71 - 134	2	20
1,2-Dibromoethane	50.0	57.3		ug/L		115	80 - 120	2	20
Dibromomethane	50.0	55.4		ug/L		111	80 - 120	0	20
1,2-Dichlorobenzene	50.0	55.1		ug/L		110	80 - 120	0	20
1,3-Dichlorobenzene	50.0	54.1		ug/L		108	80 - 120	1	20
1,4-Dichlorobenzene	50.0	53.8		ug/L		108	80 - 120	0	20
Dichlorodifluoromethane	50.1	56.9		ug/L		114	47 - 155	0	40
1,1-Dichloroethane	50.0	54.5		ug/L		109	80 - 120	0	20
1,2-Dichloroethane	50.0	54.5		ug/L		109	80 - 120	2	50
1,1-Dichloroethene	50.0	52.1		ug/L		104	76 - 120	1	20
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120	1	20
1,2-Dichloropropane	50.0	56.4		ug/L		113	80 - 120	0	20
1,3-Dichloropropane	50.0	56.6		ug/L		113	80 - 120	1	20

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

Lab Sample ID: LCSD 680-613494/5
Matrix: Water
Analysis Batch: 613494

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
2,2-Dichloropropane			50.0	57.9		ug/L		116	76 - 126	1	20
1,1-Dichloropropene			50.0	54.0		ug/L		108	80 - 120	1	20
Ethylbenzene			50.0	54.2		ug/L		108	80 - 120	1	20
Hexachlorobutadiene			50.0	58.8		ug/L		118	60 - 140	1	20
2-Hexanone			250	291		ug/L		116	74 - 127	2	20
Isopropylbenzene			50.0	54.3		ug/L		109	80 - 120	1	20
Methylene Chloride			50.0	50.4		ug/L		101	80 - 120	1	20
4-Methyl-2-pentanone			250	286		ug/L		115	76 - 124	2	20
Methyl tert-butyl ether			50.0	54.9		ug/L		110	80 - 120	1	20
m-Xylene & p-Xylene			50.0	54.3		ug/L		109	80 - 120	1	20
n-Butylbenzene			50.0	53.1		ug/L		106	80 - 120	2	20
N-Propylbenzene			50.0	54.3		ug/L		109	80 - 120	1	20
o-Xylene			50.0	55.3		ug/L		111	80 - 120	1	30
p-Isopropyltoluene			50.0	53.8		ug/L		108	80 - 120	3	20
sec-Butylbenzene			50.0	53.4		ug/L		107	80 - 120	2	20
Styrene			50.0	57.6		ug/L		115	80 - 120	0	20
tert-Butylbenzene			50.0	54.3		ug/L		109	80 - 121	1	20
1,1,1,2-Tetrachloroethane			50.0	56.4		ug/L		113	80 - 121	0	20
1,1,2,2-Tetrachloroethane			50.0	57.1		ug/L		114	80 - 120	2	20
Tetrachloroethene			50.0	54.0		ug/L		108	80 - 121	2	20
Toluene			50.0	55.5		ug/L		111	80 - 113	1	20
trans-1,2-Dichloroethene			50.0	54.5		ug/L		109	80 - 120	1	20
trans-1,3-Dichloropropene			50.0	59.0		ug/L		118	80 - 120	1	30
1,2,3-Trichlorobenzene			50.0	60.9		ug/L		122	61 - 141	0	20
1,2,4-Trichlorobenzene			50.0	60.2		ug/L		120	68 - 128	1	20
1,1,1-Trichloroethane			50.0	53.7		ug/L		107	80 - 120	1	20
1,1,2-Trichloroethane			50.0	57.0		ug/L		114	80 - 120	2	20
Trichloroethene			50.0	54.6		ug/L		109	80 - 120	1	20
Trichlorofluoromethane			50.0	51.2		ug/L		102	60 - 141	1	20
1,2,3-Trichloropropane			50.0	54.4		ug/L		109	80 - 123	3	30
1,2,4-Trimethylbenzene			50.0	56.1		ug/L		112	80 - 120	2	20
1,3,5-Trimethylbenzene			50.0	55.4		ug/L		111	80 - 120	2	20
Vinyl acetate			100	121		ug/L		121	67 - 135	2	20
Vinyl chloride			50.1	50.5		ug/L		101	71 - 128	1	20
Xylenes, Total			100	110		ug/L		110	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*
Dibromofluoromethane (Surr)	*113*		*80 - 122*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*

Lab Sample ID: MB 680-613502/9
Matrix: Water
Analysis Batch: 613502

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 11:50	1

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

Lab Sample ID: MB 680-613502/9
Matrix: Water
Analysis Batch: 613502

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 11:50	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 11:50	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 11:50	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 11:50	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 11:50	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 11:50	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 11:50	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 11:50	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 11:50	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 11:50	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 11:50	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 11:50	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 11:50	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 11:50	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 11:50	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 11:50	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 11:50	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 11:50	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 11:50	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 11:50	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 11:50	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 11:50	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 11:50	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 11:50	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 11:50	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 11:50	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/01/20 11:50	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 11:50	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 11:50	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 11:50	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 11:50	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 11:50	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 11:50	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 11:50	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 11:50	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 11:50	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 11:50	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 11:50	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 11:50	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 11:50	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 11:50	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 11:50	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 11:50	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 11:50	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 11:50	1

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

Lab Sample ID: MB 680-613502/9
Matrix: Water
Analysis Batch: 613502

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 11:50	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 11:50	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 11:50	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 11:50	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 11:50	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 11:50	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 11:50	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 11:50	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 11:50	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/01/20 11:50	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 11:50	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 11:50	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 11:50	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 11:50	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 11:50	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 11:50	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 11:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/01/20 11:50*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/01/20 11:50*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*04/01/20 11:50*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/01/20 11:50*	*1*

Lab Sample ID: LCS 680-613502/4
Matrix: Water
Analysis Batch: 613502

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	280		ug/L		112	70 - 135
Benzene	50.0	52.7		ug/L		105	80 - 120
Bromobenzene	50.0	55.4		ug/L		111	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	52.2		ug/L		104	80 - 120
Bromoform	50.0	55.2		ug/L		110	74 - 126
Bromomethane	50.0	93.0	*	ug/L		186	62 - 130
2-Butanone	250	252		ug/L		101	80 - 131
Carbon disulfide	50.0	52.2		ug/L		104	80 - 120
Carbon tetrachloride	50.0	59.4		ug/L		119	76 - 123
Chlorobenzene	50.0	53.1		ug/L		106	80 - 120
Chloroethane	50.0	56.2		ug/L		112	66 - 135
2-Chloroethyl vinyl ether	50.0	47.7		ug/L		95	71 - 135
Chloroform	50.0	51.9		ug/L		104	80 - 120
Chloromethane	50.0	49.2		ug/L		98	69 - 131
2-Chlorotoluene	50.0	53.9		ug/L		108	80 - 120
4-Chlorotoluene	50.0	52.6		ug/L		105	80 - 120
cis-1,2-Dichloroethene	50.0	55.0		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613502/4
Matrix: Water
Analysis Batch: 613502

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	54.2		ug/L		108	80 - 120
Dibromochloromethane	50.0	53.0		ug/L		106	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	49.6		ug/L		99	71 - 134
1,2-Dibromoethane	50.0	53.4		ug/L		107	80 - 120
Dibromomethane	50.0	53.5		ug/L		107	80 - 120
1,2-Dichlorobenzene	50.0	52.8		ug/L		106	80 - 120
1,3-Dichlorobenzene	50.0	52.8		ug/L		106	80 - 120
1,4-Dichlorobenzene	50.0	50.7		ug/L		101	80 - 120
Dichlorodifluoromethane	50.0	72.6		ug/L		145	47 - 155
1,1-Dichloroethane	50.0	52.2		ug/L		104	80 - 120
1,2-Dichloroethane	50.0	51.4		ug/L		103	80 - 120
1,1-Dichloroethene	50.0	57.5		ug/L		115	76 - 120
1,2-Dichloroethene, Total	100	111		ug/L		111	80 - 120
1,2-Dichloropropane	50.0	51.0		ug/L		102	80 - 120
1,3-Dichloropropane	50.0	51.5		ug/L		103	80 - 120
2,2-Dichloropropane	50.0	67.5	*	ug/L		135	76 - 126
1,1-Dichloropropene	50.0	56.6		ug/L		113	80 - 120
Ethylbenzene	50.0	53.5		ug/L		107	80 - 120
Hexachlorobutadiene	50.0	59.8		ug/L		120	60 - 140
2-Hexanone	250	242		ug/L		97	74 - 127
Isopropylbenzene	50.0	54.1		ug/L		108	80 - 120
Methylene Chloride	50.0	49.4		ug/L		99	80 - 120
4-Methyl-2-pentanone	250	243		ug/L		97	76 - 124
Methyl tert-butyl ether	50.0	51.6		ug/L		103	80 - 120
m-Xylene & p-Xylene	50.0	52.6		ug/L		105	80 - 120
n-Butylbenzene	50.0	47.9		ug/L		96	80 - 120
N-Propylbenzene	50.0	55.3		ug/L		111	80 - 120
o-Xylene	50.0	53.5		ug/L		107	80 - 120
p-Isopropyltoluene	50.0	52.8		ug/L		106	80 - 120
sec-Butylbenzene	50.0	52.8		ug/L		106	80 - 120
Styrene	50.0	54.5		ug/L		109	80 - 120
tert-Butylbenzene	50.0	52.6		ug/L		105	80 - 121
1,1,1,2-Tetrachloroethane	50.0	56.7		ug/L		113	80 - 121
1,1,2,2-Tetrachloroethane	50.0	51.1		ug/L		102	80 - 120
Tetrachloroethene	50.0	59.3		ug/L		119	80 - 121
Toluene	50.0	52.8		ug/L		106	80 - 113
trans-1,2-Dichloroethene	50.0	56.5		ug/L		113	80 - 120
trans-1,3-Dichloropropene	50.0	54.2		ug/L		108	80 - 120
1,2,3-Trichlorobenzene	50.0	59.3		ug/L		119	61 - 141
1,2,4-Trichlorobenzene	50.0	59.1		ug/L		118	68 - 128
1,1,1-Trichloroethane	50.0	56.1		ug/L		112	80 - 120
1,1,2-Trichloroethane	50.0	51.7		ug/L		103	80 - 120
Trichloroethene	50.0	56.9		ug/L		114	80 - 120
Trichlorofluoromethane	50.0	61.4		ug/L		123	60 - 141
1,2,3-Trichloropropane	50.0	50.8		ug/L		102	80 - 123
1,2,4-Trimethylbenzene	50.0	51.4		ug/L		103	80 - 120
1,3,5-Trimethylbenzene	50.0	50.9		ug/L		102	80 - 120
Vinyl acetate	100	130		ug/L		130	67 - 135
Vinyl chloride	50.0	54.9		ug/L		110	71 - 128

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

Lab Sample ID: LCS 680-613502/4
Matrix: Water
Analysis Batch: 613502

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	106		ug/L		106	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*
Dibromofluoromethane (Surr)	*109*		*80 - 122*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*

Lab Sample ID: LCSD 680-613502/5
Matrix: Water
Analysis Batch: 613502

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
Acetone			250	270		ug/L		108	70 - 135	3	30
Benzene			50.0	52.1		ug/L		104	80 - 120	1	20
Bromobenzene			50.0	54.9		ug/L		110	80 - 121	1	20
Bromochloromethane			50.0	52.0		ug/L		104	80 - 120	0	20
Bromodichloromethane			50.0	51.4		ug/L		103	80 - 120	2	20
Bromoform			50.0	54.6		ug/L		109	74 - 126	1	20
Bromomethane			50.0	92.8	*	ug/L		186	62 - 130	0	20
2-Butanone			250	240		ug/L		96	80 - 131	5	20
Carbon disulfide			50.0	51.3		ug/L		103	80 - 120	2	20
Carbon tetrachloride			50.0	57.1		ug/L		114	76 - 123	4	20
Chlorobenzene			50.0	51.7		ug/L		103	80 - 120	3	20
Chloroethane			50.0	55.5		ug/L		111	66 - 135	1	20
2-Chloroethyl vinyl ether			50.0	47.9		ug/L		96	71 - 135	0	50
Chloroform			50.0	51.3		ug/L		103	80 - 120	1	20
Chloromethane			50.0	48.7		ug/L		97	69 - 131	1	30
2-Chlorotoluene			50.0	51.8		ug/L		104	80 - 120	4	20
4-Chlorotoluene			50.0	52.6		ug/L		105	80 - 120	0	20
cis-1,2-Dichloroethene			50.0	52.7		ug/L		105	80 - 120	4	20
cis-1,3-Dichloropropene			50.0	53.8		ug/L		108	80 - 120	1	20
Dibromochloromethane			50.0	52.3		ug/L		105	80 - 121	1	20
1,2-Dibromo-3-Chloropropane			50.0	48.1		ug/L		96	71 - 134	3	20
1,2-Dibromoethane			50.0	53.3		ug/L		107	80 - 120	0	20
Dibromomethane			50.0	52.9		ug/L		106	80 - 120	1	20
1,2-Dichlorobenzene			50.0	50.7		ug/L		101	80 - 120	4	20
1,3-Dichlorobenzene			50.0	51.3		ug/L		103	80 - 120	3	20
1,4-Dichlorobenzene			50.0	49.1		ug/L		98	80 - 120	3	20
Dichlorodifluoromethane			50.0	71.8		ug/L		144	47 - 155	1	40
1,1-Dichloroethane			50.0	52.2		ug/L		104	80 - 120	0	20
1,2-Dichloroethane			50.0	50.0		ug/L		100	80 - 120	3	50
1,1-Dichloroethene			50.0	58.6		ug/L		117	76 - 120	2	20
1,2-Dichloroethene, Total			100	108		ug/L		108	80 - 120	4	20
1,2-Dichloropropane			50.0	50.5		ug/L		101	80 - 120	1	20
1,3-Dichloropropane			50.0	50.2		ug/L		100	80 - 120	2	20
2,2-Dichloropropane			50.0	65.6	*	ug/L		131	76 - 126	3	20
1,1-Dichloropropene			50.0	56.7		ug/L		113	80 - 120	0	20

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

Lab Sample ID: LCSD 680-613502/5
Matrix: Water
Analysis Batch: 613502

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
Ethylbenzene			50.0	52.3		ug/L		105	80 - 120	2	20
Hexachlorobutadiene			50.0	59.3		ug/L		119	60 - 140	1	20
2-Hexanone			250	237		ug/L		95	74 - 127	2	20
Isopropylbenzene			50.0	53.0		ug/L		106	80 - 120	2	20
Methylene Chloride			50.0	49.1		ug/L		98	80 - 120	1	20
4-Methyl-2-pentanone			250	241		ug/L		96	76 - 124	1	20
Methyl tert-butyl ether			50.0	50.3		ug/L		101	80 - 120	2	20
m-Xylene & p-Xylene			50.0	51.5		ug/L		103	80 - 120	2	20
n-Butylbenzene			50.0	46.3		ug/L		93	80 - 120	3	20
N-Propylbenzene			50.0	54.1		ug/L		108	80 - 120	2	20
o-Xylene			50.0	52.4		ug/L		105	80 - 120	2	30
p-Isopropyltoluene			50.0	52.1		ug/L		104	80 - 120	1	20
sec-Butylbenzene			50.0	51.5		ug/L		103	80 - 120	3	20
Styrene			50.0	53.3		ug/L		107	80 - 120	2	20
tert-Butylbenzene			50.0	51.8		ug/L		104	80 - 121	2	20
1,1,1,2-Tetrachloroethane			50.0	56.1		ug/L		112	80 - 121	1	20
1,1,2,2-Tetrachloroethane			50.0	50.1		ug/L		100	80 - 120	2	20
Tetrachloroethene			50.0	58.3		ug/L		117	80 - 121	2	20
Toluene			50.0	52.4		ug/L		105	80 - 113	1	20
trans-1,2-Dichloroethene			50.0	54.9		ug/L		110	80 - 120	3	20
trans-1,3-Dichloropropene			50.0	52.9		ug/L		106	80 - 120	3	30
1,2,3-Trichlorobenzene			50.0	58.0		ug/L		116	61 - 141	2	20
1,2,4-Trichlorobenzene			50.0	57.2		ug/L		114	68 - 128	3	20
1,1,1-Trichloroethane			50.0	55.1		ug/L		110	80 - 120	2	20
1,1,2-Trichloroethane			50.0	51.3		ug/L		103	80 - 120	1	20
Trichloroethene			50.0	57.4		ug/L		115	80 - 120	1	20
Trichlorofluoromethane			50.0	60.7		ug/L		121	60 - 141	1	20
1,2,3-Trichloropropane			50.0	50.0		ug/L		100	80 - 123	2	30
1,2,4-Trimethylbenzene			50.0	50.9		ug/L		102	80 - 120	1	20
1,3,5-Trimethylbenzene			50.0	49.8		ug/L		100	80 - 120	2	20
Vinyl acetate			100	126		ug/L		126	67 - 135	3	20
Vinyl chloride			50.0	53.8		ug/L		108	71 - 128	2	20
Xylenes, Total			100	104		ug/L		104	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*109*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*
Dibromofluoromethane (Surr)	*108*		*80 - 122*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 13:24	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1

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

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 13:24	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 13:24	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 13:24	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 13:24	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 13:24	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 13:24	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 13:24	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 13:24	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 13:24	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 13:24	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 13:24	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 13:24	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 13:24	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 13:24	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 13:24	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 13:24	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 13:24	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 13:24	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 13:24	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 13:24	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 13:24	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 13:24	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 13:24	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 13:24	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 13:24	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 13:24	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 13:24	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 13:24	1

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

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 13:24	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 13:24	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 13:24	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 13:24	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 13:24	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 13:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/02/20 13:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/02/20 13:24*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*04/02/20 13:24*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/02/20 13:24*	*1*

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	283		ug/L		113	70 - 135
Benzene	50.0	54.4		ug/L		109	80 - 120
Bromobenzene	50.0	60.6		ug/L		121	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	53.8		ug/L		108	80 - 120
Bromoform	50.0	60.3		ug/L		121	74 - 126
Bromomethane	50.0	79.9	*	ug/L		160	62 - 130
2-Butanone	250	248		ug/L		99	80 - 131
Carbon disulfide	50.0	53.1		ug/L		106	80 - 120
Carbon tetrachloride	50.0	59.7		ug/L		119	76 - 123
Chlorobenzene	50.0	56.9		ug/L		114	80 - 120
Chloroethane	50.0	54.7		ug/L		109	66 - 135
2-Chloroethyl vinyl ether	50.0	49.1		ug/L		98	71 - 135
Chloroform	50.0	54.0		ug/L		108	80 - 120
Chloromethane	50.0	43.7		ug/L		87	69 - 131
2-Chlorotoluene	50.0	57.8		ug/L		116	80 - 120
4-Chlorotoluene	50.0	57.0		ug/L		114	80 - 120
cis-1,2-Dichloroethene	50.0	56.8		ug/L		114	80 - 120
cis-1,3-Dichloropropene	50.0	55.8		ug/L		112	80 - 120
Dibromochloromethane	50.0	55.1		ug/L		110	80 - 121

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

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromo-3-Chloropropane	50.0	51.9		ug/L		104	71 - 134
1,2-Dibromoethane	50.0	55.6		ug/L		111	80 - 120
Dibromomethane	50.0	56.8		ug/L		114	80 - 120
1,2-Dichlorobenzene	50.0	55.2		ug/L		110	80 - 120
1,3-Dichlorobenzene	50.0	55.5		ug/L		111	80 - 120
1,4-Dichlorobenzene	50.0	52.6		ug/L		105	80 - 120
Dichlorodifluoromethane	50.0	63.3		ug/L		127	47 - 155
1,1-Dichloroethane	50.0	53.7		ug/L		107	80 - 120
1,2-Dichloroethane	50.0	52.4		ug/L		105	80 - 120
1,1-Dichloroethene	50.0	59.2		ug/L		118	76 - 120
1,2-Dichloroethene, Total	100	113		ug/L		113	80 - 120
1,2-Dichloropropane	50.0	53.2		ug/L		106	80 - 120
1,3-Dichloropropane	50.0	52.8		ug/L		106	80 - 120
2,2-Dichloropropane	50.0	69.9	*	ug/L		140	76 - 126
1,1-Dichloropropene	50.0	56.1		ug/L		112	80 - 120
Ethylbenzene	50.0	57.1		ug/L		114	80 - 120
Hexachlorobutadiene	50.0	63.9		ug/L		128	60 - 140
2-Hexanone	250	239		ug/L		95	74 - 127
Isopropylbenzene	50.0	57.5		ug/L		115	80 - 120
Methylene Chloride	50.0	53.4		ug/L		107	80 - 120
4-Methyl-2-pentanone	250	237		ug/L		95	76 - 124
Methyl tert-butyl ether	50.0	52.5		ug/L		105	80 - 120
m-Xylene & p-Xylene	50.0	57.0		ug/L		114	80 - 120
n-Butylbenzene	50.0	49.3		ug/L		99	80 - 120
N-Propylbenzene	50.0	57.5		ug/L		115	80 - 120
o-Xylene	50.0	57.3		ug/L		115	80 - 120
p-Isopropyltoluene	50.0	54.9		ug/L		110	80 - 120
sec-Butylbenzene	50.0	55.1		ug/L		110	80 - 120
Styrene	50.0	58.5		ug/L		117	80 - 120
tert-Butylbenzene	50.0	54.7		ug/L		109	80 - 121
1,1,1,2-Tetrachloroethane	50.0	62.3	*	ug/L		125	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.7		ug/L		111	80 - 120
Tetrachloroethene	50.0	59.0		ug/L		118	80 - 121
Toluene	50.0	54.3		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	56.5		ug/L		113	80 - 120
trans-1,3-Dichloropropene	50.0	56.0		ug/L		112	80 - 120
1,2,3-Trichlorobenzene	50.0	58.5		ug/L		117	61 - 141
1,2,4-Trichlorobenzene	50.0	58.0		ug/L		116	68 - 128
1,1,1-Trichloroethane	50.0	56.4		ug/L		113	80 - 120
1,1,2-Trichloroethane	50.0	54.2		ug/L		108	80 - 120
Trichloroethene	50.0	58.2		ug/L		116	80 - 120
Trichlorofluoromethane	50.0	59.5		ug/L		119	60 - 141
1,2,3-Trichloropropane	50.0	53.2		ug/L		106	80 - 123
1,2,4-Trimethylbenzene	50.0	55.4		ug/L		111	80 - 120
1,3,5-Trimethylbenzene	50.0	54.4		ug/L		109	80 - 120
Vinyl acetate	100	131		ug/L		131	67 - 135
Vinyl chloride	50.0	51.6		ug/L		103	71 - 128
Xylenes, Total	100	114		ug/L		114	80 - 120

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

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*113*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*115*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 680-613689/5
Matrix: Water
Analysis Batch: 613689

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
Acetone			250	277		ug/L		111	70 - 135	2	30
Benzene			50.0	54.0		ug/L		108	80 - 120	1	20
Bromobenzene			50.0	59.9		ug/L		120	80 - 121	1	20
Bromochloromethane			50.0	53.4		ug/L		107	80 - 120	2	20
Bromodichloromethane			50.0	53.4		ug/L		107	80 - 120	1	20
Bromoform			50.0	58.8		ug/L		118	74 - 126	3	20
Bromomethane			50.0	90.5	*	ug/L		181	62 - 130	12	20
2-Butanone			250	241		ug/L		96	80 - 131	3	20
Carbon disulfide			50.0	52.7		ug/L		105	80 - 120	1	20
Carbon tetrachloride			50.0	59.1		ug/L		118	76 - 123	1	20
Chlorobenzene			50.0	57.1		ug/L		114	80 - 120	0	20
Chloroethane			50.0	55.9		ug/L		112	66 - 135	2	20
2-Chloroethyl vinyl ether			50.0	48.1		ug/L		96	71 - 135	2	50
Chloroform			50.0	53.6		ug/L		107	80 - 120	1	20
Chloromethane			50.0	46.5		ug/L		93	69 - 131	6	30
2-Chlorotoluene			50.0	57.8		ug/L		116	80 - 120	0	20
4-Chlorotoluene			50.0	57.6		ug/L		115	80 - 120	1	20
cis-1,2-Dichloroethene			50.0	55.3		ug/L		111	80 - 120	3	20
cis-1,3-Dichloropropene			50.0	55.5		ug/L		111	80 - 120	1	20
Dibromochloromethane			50.0	53.8		ug/L		108	80 - 121	2	20
1,2-Dibromo-3-Chloropropane			50.0	49.3		ug/L		99	71 - 134	5	20
1,2-Dibromoethane			50.0	54.1		ug/L		108	80 - 120	3	20
Dibromomethane			50.0	55.3		ug/L		111	80 - 120	3	20
1,2-Dichlorobenzene			50.0	55.9		ug/L		112	80 - 120	1	20
1,3-Dichlorobenzene			50.0	56.0		ug/L		112	80 - 120	1	20
1,4-Dichlorobenzene			50.0	54.5		ug/L		109	80 - 120	4	20
Dichlorodifluoromethane			50.0	62.1		ug/L		124	47 - 155	2	40
1,1-Dichloroethane			50.0	53.6		ug/L		107	80 - 120	0	20
1,2-Dichloroethane			50.0	52.2		ug/L		104	80 - 120	0	50
1,1-Dichloroethene			50.0	54.5		ug/L		109	76 - 120	8	20
1,2-Dichloroethene, Total			100	112		ug/L		112	80 - 120	1	20
1,2-Dichloropropane			50.0	52.9		ug/L		106	80 - 120	1	20
1,3-Dichloropropane			50.0	52.2		ug/L		104	80 - 120	1	20
2,2-Dichloropropane			50.0	67.8	*	ug/L		136	76 - 126	3	20
1,1-Dichloropropene			50.0	56.4		ug/L		113	80 - 120	0	20
Ethylbenzene			50.0	57.3		ug/L		115	80 - 120	0	20
Hexachlorobutadiene			50.0	63.2		ug/L		126	60 - 140	1	20
2-Hexanone			250	234		ug/L		94	74 - 127	2	20

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

Lab Sample ID: LCSD 680-613689/5
Matrix: Water
Analysis Batch: 613689

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
Isopropylbenzene			50.0	58.2		ug/L		116	80 - 120	1	20
Methylene Chloride			50.0	53.2		ug/L		106	80 - 120	1	20
4-Methyl-2-pentanone			250	238		ug/L		95	76 - 124	0	20
Methyl tert-butyl ether			50.0	51.7		ug/L		103	80 - 120	2	20
m-Xylene & p-Xylene			50.0	56.9		ug/L		114	80 - 120	0	20
n-Butylbenzene			50.0	49.6		ug/L		99	80 - 120	1	20
N-Propylbenzene			50.0	58.2		ug/L		116	80 - 120	1	20
o-Xylene			50.0	57.6		ug/L		115	80 - 120	1	30
p-Isopropyltoluene			50.0	55.4		ug/L		111	80 - 120	1	20
sec-Butylbenzene			50.0	55.2		ug/L		110	80 - 120	0	20
Styrene			50.0	58.8		ug/L		118	80 - 120	1	20
tert-Butylbenzene			50.0	55.1		ug/L		110	80 - 121	1	20
1,1,1,2-Tetrachloroethane			50.0	61.3	*	ug/L		123	80 - 121	2	20
1,1,2,2-Tetrachloroethane			50.0	54.5		ug/L		109	80 - 120	2	20
Tetrachloroethene			50.0	59.4		ug/L		119	80 - 121	1	20
Toluene			50.0	54.1		ug/L		108	80 - 113	0	20
trans-1,2-Dichloroethene			50.0	56.9		ug/L		114	80 - 120	1	20
trans-1,3-Dichloropropene			50.0	55.1		ug/L		110	80 - 120	1	30
1,2,3-Trichlorobenzene			50.0	59.0		ug/L		118	61 - 141	1	20
1,2,4-Trichlorobenzene			50.0	59.0		ug/L		118	68 - 128	2	20
1,1,1-Trichloroethane			50.0	56.4		ug/L		113	80 - 120	0	20
1,1,2-Trichloroethane			50.0	52.6		ug/L		105	80 - 120	3	20
Trichloroethene			50.0	57.8		ug/L		116	80 - 120	1	20
Trichlorofluoromethane			50.0	60.1		ug/L		120	60 - 141	1	20
1,2,3-Trichloropropane			50.0	53.5		ug/L		107	80 - 123	1	30
1,2,4-Trimethylbenzene			50.0	55.6		ug/L		111	80 - 120	0	20
1,3,5-Trimethylbenzene			50.0	54.4		ug/L		109	80 - 120	0	20
Vinyl acetate			100	126		ug/L		126	67 - 135	4	20
Vinyl chloride			50.0	52.5		ug/L		105	71 - 128	2	20
Xylenes, Total			100	115		ug/L		115	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*112*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*
Dibromofluoromethane (Surr)	*114*		*80 - 122*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-613785/10
Matrix: Water
Analysis Batch: 613785

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			04/02/20 15:49	1

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 680-613785/11
Matrix: Water
Analysis Batch: 613785

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate			10.0	10.1		mg/L		101	90 - 110		

Lab Sample ID: LCSD 680-613785/12
Matrix: Water
Analysis Batch: 613785

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate			10.0	10.2		mg/L		102	90 - 110	1	15

Lab Sample ID: 680-181932-8 MS
Matrix: Water
Analysis Batch: 613785

Client Sample ID: DUP-03 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	23		10.0	32.4		mg/L		95	80 - 120		

Lab Sample ID: 680-181932-8 MSD
Matrix: Water
Analysis Batch: 613785

Client Sample ID: DUP-03 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	23		10.0	32.5		mg/L		96	80 - 120	0	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206740/1002
Matrix: Water
Analysis Batch: 206740

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/27/20 20:36	1

Lab Sample ID: LCS 550-206740/4
Matrix: Water
Analysis Batch: 206740

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	25.2		ug/L		101	85 - 115		

Lab Sample ID: LCSD 550-206740/5
Matrix: Water
Analysis Batch: 206740

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
Perchlorate			25.0	25.4		ug/L		102	85 - 115	1	15

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: 680-181932-2 MS
Matrix: Water
Analysis Batch: 206740

Client Sample ID: MW-19 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	890		2500	3410		ug/L		101	80 - 120		

Lab Sample ID: 680-181932-2 MSD
Matrix: Water
Analysis Batch: 206740

Client Sample ID: MW-19 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	890		2500	3450		ug/L		103	80 - 120	1	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-612538/1-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 19:37	1

Lab Sample ID: LCS 680-612538/2-A
Matrix: Water
Analysis Batch: 612837

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 612538

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Iron	5010	4910		ug/L		98	80 - 120

Lab Sample ID: MB 680-613127/1-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	18.1	J	50	17	ug/L		03/29/20 13:03	03/30/20 22:30	1

Lab Sample ID: LCS 680-613127/2-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Iron	5010	4870		ug/L		97	80 - 120

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 680-613270/10-A
Matrix: Water
Analysis Batch: 613420

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613270

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:24	03/31/20 11:20	1

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: LCS 680-613270/11-A
Matrix: Water
Analysis Batch: 613420

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613270

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	2.00	2.20		mg/L		110	75 - 125

Lab Sample ID: MB 680-613271/1-A
Matrix: Water
Analysis Batch: 613420

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613271

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.20		0.20	0.10	mg/L		03/30/20 14:25	03/31/20 11:51	1

Lab Sample ID: LCS 680-613271/2-A
Matrix: Water
Analysis Batch: 613420

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613271

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	2.00	2.41		mg/L		121	75 - 125

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 680-613054/13
Matrix: Water
Analysis Batch: 613054

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.050		0.050	0.010	mg/L			03/28/20 12:39	1

Lab Sample ID: LCS 680-613054/16
Matrix: Water
Analysis Batch: 613054

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	0.972		mg/L		97	90 - 110

Lab Sample ID: 680-181932-4 MS
Matrix: Water
Analysis Batch: 613054

Client Sample ID: MW-22 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.55		1.00	1.49		mg/L		94	90 - 110

Lab Sample ID: 680-181932-4 MSD
Matrix: Water
Analysis Batch: 613054

Client Sample ID: MW-22 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	0.55		1.00	1.49		mg/L		94	90 - 110	0	10

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: MB 680-613060/13
Matrix: Water
Analysis Batch: 613060

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.050		0.050	0.010	mg/L			03/28/20 15:41	1

Lab Sample ID: LCS 680-613060/16
Matrix: Water
Analysis Batch: 613060

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	0.954		mg/L		95	90 - 110

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613565/2
Matrix: Water
Analysis Batch: 613565

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/31/20 19:12	1

Lab Sample ID: LCS 680-613565/3
Matrix: Water
Analysis Batch: 613565

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	19.5		mg/L		97	80 - 120

Lab Sample ID: LCSD 680-613565/4
Matrix: Water
Analysis Batch: 613565

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	20.0	19.6		mg/L		98	80 - 120	1	25

Lab Sample ID: 680-181932-4 MS
Matrix: Water
Analysis Batch: 613565

Client Sample ID: MW-22 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	0.77	J	20.0	20.3		mg/L		98	80 - 120

Lab Sample ID: 680-181932-4 MSD
Matrix: Water
Analysis Batch: 613565

Client Sample ID: MW-22 (032020)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	0.77	J	20.0	20.3		mg/L		97	80 - 120	0	25

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

GC/MS VOA

Analysis Batch: 613494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-2	MW-19 (032020)	Total/NA	Water	8260B	
MB 680-613494/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613494/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613494/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-4	MW-22 (032020)	Total/NA	Water	8260B	
680-181932-5	MW-25 (032020)	Total/NA	Water	8260B	
680-181932-6	MW-28 (032020)	Total/NA	Water	8260B	
680-181932-7	MW-29 (032020)	Total/NA	Water	8260B	
680-181932-8	DUP-03 (032020)	Total/NA	Water	8260B	
680-181932-9	Trip Blank	Total/NA	Water	8260B	
MB 680-613502/9	Method Blank	Total/NA	Water	8260B	
LCS 680-613502/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613502/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-3	MW-20 (032020)	Total/NA	Water	8260B	
MB 680-613689/9	Method Blank	Total/NA	Water	8260B	
LCS 680-613689/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613689/5	Lab Control Sample Dup	Total/NA	Water	8260B	

HPLC/IC

Analysis Batch: 206740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-2	MW-19 (032020)	Total/NA	Water	314.0	
680-181932-3	MW-20 (032020)	Total/NA	Water	314.0	
680-181932-4	MW-22 (032020)	Total/NA	Water	314.0	
680-181932-5	MW-25 (032020)	Total/NA	Water	314.0	
680-181932-6	MW-28 (032020)	Total/NA	Water	314.0	
680-181932-7	MW-29 (032020)	Total/NA	Water	314.0	
680-181932-8	DUP-03 (032020)	Total/NA	Water	314.0	
MB 550-206740/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206740/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206740/5	Lab Control Sample Dup	Total/NA	Water	314.0	
680-181932-2 MS	MW-19 (032020)	Total/NA	Water	314.0	
680-181932-2 MSD	MW-19 (032020)	Total/NA	Water	314.0	

Analysis Batch: 613785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-4	MW-22 (032020)	Total/NA	Water	300.0-1993 R2.1	
680-181932-5	MW-25 (032020)	Total/NA	Water	300.0-1993 R2.1	
680-181932-6	MW-28 (032020)	Total/NA	Water	300.0-1993 R2.1	
680-181932-8	DUP-03 (032020)	Total/NA	Water	300.0-1993 R2.1	
MB 680-613785/10	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-613785/11	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-613785/12	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	
680-181932-8 MS	DUP-03 (032020)	Total/NA	Water	300.0-1993 R2.1	

HPLC/IC (Continued)

Analysis Batch: 613785 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-8 MSD	DUP-03 (032020)	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 612538

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-5	MW-25 (032020)	Dissolved	Water	3005A	
680-181932-6	MW-28 (032020)	Dissolved	Water	3005A	
680-181932-8	DUP-03 (032020)	Dissolved	Water	3005A	
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 612837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-5	MW-25 (032020)	Dissolved	Water	6010C	612538
680-181932-6	MW-28 (032020)	Dissolved	Water	6010C	612538
680-181932-8	DUP-03 (032020)	Dissolved	Water	6010C	612538
MB 680-612538/1-A	Method Blank	Total Recoverable	Water	6010C	612538
LCS 680-612538/2-A	Lab Control Sample	Total Recoverable	Water	6010C	612538

Prep Batch: 613127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-4	MW-22 (032020)	Dissolved	Water	3005A	
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 613384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-4	MW-22 (032020)	Dissolved	Water	6010C	613127
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	6010C	613127
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	6010C	613127

General Chemistry

Analysis Batch: 612911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-1	MW-11 (032020)	Total/NA	Water	Total Nitrogen	
680-181932-3	MW-20 (032020)	Total/NA	Water	Total Nitrogen	
680-181932-4	MW-22 (032020)	Total/NA	Water	Total Nitrogen	
680-181932-8	DUP-03 (032020)	Total/NA	Water	Total Nitrogen	
680-181932-10	EB-01 (032020)	Total/NA	Water	Total Nitrogen	

Analysis Batch: 613054

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-1	MW-11 (032020)	Total/NA	Water	353.2	
680-181932-3	MW-20 (032020)	Total/NA	Water	353.2	
680-181932-4	MW-22 (032020)	Total/NA	Water	353.2	
680-181932-10	EB-01 (032020)	Total/NA	Water	353.2	
MB 680-613054/13	Method Blank	Total/NA	Water	353.2	
LCS 680-613054/16	Lab Control Sample	Total/NA	Water	353.2	
680-181932-4 MS	MW-22 (032020)	Total/NA	Water	353.2	
680-181932-4 MSD	MW-22 (032020)	Total/NA	Water	353.2	

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

General Chemistry

Analysis Batch: 613060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-8	DUP-03 (032020)	Total/NA	Water	353.2	
MB 680-613060/13	Method Blank	Total/NA	Water	353.2	
LCS 680-613060/16	Lab Control Sample	Total/NA	Water	353.2	

Prep Batch: 613270

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-10	EB-01 (032020)	Total/NA	Water	Digestion	
MB 680-613270/10-A	Method Blank	Total/NA	Water	Digestion	
LCS 680-613270/11-A	Lab Control Sample	Total/NA	Water	Digestion	

Prep Batch: 613271

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-1	MW-11 (032020)	Total/NA	Water	Digestion	
680-181932-3	MW-20 (032020)	Total/NA	Water	Digestion	
680-181932-4	MW-22 (032020)	Total/NA	Water	Digestion	
680-181932-8	DUP-03 (032020)	Total/NA	Water	Digestion	
MB 680-613271/1-A	Method Blank	Total/NA	Water	Digestion	
LCS 680-613271/2-A	Lab Control Sample	Total/NA	Water	Digestion	

Analysis Batch: 613420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-1	MW-11 (032020)	Total/NA	Water	351.2	613271
680-181932-3	MW-20 (032020)	Total/NA	Water	351.2	613271
680-181932-4	MW-22 (032020)	Total/NA	Water	351.2	613271
680-181932-8	DUP-03 (032020)	Total/NA	Water	351.2	613271
680-181932-10	EB-01 (032020)	Total/NA	Water	351.2	613270
MB 680-613270/10-A	Method Blank	Total/NA	Water	351.2	613270
MB 680-613271/1-A	Method Blank	Total/NA	Water	351.2	613271
LCS 680-613270/11-A	Lab Control Sample	Total/NA	Water	351.2	613270
LCS 680-613271/2-A	Lab Control Sample	Total/NA	Water	351.2	613271

Analysis Batch: 613565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181932-4	MW-22 (032020)	Total/NA	Water	5310 B-2011	
680-181932-5	MW-25 (032020)	Total/NA	Water	5310 B-2011	
680-181932-6	MW-28 (032020)	Total/NA	Water	5310 B-2011	
680-181932-8	DUP-03 (032020)	Total/NA	Water	5310 B-2011	
MB 680-613565/2	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613565/3	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613565/4	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
680-181932-4 MS	MW-22 (032020)	Total/NA	Water	5310 B-2011	
680-181932-4 MSD	MW-22 (032020)	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-11 (032020)

Lab Sample ID: 680-181932-1
Matrix: Water
Date Collected: 03/20/20 11:05
Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Digestion			20 mL	20 mL	613271	03/30/20 14:25	SM	TAL SAV
Total/NA	Analysis	351.2		1			613420	03/31/20 12:26	NVF	TAL SAV
	Instrument ID: LACHAT3									
Total/NA	Analysis	353.2		10	2 mL	2 mL	613054	03/28/20 12:59	MCL	TAL SAV
	Instrument ID: LACHAT2									
Total/NA	Analysis	Total Nitrogen		1			612911	03/31/20 13:40	ALG	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: MW-19 (032020)

Lab Sample ID: 680-181932-2
Matrix: Water
Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613494	04/01/20 05:29	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Analysis	314.0		100			206740	03/27/20 22:08	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: MW-20 (032020)

Lab Sample ID: 680-181932-3
Matrix: Water
Date Collected: 03/20/20 13:15
Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613689	04/02/20 21:15	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	314.0		100			206740	03/27/20 23:16	NEL	TAL PHX
	Instrument ID: IC4									
Total/NA	Prep	Digestion			20 mL	20 mL	613271	03/30/20 14:25	SM	TAL SAV
Total/NA	Analysis	351.2		1			613420	03/31/20 12:25	NVF	TAL SAV
	Instrument ID: LACHAT3									
Total/NA	Analysis	353.2		10	2 mL	2 mL	613054	03/28/20 13:04	MCL	TAL SAV
	Instrument ID: LACHAT2									
Total/NA	Analysis	Total Nitrogen		1			612911	03/31/20 13:40	ALG	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: MW-22 (032020)

Lab Sample ID: 680-181932-4
Matrix: Water
Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 13:48	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613785	04/02/20 21:51	CS	TAL SAV
	Instrument ID: CICK									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-22 (032020)

Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		2			206740	03/27/20 23:39	NEL	TAL PHX
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/30/20 23:11	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	Digestion			20 mL	20 mL	613271	03/30/20 14:25	SM	TAL SAV
Total/NA	Analysis	351.2		1			613420	03/31/20 11:59	NVF	TAL SAV
	Instrument ID: LACHAT3									
Total/NA	Analysis	353.2		1	2 mL	2 mL	613054	03/28/20 13:00	MCL	TAL SAV
	Instrument ID: LACHAT2									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613565	03/31/20 20:18	RKJ	TAL SAV
	Instrument ID: TOC7									
Total/NA	Analysis	Total Nitrogen		1			612911	03/31/20 13:40	ALG	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: MW-25 (032020)

Date Collected: 03/20/20 09:45
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 14:12	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613785	04/02/20 22:04	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		5			206740	03/28/20 00:02	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:44	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613565	03/31/20 21:08	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: MW-28 (032020)

Date Collected: 03/20/20 10:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 14:36	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613785	04/02/20 22:17	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		5			206740	03/28/20 00:25	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:49	BCB	TAL SAV
	Instrument ID: ICPE									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-28 (032020)

Lab Sample ID: 680-181932-6

Date Collected: 03/20/20 10:30

Matrix: Water

Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613565	03/31/20 21:24	RKJ	TAL SAV

Client Sample ID: MW-29 (032020)

Lab Sample ID: 680-181932-7

Date Collected: 03/20/20 09:30

Matrix: Water

Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 14:59	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	314.0		100			206740	03/28/20 00:48	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: DUP-03 (032020)

Lab Sample ID: 680-181932-8

Date Collected: 03/20/20 12:00

Matrix: Water

Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 15:23	Y1S	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613785	04/02/20 20:23	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		2			206740	03/28/20 01:11	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	612538	03/25/20 14:00	BCB	TAL SAV
Dissolved	Analysis	6010C		1			612837	03/26/20 20:54	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	Digestion			20 mL	20 mL	613271	03/30/20 14:25	SM	TAL SAV
Total/NA	Analysis	351.2		1			613420	03/31/20 12:00	NVF	TAL SAV
	Instrument ID: LACHAT3									
Total/NA	Analysis	353.2		1	2 mL	2 mL	613060	03/28/20 16:00	MCL	TAL SAV
	Instrument ID: LACHAT2									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613565	03/31/20 21:42	RKJ	TAL SAV
	Instrument ID: TOC7									
Total/NA	Analysis	Total Nitrogen		1			612911	03/31/20 13:40	ALG	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: Trip Blank

Lab Sample ID: 680-181932-9

Date Collected: 03/20/20 00:00

Matrix: Water

Date Received: 03/24/20 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613502	04/01/20 13:01	Y1S	TAL SAV
	Instrument ID: CMSA2									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: EB-01 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Digestion			20 mL	20 mL	613270	03/30/20 14:24	SM	TAL SAV
Total/NA	Analysis	351.2		1			613420	03/31/20 11:28	NVF	TAL SAV
	Instrument ID: LACHAT3									
Total/NA	Analysis	353.2		1	2 mL	2 mL	613054	03/28/20 13:08	MCL	TAL SAV
	Instrument ID: LACHAT2									
Total/NA	Analysis	Total Nitrogen		1			612911	03/31/20 13:40	ALG	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

baltimore #201

Chain of Custody Record

397790

eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-20-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of ____ COCs
Address: 7550 Teague Rd. Ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK orbital	☐ 1 week			Job / SDG No.:
Site: Elkton, MD	☐ 2 days			
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOC	Perchlorate	6010C dissolved iron	SM5310 TOC	300 ORGFM Sulfate	TKN - nitrate+nitrite	Sample Specific Notes:
MW-11 (032020)	3-20-20	1105	G	GW	1								1	dissolved iron is filtered
MW-19 (032020)		1200			4			3	1					
MW-20 (032020)		1315			5			3	1				1	
MW-22 (032020)		1140			10	1		3	1	1	3	1	1	
MW-25 (032020)		0945			9	1		3	1	1	3	1		
MW-28 (032020)		1030			9	1		3	1	1	3	1		
MW-29 (032020)		0930			4			3	1					
DUP-03 (032020)	3-20-20	1200	G	GW	10	1		3	1	1	3	1	1	
Trip Blank					2			2						
EB-01 (032020)	3-20-20	1200				1							1	

680-181932 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by:	Arcadis	3-20-20 0600	Received by:		3/23/20 10:00
Relinquished by:	3/23/20 1730		Received by:		03-24-2020 0840
Relinquished by:			Received in Laboratory by:		2.6 (CF) 3.0°C

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605218.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181932-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/3/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-19 (032020) (680-181932-2)	3/20/20	12:00 Eastern		Water			X	1	
MW-20 (032020) (680-181932-3)	3/20/20	13:15 Eastern		Water			X	1	
MW-22 (032020) (680-181932-4)	3/20/20	11:40 Eastern		Water			X	1	
MW-25 (032020) (680-181932-5)	3/20/20	09:45 Eastern		Water			X	1	
MW-28 (032020) (680-181932-6)	3/20/20	10:30 Eastern		Water			X	1	
MW-29 (032020) (680-181932-7)	3/20/20	09:30 Eastern		Water			X	1	
DUP-03 (032020) (680-181932-8)	3/20/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-24-20 1600	TA		3.25.20 0915	TALLC

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (4.1c) REF

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181932-1

Login Number: 181932
List Number: 1
Creator: Banda, Christy S

List Source: Eurofins TestAmerica, Savannah

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181932-1

Login Number: 181932
List Number: 2
Creator: Doerr, Bret C

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/25/20 04:58 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181932-1
Project/Site: ATK Orbital, Elkton MD

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-10-21
USDA	US Federal Programs	P330-19-00227	08-27-22

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ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181985-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
4/6/2020 5:02:12 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-181985-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-181985-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 03/25/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.2 C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples GM-2B (032320) (680-181985-1), GM-16M (032320) (680-181985-2), GM-16S (032320) (680-181985-3), GM-27 (032320) (680-181985-4) and Trip Blank (680-181985-5) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/02/2020 and 04/03/2020.

Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (680-181985-5). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

The method blank for preparation batch 613695 contained n-Butylbenzene above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613689 recovered outside control limits for the following analytes: 1,1,1,2-Tetrachloroethane, 2,2-Dichloropropane and Bromomethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample and/or the laboratory control sample duplicate (LCS/LCSD) for analytical batch 680-613695 recovered outside control limits for the following analyte(s): Bromomethane and Chloroethane. These analytes have been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613811 recovered outside control limits for the following analytes: Bromomethane and Chloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Bromomethane is reported with an E flag in the batch QC because the top three points were dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported.

Sample GM-16S (032320) (680-181985-3)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613689, 680-613695, and 680-613811.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 680-181985-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL

Samples GM-2B (032320) (680-181985-1), GM-16M (032320) (680-181985-2), GM-16S (032320) (680-181985-3) and GM-27 (032320) (680-181985-4) were analyzed for Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared and analyzed on 03/27/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples GM-2B (032320) (680-181985-1), GM-16M (032320) (680-181985-2), GM-16S (032320) (680-181985-3) and GM-27 (032320) (680-181985-4) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/28/2020 and 03/31/2020.

Sample GM-16S (032320) (680-181985-3)[50X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181985-1	GM-2B (032320)	Water	03/23/20 10:50	03/25/20 09:25	
680-181985-2	GM-16M (032320)	Water	03/23/20 09:20	03/25/20 09:25	
680-181985-3	GM-16S (032320)	Water	03/23/20 09:20	03/25/20 09:25	
680-181985-4	GM-27 (032320)	Water	03/23/20 11:00	03/25/20 09:25	
680-181985-5	Trip Blank	Water	03/23/20 00:00	03/25/20 09:25	

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
314.0	Perchlorate (IC)	EPA	TAL PHX
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
5030B	Purge and Trap	SW846	TAL SAV

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: ARCADIS U.S., Inc.
Job ID: 680-181985-1
Project/Site: ATK Orbital, Elkton MD

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-181985-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-2B (032320) — Lab Sample ID: 680-181985-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	10		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.76	J	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	10		2.0	0.37	ug/L	1		8260B	Total/NA
Vinyl chloride	0.55	J	1.0	0.50	ug/L	1		8260B	Total/NA

Client Sample ID: GM-16M (032320) — Lab Sample ID: 680-181985-2

No Detections.

Client Sample ID: GM-16S (032320) — Lab Sample ID: 680-181985-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	150		5.0	2.1	ug/L	5		8260B	Total/NA
1,1-Dichloroethane	11		5.0	1.9	ug/L	5		8260B	Total/NA
1,2-Dichloroethane	3.2	J	5.0	2.5	ug/L	5		8260B	Total/NA
1,1-Dichloroethene	89		5.0	1.8	ug/L	5		8260B	Total/NA
1,2-Dichloroethene, Total	150		10	1.9	ug/L	5		8260B	Total/NA
1,1,1-Trichloroethane	27		5.0	1.9	ug/L	5		8260B	Total/NA
Trichloroethene	550		5.0	2.4	ug/L	5		8260B	Total/NA
Vinyl chloride	18		5.0	2.5	ug/L	5		8260B	Total/NA
1,4-Dioxane	12		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Perchlorate	230		50	16	ug/L	50		314.0	Total/NA

Client Sample ID: GM-27 (032320) — Lab Sample ID: 680-181985-4

No Detections.

Client Sample ID: Trip Blank — Lab Sample ID: 680-181985-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-2B (032320)
Date Collected: 03/23/20 10:50
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 20:43	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 20:43	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 20:43	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 20:43	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 20:43	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 20:43	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 20:43	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 20:43	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 20:43	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 20:43	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
cis-1,2-Dichloroethene	**10**		1.0	0.41	ug/L			04/02/20 20:43	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 20:43	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 20:43	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 20:43	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 20:43	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 20:43	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 20:43	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 20:43	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
1,1-Dichloroethene	**0.76**	**J**	1.0	0.36	ug/L			04/02/20 20:43	1
1,2-Dichloroethene, Total	**10**		2.0	0.37	ug/L			04/02/20 20:43	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 20:43	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 20:43	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 20:43	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 20:43	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 20:43	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 20:43	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 20:43	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 20:43	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 20:43	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 20:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-2B (032320)
Date Collected: 03/23/20 10:50
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 20:43	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 20:43	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 20:43	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 20:43	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 20:43	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 20:43	1
Vinyl chloride	**0.55**	**J**	1.0	0.50	ug/L			04/02/20 20:43	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 20:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 20:43*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/02/20 20:43*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/02/20 20:43*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/02/20 20:43*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 18:58	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 18:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*52*		*41 - 144*	*03/27/20 09:24*	*03/27/20 18:58*	*1*
Terphenyl-d14	*49*			*03/27/20 09:24*	*03/27/20 18:58*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 03:51	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16M (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 21:06	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 21:06	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 21:06	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 21:06	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 21:06	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 21:06	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 21:06	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 21:06	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 21:06	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 21:06	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 21:06	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 21:06	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 21:06	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 21:06	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 21:06	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 21:06	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 21:06	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 21:06	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 21:06	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 21:06	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 21:06	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 21:06	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 21:06	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 21:06	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 21:06	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 21:06	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:06	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 21:06	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 21:06	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 21:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16M (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 21:06	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 21:06	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 21:06	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:06	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 21:06	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 21:06	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 21:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 21:06*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/02/20 21:06*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/02/20 21:06*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/02/20 21:06*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 19:20	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 19:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*106*		*41 - 144*	*03/27/20 09:24*	*03/27/20 19:20*	*1*
Terphenyl-d14	*104*			*03/27/20 09:24*	*03/27/20 19:20*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 04:14	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16S (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<50		50	35	ug/L			04/03/20 04:24	5
Benzene	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromobenzene	<5.0		5.0	2.5	ug/L			04/03/20 04:24	5
Bromochloromethane	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
Bromodichloromethane	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromoform	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromomethane	<25	*	25	13	ug/L			04/03/20 04:24	5
2-Butanone	<50		50	17	ug/L			04/03/20 04:24	5
Carbon disulfide	<10		10	5.0	ug/L			04/03/20 04:24	5
Carbon tetrachloride	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Chlorobenzene	<5.0		5.0	1.3	ug/L			04/03/20 04:24	5
Chloroethane	<25	*	25	13	ug/L			04/03/20 04:24	5
2-Chloroethyl vinyl ether	<50		50	25	ug/L			04/03/20 04:24	5
Chloroform	<5.0		5.0	2.5	ug/L			04/03/20 04:24	5
Chloromethane	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
2-Chlorotoluene	<5.0		5.0	1.4	ug/L			04/03/20 04:24	5
4-Chlorotoluene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
cis-1,2-Dichloroethene	**150**		5.0	2.1	ug/L			04/03/20 04:24	5
cis-1,3-Dichloropropene	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
Dibromochloromethane	<5.0		5.0	1.6	ug/L			04/03/20 04:24	5
1,2-Dibromo-3-Chloropropane	<25		25	5.5	ug/L			04/03/20 04:24	5
1,2-Dibromoethane	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Dibromomethane	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
1,2-Dichlorobenzene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,3-Dichlorobenzene	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
1,4-Dichlorobenzene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
Dichlorodifluoromethane	<5.0		5.0	3.0	ug/L			04/03/20 04:24	5
1,1-Dichloroethane	**11**		5.0	1.9	ug/L			04/03/20 04:24	5
1,2-Dichloroethane	**3.2**	**J**	5.0	2.5	ug/L			04/03/20 04:24	5
1,1-Dichloroethene	**89**		5.0	1.8	ug/L			04/03/20 04:24	5
1,2-Dichloroethene, Total	**150**		10	1.9	ug/L			04/03/20 04:24	5
1,2-Dichloropropane	<5.0		5.0	3.4	ug/L			04/03/20 04:24	5
1,3-Dichloropropane	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
2,2-Dichloropropane	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,1-Dichloropropene	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Ethylbenzene	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Hexachlorobutadiene	<25		25	13	ug/L			04/03/20 04:24	5
2-Hexanone	<50		50	10	ug/L			04/03/20 04:24	5
Isopropylbenzene	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
Methylene Chloride	<25		25	13	ug/L			04/03/20 04:24	5
4-Methyl-2-pentanone	<50		50	11	ug/L			04/03/20 04:24	5
Methyl tert-butyl ether	<50		50	1.5	ug/L			04/03/20 04:24	5
m-Xylene & p-Xylene	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
n-Butylbenzene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
N-Propylbenzene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
o-Xylene	<5.0		5.0	1.2	ug/L			04/03/20 04:24	5
p-Isopropyltoluene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
sec-Butylbenzene	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
Styrene	<5.0		5.0	1.4	ug/L			04/03/20 04:24	5

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16S (032320)

Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
1,1,1,2-Tetrachloroethane	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,1,2,2-Tetrachloroethane	<5.0		5.0	3.1	ug/L			04/03/20 04:24	5
Tetrachloroethene	<5.0		5.0	3.7	ug/L			04/03/20 04:24	5
Toluene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
trans-1,2-Dichloroethene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
trans-1,3-Dichloropropene	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
1,2,3-Trichlorobenzene	<25		25	13	ug/L			04/03/20 04:24	5
1,2,4-Trichlorobenzene	<25		25	13	ug/L			04/03/20 04:24	5
1,1,1-Trichloroethane	**27**		5.0	1.9	ug/L			04/03/20 04:24	5
1,1,2-Trichloroethane	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Trichloroethene	**550**		5.0	2.4	ug/L			04/03/20 04:24	5
Trichlorofluoromethane	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
1,2,3-Trichloropropane	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
1,2,4-Trimethylbenzene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
1,3,5-Trimethylbenzene	<5.0		5.0	1.6	ug/L			04/03/20 04:24	5
Vinyl acetate	<10		10	4.1	ug/L			04/03/20 04:24	5
Vinyl chloride	**18**		5.0	2.5	ug/L			04/03/20 04:24	5
Xylenes, Total	<5.0		5.0	1.2	ug/L			04/03/20 04:24	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 04:24*	*5*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*04/03/20 04:24*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 04:24*	*5*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 04:24*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**12**		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 19:41	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 19:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/27/20 09:24*	*03/27/20 19:41*	*1*
Terphenyl-d14	*93*			*03/27/20 09:24*	*03/27/20 19:41*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**230**		50	16	ug/L			03/31/20 01:45	50

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-27 (032320)
Date Collected: 03/23/20 11:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 15:39	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 15:39	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 15:39	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 15:39	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 15:39	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 15:39	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 15:39	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 15:39	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 15:39	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 15:39	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 15:39	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 15:39	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 15:39	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 15:39	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 15:39	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 15:39	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 15:39	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 15:39	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 15:39	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 15:39	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 15:39	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 15:39	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 15:39	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 15:39	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 15:39	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 15:39	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 15:39	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 15:39	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 15:39	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 15:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-27 (032320)
Date Collected: 03/23/20 11:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 15:39	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 15:39	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 15:39	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 15:39	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 15:39	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 15:39	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 15:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 15:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*		*04/02/20 15:39*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/02/20 15:39*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/02/20 15:39*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 20:02	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 20:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/27/20 09:24*	*03/27/20 20:02*	*1*
Terphenyl-d14	*93*			*03/27/20 09:24*	*03/27/20 20:02*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 05:00	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: Trip Blank
Date Collected: 03/23/20 00:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 14:58	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 14:58	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 14:58	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 14:58	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 14:58	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 14:58	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 14:58	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 14:58	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 14:58	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 14:58	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 14:58	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 14:58	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 14:58	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 14:58	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 14:58	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 14:58	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 14:58	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 14:58	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 14:58	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 14:58	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 14:58	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/02/20 14:58	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 14:58	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 14:58	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 14:58	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 14:58	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:58	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 14:58	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 14:58	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 14:58	1

Client Sample ID: Trip Blank
Lab Sample ID: 680-181985-5
Date Collected: 03/23/20 00:00
Matrix: Water
Date Received: 03/25/20 09:25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			04/02/20 14:58	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 14:58	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 14:58	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 14:58	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:58	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 14:58	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 14:58	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*80 - 120*		*04/02/20 14:58*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/02/20 14:58*	*1*
Dibromofluoromethane (Surr)	*125*	*X*	*80 - 122*		*04/02/20 14:58*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/02/20 14:58*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-181985-1	GM-2B (032320)	105	111	108	101
680-181985-2	GM-16M (032320)	105	111	108	102
680-181985-3	GM-16S (032320)	105	110	107	102
680-181985-4	GM-27 (032320)	105	109	107	101
680-181985-5	Trip Blank	110	105	125 X	93
LCS 680-613689/4	Lab Control Sample	113	108	115	104
LCS 680-613695/4	Lab Control Sample	110	104	107	110
LCS 680-613811/5	Lab Control Sample	109	108	109	110
LCSD 680-613689/5	Lab Control Sample Dup	112	106	114	105
LCSD 680-613695/5	Lab Control Sample Dup	110	105	110	111
LCSD 680-613811/6	Lab Control Sample Dup	110	109	110	111
MB 680-613689/9	Method Blank	109	95	118	100
MB 680-613695/10	Method Blank	105	106	107	99
MB 680-613811/11	Method Blank	105	108	107	101

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
		NBZ	TPHL
Lab Sample ID	Client Sample ID	(41-144)	
680-181985-1	GM-2B (032320)	52	49
680-181985-2	GM-16M (032320)	106	104
680-181985-3	GM-16S (032320)	95	93
680-181985-4	GM-27 (032320)	99	93
LCS 460-684079/2-A	Lab Control Sample	112	127
LCSD 460-684079/3-A	Lab Control Sample Dup	117	143
MB 460-684079/1-A	Method Blank	96	112

Surrogate Legend

NBZ = Nitrobenzene-d5
TPHL = Terphenyl-d14

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 13:24	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 13:24	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 13:24	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 13:24	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 13:24	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 13:24	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 13:24	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 13:24	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 13:24	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 13:24	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 13:24	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 13:24	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 13:24	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 13:24	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 13:24	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 13:24	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 13:24	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 13:24	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 13:24	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 13:24	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 13:24	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 13:24	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 13:24	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 13:24	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 13:24	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 13:24	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 13:24	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 13:24	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 13:24	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1

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

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 13:24	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 13:24	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 13:24	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 13:24	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 13:24	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 13:24	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 13:24	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 13:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/02/20 13:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/02/20 13:24*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*04/02/20 13:24*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/02/20 13:24*	*1*

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	283		ug/L		113	70 - 135
Benzene	50.0	54.4		ug/L		109	80 - 120
Bromobenzene	50.0	60.6		ug/L		121	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	53.8		ug/L		108	80 - 120
Bromoform	50.0	60.3		ug/L		121	74 - 126
Bromomethane	50.0	79.9	*	ug/L		160	62 - 130
2-Butanone	250	248		ug/L		99	80 - 131
Carbon disulfide	50.0	53.1		ug/L		106	80 - 120
Carbon tetrachloride	50.0	59.7		ug/L		119	76 - 123
Chlorobenzene	50.0	56.9		ug/L		114	80 - 120
Chloroethane	50.0	54.7		ug/L		109	66 - 135
2-Chloroethyl vinyl ether	50.0	49.1		ug/L		98	71 - 135
Chloroform	50.0	54.0		ug/L		108	80 - 120
Chloromethane	50.0	43.7		ug/L		87	69 - 131
2-Chlorotoluene	50.0	57.8		ug/L		116	80 - 120

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

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	57.0		ug/L		114	80 - 120
cis-1,2-Dichloroethene	50.0	56.8		ug/L		114	80 - 120
cis-1,3-Dichloropropene	50.0	55.8		ug/L		112	80 - 120
Dibromochloromethane	50.0	55.1		ug/L		110	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	51.9		ug/L		104	71 - 134
1,2-Dibromoethane	50.0	55.6		ug/L		111	80 - 120
Dibromomethane	50.0	56.8		ug/L		114	80 - 120
1,2-Dichlorobenzene	50.0	55.2		ug/L		110	80 - 120
1,3-Dichlorobenzene	50.0	55.5		ug/L		111	80 - 120
1,4-Dichlorobenzene	50.0	52.6		ug/L		105	80 - 120
Dichlorodifluoromethane	50.0	63.3		ug/L		127	47 - 155
1,1-Dichloroethane	50.0	53.7		ug/L		107	80 - 120
1,2-Dichloroethane	50.0	52.4		ug/L		105	80 - 120
1,1-Dichloroethene	50.0	59.2		ug/L		118	76 - 120
1,2-Dichloroethene, Total	100	113		ug/L		113	80 - 120
1,2-Dichloropropane	50.0	53.2		ug/L		106	80 - 120
1,3-Dichloropropane	50.0	52.8		ug/L		106	80 - 120
2,2-Dichloropropane	50.0	69.9	*	ug/L		140	76 - 126
1,1-Dichloropropene	50.0	56.1		ug/L		112	80 - 120
Ethylbenzene	50.0	57.1		ug/L		114	80 - 120
Hexachlorobutadiene	50.0	63.9		ug/L		128	60 - 140
2-Hexanone	250	239		ug/L		95	74 - 127
Isopropylbenzene	50.0	57.5		ug/L		115	80 - 120
Methylene Chloride	50.0	53.4		ug/L		107	80 - 120
4-Methyl-2-pentanone	250	237		ug/L		95	76 - 124
Methyl tert-butyl ether	50.0	52.5		ug/L		105	80 - 120
m-Xylene & p-Xylene	50.0	57.0		ug/L		114	80 - 120
n-Butylbenzene	50.0	49.3		ug/L		99	80 - 120
N-Propylbenzene	50.0	57.5		ug/L		115	80 - 120
o-Xylene	50.0	57.3		ug/L		115	80 - 120
p-Isopropyltoluene	50.0	54.9		ug/L		110	80 - 120
sec-Butylbenzene	50.0	55.1		ug/L		110	80 - 120
Styrene	50.0	58.5		ug/L		117	80 - 120
tert-Butylbenzene	50.0	54.7		ug/L		109	80 - 121
1,1,1,2-Tetrachloroethane	50.0	62.3	*	ug/L		125	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.7		ug/L		111	80 - 120
Tetrachloroethene	50.0	59.0		ug/L		118	80 - 121
Toluene	50.0	54.3		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	56.5		ug/L		113	80 - 120
trans-1,3-Dichloropropene	50.0	56.0		ug/L		112	80 - 120
1,2,3-Trichlorobenzene	50.0	58.5		ug/L		117	61 - 141
1,2,4-Trichlorobenzene	50.0	58.0		ug/L		116	68 - 128
1,1,1-Trichloroethane	50.0	56.4		ug/L		113	80 - 120
1,1,2-Trichloroethane	50.0	54.2		ug/L		108	80 - 120
Trichloroethene	50.0	58.2		ug/L		116	80 - 120
Trichlorofluoromethane	50.0	59.5		ug/L		119	60 - 141
1,2,3-Trichloropropane	50.0	53.2		ug/L		106	80 - 123
1,2,4-Trimethylbenzene	50.0	55.4		ug/L		111	80 - 120
1,3,5-Trimethylbenzene	50.0	54.4		ug/L		109	80 - 120

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

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	131		ug/L		131	67 - 135
Vinyl chloride	50.0	51.6		ug/L		103	71 - 128
Xylenes, Total	100	114		ug/L		114	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*113*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*115*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 680-613689/5
Matrix: Water
Analysis Batch: 613689

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
Acetone	250	277		ug/L		111	70 - 135	2	30
Benzene	50.0	54.0		ug/L		108	80 - 120	1	20
Bromobenzene	50.0	59.9		ug/L		120	80 - 121	1	20
Bromochloromethane	50.0	53.4		ug/L		107	80 - 120	2	20
Bromodichloromethane	50.0	53.4		ug/L		107	80 - 120	1	20
Bromoform	50.0	58.8		ug/L		118	74 - 126	3	20
Bromomethane	50.0	90.5	*	ug/L		181	62 - 130	12	20
2-Butanone	250	241		ug/L		96	80 - 131	3	20
Carbon disulfide	50.0	52.7		ug/L		105	80 - 120	1	20
Carbon tetrachloride	50.0	59.1		ug/L		118	76 - 123	1	20
Chlorobenzene	50.0	57.1		ug/L		114	80 - 120	0	20
Chloroethane	50.0	55.9		ug/L		112	66 - 135	2	20
2-Chloroethyl vinyl ether	50.0	48.1		ug/L		96	71 - 135	2	50
Chloroform	50.0	53.6		ug/L		107	80 - 120	1	20
Chloromethane	50.0	46.5		ug/L		93	69 - 131	6	30
2-Chlorotoluene	50.0	57.8		ug/L		116	80 - 120	0	20
4-Chlorotoluene	50.0	57.6		ug/L		115	80 - 120	1	20
cis-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120	3	20
cis-1,3-Dichloropropene	50.0	55.5		ug/L		111	80 - 120	1	20
Dibromochloromethane	50.0	53.8		ug/L		108	80 - 121	2	20
1,2-Dibromo-3-Chloropropane	50.0	49.3		ug/L		99	71 - 134	5	20
1,2-Dibromoethane	50.0	54.1		ug/L		108	80 - 120	3	20
Dibromomethane	50.0	55.3		ug/L		111	80 - 120	3	20
1,2-Dichlorobenzene	50.0	55.9		ug/L		112	80 - 120	1	20
1,3-Dichlorobenzene	50.0	56.0		ug/L		112	80 - 120	1	20
1,4-Dichlorobenzene	50.0	54.5		ug/L		109	80 - 120	4	20
Dichlorodifluoromethane	50.0	62.1		ug/L		124	47 - 155	2	40
1,1-Dichloroethane	50.0	53.6		ug/L		107	80 - 120	0	20
1,2-Dichloroethane	50.0	52.2		ug/L		104	80 - 120	0	50
1,1-Dichloroethene	50.0	54.5		ug/L		109	76 - 120	8	20
1,2-Dichloroethene, Total	100	112		ug/L		112	80 - 120	1	20
1,2-Dichloropropane	50.0	52.9		ug/L		106	80 - 120	1	20
1,3-Dichloropropane	50.0	52.2		ug/L		104	80 - 120	1	20

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

Lab Sample ID: LCSD 680-613689/5
Matrix: Water
Analysis Batch: 613689

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
2,2-Dichloropropane	50.0	67.8	*	ug/L		136	76 - 126	3	20
1,1-Dichloropropene	50.0	56.4		ug/L		113	80 - 120	0	20
Ethylbenzene	50.0	57.3		ug/L		115	80 - 120	0	20
Hexachlorobutadiene	50.0	63.2		ug/L		126	60 - 140	1	20
2-Hexanone	250	234		ug/L		94	74 - 127	2	20
Isopropylbenzene	50.0	58.2		ug/L		116	80 - 120	1	20
Methylene Chloride	50.0	53.2		ug/L		106	80 - 120	1	20
4-Methyl-2-pentanone	250	238		ug/L		95	76 - 124	0	20
Methyl tert-butyl ether	50.0	51.7		ug/L		103	80 - 120	2	20
m-Xylene & p-Xylene	50.0	56.9		ug/L		114	80 - 120	0	20
n-Butylbenzene	50.0	49.6		ug/L		99	80 - 120	1	20
N-Propylbenzene	50.0	58.2		ug/L		116	80 - 120	1	20
o-Xylene	50.0	57.6		ug/L		115	80 - 120	1	30
p-Isopropyltoluene	50.0	55.4		ug/L		111	80 - 120	1	20
sec-Butylbenzene	50.0	55.2		ug/L		110	80 - 120	0	20
Styrene	50.0	58.8		ug/L		118	80 - 120	1	20
tert-Butylbenzene	50.0	55.1		ug/L		110	80 - 121	1	20
1,1,1,2-Tetrachloroethane	50.0	61.3	*	ug/L		123	80 - 121	2	20
1,1,2,2-Tetrachloroethane	50.0	54.5		ug/L		109	80 - 120	2	20
Tetrachloroethene	50.0	59.4		ug/L		119	80 - 121	1	20
Toluene	50.0	54.1		ug/L		108	80 - 113	0	20
trans-1,2-Dichloroethene	50.0	56.9		ug/L		114	80 - 120	1	20
trans-1,3-Dichloropropene	50.0	55.1		ug/L		110	80 - 120	1	30
1,2,3-Trichlorobenzene	50.0	59.0		ug/L		118	61 - 141	1	20
1,2,4-Trichlorobenzene	50.0	59.0		ug/L		118	68 - 128	2	20
1,1,1-Trichloroethane	50.0	56.4		ug/L		113	80 - 120	0	20
1,1,2-Trichloroethane	50.0	52.6		ug/L		105	80 - 120	3	20
Trichloroethene	50.0	57.8		ug/L		116	80 - 120	1	20
Trichlorofluoromethane	50.0	60.1		ug/L		120	60 - 141	1	20
1,2,3-Trichloropropane	50.0	53.5		ug/L		107	80 - 123	1	30
1,2,4-Trimethylbenzene	50.0	55.6		ug/L		111	80 - 120	0	20
1,3,5-Trimethylbenzene	50.0	54.4		ug/L		109	80 - 120	0	20
Vinyl acetate	100	126		ug/L		126	67 - 135	4	20
Vinyl chloride	50.0	52.5		ug/L		105	71 - 128	2	20
Xylenes, Total	100	115		ug/L		115	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*112*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*
Dibromofluoromethane (Surr)	*114*		*80 - 122*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 14:05	1

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

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 14:05	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 14:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 14:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 14:05	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/02/20 14:05	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 14:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 14:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 14:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 14:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 14:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 14:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 14:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 14:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 14:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 14:05	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 14:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 14:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 14:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 14:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 14:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 14:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 14:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 14:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 14:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 14:05	1
n-Butylbenzene	0.470	J	1.0	0.47	ug/L			04/02/20 14:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 14:05	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 14:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 14:05	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 14:05	1

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

Lab Sample ID: MB 680-613695/10
Matrix: Water
Analysis Batch: 613695

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 14:05	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 14:05	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:05	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 14:05	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 14:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 14:05	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 14:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 14:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 14:05	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 14:05	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 14:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 14:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*04/02/20 14:05*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/02/20 14:05*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/02/20 14:05*	*1*

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	245		ug/L		98	70 - 135
Benzene	50.0	54.3		ug/L		109	80 - 120
Bromobenzene	50.0	53.1		ug/L		106	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	54.6		ug/L		109	80 - 120
Bromoform	50.0	55.1		ug/L		110	74 - 126
Bromomethane	50.1	114	E *	ug/L		229	62 - 130
2-Butanone	250	250		ug/L		100	80 - 131
Carbon disulfide	50.0	55.4		ug/L		111	80 - 120
Carbon tetrachloride	50.0	55.4		ug/L		111	76 - 123
Chlorobenzene	50.0	53.8		ug/L		108	80 - 120
Chloroethane	50.0	74.7	*	ug/L		149	66 - 135
2-Chloroethyl vinyl ether	50.0	54.6		ug/L		109	71 - 135
Chloroform	50.0	54.1		ug/L		108	80 - 120
Chloromethane	50.0	55.6		ug/L		111	69 - 131
2-Chlorotoluene	50.0	54.6		ug/L		109	80 - 120
4-Chlorotoluene	50.0	54.7		ug/L		109	80 - 120
cis-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	56.5		ug/L		113	80 - 120
Dibromochloromethane	50.0	54.8		ug/L		110	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	52.4		ug/L		105	71 - 134
1,2-Dibromoethane	50.0	52.8		ug/L		106	80 - 120
Dibromomethane	50.0	51.4		ug/L		103	80 - 120
1,2-Dichlorobenzene	50.0	54.0		ug/L		108	80 - 120
1,3-Dichlorobenzene	50.0	54.9		ug/L		110	80 - 120
1,4-Dichlorobenzene	50.0	53.2		ug/L		106	80 - 120
Dichlorodifluoromethane	50.1	56.9		ug/L		114	47 - 155
1,1-Dichloroethane	50.0	54.8		ug/L		110	80 - 120
1,2-Dichloroethane	50.0	52.7		ug/L		105	80 - 120
1,1-Dichloroethene	50.0	54.3		ug/L		109	76 - 120
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120
1,2-Dichloropropane	50.0	55.1		ug/L		110	80 - 120
1,3-Dichloropropane	50.0	53.1		ug/L		106	80 - 120
2,2-Dichloropropane	50.0	59.8		ug/L		120	76 - 126
1,1-Dichloropropene	50.0	56.3		ug/L		113	80 - 120
Ethylbenzene	50.0	55.7		ug/L		111	80 - 120
Hexachlorobutadiene	50.0	59.8		ug/L		120	60 - 140
2-Hexanone	250	257		ug/L		103	74 - 127
Isopropylbenzene	50.0	56.3		ug/L		113	80 - 120
Methylene Chloride	50.0	52.2		ug/L		104	80 - 120
4-Methyl-2-pentanone	250	258		ug/L		103	76 - 124
Methyl tert-butyl ether	50.0	51.8		ug/L		104	80 - 120
m-Xylene & p-Xylene	50.0	55.5		ug/L		111	80 - 120
n-Butylbenzene	50.0	57.2		ug/L		114	80 - 120
N-Propylbenzene	50.0	56.0		ug/L		112	80 - 120
o-Xylene	50.0	55.7		ug/L		111	80 - 120
p-Isopropyltoluene	50.0	57.0		ug/L		114	80 - 120
sec-Butylbenzene	50.0	55.7		ug/L		111	80 - 120
Styrene	50.0	56.9		ug/L		114	80 - 120
tert-Butylbenzene	50.0	55.6		ug/L		111	80 - 121
1,1,1,2-Tetrachloroethane	50.0	55.4		ug/L		111	80 - 121
1,1,2,2-Tetrachloroethane	50.0	52.6		ug/L		105	80 - 120
Tetrachloroethene	50.0	54.5		ug/L		109	80 - 121
Toluene	50.0	54.6		ug/L		109	80 - 113
trans-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120
trans-1,3-Dichloropropene	50.0	55.6		ug/L		111	80 - 120
1,2,3-Trichlorobenzene	50.0	57.0		ug/L		114	61 - 141
1,2,4-Trichlorobenzene	50.0	57.3		ug/L		115	68 - 128
1,1,1-Trichloroethane	50.0	54.8		ug/L		110	80 - 120
1,1,2-Trichloroethane	50.0	53.1		ug/L		106	80 - 120
Trichloroethene	50.0	54.2		ug/L		108	80 - 120
Trichlorofluoromethane	50.0	54.0		ug/L		108	60 - 141
1,2,3-Trichloropropane	50.0	50.4		ug/L		101	80 - 123
1,2,4-Trimethylbenzene	50.0	56.3		ug/L		113	80 - 120
1,3,5-Trimethylbenzene	50.0	56.3		ug/L		113	80 - 120
Vinyl acetate	100	117		ug/L		117	67 - 135
Vinyl chloride	50.1	54.4		ug/L		109	71 - 128

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

Lab Sample ID: LCS 680-613695/4
Matrix: Water
Analysis Batch: 613695

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	111		ug/L		111	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*
Dibromofluoromethane (Surr)	*107*		*80 - 122*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 680-613695/5
Matrix: Water
Analysis Batch: 613695

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
Acetone			250	253		ug/L		101	70 - 135	3	30
Benzene			50.0	54.8		ug/L		110	80 - 120	1	20
Bromobenzene			50.0	53.9		ug/L		108	80 - 121	2	20
Bromochloromethane			50.0	52.6		ug/L		105	80 - 120	1	20
Bromodichloromethane			50.0	55.6		ug/L		111	80 - 120	2	20
Bromoform			50.0	56.7		ug/L		113	74 - 126	3	20
Bromomethane			50.1	118	E *	ug/L		235	62 - 130	3	20
2-Butanone			250	259		ug/L		103	80 - 131	3	20
Carbon disulfide			50.0	55.1		ug/L		110	80 - 120	1	20
Carbon tetrachloride			50.0	55.0		ug/L		110	76 - 123	1	20
Chlorobenzene			50.0	54.6		ug/L		109	80 - 120	1	20
Chloroethane			50.0	74.5	*	ug/L		149	66 - 135	0	20
2-Chloroethyl vinyl ether			50.0	56.2		ug/L		112	71 - 135	3	50
Chloroform			50.0	54.2		ug/L		108	80 - 120	0	20
Chloromethane			50.0	54.8		ug/L		110	69 - 131	2	30
2-Chlorotoluene			50.0	54.7		ug/L		109	80 - 120	0	20
4-Chlorotoluene			50.0	54.9		ug/L		110	80 - 120	0	20
cis-1,2-Dichloroethene			50.0	55.3		ug/L		111	80 - 120	0	20
cis-1,3-Dichloropropene			50.0	57.6		ug/L		115	80 - 120	2	20
Dibromochloromethane			50.0	55.8		ug/L		112	80 - 121	2	20
1,2-Dibromo-3-Chloropropane			50.0	55.5		ug/L		111	71 - 134	6	20
1,2-Dibromoethane			50.0	53.8		ug/L		108	80 - 120	2	20
Dibromomethane			50.0	53.0		ug/L		106	80 - 120	3	20
1,2-Dichlorobenzene			50.0	55.3		ug/L		111	80 - 120	2	20
1,3-Dichlorobenzene			50.0	55.5		ug/L		111	80 - 120	1	20
1,4-Dichlorobenzene			50.0	53.6		ug/L		107	80 - 120	1	20
Dichlorodifluoromethane			50.1	55.5		ug/L		111	47 - 155	3	40
1,1-Dichloroethane			50.0	54.9		ug/L		110	80 - 120	0	20
1,2-Dichloroethane			50.0	53.6		ug/L		107	80 - 120	2	50
1,1-Dichloroethene			50.0	53.8		ug/L		108	76 - 120	1	20
1,2-Dichloroethene, Total			100	110		ug/L		110	80 - 120	0	20
1,2-Dichloropropane			50.0	55.8		ug/L		112	80 - 120	1	20
1,3-Dichloropropane			50.0	54.0		ug/L		108	80 - 120	2	20
2,2-Dichloropropane			50.0	58.8		ug/L		118	76 - 126	2	20
1,1-Dichloropropene			50.0	56.4		ug/L		113	80 - 120	0	20

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

Lab Sample ID: LCSD 680-613695/5
Matrix: Water
Analysis Batch: 613695

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
Ethylbenzene			50.0	55.7		ug/L		111	80 - 120	0	20
Hexachlorobutadiene			50.0	60.4		ug/L		121	60 - 140	1	20
2-Hexanone			250	267		ug/L		107	74 - 127	4	20
Isopropylbenzene			50.0	56.1		ug/L		112	80 - 120	0	20
Methylene Chloride			50.0	52.9		ug/L		106	80 - 120	1	20
4-Methyl-2-pentanone			250	268		ug/L		107	76 - 124	4	20
Methyl tert-butyl ether			50.0	53.4		ug/L		107	80 - 120	3	20
m-Xylene & p-Xylene			50.0	55.4		ug/L		111	80 - 120	0	20
n-Butylbenzene			50.0	57.3		ug/L		115	80 - 120	0	20
N-Propylbenzene			50.0	55.9		ug/L		112	80 - 120	0	20
o-Xylene			50.0	55.7		ug/L		111	80 - 120	0	30
p-Isopropyltoluene			50.0	57.1		ug/L		114	80 - 120	0	20
sec-Butylbenzene			50.0	55.3		ug/L		111	80 - 120	1	20
Styrene			50.0	57.5		ug/L		115	80 - 120	1	20
tert-Butylbenzene			50.0	55.5		ug/L		111	80 - 121	0	20
1,1,1,2-Tetrachloroethane			50.0	55.7		ug/L		111	80 - 121	0	20
1,1,2,2-Tetrachloroethane			50.0	54.3		ug/L		109	80 - 120	3	20
Tetrachloroethene			50.0	54.4		ug/L		109	80 - 121	0	20
Toluene			50.0	55.1		ug/L		110	80 - 113	1	20
trans-1,2-Dichloroethene			50.0	55.1		ug/L		110	80 - 120	0	20
trans-1,3-Dichloropropene			50.0	57.1		ug/L		114	80 - 120	3	30
1,2,3-Trichlorobenzene			50.0	59.7		ug/L		119	61 - 141	5	20
1,2,4-Trichlorobenzene			50.0	60.2		ug/L		120	68 - 128	5	20
1,1,1-Trichloroethane			50.0	54.7		ug/L		109	80 - 120	0	20
1,1,2-Trichloroethane			50.0	54.5		ug/L		109	80 - 120	2	20
Trichloroethene			50.0	54.2		ug/L		108	80 - 120	0	20
Trichlorofluoromethane			50.0	53.1		ug/L		106	60 - 141	2	20
1,2,3-Trichloropropane			50.0	52.2		ug/L		104	80 - 123	3	30
1,2,4-Trimethylbenzene			50.0	56.8		ug/L		114	80 - 120	1	20
1,3,5-Trimethylbenzene			50.0	56.4		ug/L		113	80 - 120	0	20
Vinyl acetate			100	118		ug/L		118	67 - 135	1	20
Vinyl chloride			50.1	53.3		ug/L		106	71 - 128	2	20
Xylenes, Total			100	111		ug/L		111	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Lab Sample ID: MB 680-613811/11
Matrix: Water
Analysis Batch: 613811

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 02:27	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1

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

Lab Sample ID: MB 680-613811/11
Matrix: Water
Analysis Batch: 613811

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 02:27	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 02:27	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 02:27	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 02:27	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 02:27	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 02:27	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 02:27	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 02:27	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 02:27	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 02:27	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 02:27	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 02:27	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 02:27	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 02:27	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 02:27	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 02:27	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 02:27	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 02:27	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 02:27	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 02:27	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 02:27	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 02:27	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 02:27	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
n-Butylbenzene	0.474	J	1.0	0.47	ug/L			04/03/20 02:27	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 02:27	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 02:27	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 02:27	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 02:27	1

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

Lab Sample ID: MB 680-613811/11
Matrix: Water
Analysis Batch: 613811

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 02:27	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 02:27	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 02:27	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 02:27	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 02:27	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 02:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 02:27*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/03/20 02:27*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 02:27*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/03/20 02:27*	*1*

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	263		ug/L		105	70 - 135
Benzene	50.0	54.8		ug/L		110	80 - 120
Bromobenzene	50.0	52.8		ug/L		106	80 - 121
Bromochloromethane	50.0	52.9		ug/L		106	80 - 120
Bromodichloromethane	50.0	56.3		ug/L		113	80 - 120
Bromoform	50.0	54.9		ug/L		110	74 - 126
Bromomethane	50.1	119	E *	ug/L		237	62 - 130
2-Butanone	250	264		ug/L		106	80 - 131
Carbon disulfide	50.0	53.7		ug/L		107	80 - 120
Carbon tetrachloride	50.0	52.0		ug/L		104	76 - 123
Chlorobenzene	50.0	53.5		ug/L		107	80 - 120
Chloroethane	50.0	74.8	*	ug/L		150	66 - 135
2-Chloroethyl vinyl ether	50.0	56.9		ug/L		114	71 - 135
Chloroform	50.0	54.8		ug/L		110	80 - 120
Chloromethane	50.0	58.0		ug/L		116	69 - 131
2-Chlorotoluene	50.0	54.0		ug/L		108	80 - 120
4-Chlorotoluene	50.0	53.7		ug/L		107	80 - 120
cis-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120
cis-1,3-Dichloropropene	50.0	57.4		ug/L		115	80 - 120
Dibromochloromethane	50.0	55.7		ug/L		111	80 - 121

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

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromo-3-Chloropropane	50.0	52.3		ug/L		105	71 - 134
1,2-Dibromoethane	50.0	54.8		ug/L		110	80 - 120
Dibromomethane	50.0	53.8		ug/L		108	80 - 120
1,2-Dichlorobenzene	50.0	54.3		ug/L		109	80 - 120
1,3-Dichlorobenzene	50.0	53.8		ug/L		108	80 - 120
1,4-Dichlorobenzene	50.0	52.7		ug/L		105	80 - 120
Dichlorodifluoromethane	50.1	60.7		ug/L		121	47 - 155
1,1-Dichloroethane	50.0	55.5		ug/L		111	80 - 120
1,2-Dichloroethane	50.0	55.0		ug/L		110	80 - 120
1,1-Dichloroethene	50.0	51.4		ug/L		103	76 - 120
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120
1,2-Dichloropropane	50.0	56.9		ug/L		114	80 - 120
1,3-Dichloropropane	50.0	55.3		ug/L		111	80 - 120
2,2-Dichloropropane	50.0	51.6		ug/L		103	76 - 126
1,1-Dichloropropene	50.0	54.0		ug/L		108	80 - 120
Ethylbenzene	50.0	54.1		ug/L		108	80 - 120
Hexachlorobutadiene	50.0	53.4		ug/L		107	60 - 140
2-Hexanone	250	277		ug/L		111	74 - 127
Isopropylbenzene	50.0	53.4		ug/L		107	80 - 120
Methylene Chloride	50.0	51.1		ug/L		102	80 - 120
4-Methyl-2-pentanone	250	277		ug/L		111	76 - 124
Methyl tert-butyl ether	50.0	54.1		ug/L		108	80 - 120
m-Xylene & p-Xylene	50.0	53.9		ug/L		108	80 - 120
n-Butylbenzene	50.0	52.8		ug/L		106	80 - 120
N-Propylbenzene	50.0	53.6		ug/L		107	80 - 120
o-Xylene	50.0	55.2		ug/L		110	80 - 120
p-Isopropyltoluene	50.0	53.6		ug/L		107	80 - 120
sec-Butylbenzene	50.0	52.1		ug/L		104	80 - 120
Styrene	50.0	56.8		ug/L		114	80 - 120
tert-Butylbenzene	50.0	52.3		ug/L		105	80 - 121
1,1,1,2-Tetrachloroethane	50.0	55.3		ug/L		111	80 - 121
1,1,2,2-Tetrachloroethane	50.0	53.5		ug/L		107	80 - 120
Tetrachloroethene	50.0	51.0		ug/L		102	80 - 121
Toluene	50.0	54.9		ug/L		110	80 - 113
trans-1,2-Dichloroethene	50.0	54.2		ug/L		108	80 - 120
trans-1,3-Dichloropropene	50.0	57.4		ug/L		115	80 - 120
1,2,3-Trichlorobenzene	50.0	57.1		ug/L		114	61 - 141
1,2,4-Trichlorobenzene	50.0	56.0		ug/L		112	68 - 128
1,1,1-Trichloroethane	50.0	52.7		ug/L		105	80 - 120
1,1,2-Trichloroethane	50.0	55.8		ug/L		112	80 - 120
Trichloroethene	50.0	53.0		ug/L		106	80 - 120
Trichlorofluoromethane	50.0	50.6		ug/L		101	60 - 141
1,2,3-Trichloropropane	50.0	51.9		ug/L		104	80 - 123
1,2,4-Trimethylbenzene	50.0	55.1		ug/L		110	80 - 120
1,3,5-Trimethylbenzene	50.0	54.2		ug/L		108	80 - 120
Vinyl acetate	100	112		ug/L		112	67 - 135
Vinyl chloride	50.1	54.1		ug/L		108	71 - 128
Xylenes, Total	100	109		ug/L		109	80 - 120

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

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*109*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*109*		*80 - 122*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 680-613811/6
Matrix: Water
Analysis Batch: 613811

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
Acetone	250	255		ug/L		102	70 - 135	3	30
Benzene	50.0	55.3		ug/L		111	80 - 120	1	20
Bromobenzene	50.0	53.0		ug/L		106	80 - 121	0	20
Bromochloromethane	50.0	53.6		ug/L		107	80 - 120	1	20
Bromodichloromethane	50.0	56.6		ug/L		113	80 - 120	1	20
Bromoform	50.0	55.2		ug/L		110	74 - 126	1	20
Bromomethane	50.1	124	E *	ug/L		247	62 - 130	4	20
2-Butanone	250	259		ug/L		104	80 - 131	2	20
Carbon disulfide	50.0	55.0		ug/L		110	80 - 120	2	20
Carbon tetrachloride	50.0	53.4		ug/L		107	76 - 123	3	20
Chlorobenzene	50.0	53.5		ug/L		107	80 - 120	0	20
Chloroethane	50.0	75.4	*	ug/L		151	66 - 135	1	20
2-Chloroethyl vinyl ether	50.0	57.3		ug/L		115	71 - 135	1	50
Chloroform	50.0	55.4		ug/L		111	80 - 120	1	20
Chloromethane	50.0	58.5		ug/L		117	69 - 131	1	30
2-Chlorotoluene	50.0	54.2		ug/L		108	80 - 120	0	20
4-Chlorotoluene	50.0	53.8		ug/L		108	80 - 120	0	20
cis-1,2-Dichloroethene	50.0	56.0		ug/L		112	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	57.8		ug/L		116	80 - 120	1	20
Dibromochloromethane	50.0	56.1		ug/L		112	80 - 121	1	20
1,2-Dibromo-3-Chloropropane	50.0	52.9		ug/L		106	71 - 134	1	20
1,2-Dibromoethane	50.0	55.0		ug/L		110	80 - 120	0	20
Dibromomethane	50.0	53.9		ug/L		108	80 - 120	0	20
1,2-Dichlorobenzene	50.0	54.9		ug/L		110	80 - 120	1	20
1,3-Dichlorobenzene	50.0	54.5		ug/L		109	80 - 120	1	20
1,4-Dichlorobenzene	50.0	53.5		ug/L		107	80 - 120	2	20
Dichlorodifluoromethane	50.1	63.6		ug/L		127	47 - 155	5	40
1,1-Dichloroethane	50.0	55.9		ug/L		112	80 - 120	1	20
1,2-Dichloroethane	50.0	54.6		ug/L		109	80 - 120	1	50
1,1-Dichloroethene	50.0	53.1		ug/L		106	76 - 120	3	20
1,2-Dichloroethene, Total	100	111		ug/L		111	80 - 120	2	20
1,2-Dichloropropane	50.0	57.7		ug/L		115	80 - 120	1	20
1,3-Dichloropropane	50.0	55.5		ug/L		111	80 - 120	0	20
2,2-Dichloropropane	50.0	51.9		ug/L		104	76 - 126	1	20
1,1-Dichloropropene	50.0	55.0		ug/L		110	80 - 120	2	20
Ethylbenzene	50.0	54.5		ug/L		109	80 - 120	1	20
Hexachlorobutadiene	50.0	58.8		ug/L		118	60 - 140	10	20
2-Hexanone	250	271		ug/L		108	74 - 127	2	20

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

Lab Sample ID: LCSD 680-613811/6
Matrix: Water
Analysis Batch: 613811

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
Isopropylbenzene			50.0	54.1		ug/L		108	80 - 120	1	20
Methylene Chloride			50.0	51.3		ug/L		103	80 - 120	0	20
4-Methyl-2-pentanone			250	272		ug/L		109	76 - 124	2	20
Methyl tert-butyl ether			50.0	53.8		ug/L		108	80 - 120	1	20
m-Xylene & p-Xylene			50.0	54.0		ug/L		108	80 - 120	0	20
n-Butylbenzene			50.0	54.7		ug/L		109	80 - 120	4	20
N-Propylbenzene			50.0	53.8		ug/L		108	80 - 120	0	20
o-Xylene			50.0	54.9		ug/L		110	80 - 120	1	30
p-Isopropyltoluene			50.0	55.3		ug/L		111	80 - 120	3	20
sec-Butylbenzene			50.0	53.2		ug/L		106	80 - 120	2	20
Styrene			50.0	56.6		ug/L		113	80 - 120	0	20
tert-Butylbenzene			50.0	53.6		ug/L		107	80 - 121	2	20
1,1,1,2-Tetrachloroethane			50.0	55.4		ug/L		111	80 - 121	0	20
1,1,2,2-Tetrachloroethane			50.0	53.1		ug/L		106	80 - 120	1	20
Tetrachloroethene			50.0	52.1		ug/L		104	80 - 121	2	20
Toluene			50.0	55.2		ug/L		110	80 - 113	1	20
trans-1,2-Dichloroethene			50.0	55.2		ug/L		110	80 - 120	2	20
trans-1,3-Dichloropropene			50.0	57.4		ug/L		115	80 - 120	0	30
1,2,3-Trichlorobenzene			50.0	58.3		ug/L		117	61 - 141	2	20
1,2,4-Trichlorobenzene			50.0	57.9		ug/L		116	68 - 128	3	20
1,1,1-Trichloroethane			50.0	54.1		ug/L		108	80 - 120	3	20
1,1,2-Trichloroethane			50.0	55.6		ug/L		111	80 - 120	0	20
Trichloroethene			50.0	53.9		ug/L		108	80 - 120	2	20
Trichlorofluoromethane			50.0	52.6		ug/L		105	60 - 141	4	20
1,2,3-Trichloropropane			50.0	51.5		ug/L		103	80 - 123	1	30
1,2,4-Trimethylbenzene			50.0	54.7		ug/L		109	80 - 120	1	20
1,3,5-Trimethylbenzene			50.0	54.7		ug/L		109	80 - 120	1	20
Vinyl acetate			100	111		ug/L		111	67 - 135	1	20
Vinyl chloride			50.1	55.6		ug/L		111	71 - 128	3	20
Xylenes, Total			100	109		ug/L		109	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-684079/1-A
Matrix: Water
Analysis Batch: 684053

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 684079

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 17:34	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 17:34	1

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: MB 460-684079/1-A
Matrix: Water
Analysis Batch: 684053

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 684079

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	96		41 - 144	03/27/20 09:24	03/27/20 17:34	1
Terphenyl-d14	112			03/27/20 09:24	03/27/20 17:34	1

Lab Sample ID: LCS 460-684079/2-A
Matrix: Water
Analysis Batch: 684053

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 684079

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	0.800	0.855		ug/L		107	10 - 150
Naphthalene	0.800	0.714		ug/L		89	33 - 124

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5	112		41 - 144
Terphenyl-d14	127		

Lab Sample ID: LCSD 460-684079/3-A
Matrix: Water
Analysis Batch: 684053

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 684079

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	0.800	1.01		ug/L		126	10 - 150	16	30
Naphthalene	0.800	0.829		ug/L		104	33 - 124	15	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Nitrobenzene-d5	117		41 - 144
Terphenyl-d14	143		

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206740/1002
Matrix: Water
Analysis Batch: 206740

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/27/20 20:36	1

Lab Sample ID: LCS 550-206740/4
Matrix: Water
Analysis Batch: 206740

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.2		ug/L		101	85 - 115

Lab Sample ID: LCSD 550-206740/5
Matrix: Water
Analysis Batch: 206740

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
Perchlorate	25.0	25.4		ug/L		102	85 - 115	1	15

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206823/1002
Matrix: Water
Analysis Batch: 206823

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/30/20 23:04	1

Lab Sample ID: LCS 550-206823/4
Matrix: Water
Analysis Batch: 206823

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			25.0	25.0		ug/L		100	85 - 115		

Lab Sample ID: LCSD 550-206823/5
Matrix: Water
Analysis Batch: 206823

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
Perchlorate			25.0	24.9		ug/L		99	85 - 115	1	15

GC/MS VOA

Analysis Batch: 613689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-5	Trip Blank	Total/NA	Water	8260B	
MB 680-613689/9	Method Blank	Total/NA	Water	8260B	
LCS 680-613689/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613689/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-1	GM-2B (032320)	Total/NA	Water	8260B	
680-181985-2	GM-16M (032320)	Total/NA	Water	8260B	
680-181985-4	GM-27 (032320)	Total/NA	Water	8260B	
MB 680-613695/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613695/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613695/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 613811

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-3	GM-16S (032320)	Total/NA	Water	8260B	
MB 680-613811/11	Method Blank	Total/NA	Water	8260B	
LCS 680-613811/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613811/6	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Analysis Batch: 684053

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-1	GM-2B (032320)	Total/NA	Water	8270D SIM	684079
680-181985-2	GM-16M (032320)	Total/NA	Water	8270D SIM	684079
680-181985-3	GM-16S (032320)	Total/NA	Water	8270D SIM	684079
680-181985-4	GM-27 (032320)	Total/NA	Water	8270D SIM	684079
MB 460-684079/1-A	Method Blank	Total/NA	Water	8270D SIM	684079
LCS 460-684079/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	684079
LCSD 460-684079/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	684079

Prep Batch: 684079

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-1	GM-2B (032320)	Total/NA	Water	3510C	
680-181985-2	GM-16M (032320)	Total/NA	Water	3510C	
680-181985-3	GM-16S (032320)	Total/NA	Water	3510C	
680-181985-4	GM-27 (032320)	Total/NA	Water	3510C	
MB 460-684079/1-A	Method Blank	Total/NA	Water	3510C	
LCS 460-684079/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-684079/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

HPLC/IC

Analysis Batch: 206740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-1	GM-2B (032320)	Total/NA	Water	314.0	
680-181985-2	GM-16M (032320)	Total/NA	Water	314.0	
680-181985-4	GM-27 (032320)	Total/NA	Water	314.0	
MB 550-206740/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206740/4	Lab Control Sample	Total/NA	Water	314.0	

HPLC/IC (Continued)

Analysis Batch: 206740 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 550-206740/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 206823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181985-3	GM-16S (032320)	Total/NA	Water	314.0	
MB 550-206823/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206823/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206823/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Client Sample ID: GM-2B (032320)

Lab Sample ID: 680-181985-1

Date Collected: 03/23/20 10:50

Matrix: Water

Date Received: 03/25/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613695	04/02/20 20:43	Y1S	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684079	03/27/20 09:24	DXD	TAL EDI
Total/NA	Analysis	8270D SIM		1			684053	03/27/20 18:58	MDJ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206740	03/28/20 03:51	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-16M (032320)

Lab Sample ID: 680-181985-2

Date Collected: 03/23/20 09:20

Matrix: Water

Date Received: 03/25/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613695	04/02/20 21:06	Y1S	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684079	03/27/20 09:24	DXD	TAL EDI
Total/NA	Analysis	8270D SIM		1			684053	03/27/20 19:20	MDJ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206740	03/28/20 04:14	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-16S (032320)

Lab Sample ID: 680-181985-3

Date Collected: 03/23/20 09:20

Matrix: Water

Date Received: 03/25/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	5 mL	5 mL	613811	04/03/20 04:24	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684079	03/27/20 09:24	DXD	TAL EDI
Total/NA	Analysis	8270D SIM		1			684053	03/27/20 19:41	MDJ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		50			206823	03/31/20 01:45	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-27 (032320)

Lab Sample ID: 680-181985-4

Date Collected: 03/23/20 11:00

Matrix: Water

Date Received: 03/25/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613695	04/02/20 15:39	Y1S	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684079	03/27/20 09:24	DXD	TAL EDI
Total/NA	Analysis	8270D SIM		1			684053	03/27/20 20:02	MDJ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206740	03/28/20 05:00	NEL	TAL PHX
	Instrument ID: IC4									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-181985-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: Trip Blank
Lab Sample ID: 680-181985-5
Date Collected: 03/23/20 00:00
Matrix: Water
Date Received: 03/25/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613689	04/02/20 14:58	Y1S	TAL SAV
	Instrument ID: CMSA2									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Baltimore #201

Chain of Custody Record

397791

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Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact			
Company Name: Arcadis Inc	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-23-20
Address: 2550 Teague Rd Ste 210	Tel/Email:	Lab Contact:	Carrier:
City/State/Zip: Hanover, MD 21076			
Phone:			
Fax:			
Project Name: ATK Orbital			
Site: Elkton MD			
PO# 30044769			

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

☐ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

COC No: 1 of 1 COCs

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOCs 8260B	3/4.0 Perchlorate	1,4-Dioxane	Sample Specific Notes:
GM-2B (032320)	3-23-20	1050	G	GW	6			3	1	2	
GM-16M (032320)	|	0920	|	|	6			3	1	2	
GM-16S (032320)	|	0920	|	|	6			3	1	2	
GM-27 (032320)	3-23-20	1100	G	GW	6			3	1	2	
Trip Blank								2			

680-181985 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

2.8 3.2

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Arcadis	3/24/20 0600	[signature]	ETA	3/24/20 0945
[signature]	ETA	3/24/20 1700	[signature]	TA	3-25-20 925
			Received in Laboratory by:		

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605337.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-181985-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/6/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X		X	
GM-2B (032320) (680-181985-1)	3/23/20	10:50 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-16M (032320) (680-181985-2)	3/23/20	09:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-16S (032320) (680-181985-3)	3/23/20	09:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-27 (032320) (680-181985-4)	3/23/20	11:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3-25-26 1600	TA	J.a Fedex	3/26/20 1000	EUROFINS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No.: 164498	Cooler Temperature(s) °C and Other Remarks: 4.1°C IR11

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605354.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181985-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/6/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-2B (032320) (680-181985-1)	3/23/20	10:50 Eastern		Water			X	1	
GM-16M (032320) (680-181985-2)	3/23/20	09:20 Eastern		Water			X	1	
GM-16S (032320) (680-181985-3)	3/23/20	09:20 Eastern		Water			X	1	
GM-27 (032320) (680-181985-4)	3/23/20	11:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3/26/20 1600	TA			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-26-20 0615	Company TAK

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (3.1°C) REPO

Ver: 01/16/2019

4/6/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181985-1

Login Number: 181985

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Sims, Robert D

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-181985-1

Login Number: 181985
List Number: 2
Creator: Armbruster, Chris

List Source: Eurofins TestAmerica, Edison
List Creation: 03/26/20 02:10 PM

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	1164498
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.1°C IR11
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: ARCADIS U.S., Inc.

Job Number: 680-181985-1

Login Number: 181985
List Number: 3
Creator: Maycock, Lisa

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/26/20 04:59 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
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?	False	Received project as a subcontract.
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.	True	

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182056-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
4/7/2020 5:03:55 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-182056-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-182056-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 03/26/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.2 C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples BS-1 (032420) (680-182056-1), GM-30M (032420) (680-182056-2), GM-32 (032420) (680-182056-3), GM-32D (032420) (680-182056-4), EB-03 (032420) (680-182056-5) and Trip Blank (680-182056-6) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/03/2020 and 04/06/2020.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-613811 recovered outside control limits for the following analytes: Bromomethane and Chloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Bromomethane is reported with an E flag in the batch QC because the top three points were dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported.

The laboratory control sample (LCS) for analytical batch 680-614070 recovered outside control limits for the following analytes: Bromomethane, Chloroethane and Vinyl acetate. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-614070 recovered outside control limits for the following analytes: Bromomethane, Chloroethane, Dichlorodifluoromethane, 2,2-Dichloropropane and Vinyl acetate. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613811, and 680-614070.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (AQUEOUS)
Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for Semivolatile Organic Compounds (Aqueous) in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/31/2020 and analyzed on 04/02/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL
Samples GM-30M (032420) (680-182056-2), GM-32 (032420) (680-182056-3) and GM-32D (032420) (680-182056-4) were analyzed for

Job ID: 680-182056-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/30/2020 and analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples BS-1 (032420) (680-182056-1), GM-30M (032420) (680-182056-2), GM-32 (032420) (680-182056-3), GM-32D (032420) (680-182056-4) and EB-03 (032420) (680-182056-5) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/29/2020 and analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)

Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/29/2020 and analyzed on 03/30/2020.

Dissolved Iron, Iron and Silver were detected in method blank MB 680-613127/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 03/31/2020 and analyzed on 04/01/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 04/04/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples BS-1 (032420) (680-182056-1) and EB-03 (032420) (680-182056-5) were analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 04/01/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182056-1	BS-1 (032420)	Water	03/24/20 12:00	03/26/20 09:10	
680-182056-2	GM-30M (032420)	Water	03/24/20 11:55	03/26/20 09:10	
680-182056-3	GM-32 (032420)	Water	03/24/20 09:30	03/26/20 09:10	
680-182056-4	GM-32D (032420)	Water	03/24/20 10:20	03/26/20 09:10	
680-182056-5	EB-03 (032420)	Water	03/24/20 12:00	03/26/20 09:10	
680-182056-6	Trip Blank	Water	03/24/20 00:00	03/26/20 09:10	

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-182056-1
Project/Site: ATK Orbital, Elkton MD

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
7470A	Mercury (CVAA)	SW846	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
7470A	Preparation, Mercury	SW846	TAL SAV

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.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: ARCADIS U.S., Inc.
Job ID: 680-182056-1
Project/Site: ATK Orbital, Elkton MD

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: BS-1 (032420) — Lab Sample ID: 680-182056-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Caprolactam	7.2	J	9.9	0.78	ug/L	1		8270D	Total/NA
Sulfate	3.6		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	0.41	J	1.0	0.31	ug/L	1		314.0	Total/NA
Aluminum	290		200	24	ug/L	1		6010C	Total Recoverable
Barium	8.7	J	10	1.7	ug/L	1		6010C	Total Recoverable
Calcium	13000		500	25	ug/L	1		6010C	Total Recoverable
Copper	4.4	J	20	1.8	ug/L	1		6010C	Total Recoverable
Iron	330	B	50	17	ug/L	1		6010C	Total Recoverable
Magnesium	4100		500	33	ug/L	1		6010C	Total Recoverable
Manganese	5.1	J	10	1.0	ug/L	1		6010C	Total Recoverable
Potassium	560	J	1000	17	ug/L	1		6010C	Total Recoverable
Silver	0.60	J B	10	0.60	ug/L	1		6010C	Total Recoverable
Sodium	5800		1000	480	ug/L	1		6010C	Total Recoverable
Vanadium	1.1	J	10	1.0	ug/L	1		6010C	Total Recoverable
Dissolved Iron	410	B	50	17	ug/L	1		6010C	Dissolved
Total Organic Carbon	7.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: GM-30M (032420) — Lab Sample ID: 680-182056-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.43	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.44	J	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	0.43	J	2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	6.4		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	15		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-32 (032420) — Lab Sample ID: 680-182056-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.34	J	1.0	0.33	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	1.9		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	1.9		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	1.9	J	2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.38	J	1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	34		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	16		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: GM-32D (032420) — Lab Sample ID: 680-182056-4

No Detections.

Client Sample ID: EB-03 (032420) — Lab Sample ID: 680-182056-5

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: Trip Blank

Lab Sample ID: 680-182056-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	8.6		1.0	0.50	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 07:31	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 07:31	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:31	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 07:31	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 07:31	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 07:31	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:31	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 07:31	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 07:31	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 07:31	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 07:31	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 07:31	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 07:31	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 07:31	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 07:31	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 07:31	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 07:31	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 07:31	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 07:31	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 07:31	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 07:31	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 07:31	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 07:31	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 07:31	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 07:31	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 07:31	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:31	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 07:31	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 07:31	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 07:31	1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 07:31	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 07:31	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 07:31	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:31	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 07:31	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 07:31	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 07:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 07:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 07:31*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 07:31*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*04/03/20 07:31*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
Acenaphthylene	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 18:59	1
Acetophenone	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 18:59	1
Anthracene	<9.9		9.9	0.68	ug/L		03/31/20 14:46	04/02/20 18:59	1
Atrazine	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzaldehyde	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[a]anthracene	<9.9		9.9	0.55	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[a]pyrene	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[b]fluoranthene	<9.9		9.9	2.6	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[g,h,i]perylene	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[k]fluoranthene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,1'-Biphenyl	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-chloroethoxy)methane	<9.9		9.9	0.93	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-chloroethyl)ether	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
bis (2-chloroisopropyl) ether	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-ethylhexyl) phthalate	<9.9		9.9	1.6	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Bromophenyl phenyl ether	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 18:59	1
Butyl benzyl phthalate	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
Caprolactam	**7.2**	**J**	9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
Carbazole	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chloroaniline	<20		20	2.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chloro-3-methylphenol	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.9		9.9	0.79	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Chlorophenol	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chlorophenyl phenyl ether	<9.9		9.9	0.83	ug/L		03/31/20 14:46	04/02/20 18:59	1
Chrysene	<9.9		9.9	0.51	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dibenz(a,h)anthracene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dibenzofuran	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,2-Dichlorobenzene	<9.9		9.9	0.53	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,3-Dichlorobenzene	<9.9		9.9	0.58	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,4-Dichlorobenzene	<9.9		9.9	0.54	ug/L		03/31/20 14:46	04/02/20 18:59	1
3,3'-Dichlorobenzidine	<59		59	30	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dichlorophenol	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Diethyl phthalate	<9.9		9.9	0.87	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dimethylphenol	<9.9		9.9	4.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dimethyl phthalate	<9.9		9.9	0.98	ug/L		03/31/20 14:46	04/02/20 18:59	1
Di-n-butyl phthalate	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 18:59	1
4,6-Dinitro-2-methylphenol	<50		50	9.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dinitrophenol	<50		50	9.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dinitrotoluene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,6-Dinitrotoluene	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Di-n-octyl phthalate	<9.9		9.9	1.4	ug/L		03/31/20 14:46	04/02/20 18:59	1
Fluoranthene	<9.9		9.9	0.73	ug/L		03/31/20 14:46	04/02/20 18:59	1
Fluorene	<9.9		9.9	0.95	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorobenzene	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorobutadiene	<9.9		9.9	0.61	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorocyclopentadiene	<9.9		9.9	2.5	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachloroethane	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
Indeno[1,2,3-cd]pyrene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1
Isophorone	<9.9		9.9	0.89	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Methylnaphthalene	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Methylphenol	<9.9		9.9	0.88	ug/L		03/31/20 14:46	04/02/20 18:59	1
3 & 4 Methylphenol	<9.9		9.9	1.3	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Nitroaniline	<50		50	1.3	ug/L		03/31/20 14:46	04/02/20 18:59	1
3-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Nitrobenzene	<9.9		9.9	0.72	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Nitrophenol	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Nitrophenol	<50		50	1.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
N-Nitrosodi-n-propylamine	<9.9		9.9	0.71	ug/L		03/31/20 14:46	04/02/20 18:59	1
N-Nitrosodiphenylamine	<9.9		9.9	0.91	ug/L		03/31/20 14:46	04/02/20 18:59	1
Pentachlorophenol	<50		50	2.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Phenanthrene	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 18:59	1
Phenol	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 18:59	1
Pyrene	<9.9		9.9	0.62	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,2,4-Trichlorobenzene	<9.9		9.9	0.56	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4,5-Trichlorophenol	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4,6-Trichlorophenol	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 18:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*89*		*32 - 113*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
2-Fluorophenol	*77*		*26 - 109*	*03/31/20 14:46*	*04/02/20 18:59*	*1*

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*83*		*32 - 118*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
Phenol-d5	*81*		*27 - 110*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
Terphenyl-d14	*55*		*10 - 126*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
2,4,6-Tribromophenol	*77*		*39 - 124*	*03/31/20 14:46*	*04/02/20 18:59*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**3.6**		1.0	0.40	mg/L			04/04/20 03:43	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.41**	**J**	1.0	0.31	ug/L			03/31/20 02:08	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**290**		200	24	ug/L		03/29/20 13:03	03/30/20 23:21	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:21	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:21	1
Barium	**8.7**	**J**	10	1.7	ug/L		03/29/20 13:03	03/30/20 23:21	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:21	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Calcium	**13000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:21	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:21	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Copper	**4.4**	**J**	20	1.8	ug/L		03/29/20 13:03	03/30/20 23:21	1
Iron	**330**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:21	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:21	1
Magnesium	**4100**		500	33	ug/L		03/29/20 13:03	03/30/20 23:21	1
Manganese	**5.1**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 23:21	1
Potassium	**560**	**J**	1000	17	ug/L		03/29/20 13:03	03/30/20 23:21	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:21	1
Silver	**0.60**	**J B**	10	0.60	ug/L		03/29/20 13:03	03/30/20 23:21	1
Sodium	**5800**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:21	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Vanadium	**1.1**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:21	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**410**	**B**	50	17	ug/L		03/29/20 13:03	03/31/20 00:12	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:17	04/01/20 15:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**7.0**		1.0	0.50	mg/L			04/01/20 18:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-30M (032420)
Date Collected: 03/24/20 11:55
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 07:54	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 07:54	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:54	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 07:54	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 07:54	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 07:54	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:54	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 07:54	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 07:54	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 07:54	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
cis-1,2-Dichloroethene	**0.43**	**J**	1.0	0.41	ug/L			04/03/20 07:54	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 07:54	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 07:54	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 07:54	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 07:54	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 07:54	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 07:54	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 07:54	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
1,1-Dichloroethene	**0.44**	**J**	1.0	0.36	ug/L			04/03/20 07:54	1
1,2-Dichloroethene, Total	**0.43**	**J**	2.0	0.37	ug/L			04/03/20 07:54	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 07:54	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 07:54	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 07:54	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 07:54	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 07:54	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 07:54	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:54	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 07:54	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 07:54	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 07:54	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 07:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-30M (032420)
Date Collected: 03/24/20 11:55
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 07:54	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 07:54	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 07:54	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Trichloroethene	**6.4**		1.0	0.48	ug/L			04/03/20 07:54	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 07:54	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:54	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 07:54	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 07:54	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 07:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/03/20 07:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*04/03/20 07:54*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/03/20 07:54*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/03/20 07:54*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 14:26	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 14:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*88*		*41 - 144*	*03/30/20 08:57*	*03/31/20 14:26*	*1*
Terphenyl-d14	*67*			*03/30/20 08:57*	*03/31/20 14:26*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**15**		1.0	0.31	ug/L			03/31/20 02:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32 (032420)
Date Collected: 03/24/20 09:30
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 08:17	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 08:17	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:17	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 08:17	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 08:17	1
Carbon tetrachloride	**0.34**	**J**	1.0	0.33	ug/L			04/03/20 08:17	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 08:17	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:17	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 08:17	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 08:17	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 08:17	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
cis-1,2-Dichloroethene	**1.9**		1.0	0.41	ug/L			04/03/20 08:17	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 08:17	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 08:17	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 08:17	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 08:17	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 08:17	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 08:17	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 08:17	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
1,1-Dichloroethene	**1.9**		1.0	0.36	ug/L			04/03/20 08:17	1
1,2-Dichloroethene, Total	**1.9**	**J**	2.0	0.37	ug/L			04/03/20 08:17	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 08:17	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 08:17	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 08:17	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 08:17	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 08:17	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 08:17	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 08:17	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:17	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 08:17	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 08:17	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 08:17	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 08:17	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32 (032420)
Date Collected: 03/24/20 09:30
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 08:17	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 08:17	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 08:17	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
1,1,1-Trichloroethane	**0.38**	**J**	1.0	0.37	ug/L			04/03/20 08:17	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 08:17	1
Trichloroethene	**34**		1.0	0.48	ug/L			04/03/20 08:17	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 08:17	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:17	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 08:17	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 08:17	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 08:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 08:17*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 08:17*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 08:17*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 08:17*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 14:48	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/30/20 08:57*	*03/31/20 14:48*	*1*
Terphenyl-d14	*79*			*03/30/20 08:57*	*03/31/20 14:48*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**16**		1.0	0.31	ug/L			03/31/20 02:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32D (032420)
Date Collected: 03/24/20 10:20
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 08:41	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 08:41	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:41	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 08:41	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 08:41	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 08:41	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:41	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 08:41	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 08:41	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 08:41	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 08:41	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 08:41	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 08:41	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 08:41	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 08:41	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 08:41	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 08:41	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 08:41	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 08:41	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 08:41	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 08:41	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 08:41	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 08:41	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 08:41	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 08:41	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 08:41	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:41	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 08:41	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 08:41	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 08:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32D (032420)
Date Collected: 03/24/20 10:20
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 08:41	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 08:41	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 08:41	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:41	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 08:41	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 08:41	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 08:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 08:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 08:41*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 08:41*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 08:41*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:09	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*104*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:09*	*1*
Terphenyl-d14	*101*			*03/30/20 08:57*	*03/31/20 15:09*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/31/20 03:16	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 09:04	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 09:04	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 09:04	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 09:04	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 09:04	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 09:04	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 09:04	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 09:04	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 09:04	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 09:04	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 09:04	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 09:04	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 09:04	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 09:04	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 09:04	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 09:04	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 09:04	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 09:04	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 09:04	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 09:04	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 09:04	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 09:04	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 09:04	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 09:04	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 09:04	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 09:04	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 09:04	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 09:04	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 09:04	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 09:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 09:04	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 09:04	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 09:04	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 09:04	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 09:04	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 09:04	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 09:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/03/20 09:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 09:04*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/03/20 09:04*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 09:04*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
Acenaphthylene	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 19:22	1
Acetophenone	<9.9		9.9	0.56	ug/L		03/31/20 14:46	04/02/20 19:22	1
Anthracene	<9.9		9.9	0.68	ug/L		03/31/20 14:46	04/02/20 19:22	1
Atrazine	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzaldehyde	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[a]anthracene	<9.9		9.9	0.54	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[a]pyrene	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[b]fluoranthene	<9.9		9.9	2.6	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[g,h,i]perylene	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[k]fluoranthene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,1'-Biphenyl	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-chloroethoxy)methane	<9.9		9.9	0.93	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-chloroethyl)ether	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
bis (2-chloroisopropyl) ether	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-ethylhexyl) phthalate	<9.9		9.9	1.6	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Bromophenyl phenyl ether	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 19:22	1
Butyl benzyl phthalate	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
Caprolactam	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
Carbazole	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chloroaniline	<20		20	2.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chloro-3-methylphenol	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.9		9.9	0.79	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Chlorophenol	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chlorophenyl phenyl ether	<9.9		9.9	0.83	ug/L		03/31/20 14:46	04/02/20 19:22	1
Chrysene	<9.9		9.9	0.50	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dibenz(a,h)anthracene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dibenzofuran	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,2-Dichlorobenzene	<9.9		9.9	0.52	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,3-Dichlorobenzene	<9.9		9.9	0.58	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,4-Dichlorobenzene	<9.9		9.9	0.53	ug/L		03/31/20 14:46	04/02/20 19:22	1
3,3'-Dichlorobenzidine	<59		59	30	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dichlorophenol	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Diethyl phthalate	<9.9		9.9	0.87	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dimethylphenol	<9.9		9.9	3.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dimethyl phthalate	<9.9		9.9	0.98	ug/L		03/31/20 14:46	04/02/20 19:22	1
Di-n-butyl phthalate	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 19:22	1
4,6-Dinitro-2-methylphenol	<49		49	9.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dinitrophenol	<49		49	9.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dinitrotoluene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,6-Dinitrotoluene	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Di-n-octyl phthalate	<9.9		9.9	1.4	ug/L		03/31/20 14:46	04/02/20 19:22	1
Fluoranthene	<9.9		9.9	0.73	ug/L		03/31/20 14:46	04/02/20 19:22	1
Fluorene	<9.9		9.9	0.95	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorobenzene	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorobutadiene	<9.9		9.9	0.61	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorocyclopentadiene	<9.9		9.9	2.5	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachloroethane	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
Indeno[1,2,3-cd]pyrene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1
Isophorone	<9.9		9.9	0.89	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Methylnaphthalene	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Methylphenol	<9.9		9.9	0.88	ug/L		03/31/20 14:46	04/02/20 19:22	1
3 & 4 Methylphenol	<9.9		9.9	1.3	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Nitroaniline	<49		49	1.3	ug/L		03/31/20 14:46	04/02/20 19:22	1
3-Nitroaniline	<49		49	4.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Nitroaniline	<49		49	4.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
Nitrobenzene	<9.9		9.9	0.72	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Nitrophenol	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Nitrophenol	<49		49	1.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
N-Nitrosodi-n-propylamine	<9.9		9.9	0.71	ug/L		03/31/20 14:46	04/02/20 19:22	1
N-Nitrosodiphenylamine	<9.9		9.9	0.91	ug/L		03/31/20 14:46	04/02/20 19:22	1
Pentachlorophenol	<49		49	2.0	ug/L		03/31/20 14:46	04/02/20 19:22	1
Phenanthrene	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 19:22	1
Phenol	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 19:22	1
Pyrene	<9.9		9.9	0.62	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,2,4-Trichlorobenzene	<9.9		9.9	0.55	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4,5-Trichlorophenol	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4,6-Trichlorophenol	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 19:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*88*		*32 - 113*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
2-Fluorophenol	*82*		*26 - 109*	*03/31/20 14:46*	*04/02/20 19:22*	*1*

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*32 - 118*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
Phenol-d5	*94*		*27 - 110*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
Terphenyl-d14	*113*		*10 - 126*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
2,4,6-Tribromophenol	*80*		*39 - 124*	*03/31/20 14:46*	*04/02/20 19:22*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			04/04/20 04:59	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/31/20 03:39	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<200		200	24	ug/L		03/29/20 13:03	03/30/20 23:16	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:16	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:16	1
Barium	<10		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:16	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:16	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Calcium	<500		500	25	ug/L		03/29/20 13:03	03/30/20 23:16	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:16	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:16	1
Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:16	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:16	1
Magnesium	<500		500	33	ug/L		03/29/20 13:03	03/30/20 23:16	1
Manganese	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 23:16	1
Potassium	<1000		1000	17	ug/L		03/29/20 13:03	03/30/20 23:16	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:16	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:16	1
Sodium	<1000		1000	480	ug/L		03/29/20 13:03	03/30/20 23:16	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:16	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/31/20 00:07	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:17	04/01/20 15:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			04/01/20 18:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: Trip Blank
Date Collected: 03/24/20 00:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 13:46	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 13:46	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/06/20 13:46	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 13:46	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 13:46	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 13:46	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/06/20 13:46	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 13:46	1
Chloroform	**8.6**		1.0	0.50	ug/L			04/06/20 13:46	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 13:46	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 13:46	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 13:46	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 13:46	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 13:46	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 13:46	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 13:46	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 13:46	1
Dichlorodifluoromethane	<1.0	*	1.0	0.60	ug/L			04/06/20 13:46	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 13:46	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 13:46	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 13:46	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 13:46	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 13:46	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/06/20 13:46	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 13:46	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 13:46	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 13:46	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 13:46	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:46	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 13:46	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 13:46	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 13:46	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: Trip Blank
Date Collected: 03/24/20 00:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 13:46	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 13:46	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 13:46	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:46	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 13:46	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			04/06/20 13:46	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 13:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/06/20 13:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/06/20 13:46*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/06/20 13:46*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/06/20 13:46*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-182056-1	BS-1 (032420)	105	111	107	103
680-182056-2	GM-30M (032420)	106	110	108	101
680-182056-3	GM-32 (032420)	105	111	107	102
680-182056-4	GM-32D (032420)	105	111	107	102
680-182056-5	EB-03 (032420)	106	111	108	102
680-182056-6	Trip Blank	105	108	107	102
LCS 680-613811/5	Lab Control Sample	109	108	109	110
LCS 680-614070/4	Lab Control Sample	108	109	109	109
LCSD 680-613811/6	Lab Control Sample Dup	110	109	110	111
LCSD 680-614070/5	Lab Control Sample Dup	113	109	111	112
MB 680-613811/11	Method Blank	105	108	107	101
MB 680-614070/10	Method Blank	106	108	107	102

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	NBZ	PHL	TPHL	TBP
Lab Sample ID	Client Sample ID	(32-113)	(26-109)	(32-118)	(27-110)	(10-126)	(39-124)
680-182056-1	BS-1 (032420)	89	77	83	81	55	77
680-182056-5	EB-03 (032420)	88	82	79	94	113	80
LCS 680-613428/6-A	Lab Control Sample	110	86	91	92	113	95
MB 680-613428/5-A	Method Blank	84	66	85	76	95	85

Surrogate Legend

FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPHL = Terphenyl-d14
TBP = 2,4,6-Tribromophenol

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
		NBZ	TPHL
Lab Sample ID	Client Sample ID	(41-144)	
680-182056-2	GM-30M (032420)	88	67
680-182056-3	GM-32 (032420)	95	79
680-182056-4	GM-32D (032420)	104	101
LCS 460-684564/2-A	Lab Control Sample	100	108
LCSD 460-684564/3-A	Lab Control Sample Dup	95	101
MB 460-684564/1-A	Method Blank	73	87

Surrogate Legend

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

NBZ = Nitrobenzene-d5
TPHL = Terphenyl-d14

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613811/11
Matrix: Water
Analysis Batch: 613811

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 02:27	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 02:27	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 02:27	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 02:27	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 02:27	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/03/20 02:27	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 02:27	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 02:27	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 02:27	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 02:27	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 02:27	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 02:27	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 02:27	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 02:27	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 02:27	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 02:27	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 02:27	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 02:27	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 02:27	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 02:27	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 02:27	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 02:27	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 02:27	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 02:27	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 02:27	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 02:27	1
n-Butylbenzene	0.474	J	1.0	0.47	ug/L			04/03/20 02:27	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 02:27	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 02:27	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1

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

Lab Sample ID: MB 680-613811/11
Matrix: Water
Analysis Batch: 613811

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 02:27	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 02:27	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 02:27	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 02:27	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 02:27	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 02:27	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 02:27	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 02:27	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 02:27	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 02:27	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 02:27	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 02:27	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 02:27	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 02:27	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 02:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 02:27*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/03/20 02:27*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 02:27*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/03/20 02:27*	*1*

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	263		ug/L		105	70 - 135
Benzene	50.0	54.8		ug/L		110	80 - 120
Bromobenzene	50.0	52.8		ug/L		106	80 - 121
Bromochloromethane	50.0	52.9		ug/L		106	80 - 120
Bromodichloromethane	50.0	56.3		ug/L		113	80 - 120
Bromoform	50.0	54.9		ug/L		110	74 - 126
Bromomethane	50.1	119	E *	ug/L		237	62 - 130
2-Butanone	250	264		ug/L		106	80 - 131
Carbon disulfide	50.0	53.7		ug/L		107	80 - 120
Carbon tetrachloride	50.0	52.0		ug/L		104	76 - 123
Chlorobenzene	50.0	53.5		ug/L		107	80 - 120
Chloroethane	50.0	74.8	*	ug/L		150	66 - 135
2-Chloroethyl vinyl ether	50.0	56.9		ug/L		114	71 - 135
Chloroform	50.0	54.8		ug/L		110	80 - 120
Chloromethane	50.0	58.0		ug/L		116	69 - 131
2-Chlorotoluene	50.0	54.0		ug/L		108	80 - 120

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

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	53.7		ug/L		107	80 - 120
cis-1,2-Dichloroethene	50.0	55.3		ug/L		111	80 - 120
cis-1,3-Dichloropropene	50.0	57.4		ug/L		115	80 - 120
Dibromochloromethane	50.0	55.7		ug/L		111	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	52.3		ug/L		105	71 - 134
1,2-Dibromoethane	50.0	54.8		ug/L		110	80 - 120
Dibromomethane	50.0	53.8		ug/L		108	80 - 120
1,2-Dichlorobenzene	50.0	54.3		ug/L		109	80 - 120
1,3-Dichlorobenzene	50.0	53.8		ug/L		108	80 - 120
1,4-Dichlorobenzene	50.0	52.7		ug/L		105	80 - 120
Dichlorodifluoromethane	50.1	60.7		ug/L		121	47 - 155
1,1-Dichloroethane	50.0	55.5		ug/L		111	80 - 120
1,2-Dichloroethane	50.0	55.0		ug/L		110	80 - 120
1,1-Dichloroethene	50.0	51.4		ug/L		103	76 - 120
1,2-Dichloroethene, Total	100	110		ug/L		110	80 - 120
1,2-Dichloropropane	50.0	56.9		ug/L		114	80 - 120
1,3-Dichloropropane	50.0	55.3		ug/L		111	80 - 120
2,2-Dichloropropane	50.0	51.6		ug/L		103	76 - 126
1,1-Dichloropropene	50.0	54.0		ug/L		108	80 - 120
Ethylbenzene	50.0	54.1		ug/L		108	80 - 120
Hexachlorobutadiene	50.0	53.4		ug/L		107	60 - 140
2-Hexanone	250	277		ug/L		111	74 - 127
Isopropylbenzene	50.0	53.4		ug/L		107	80 - 120
Methylene Chloride	50.0	51.1		ug/L		102	80 - 120
4-Methyl-2-pentanone	250	277		ug/L		111	76 - 124
Methyl tert-butyl ether	50.0	54.1		ug/L		108	80 - 120
m-Xylene & p-Xylene	50.0	53.9		ug/L		108	80 - 120
n-Butylbenzene	50.0	52.8		ug/L		106	80 - 120
N-Propylbenzene	50.0	53.6		ug/L		107	80 - 120
o-Xylene	50.0	55.2		ug/L		110	80 - 120
p-Isopropyltoluene	50.0	53.6		ug/L		107	80 - 120
sec-Butylbenzene	50.0	52.1		ug/L		104	80 - 120
Styrene	50.0	56.8		ug/L		114	80 - 120
tert-Butylbenzene	50.0	52.3		ug/L		105	80 - 121
1,1,1,2-Tetrachloroethane	50.0	55.3		ug/L		111	80 - 121
1,1,2,2-Tetrachloroethane	50.0	53.5		ug/L		107	80 - 120
Tetrachloroethene	50.0	51.0		ug/L		102	80 - 121
Toluene	50.0	54.9		ug/L		110	80 - 113
trans-1,2-Dichloroethene	50.0	54.2		ug/L		108	80 - 120
trans-1,3-Dichloropropene	50.0	57.4		ug/L		115	80 - 120
1,2,3-Trichlorobenzene	50.0	57.1		ug/L		114	61 - 141
1,2,4-Trichlorobenzene	50.0	56.0		ug/L		112	68 - 128
1,1,1-Trichloroethane	50.0	52.7		ug/L		105	80 - 120
1,1,2-Trichloroethane	50.0	55.8		ug/L		112	80 - 120
Trichloroethene	50.0	53.0		ug/L		106	80 - 120
Trichlorofluoromethane	50.0	50.6		ug/L		101	60 - 141
1,2,3-Trichloropropane	50.0	51.9		ug/L		104	80 - 123
1,2,4-Trimethylbenzene	50.0	55.1		ug/L		110	80 - 120
1,3,5-Trimethylbenzene	50.0	54.2		ug/L		108	80 - 120

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

Lab Sample ID: LCS 680-613811/5
Matrix: Water
Analysis Batch: 613811

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	112		ug/L		112	67 - 135
Vinyl chloride	50.1	54.1		ug/L		108	71 - 128
Xylenes, Total	100	109		ug/L		109	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*109*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*
Dibromofluoromethane (Surr)	*109*		*80 - 122*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 680-613811/6
Matrix: Water
Analysis Batch: 613811

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
Acetone	250	255		ug/L		102	70 - 135	3	30
Benzene	50.0	55.3		ug/L		111	80 - 120	1	20
Bromobenzene	50.0	53.0		ug/L		106	80 - 121	0	20
Bromochloromethane	50.0	53.6		ug/L		107	80 - 120	1	20
Bromodichloromethane	50.0	56.6		ug/L		113	80 - 120	1	20
Bromoform	50.0	55.2		ug/L		110	74 - 126	1	20
Bromomethane	50.1	124	E *	ug/L		247	62 - 130	4	20
2-Butanone	250	259		ug/L		104	80 - 131	2	20
Carbon disulfide	50.0	55.0		ug/L		110	80 - 120	2	20
Carbon tetrachloride	50.0	53.4		ug/L		107	76 - 123	3	20
Chlorobenzene	50.0	53.5		ug/L		107	80 - 120	0	20
Chloroethane	50.0	75.4	*	ug/L		151	66 - 135	1	20
2-Chloroethyl vinyl ether	50.0	57.3		ug/L		115	71 - 135	1	50
Chloroform	50.0	55.4		ug/L		111	80 - 120	1	20
Chloromethane	50.0	58.5		ug/L		117	69 - 131	1	30
2-Chlorotoluene	50.0	54.2		ug/L		108	80 - 120	0	20
4-Chlorotoluene	50.0	53.8		ug/L		108	80 - 120	0	20
cis-1,2-Dichloroethene	50.0	56.0		ug/L		112	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	57.8		ug/L		116	80 - 120	1	20
Dibromochloromethane	50.0	56.1		ug/L		112	80 - 121	1	20
1,2-Dibromo-3-Chloropropane	50.0	52.9		ug/L		106	71 - 134	1	20
1,2-Dibromoethane	50.0	55.0		ug/L		110	80 - 120	0	20
Dibromomethane	50.0	53.9		ug/L		108	80 - 120	0	20
1,2-Dichlorobenzene	50.0	54.9		ug/L		110	80 - 120	1	20
1,3-Dichlorobenzene	50.0	54.5		ug/L		109	80 - 120	1	20
1,4-Dichlorobenzene	50.0	53.5		ug/L		107	80 - 120	2	20
Dichlorodifluoromethane	50.1	63.6		ug/L		127	47 - 155	5	40
1,1-Dichloroethane	50.0	55.9		ug/L		112	80 - 120	1	20
1,2-Dichloroethane	50.0	54.6		ug/L		109	80 - 120	1	50
1,1-Dichloroethene	50.0	53.1		ug/L		106	76 - 120	3	20
1,2-Dichloroethene, Total	100	111		ug/L		111	80 - 120	2	20
1,2-Dichloropropane	50.0	57.7		ug/L		115	80 - 120	1	20
1,3-Dichloropropane	50.0	55.5		ug/L		111	80 - 120	0	20

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

Lab Sample ID: LCSD 680-613811/6
Matrix: Water
Analysis Batch: 613811

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
2,2-Dichloropropane	50.0	51.9		ug/L		104	76 - 126	1	20
1,1-Dichloropropene	50.0	55.0		ug/L		110	80 - 120	2	20
Ethylbenzene	50.0	54.5		ug/L		109	80 - 120	1	20
Hexachlorobutadiene	50.0	58.8		ug/L		118	60 - 140	10	20
2-Hexanone	250	271		ug/L		108	74 - 127	2	20
Isopropylbenzene	50.0	54.1		ug/L		108	80 - 120	1	20
Methylene Chloride	50.0	51.3		ug/L		103	80 - 120	0	20
4-Methyl-2-pentanone	250	272		ug/L		109	76 - 124	2	20
Methyl tert-butyl ether	50.0	53.8		ug/L		108	80 - 120	1	20
m-Xylene & p-Xylene	50.0	54.0		ug/L		108	80 - 120	0	20
n-Butylbenzene	50.0	54.7		ug/L		109	80 - 120	4	20
N-Propylbenzene	50.0	53.8		ug/L		108	80 - 120	0	20
o-Xylene	50.0	54.9		ug/L		110	80 - 120	1	30
p-Isopropyltoluene	50.0	55.3		ug/L		111	80 - 120	3	20
sec-Butylbenzene	50.0	53.2		ug/L		106	80 - 120	2	20
Styrene	50.0	56.6		ug/L		113	80 - 120	0	20
tert-Butylbenzene	50.0	53.6		ug/L		107	80 - 121	2	20
1,1,1,2-Tetrachloroethane	50.0	55.4		ug/L		111	80 - 121	0	20
1,1,2,2-Tetrachloroethane	50.0	53.1		ug/L		106	80 - 120	1	20
Tetrachloroethene	50.0	52.1		ug/L		104	80 - 121	2	20
Toluene	50.0	55.2		ug/L		110	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120	2	20
trans-1,3-Dichloropropene	50.0	57.4		ug/L		115	80 - 120	0	30
1,2,3-Trichlorobenzene	50.0	58.3		ug/L		117	61 - 141	2	20
1,2,4-Trichlorobenzene	50.0	57.9		ug/L		116	68 - 128	3	20
1,1,1-Trichloroethane	50.0	54.1		ug/L		108	80 - 120	3	20
1,1,2-Trichloroethane	50.0	55.6		ug/L		111	80 - 120	0	20
Trichloroethene	50.0	53.9		ug/L		108	80 - 120	2	20
Trichlorofluoromethane	50.0	52.6		ug/L		105	60 - 141	4	20
1,2,3-Trichloropropane	50.0	51.5		ug/L		103	80 - 123	1	30
1,2,4-Trimethylbenzene	50.0	54.7		ug/L		109	80 - 120	1	20
1,3,5-Trimethylbenzene	50.0	54.7		ug/L		109	80 - 120	1	20
Vinyl acetate	100	111		ug/L		111	67 - 135	1	20
Vinyl chloride	50.1	55.6		ug/L		111	71 - 128	3	20
Xylenes, Total	100	109		ug/L		109	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Lab Sample ID: MB 680-614070/10
Matrix: Water
Analysis Batch: 614070

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 12:44	1

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

Lab Sample ID: MB 680-614070/10
Matrix: Water
Analysis Batch: 614070

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 12:44	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 12:44	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 12:44	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 12:44	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 12:44	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 12:44	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 12:44	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 12:44	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 12:44	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 12:44	1
Chloroform	<1.0		1.0	0.50	ug/L			04/06/20 12:44	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 12:44	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 12:44	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 12:44	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 12:44	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 12:44	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 12:44	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 12:44	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 12:44	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 12:44	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 12:44	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 12:44	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 12:44	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/06/20 12:44	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 12:44	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 12:44	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 12:44	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 12:44	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 12:44	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 12:44	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 12:44	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 12:44	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 12:44	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 12:44	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 12:44	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 12:44	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 12:44	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 12:44	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 12:44	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 12:44	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 12:44	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 12:44	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 12:44	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 12:44	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 12:44	1

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

Lab Sample ID: MB 680-614070/10
Matrix: Water
Analysis Batch: 614070

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 12:44	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 12:44	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 12:44	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 12:44	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 12:44	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 12:44	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 12:44	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 12:44	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 12:44	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 12:44	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 12:44	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 12:44	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 12:44	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 12:44	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/06/20 12:44	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 12:44	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 12:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/06/20 12:44*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/06/20 12:44*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/06/20 12:44*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/06/20 12:44*	*1*

Lab Sample ID: LCS 680-614070/4
Matrix: Water
Analysis Batch: 614070

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	264		ug/L		105	70 - 135
Benzene	50.0	52.9		ug/L		106	80 - 120
Bromobenzene	50.0	51.5		ug/L		103	80 - 121
Bromochloromethane	50.0	52.4		ug/L		105	80 - 120
Bromodichloromethane	50.0	57.2		ug/L		114	80 - 120
Bromoform	50.0	55.4		ug/L		111	74 - 126
Bromomethane	50.1	116	E *	ug/L		231	62 - 130
2-Butanone	250	264		ug/L		105	80 - 131
Carbon disulfide	50.0	52.7		ug/L		105	80 - 120
Carbon tetrachloride	50.0	51.0		ug/L		102	76 - 123
Chlorobenzene	50.0	51.8		ug/L		104	80 - 120
Chloroethane	50.0	74.5	*	ug/L		149	66 - 135
2-Chloroethyl vinyl ether	50.0	59.0		ug/L		118	71 - 135
Chloroform	50.0	53.8		ug/L		108	80 - 120
Chloromethane	50.0	57.9		ug/L		116	69 - 131
2-Chlorotoluene	50.0	51.8		ug/L		104	80 - 120
4-Chlorotoluene	50.0	51.5		ug/L		103	80 - 120
cis-1,2-Dichloroethene	50.0	56.5		ug/L		113	80 - 120

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

Lab Sample ID: LCS 680-614070/4
Matrix: Water
Analysis Batch: 614070

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	50.0	59.0		ug/L		118	80 - 120
Dibromochloromethane	50.0	56.3		ug/L		113	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	54.5		ug/L		109	71 - 134
1,2-Dibromoethane	50.0	55.0		ug/L		110	80 - 120
Dibromomethane	50.0	54.9		ug/L		110	80 - 120
1,2-Dichlorobenzene	50.0	51.7		ug/L		103	80 - 120
1,3-Dichlorobenzene	50.0	52.6		ug/L		105	80 - 120
1,4-Dichlorobenzene	50.0	52.0		ug/L		104	80 - 120
Dichlorodifluoromethane	50.1	63.4		ug/L		127	47 - 155
1,1-Dichloroethane	50.0	53.8		ug/L		108	80 - 120
1,2-Dichloroethane	50.0	54.5		ug/L		109	80 - 120
1,1-Dichloroethene	50.0	52.6		ug/L		105	76 - 120
1,2-Dichloroethene, Total	100	111		ug/L		111	80 - 120
1,2-Dichloropropane	50.0	57.0		ug/L		114	80 - 120
1,3-Dichloropropane	50.0	54.5		ug/L		109	80 - 120
2,2-Dichloropropane	50.0	60.0		ug/L		120	76 - 126
1,1-Dichloropropene	50.0	52.1		ug/L		104	80 - 120
Ethylbenzene	50.0	52.2		ug/L		104	80 - 120
Hexachlorobutadiene	50.0	57.3		ug/L		115	60 - 140
2-Hexanone	250	280		ug/L		112	74 - 127
Isopropylbenzene	50.0	52.1		ug/L		104	80 - 120
Methylene Chloride	50.0	51.0		ug/L		102	80 - 120
4-Methyl-2-pentanone	250	276		ug/L		110	76 - 124
Methyl tert-butyl ether	50.0	54.8		ug/L		110	80 - 120
m-Xylene & p-Xylene	50.0	51.6		ug/L		103	80 - 120
n-Butylbenzene	50.0	53.6		ug/L		107	80 - 120
N-Propylbenzene	50.0	51.5		ug/L		103	80 - 120
o-Xylene	50.0	53.1		ug/L		106	80 - 120
p-Isopropyltoluene	50.0	53.2		ug/L		106	80 - 120
sec-Butylbenzene	50.0	51.1		ug/L		102	80 - 120
Styrene	50.0	54.2		ug/L		108	80 - 120
tert-Butylbenzene	50.0	51.1		ug/L		102	80 - 121
1,1,1,2-Tetrachloroethane	50.0	52.5		ug/L		105	80 - 121
1,1,2,2-Tetrachloroethane	50.0	53.8		ug/L		108	80 - 120
Tetrachloroethene	50.0	50.8		ug/L		102	80 - 121
Toluene	50.0	53.1		ug/L		106	80 - 113
trans-1,2-Dichloroethene	50.0	54.2		ug/L		108	80 - 120
trans-1,3-Dichloropropene	50.0	55.1		ug/L		110	80 - 120
1,2,3-Trichlorobenzene	50.0	58.5		ug/L		117	61 - 141
1,2,4-Trichlorobenzene	50.0	58.3		ug/L		117	68 - 128
1,1,1-Trichloroethane	50.0	52.5		ug/L		105	80 - 120
1,1,2-Trichloroethane	50.0	55.5		ug/L		111	80 - 120
Trichloroethene	50.0	51.3		ug/L		103	80 - 120
Trichlorofluoromethane	50.0	50.6		ug/L		101	60 - 141
1,2,3-Trichloropropane	50.0	51.3		ug/L		103	80 - 123
1,2,4-Trimethylbenzene	50.0	53.7		ug/L		107	80 - 120
1,3,5-Trimethylbenzene	50.0	52.6		ug/L		105	80 - 120
Vinyl acetate	100	142	*	ug/L		142	67 - 135
Vinyl chloride	50.1	54.8		ug/L		109	71 - 128

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

Lab Sample ID: LCS 680-614070/4
Matrix: Water
Analysis Batch: 614070

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Xylenes, Total			100	105		ug/L		105	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*108*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*109*		*80 - 122*
4-Bromofluorobenzene (Surr)	*109*		*80 - 120*

Lab Sample ID: LCSD 680-614070/5
Matrix: Water
Analysis Batch: 614070

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
Acetone			250	255		ug/L		102	70 - 135	3	30
Benzene			50.0	56.0		ug/L		112	80 - 120	6	20
Bromobenzene			50.0	52.3		ug/L		105	80 - 121	1	20
Bromochloromethane			50.0	52.2		ug/L		104	80 - 120	0	20
Bromodichloromethane			50.0	58.2		ug/L		116	80 - 120	2	20
Bromoform			50.0	55.7		ug/L		111	74 - 126	1	20
Bromomethane			50.1	124	E *	ug/L		248	62 - 130	7	20
2-Butanone			250	267		ug/L		107	80 - 131	1	20
Carbon disulfide			50.0	58.7		ug/L		117	80 - 120	11	20
Carbon tetrachloride			50.0	56.8		ug/L		114	76 - 123	11	20
Chlorobenzene			50.0	53.6		ug/L		107	80 - 120	3	20
Chloroethane			50.0	81.2	*	ug/L		162	66 - 135	9	20
2-Chloroethyl vinyl ether			50.0	59.2		ug/L		118	71 - 135	0	50
Chloroform			50.0	55.6		ug/L		111	80 - 120	3	20
Chloromethane			50.0	64.4		ug/L		129	69 - 131	11	30
2-Chlorotoluene			50.0	54.3		ug/L		109	80 - 120	5	20
4-Chlorotoluene			50.0	53.7		ug/L		107	80 - 120	4	20
cis-1,2-Dichloroethene			50.0	58.8		ug/L		118	80 - 120	4	20
cis-1,3-Dichloropropene			50.0	60.0		ug/L		120	80 - 120	2	20
Dibromochloromethane			50.0	56.4		ug/L		113	80 - 121	0	20
1,2-Dibromo-3-Chloropropane			50.0	54.9		ug/L		110	71 - 134	1	20
1,2-Dibromoethane			50.0	54.6		ug/L		109	80 - 120	1	20
Dibromomethane			50.0	54.0		ug/L		108	80 - 120	2	20
1,2-Dichlorobenzene			50.0	52.8		ug/L		106	80 - 120	2	20
1,3-Dichlorobenzene			50.0	53.7		ug/L		107	80 - 120	2	20
1,4-Dichlorobenzene			50.0	53.3		ug/L		107	80 - 120	2	20
Dichlorodifluoromethane			50.1	78.8	*	ug/L		157	47 - 155	22	40
1,1-Dichloroethane			50.0	56.9		ug/L		114	80 - 120	6	20
1,2-Dichloroethane			50.0	54.5		ug/L		109	80 - 120	0	50
1,1-Dichloroethene			50.0	58.5		ug/L		117	76 - 120	11	20
1,2-Dichloroethene, Total			100	118		ug/L		118	80 - 120	6	20
1,2-Dichloropropane			50.0	58.5		ug/L		117	80 - 120	3	20
1,3-Dichloropropane			50.0	54.8		ug/L		110	80 - 120	1	20
2,2-Dichloropropane			50.0	64.1	*	ug/L		128	76 - 126	7	20
1,1-Dichloropropene			50.0	57.7		ug/L		115	80 - 120	10	20

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

Lab Sample ID: LCSD 680-614070/5
Matrix: Water
Analysis Batch: 614070

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
Ethylbenzene	50.0	55.2		ug/L		110	80 - 120	6	20
Hexachlorobutadiene	50.0	61.9		ug/L		124	60 - 140	8	20
2-Hexanone	250	280		ug/L		112	74 - 127	0	20
Isopropylbenzene	50.0	56.0		ug/L		112	80 - 120	7	20
Methylene Chloride	50.0	52.0		ug/L		104	80 - 120	2	20
4-Methyl-2-pentanone	250	277		ug/L		111	76 - 124	0	20
Methyl tert-butyl ether	50.0	54.8		ug/L		110	80 - 120	0	20
m-Xylene & p-Xylene	50.0	54.6		ug/L		109	80 - 120	6	20
n-Butylbenzene	50.0	57.3		ug/L		115	80 - 120	7	20
N-Propylbenzene	50.0	55.2		ug/L		110	80 - 120	7	20
o-Xylene	50.0	55.5		ug/L		111	80 - 120	4	30
p-Isopropyltoluene	50.0	57.0		ug/L		114	80 - 120	7	20
sec-Butylbenzene	50.0	55.3		ug/L		111	80 - 120	8	20
Styrene	50.0	56.3		ug/L		113	80 - 120	4	20
tert-Butylbenzene	50.0	54.9		ug/L		110	80 - 121	7	20
1,1,1,2-Tetrachloroethane	50.0	54.1		ug/L		108	80 - 121	3	20
1,1,2,2-Tetrachloroethane	50.0	54.1		ug/L		108	80 - 120	1	20
Tetrachloroethene	50.0	54.5		ug/L		109	80 - 121	7	20
Toluene	50.0	56.1		ug/L		112	80 - 113	5	20
trans-1,2-Dichloroethene	50.0	58.7		ug/L		117	80 - 120	8	20
trans-1,3-Dichloropropene	50.0	55.7		ug/L		111	80 - 120	1	30
1,2,3-Trichlorobenzene	50.0	59.3		ug/L		119	61 - 141	1	20
1,2,4-Trichlorobenzene	50.0	59.5		ug/L		119	68 - 128	2	20
1,1,1-Trichloroethane	50.0	57.2		ug/L		114	80 - 120	9	20
1,1,2-Trichloroethane	50.0	55.3		ug/L		111	80 - 120	0	20
Trichloroethene	50.0	54.5		ug/L		109	80 - 120	6	20
Trichlorofluoromethane	50.0	58.7		ug/L		117	60 - 141	15	20
1,2,3-Trichloropropane	50.0	51.2		ug/L		102	80 - 123	0	30
1,2,4-Trimethylbenzene	50.0	55.9		ug/L		112	80 - 120	4	20
1,3,5-Trimethylbenzene	50.0	55.6		ug/L		111	80 - 120	6	20
Vinyl acetate	100	140	*	ug/L		140	67 - 135	1	20
Vinyl chloride	50.1	62.6		ug/L		125	71 - 128	13	20
Xylenes, Total	100	110		ug/L		110	80 - 120	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*113*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*
Dibromofluoromethane (Surr)	*111*		*80 - 122*
4-Bromofluorobenzene (Surr)	*112*		*80 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613428/5-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613428

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<10		10	0.76	ug/L		03/31/20 14:46	04/02/20 16:24	1
Acenaphthylene	<10		10	0.85	ug/L		03/31/20 14:46	04/02/20 16:24	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-613428/5-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613428

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetophenone	<10		10	0.57	ug/L		03/31/20 14:46	04/02/20 16:24	1
Anthracene	<10		10	0.69	ug/L		03/31/20 14:46	04/02/20 16:24	1
Atrazine	<10		10	1.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzaldehyde	<10		10	1.1	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzo[a]anthracene	<10		10	0.55	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzo[a]pyrene	<10		10	0.71	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzo[b]fluoranthene	<10		10	2.6	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzo[g,h,i]perylene	<10		10	0.87	ug/L		03/31/20 14:46	04/02/20 16:24	1
Benzo[k]fluoranthene	<10		10	1.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
1,1'-Biphenyl	<10		10	0.58	ug/L		03/31/20 14:46	04/02/20 16:24	1
Bis(2-chloroethoxy)methane	<10		10	0.94	ug/L		03/31/20 14:46	04/02/20 16:24	1
Bis(2-chloroethyl)ether	<10		10	1.1	ug/L		03/31/20 14:46	04/02/20 16:24	1
bis (2-chloroisopropyl) ether	<10		10	0.78	ug/L		03/31/20 14:46	04/02/20 16:24	1
Bis(2-ethylhexyl) phthalate	<10		10	1.6	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Bromophenyl phenyl ether	<10		10	0.77	ug/L		03/31/20 14:46	04/02/20 16:24	1
Butyl benzyl phthalate	<10		10	1.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
Caprolactam	<10		10	0.79	ug/L		03/31/20 14:46	04/02/20 16:24	1
Carbazole	<10		10	0.71	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Chloroaniline	<20		20	2.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Chloro-3-methylphenol	<10		10	1.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
2-Chloronaphthalene	<10		10	0.80	ug/L		03/31/20 14:46	04/02/20 16:24	1
2-Chlorophenol	<10		10	0.87	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Chlorophenyl phenyl ether	<10		10	0.84	ug/L		03/31/20 14:46	04/02/20 16:24	1
Chrysene	<10		10	0.51	ug/L		03/31/20 14:46	04/02/20 16:24	1
Dibenz(a,h)anthracene	<10		10	1.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
Dibenzofuran	<10		10	0.79	ug/L		03/31/20 14:46	04/02/20 16:24	1
1,2-Dichlorobenzene	<10		10	0.53	ug/L		03/31/20 14:46	04/02/20 16:24	1
1,3-Dichlorobenzene	<10		10	0.59	ug/L		03/31/20 14:46	04/02/20 16:24	1
1,4-Dichlorobenzene	<10		10	0.54	ug/L		03/31/20 14:46	04/02/20 16:24	1
3,3'-Dichlorobenzidine	<60		60	30	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4-Dichlorophenol	<10		10	1.1	ug/L		03/31/20 14:46	04/02/20 16:24	1
Diethyl phthalate	<10		10	0.88	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4-Dimethylphenol	<10		10	4.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
Dimethyl phthalate	<10		10	0.99	ug/L		03/31/20 14:46	04/02/20 16:24	1
Di-n-butyl phthalate	<10		10	0.83	ug/L		03/31/20 14:46	04/02/20 16:24	1
4,6-Dinitro-2-methylphenol	<50		50	10	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4-Dinitrophenol	<50		50	10	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4-Dinitrotoluene	<10		10	1.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,6-Dinitrotoluene	<10		10	1.1	ug/L		03/31/20 14:46	04/02/20 16:24	1
Di-n-octyl phthalate	<10		10	1.4	ug/L		03/31/20 14:46	04/02/20 16:24	1
Fluoranthene	<10		10	0.74	ug/L		03/31/20 14:46	04/02/20 16:24	1
Fluorene	<10		10	0.96	ug/L		03/31/20 14:46	04/02/20 16:24	1
Hexachlorobenzene	<10		10	0.79	ug/L		03/31/20 14:46	04/02/20 16:24	1
Hexachlorobutadiene	<10		10	0.62	ug/L		03/31/20 14:46	04/02/20 16:24	1
Hexachlorocyclopentadiene	<10		10	2.5	ug/L		03/31/20 14:46	04/02/20 16:24	1
Hexachloroethane	<10		10	0.76	ug/L		03/31/20 14:46	04/02/20 16:24	1
Indeno[1,2,3-cd]pyrene	<10		10	1.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
Isophorone	<10		10	0.90	ug/L		03/31/20 14:46	04/02/20 16:24	1
2-Methylnaphthalene	<10		10	0.78	ug/L		03/31/20 14:46	04/02/20 16:24	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-613428/5-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613428

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylphenol	<10		10	0.89	ug/L		03/31/20 14:46	04/02/20 16:24	1
3 & 4 Methylphenol	<10		10	1.3	ug/L		03/31/20 14:46	04/02/20 16:24	1
2-Nitroaniline	<50		50	1.3	ug/L		03/31/20 14:46	04/02/20 16:24	1
3-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
Nitrobenzene	<10		10	0.73	ug/L		03/31/20 14:46	04/02/20 16:24	1
2-Nitrophenol	<10		10	0.76	ug/L		03/31/20 14:46	04/02/20 16:24	1
4-Nitrophenol	<50		50	1.9	ug/L		03/31/20 14:46	04/02/20 16:24	1
N-Nitrosodi-n-propylamine	<10		10	0.72	ug/L		03/31/20 14:46	04/02/20 16:24	1
N-Nitrosodiphenylamine	<10		10	0.92	ug/L		03/31/20 14:46	04/02/20 16:24	1
Pentachlorophenol	<50		50	2.0	ug/L		03/31/20 14:46	04/02/20 16:24	1
Phenanthrene	<10		10	0.77	ug/L		03/31/20 14:46	04/02/20 16:24	1
Phenol	<10		10	0.83	ug/L		03/31/20 14:46	04/02/20 16:24	1
Pyrene	<10		10	0.63	ug/L		03/31/20 14:46	04/02/20 16:24	1
1,2,4-Trichlorobenzene	<10		10	0.56	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4,5-Trichlorophenol	<10		10	1.2	ug/L		03/31/20 14:46	04/02/20 16:24	1
2,4,6-Trichlorophenol	<10		10	0.85	ug/L		03/31/20 14:46	04/02/20 16:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*84*		*32 - 113*	*03/31/20 14:46*	*04/02/20 16:24*	*1*
2-Fluorophenol	*66*		*26 - 109*	*03/31/20 14:46*	*04/02/20 16:24*	*1*
Nitrobenzene-d5	*85*		*32 - 118*	*03/31/20 14:46*	*04/02/20 16:24*	*1*
Phenol-d5	*76*		*27 - 110*	*03/31/20 14:46*	*04/02/20 16:24*	*1*
Terphenyl-d14	*95*		*10 - 126*	*03/31/20 14:46*	*04/02/20 16:24*	*1*
2,4,6-Tribromophenol	*85*		*39 - 124*	*03/31/20 14:46*	*04/02/20 16:24*	*1*

Lab Sample ID: LCS 680-613428/6-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613428

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	100	89.0		ug/L		89	48 - 130
Acenaphthylene	100	105		ug/L		105	48 - 130
Anthracene	100	102		ug/L		102	49 - 130
Atrazine	100	88.1		ug/L		88	39 - 130
Benzaldehyde	100	90.3		ug/L		90	14 - 130
Benzo[a]anthracene	100	103		ug/L		103	44 - 130
Benzo[a]pyrene	100	94.0		ug/L		94	44 - 130
Benzo[b]fluoranthene	100	96.2		ug/L		96	43 - 130
Benzo[g,h,i]perylene	100	105		ug/L		105	41 - 130
Benzo[k]fluoranthene	100	98.5		ug/L		98	40 - 130
1,1'-Biphenyl	100	107		ug/L		107	45 - 130
Bis(2-chloroethoxy)methane	100	95.7		ug/L		96	47 - 130
Bis(2-chloroethyl)ether	100	118		ug/L		118	32 - 130
bis (2-chloroisopropyl) ether	100	104		ug/L		104	26 - 130
Bis(2-ethylhexyl) phthalate	100	111		ug/L		111	45 - 130
4-Bromophenyl phenyl ether	100	98.5		ug/L		99	47 - 130
Butyl benzyl phthalate	100	119		ug/L		119	50 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-613428/6-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613428

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Caprolactam	100	72.5		ug/L		72	26 - 130
Carbazole	100	107		ug/L		107	54 - 130
4-Chloroaniline	100	73.0		ug/L		73	42 - 130
4-Chloro-3-methylphenol	100	82.9		ug/L		83	47 - 130
2-Chloronaphthalene	100	99.8		ug/L		100	44 - 130
2-Chlorophenol	100	90.9		ug/L		91	39 - 130
4-Chlorophenyl phenyl ether	100	96.3		ug/L		96	45 - 130
Chrysene	100	102		ug/L		102	47 - 130
Dibenz(a,h)anthracene	100	105		ug/L		105	41 - 130
Dibenzofuran	100	100		ug/L		100	50 - 130
1,2-Dichlorobenzene	100	73.6		ug/L		74	31 - 130
1,3-Dichlorobenzene	100	70.6		ug/L		71	30 - 130
1,4-Dichlorobenzene	100	73.8		ug/L		74	31 - 130
3,3'-Dichlorobenzidine	100	107		ug/L		107	46 - 130
2,4-Dichlorophenol	100	88.3		ug/L		88	44 - 130
Diethyl phthalate	100	106		ug/L		106	53 - 130
2,4-Dimethylphenol	100	96.5		ug/L		97	37 - 130
Dimethyl phthalate	100	109		ug/L		109	53 - 130
Di-n-butyl phthalate	100	106		ug/L		106	51 - 130
4,6-Dinitro-2-methylphenol	200	199		ug/L		99	42 - 130
2,4-Dinitrophenol	200	211		ug/L		106	31 - 130
2,4-Dinitrotoluene	100	101		ug/L		101	52 - 130
2,6-Dinitrotoluene	100	92.0		ug/L		92	52 - 130
Di-n-octyl phthalate	100	103		ug/L		103	42 - 130
Fluoranthene	100	93.0		ug/L		93	47 - 130
Fluorene	100	103		ug/L		103	50 - 130
Hexachlorobenzene	100	91.7		ug/L		92	43 - 130
Hexachlorobutadiene	100	60.1		ug/L		60	27 - 130
Hexachlorocyclopentadiene	100	84.2		ug/L		84	11 - 130
Hexachloroethane	100	72.8		ug/L		73	29 - 130
Indeno[1,2,3-cd]pyrene	100	117		ug/L		117	31 - 130
Isophorone	100	92.1		ug/L		92	47 - 130
2-Methylnaphthalene	100	81.9		ug/L		82	40 - 130
2-Methylphenol	100	92.7		ug/L		93	40 - 130
3 & 4 Methylphenol	100	95.5		ug/L		96	42 - 130
2-Nitroaniline	100	102		ug/L		102	51 - 130
3-Nitroaniline	100	98.6		ug/L		99	53 - 130
4-Nitroaniline	100	93.5		ug/L		93	49 - 130
Nitrobenzene	100	85.5		ug/L		85	43 - 130
2-Nitrophenol	100	89.2		ug/L		89	43 - 130
4-Nitrophenol	200	199		ug/L		100	44 - 130
N-Nitrosodi-n-propylamine	100	100		ug/L		100	42 - 130
N-Nitrosodiphenylamine	100	109		ug/L		109	50 - 130
Pentachlorophenol	200	198		ug/L		99	33 - 130
Phenanthrene	100	101		ug/L		101	51 - 130
Phenol	100	86.1		ug/L		86	35 - 130
Pyrene	100	114		ug/L		114	52 - 130
1,2,4-Trichlorobenzene	100	70.9		ug/L		71	33 - 130
2,4,5-Trichlorophenol	100	105		ug/L		105	48 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-613428/6-A
Matrix: Water
Analysis Batch: 613712

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613428

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,6-Trichlorophenol	100	106		ug/L		106	47 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*110*		*32 - 113*
2-Fluorophenol	*86*		*26 - 109*
Nitrobenzene-d5	*91*		*32 - 118*
Phenol-d5	*92*		*27 - 110*
Terphenyl-d14	*113*		*10 - 126*
2,4,6-Tribromophenol	*95*		*39 - 124*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-684564/1-A
Matrix: Water
Analysis Batch: 684764

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 684564

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:56	03/31/20 11:58	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:56	03/31/20 11:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*73*		*41 - 144*	*03/30/20 08:56*	*03/31/20 11:58*	*1*
Terphenyl-d14	*87*			*03/30/20 08:56*	*03/31/20 11:58*	*1*

Lab Sample ID: LCS 460-684564/2-A
Matrix: Water
Analysis Batch: 684640

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 684564

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	0.800	0.664		ug/L		83	10 - 150
Naphthalene	0.800	0.687		ug/L		86	33 - 124

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5	*100*		*41 - 144*
Terphenyl-d14	*108*		

Lab Sample ID: LCSD 460-684564/3-A
Matrix: Water
Analysis Batch: 684640

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 684564

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	0.800	0.735		ug/L		92	10 - 150	10	30
Naphthalene	0.800	0.698		ug/L		87	33 - 124	2	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Nitrobenzene-d5	*95*		*41 - 144*
Terphenyl-d14	*101*		

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-613972/33
Matrix: Water
Analysis Batch: 613972

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			04/04/20 00:46	1

Lab Sample ID: LCS 680-613972/34
Matrix: Water
Analysis Batch: 613972

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	10.0	9.94		mg/L		99	90 - 110

Lab Sample ID: LCSD 680-613972/35
Matrix: Water
Analysis Batch: 613972

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	10.0	9.94		mg/L		99	90 - 110	0	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206823/1002
Matrix: Water
Analysis Batch: 206823

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/30/20 23:04	1

Lab Sample ID: LCS 550-206823/4
Matrix: Water
Analysis Batch: 206823

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.0		ug/L		100	85 - 115

Lab Sample ID: LCSD 550-206823/5
Matrix: Water
Analysis Batch: 206823

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
Perchlorate	25.0	24.9		ug/L		99	85 - 115	1	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-613127/1-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<200		200	24	ug/L		03/29/20 13:03	03/30/20 22:30	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 22:30	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 22:30	1
Barium	<10		10	1.7	ug/L		03/29/20 13:03	03/30/20 22:30	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 680-613127/1-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 22:30	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Calcium	<500		500	25	ug/L		03/29/20 13:03	03/30/20 22:30	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 22:30	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 22:30	1
Dissolved Iron	18.1	J	50	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Iron	18.1	J	50	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 22:30	1
Magnesium	<500		500	33	ug/L		03/29/20 13:03	03/30/20 22:30	1
Manganese	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 22:30	1
Potassium	<1000		1000	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 22:30	1
Silver	0.798	J	10	0.60	ug/L		03/29/20 13:03	03/30/20 22:30	1
Sodium	<1000		1000	480	ug/L		03/29/20 13:03	03/30/20 22:30	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 22:30	1

Lab Sample ID: LCS 680-613127/2-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	4840		ug/L		97	80 - 120
Antimony	50.0	44.7		ug/L		89	80 - 120
Arsenic	100	103		ug/L		103	80 - 120
Barium	100	96.9		ug/L		97	80 - 120
Beryllium	50.0	53.8		ug/L		108	80 - 120
Cadmium	50.0	51.6		ug/L		103	80 - 120
Calcium	5000	4830		ug/L		97	80 - 120
Chromium	100	97.8		ug/L		98	80 - 120
Cobalt	50.1	51.8		ug/L		103	80 - 120
Copper	100	96.4		ug/L		96	80 - 120
Dissolved Iron	5010	4870		ug/L		97	80 - 120
Iron	5010	4870		ug/L		97	80 - 120
Lead	454	442		ug/L		97	80 - 120
Magnesium	5010	4860		ug/L		97	80 - 120
Manganese	400	389		ug/L		97	80 - 120
Nickel	99.5	95.3		ug/L		96	80 - 120
Potassium	8000	7260		ug/L		91	80 - 120
Selenium	100	103		ug/L		103	80 - 120
Silver	50.0	49.0		ug/L		98	80 - 120
Sodium	5040	4680		ug/L		93	80 - 120
Thallium	40.0	39.9		ug/L		100	80 - 120
Vanadium	99.8	96.2		ug/L		96	80 - 120
Zinc	101	97.9		ug/L		97	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 680-613434/1-A
Matrix: Water
Analysis Batch: 613671

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613434

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:17	04/01/20 14:10	1

Lab Sample ID: LCS 680-613434/2-A
Matrix: Water
Analysis Batch: 613671

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613434

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.41		ug/L		96	80 - 120

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613757/2
Matrix: Water
Analysis Batch: 613757

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			04/01/20 17:15	1

Lab Sample ID: LCS 680-613757/3
Matrix: Water
Analysis Batch: 613757

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	19.5		mg/L		97	80 - 120

Lab Sample ID: LCSD 680-613757/4
Matrix: Water
Analysis Batch: 613757

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	20.0	19.7		mg/L		98	80 - 120	1	25

Lab Sample ID: 680-182056-5 MS
Matrix: Water
Analysis Batch: 613757

Client Sample ID: EB-03 (032420)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	<1.0		20.0	19.7		mg/L		99	80 - 120

Lab Sample ID: 680-182056-5 MSD
Matrix: Water
Analysis Batch: 613757

Client Sample ID: EB-03 (032420)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	<1.0		20.0	19.7		mg/L		99	80 - 120	0	25

GC/MS VOA

Analysis Batch: 613811

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	8260B	
680-182056-2	GM-30M (032420)	Total/NA	Water	8260B	
680-182056-3	GM-32 (032420)	Total/NA	Water	8260B	
680-182056-4	GM-32D (032420)	Total/NA	Water	8260B	
680-182056-5	EB-03 (032420)	Total/NA	Water	8260B	
MB 680-613811/11	Method Blank	Total/NA	Water	8260B	
LCS 680-613811/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613811/6	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 614070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-6	Trip Blank	Total/NA	Water	8260B	
MB 680-614070/10	Method Blank	Total/NA	Water	8260B	
LCS 680-614070/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-614070/5	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 613428

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	3520C	
680-182056-5	EB-03 (032420)	Total/NA	Water	3520C	
MB 680-613428/5-A	Method Blank	Total/NA	Water	3520C	
LCS 680-613428/6-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 613712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	8270D	613428
680-182056-5	EB-03 (032420)	Total/NA	Water	8270D	613428
MB 680-613428/5-A	Method Blank	Total/NA	Water	8270D	613428
LCS 680-613428/6-A	Lab Control Sample	Total/NA	Water	8270D	613428

Prep Batch: 684564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-2	GM-30M (032420)	Total/NA	Water	3510C	
680-182056-3	GM-32 (032420)	Total/NA	Water	3510C	
680-182056-4	GM-32D (032420)	Total/NA	Water	3510C	
MB 460-684564/1-A	Method Blank	Total/NA	Water	3510C	
LCS 460-684564/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-684564/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 684640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 460-684564/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	684564
LCSD 460-684564/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	684564

Analysis Batch: 684764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-2	GM-30M (032420)	Total/NA	Water	8270D SIM	684564
680-182056-3	GM-32 (032420)	Total/NA	Water	8270D SIM	684564
680-182056-4	GM-32D (032420)	Total/NA	Water	8270D SIM	684564

GC/MS Semi VOA (Continued)

Analysis Batch: 684764 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 460-684564/1-A	Method Blank	Total/NA	Water	8270D SIM	684564

HPLC/IC

Analysis Batch: 206823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	314.0	
680-182056-2	GM-30M (032420)	Total/NA	Water	314.0	
680-182056-3	GM-32 (032420)	Total/NA	Water	314.0	
680-182056-4	GM-32D (032420)	Total/NA	Water	314.0	
680-182056-5	EB-03 (032420)	Total/NA	Water	314.0	
MB 550-206823/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206823/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206823/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 613972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	300.0-1993 R2.1	
680-182056-5	EB-03 (032420)	Total/NA	Water	300.0-1993 R2.1	
MB 680-613972/33	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-613972/34	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-613972/35	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 613127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Dissolved	Water	3005A	
680-182056-1	BS-1 (032420)	Total Recoverable	Water	3005A	
680-182056-5	EB-03 (032420)	Dissolved	Water	3005A	
680-182056-5	EB-03 (032420)	Total Recoverable	Water	3005A	
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 613384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Dissolved	Water	6010C	613127
680-182056-1	BS-1 (032420)	Total Recoverable	Water	6010C	613127
680-182056-5	EB-03 (032420)	Dissolved	Water	6010C	613127
680-182056-5	EB-03 (032420)	Total Recoverable	Water	6010C	613127
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	6010C	613127
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	6010C	613127

Prep Batch: 613434

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	7470A	
680-182056-5	EB-03 (032420)	Total/NA	Water	7470A	
MB 680-613434/1-A	Method Blank	Total/NA	Water	7470A	
LCS 680-613434/2-A	Lab Control Sample	Total/NA	Water	7470A	

QC Association Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-182056-1
Project/Site: ATK Orbital, Elkton MD

Metals

Analysis Batch: 613671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	7470A	613434
680-182056-5	EB-03 (032420)	Total/NA	Water	7470A	613434
MB 680-613434/1-A	Method Blank	Total/NA	Water	7470A	613434
LCS 680-613434/2-A	Lab Control Sample	Total/NA	Water	7470A	613434

General Chemistry

Analysis Batch: 613757

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182056-1	BS-1 (032420)	Total/NA	Water	5310 B-2011	
680-182056-5	EB-03 (032420)	Total/NA	Water	5310 B-2011	
MB 680-613757/2	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613757/3	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613757/4	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
680-182056-5 MS	EB-03 (032420)	Total/NA	Water	5310 B-2011	
680-182056-5 MSD	EB-03 (032420)	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-182056-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: BS-1 (032420)
Lab Sample ID: 680-182056-1
Date Collected: 03/24/20 12:00
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613811	04/03/20 07:31	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3520C			1008.8 mL	1 mL	613428	03/31/20 14:46	EHS	TAL SAV
Total/NA	Analysis	8270D		1			613712	04/02/20 18:59	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613972	04/04/20 03:43	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206823	03/31/20 02:08	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/31/20 00:12	BCB	TAL SAV
	Instrument ID: ICPE									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:21	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613434	03/31/20 13:17	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 15:03	BCB	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613757	04/01/20 18:22	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: GM-30M (032420)
Lab Sample ID: 680-182056-2
Date Collected: 03/24/20 11:55
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613811	04/03/20 07:54	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 14:26	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 02:31	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: GM-32 (032420)
Lab Sample ID: 680-182056-3
Date Collected: 03/24/20 09:30
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613811	04/03/20 08:17	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 14:48	CAZ	TAL EDI
	Instrument ID: CBNAMS9									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32 (032420)

Lab Sample ID: 680-182056-3

Date Collected: 03/24/20 09:30
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		1			206823	03/31/20 02:54	NEL	TAL PHX

Client Sample ID: GM-32D (032420)

Lab Sample ID: 680-182056-4

Date Collected: 03/24/20 10:20
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613811	04/03/20 08:41	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 15:09	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 03:16	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: EB-03 (032420)

Lab Sample ID: 680-182056-5

Date Collected: 03/24/20 12:00
Matrix: Water
Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613811	04/03/20 09:04	UI	TAL SAV
	Instrument ID: CMSC									
Total/NA	Prep	3520C			1014 mL	1 mL	613428	03/31/20 14:46	EHS	TAL SAV
Total/NA	Analysis	8270D		1			613712	04/02/20 19:22	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613972	04/04/20 04:59	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206823	03/31/20 03:39	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/31/20 00:07	BCB	TAL SAV
	Instrument ID: ICPE									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:16	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613434	03/31/20 13:17	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 15:07	BCB	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613757	04/01/20 18:40	RKJ	TAL SAV
	Instrument ID: TOC7									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-182056-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: Trip Blank
Lab Sample ID: 680-182056-6

Date Collected: 03/24/20 00:00
Matrix: Water

Date Received: 03/26/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	614070	04/06/20 13:46	UI	TAL SAV
	Instrument ID: CMSC									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Baltimore #201

Chain of Custody Record

397792 eurofins | Environment Testing TestAmerica

Address: #201

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zampato	Date: 3-24-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	of COCs
Address: 7550 Teague Rd, Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOC 8260B	1,4-Dioxane 8270D SVOC	6010C, 7470A	6010C Dissolved iron	300.0 Sulfate	SM5310 TOC	Sample Specific Notes:
BS-1 (032420)	3-24-20	1200	G	GW	11	1		3	1	2	1	1	3	dissolved iron is filtered
GM-30M (032420)		1155			6			3	1	2				
GM-32 (032420)		0930			6			3	1	2				
GM-32D (032420)		1020			6			3	1	2				
EB-03 (032420)	3-24-20	1200	G	GW	11	1		3	1	2	1	1	3	
Trip Blank					2			2						

680-182056-01 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

3.8 4.2

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:

Relinquished by:	Company: Arcadis	Date/Time: 3-25-20 0700	Received by:	Company:	Date/Time: 3/25/20	11:25
Relinquished by:	Company: 3/25/20 17:10	Date/Time:	Received by:	Company: TA	Date/Time: 3.26.20	910
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:	

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605660.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/7/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-30M (032420) (680-182056-2)	3/24/20	11:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-32 (032420) (680-182056-3)	3/24/20	09:30 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-32D (032420) (680-182056-4)	3/24/20	10:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-27-20 1600	TA		3.28.20 11:30	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: IR11 3.9°C VIA FedEx

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/7/2020	Analysis Requested		Preservation Codes:
City: Phoenix	TAT Requested (days):			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 Z - other (specify) Other:
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
BS-1 (032420) (680-182056-1)	3/24/20	12:00 Eastern		Water			X	1	
GM-32 (032420) (680-182056-3)	3/24/20	09:30 Eastern		Water			X	1	
GM-32D (032420) (680-182056-4)	3/24/20	10:20 Eastern		Water			X	1	
EB-03 (032420) (680-182056-5)	3/24/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3-27-20 1600	TA			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company TAPX

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (0.8°C) FEDEX

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605664.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/7/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-30M (032420) (680-182056-2)	3/24/20	11:55 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-27-20 1600	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				3-28-20	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0820	Company TAPA

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		0.8°C FEDEX

Ver: 01/16/2019

4/7/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-182056-1

Login Number: 182056

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Sims, Robert D

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?	N/A	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-182056-1

Login Number: 182056
List Number: 3
Creator: Rivera, Kenneth

List Source: Eurofins TestAmerica, Edison
List Creation: 03/28/20 03:17 PM

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	3.9°C, IR #11
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: ARCADIS U.S., Inc.

Job Number: 680-182056-1

Login Number: 182056
List Number: 2
Creator: Doerr, Bret C

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/28/20 09:55 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182103-1
Client Project/Site: ATK Orbital, Elkton MD

For:
ARCADIS U.S., Inc.
7550 Teague Road
Suite 210
Hanover, Maryland 21076

Attn: Ms. Tina Armstrong

Authorized for release by:
4/7/2020 5:23:50 PM

Jerry Lanier, Project Manager I
(912)250-0281
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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 680-182103-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: ATK Orbital, Elkton MD

Report Number: 680-182103-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 3/27/2020 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.3º C and 1.6º C.

Receipt Exceptions

One or more containers for the following samples were received broken or leaking: SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), SW-6B (032520) (680-182103-3), SW-6C (032520) (680-182103-4), SW-6D (032520) (680-182103-5), SW-7B (032520) (680-182103-6), PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8), PW-6D (032520) (680-182103-9), DUP-04 (032520) (680-182103-10) and Trip Blank (680-182103-11).

One Trip blank vial received broken. One intact.

One container for the following sample was received broken: PW-6D (032520) (680-182103-9).

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), SW-6B (032520) (680-182103-3), SW-6C (032520) (680-182103-4), SW-6D (032520) (680-182103-5), SW-7B (032520) (680-182103-6), PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8), PW-6D (032520) (680-182103-9), DUP-04 (032520) (680-182103-10) and Trip Blank (680-182103-11) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/04/2020 and 04/06/2020.

Surrogate recovery for the following samples were outside control limits: PW-6C (032520) (680-182103-8) and PW-6D (032520) (680-182103-9). Evidence of matrix interference due to high target analytes is present; therefore, re-extraction and/or re-analysis was not performed.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-613993, and 680-614064.

The following sample(s) was collected in a properly preserved vial; however, the pH was outside the required criteria when verified by the laboratory. The sample was analyzed outside the 7-day holding time specified for unpreserved samples but within the 14-day holding time specified for preserved samples: Trip Blank (680-182103-11).

The laboratory control sample duplicate (LCSD) for analytical batch 680-614064 recovered outside control limits for the following analytes: Vinyl acetate. This analyte was biased high in the LCSD and was not detected in the associated samples; therefore, the data have been reported.

Job ID: 680-182103-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

The laboratory control sample (LCS) for analytical batch 680-614058 recovered outside control limits for the following analytes: Bromomethane, 2,2-Dichloropropane and Vinyl acetate. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-614058 recovered outside control limits for the following analytes: Bromomethane, 1,2,4-Trichlorobenzene, Dichlorodifluoromethane, 2,2-Dichloropropane, 1,1,1,2-Tetrachloroethane and Vinyl acetate. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

Bromomethane is reported with an E flag in the batch QC because the top one points were dropped from the ICAL. The sample associated with the QC was non detect for bromomethane. The data has been qualified and reported.

Samples PW-6C (032520) (680-182103-8)[10X] and PW-6D (032520) (680-182103-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (AQUEOUS)

Samples SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), PW-2B (032520) (680-182103-7) and DUP-04 (032520) (680-182103-10) were analyzed for Semivolatile Organic Compounds (Aqueous) in accordance with EPA SW-846 Method 8270D. The samples were prepared on 04/01/2020 and analyzed on 04/06/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS BY GCMS - LOW LEVEL

Samples SW-6B (032520) (680-182103-3), SW-6C (032520) (680-182103-4), SW-6D (032520) (680-182103-5), SW-7B (032520) (680-182103-6), PW-6C (032520) (680-182103-8) and PW-6D (032520) (680-182103-9) were analyzed for Semivolatile Organic Compounds by GCMS - Low Level in accordance with EPA SW-846 Method 8270D. The samples were prepared on 03/30/2020 and analyzed on 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCHLORATE (IC)

Samples SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), SW-6B (032520) (680-182103-3), SW-6C (032520) (680-182103-4), SW-6D (032520) (680-182103-5), SW-7B (032520) (680-182103-6), PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8), PW-6D (032520) (680-182103-9) and DUP-04 (032520) (680-182103-10) were analyzed for perchlorate (IC) in accordance with EPA Method 314.0. The samples were analyzed on 03/31/2020 and 04/01/2020.

Sample PW-6D (032520) (680-182103-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8) and PW-6D (032520) (680-182103-9) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/29/2020 and analyzed on 03/30/2020 and 03/31/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)

Samples SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), PW-2B (032520) (680-182103-7) and DUP-04 (032520) (680-182103-10) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/29/2020 and analyzed on 03/30/2020.

Dissolved Iron, Iron and Silver were detected in method blank MB 680-613127/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result

Job ID: 680-182103-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples SW-1C (032520) (680-182103-1), SW-2B (032520) (680-182103-2), PW-2B (032520) (680-182103-7) and DUP-04 (032520) (680-182103-10) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 03/31/2020 and analyzed on 04/01/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8) and PW-6D (032520) (680-182103-9) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 04/04/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples PW-2B (032520) (680-182103-7), PW-6C (032520) (680-182103-8) and PW-6D (032520) (680-182103-9) were analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 04/01/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182103-1	SW-1C (032520)	Water	03/25/20 11:30	03/27/20 09:00	
680-182103-2	SW-2B (032520)	Water	03/25/20 13:00	03/27/20 09:00	
680-182103-3	SW-6B (032520)	Water	03/25/20 11:00	03/27/20 09:00	
680-182103-4	SW-6C (032520)	Water	03/25/20 10:00	03/27/20 09:00	
680-182103-5	SW-6D (032520)	Water	03/25/20 09:25	03/27/20 09:00	
680-182103-6	SW-7B (032520)	Water	03/25/20 12:05	03/27/20 09:00	
680-182103-7	PW-2B (032520)	Water	03/25/20 13:00	03/27/20 09:00	
680-182103-8	PW-6C (032520)	Water	03/25/20 10:00	03/27/20 09:00	
680-182103-9	PW-6D (032520)	Water	03/25/20 09:25	03/27/20 09:00	
680-182103-10	DUP-04 (032520)	Water	03/25/20 12:00	03/27/20 09:00	
680-182103-11	Trip Blank	Water	03/25/20 00:00	03/27/20 09:00	

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-182103-1
Project/Site: ATK Orbital, Elkton MD

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	TAL EDI
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
314.0	Perchlorate (IC)	EPA	TAL PHX
6010C	Metals (ICP)	SW846	TAL SAV
7470A	Mercury (CVAA)	SW846	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL EDI
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
7470A	Preparation, Mercury	SW846	TAL SAV

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.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520) — Lab Sample ID: 680-182103-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	0.53	J	1.0	0.31	ug/L	1		314.0	Total/NA
Aluminum	150	J	200	24	ug/L	1		6010C	Total Recoverable
Barium	32		10	1.7	ug/L	1		6010C	Total Recoverable
Calcium	10000		500	25	ug/L	1		6010C	Total Recoverable
Iron	390	B	50	17	ug/L	1		6010C	Total Recoverable
Magnesium	7200		500	33	ug/L	1		6010C	Total Recoverable
Manganese	34		10	1.0	ug/L	1		6010C	Total Recoverable
Nickel	3.7	J	40	2.1	ug/L	1		6010C	Total Recoverable
Potassium	2000		1000	17	ug/L	1		6010C	Total Recoverable
Sodium	11000		1000	480	ug/L	1		6010C	Total Recoverable

Client Sample ID: SW-2B (032520) — Lab Sample ID: 680-182103-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	0.58	J	1.0	0.31	ug/L	1		314.0	Total/NA
Aluminum	180	J	200	24	ug/L	1		6010C	Total Recoverable
Barium	35		10	1.7	ug/L	1		6010C	Total Recoverable
Calcium	12000		500	25	ug/L	1		6010C	Total Recoverable
Iron	430	B	50	17	ug/L	1		6010C	Total Recoverable
Magnesium	8300		500	33	ug/L	1		6010C	Total Recoverable
Manganese	46		10	1.0	ug/L	1		6010C	Total Recoverable
Nickel	3.5	J	40	2.1	ug/L	1		6010C	Total Recoverable
Potassium	2100		1000	17	ug/L	1		6010C	Total Recoverable
Sodium	12000		1000	480	ug/L	1		6010C	Total Recoverable
Vanadium	1.0	J	10	1.0	ug/L	1		6010C	Total Recoverable
Mercury	0.33		0.20	0.080	ug/L	1		7470A	Total/NA

Client Sample ID: SW-6B (032520) — Lab Sample ID: 680-182103-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	4.5		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	1.4		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: SW-6C (032520) — Lab Sample ID: 680-182103-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	5.4		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	1.3		1.0	0.31	ug/L	1		314.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6D (032520) — Lab Sample ID: 680-182103-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.48	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.55	J	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	0.48	J	2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	5.7		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	1.6		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: SW-7B (032520) — Lab Sample ID: 680-182103-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.54	J	1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.60	J	1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	0.54	J	2.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene	6.4		1.0	0.48	ug/L	1		8260B	Total/NA
Perchlorate	1.4		1.0	0.31	ug/L	1		314.0	Total/NA

Client Sample ID: PW-2B (032520) — Lab Sample ID: 680-182103-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethene	0.53	J	1.0	0.36	ug/L	1		8260B	Total/NA
Sulfate	7.3		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	1.0		1.0	0.31	ug/L	1		314.0	Total/NA
Aluminum	2900		200	24	ug/L	1		6010C	Total Recoverable
Barium	38		10	1.7	ug/L	1		6010C	Total Recoverable
Beryllium	0.11	J	4.0	0.10	ug/L	1		6010C	Total Recoverable
Calcium	4800		500	25	ug/L	1		6010C	Total Recoverable
Chromium	10		10	1.6	ug/L	1		6010C	Total Recoverable
Cobalt	3.4	J	10	1.0	ug/L	1		6010C	Total Recoverable
Copper	6.0	J	20	1.8	ug/L	1		6010C	Total Recoverable
Iron	11000	B	50	17	ug/L	1		6010C	Total Recoverable
Lead	4.7	J	10	3.9	ug/L	1		6010C	Total Recoverable
Magnesium	2700		500	33	ug/L	1		6010C	Total Recoverable
Manganese	1000		10	1.0	ug/L	1		6010C	Total Recoverable
Nickel	12	J	40	2.1	ug/L	1		6010C	Total Recoverable
Potassium	740	J	1000	17	ug/L	1		6010C	Total Recoverable
Silver	1.3	J B	10	0.60	ug/L	1		6010C	Total Recoverable
Sodium	6700		1000	480	ug/L	1		6010C	Total Recoverable
Vanadium	6.5	J	10	1.0	ug/L	1		6010C	Total Recoverable
Zinc	15	J	20	7.0	ug/L	1		6010C	Total Recoverable
Dissolved Iron	5800	B	50	17	ug/L	1		6010C	Dissolved

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520) (Continued) — Lab Sample ID: 680-182103-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	3.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: PW-6C (032520) — Lab Sample ID: 680-182103-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	1.2		1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	18		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	7.1		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	1.2		1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	150		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	18		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	52		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - DL	570		10	4.8	ug/L	10		8260B	Total/NA
1,4-Dioxane	7.0		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	13		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	47		1.0	0.31	ug/L	1		314.0	Total/NA
Total Organic Carbon	0.91	J	1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: PW-6D (032520) — Lab Sample ID: 680-182103-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	0.56	J	1.0	0.50	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	8.3		1.0	0.41	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	2.8		1.0	0.38	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	0.56	J	1.0	0.50	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	64		1.0	0.36	ug/L	1		8260B	Total/NA
1,2-Dichloroethene, Total	8.3		2.0	0.37	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	19		1.0	0.37	ug/L	1		8260B	Total/NA
Trichloroethene - DL	230		5.0	2.4	ug/L	5		8260B	Total/NA
1,4-Dioxane	5.4		0.40	0.17	ug/L	1		8270D SIM	Total/NA
Sulfate	8.9		1.0	0.40	mg/L	1		300.0-1993 R2.1	Total/NA
Perchlorate	95		10	3.1	ug/L	10		314.0	Total/NA
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA

Client Sample ID: DUP-04 (032520) — Lab Sample ID: 680-182103-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perchlorate	0.71	J	1.0	0.31	ug/L	1		314.0	Total/NA
Aluminum	170	J	200	24	ug/L	1		6010C	Total Recoverable
Barium	33		10	1.7	ug/L	1		6010C	Total Recoverable
Calcium	11000		500	25	ug/L	1		6010C	Total Recoverable
Iron	420	B	50	17	ug/L	1		6010C	Total Recoverable
Magnesium	7400		500	33	ug/L	1		6010C	Total Recoverable
Manganese	35		10	1.0	ug/L	1		6010C	Total Recoverable
Nickel	3.4	J	40	2.1	ug/L	1		6010C	Total Recoverable
Potassium	2000		1000	17	ug/L	1		6010C	Total Recoverable

This Detection Summary does not include radiochemical test results.

Client Sample ID: DUP-04 (032520) (Continued)
Lab Sample ID: 680-182103-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Silver	1.4	J B	10	0.60	ug/L	1		6010C	Total Recoverable
Sodium	11000		1000	480	ug/L	1		6010C	Total Recoverable
Mercury	0.31		0.20	0.080	ug/L	1		7470A	Total/NA

Client Sample ID: Trip Blank
Lab Sample ID: 680-182103-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	13		10	7.0	ug/L	1		8260B	Total/NA
Chloroform	0.96	J	1.0	0.50	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 18:55	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 18:55	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 18:55	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 18:55	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 18:55	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 18:55	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 18:55	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 18:55	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 18:55	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 18:55	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 18:55	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 18:55	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 18:55	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 18:55	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 18:55	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 18:55	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 18:55	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 18:55	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 18:55	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 18:55	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 18:55	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 18:55	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 18:55	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 18:55	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:55	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 18:55	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 18:55	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 18:55	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 18:55	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 18:55	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 18:55	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:55	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 18:55	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 18:55	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 18:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 18:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*		*04/04/20 18:55*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 18:55*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 18:55*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 19:52	1
Acetophenone	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 19:52	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 19:52	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,1'-Biphenyl	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.91	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 19:52	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 19:52	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,3-Dichlorobenzene	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 19:52	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dimethyl phthalate	<9.7		9.7	0.96	ug/L		04/01/20 18:31	04/06/20 19:52	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 19:52	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 19:52	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 19:52	1
Fluorene	<9.7		9.7	0.93	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 19:52	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 19:52	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Nitrophenol	<49		49	1.8	ug/L		04/01/20 18:31	04/06/20 19:52	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 19:52	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 19:52	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 19:52	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 19:52	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 19:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*80*		*32 - 113*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
2-Fluorophenol	*70*		*26 - 109*	*04/01/20 18:31*	*04/06/20 19:52*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*32 - 118*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
Phenol-d5	*73*		*27 - 110*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
Terphenyl-d14	*30*		*10 - 126*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
2,4,6-Tribromophenol	*73*		*39 - 124*	*04/01/20 18:31*	*04/06/20 19:52*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.53**	**J**	1.0	0.31	ug/L			03/31/20 04:48	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**150**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:25	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:25	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:25	1
Barium	**32**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:25	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:25	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Calcium	**10000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:25	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:25	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:25	1
Iron	**390**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:25	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:25	1
Magnesium	**7200**		500	33	ug/L		03/29/20 13:03	03/30/20 23:25	1
Manganese	**34**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Nickel	**3.7**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:25	1
Potassium	**2000**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:25	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:25	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:25	1
Sodium	**11000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:25	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:25	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 19:19	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 19:19	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 19:19	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 19:19	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 19:19	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 19:19	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 19:19	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 19:19	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 19:19	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 19:19	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 19:19	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 19:19	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 19:19	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 19:19	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 19:19	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 19:19	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 19:19	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 19:19	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 19:19	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 19:19	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 19:19	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 19:19	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 19:19	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 19:19	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:19	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 19:19	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 19:19	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 19:19	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 19:19	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 19:19	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 19:19	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:19	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 19:19	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 19:19	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 19:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 19:19*	*1*
1,2-Dichloroethane-d4 (Surr)	*89*		*73 - 131*		*04/04/20 19:19*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 122*		*04/04/20 19:19*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 19:19*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
Acenaphthylene	<9.6		9.6	0.82	ug/L		04/01/20 18:31	04/06/20 20:15	1
Acetophenone	<9.6		9.6	0.55	ug/L		04/01/20 18:31	04/06/20 20:15	1
Anthracene	<9.6		9.6	0.66	ug/L		04/01/20 18:31	04/06/20 20:15	1
Atrazine	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzaldehyde	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[a]anthracene	<9.6		9.6	0.53	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[a]pyrene	<9.6		9.6	0.68	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[b]fluoranthene	<9.6		9.6	2.5	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[g,h,i]perylene	<9.6		9.6	0.84	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[k]fluoranthene	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,1'-Biphenyl	<9.6		9.6	0.56	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-chloroethoxy)methane	<9.6		9.6	0.90	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-chloroethyl)ether	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
bis (2-chloroisopropyl) ether	<9.6		9.6	0.75	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-ethylhexyl) phthalate	<9.6		9.6	1.5	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Bromophenyl phenyl ether	<9.6		9.6	0.74	ug/L		04/01/20 18:31	04/06/20 20:15	1
Butyl benzyl phthalate	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
Caprolactam	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
Carbazole	<9.6		9.6	0.68	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chloro-3-methylphenol	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.6		9.6	0.77	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Chlorophenol	<9.6		9.6	0.84	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chlorophenyl phenyl ether	<9.6		9.6	0.81	ug/L		04/01/20 18:31	04/06/20 20:15	1
Chrysene	<9.6		9.6	0.49	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dibenz(a,h)anthracene	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dibenzofuran	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,2-Dichlorobenzene	<9.6		9.6	0.51	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,3-Dichlorobenzene	<9.6		9.6	0.57	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,4-Dichlorobenzene	<9.6		9.6	0.52	ug/L		04/01/20 18:31	04/06/20 20:15	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dichlorophenol	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Diethyl phthalate	<9.6		9.6	0.85	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dimethylphenol	<9.6		9.6	3.9	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dimethyl phthalate	<9.6		9.6	0.95	ug/L		04/01/20 18:31	04/06/20 20:15	1
Di-n-butyl phthalate	<9.6		9.6	0.80	ug/L		04/01/20 18:31	04/06/20 20:15	1
4,6-Dinitro-2-methylphenol	<48		48	9.6	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dinitrophenol	<48		48	9.6	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dinitrotoluene	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,6-Dinitrotoluene	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Di-n-octyl phthalate	<9.6		9.6	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
Fluoranthene	<9.6		9.6	0.71	ug/L		04/01/20 18:31	04/06/20 20:15	1
Fluorene	<9.6		9.6	0.92	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorobenzene	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorobutadiene	<9.6		9.6	0.60	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorocyclopentadiene	<9.6		9.6	2.4	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachloroethane	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
Indeno[1,2,3-cd]pyrene	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1
Isophorone	<9.6		9.6	0.87	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Methylnaphthalene	<9.6		9.6	0.75	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Methylphenol	<9.6		9.6	0.86	ug/L		04/01/20 18:31	04/06/20 20:15	1
3 & 4 Methylphenol	<9.6		9.6	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Nitroaniline	<48		48	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
3-Nitroaniline	<48		48	4.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Nitroaniline	<48		48	4.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
Nitrobenzene	<9.6		9.6	0.70	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Nitrophenol	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Nitrophenol	<48		48	1.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
N-Nitrosodi-n-propylamine	<9.6		9.6	0.69	ug/L		04/01/20 18:31	04/06/20 20:15	1
N-Nitrosodiphenylamine	<9.6		9.6	0.89	ug/L		04/01/20 18:31	04/06/20 20:15	1
Pentachlorophenol	<48		48	1.9	ug/L		04/01/20 18:31	04/06/20 20:15	1
Phenanthrene	<9.6		9.6	0.74	ug/L		04/01/20 18:31	04/06/20 20:15	1
Phenol	<9.6		9.6	0.80	ug/L		04/01/20 18:31	04/06/20 20:15	1
Pyrene	<9.6		9.6	0.61	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,2,4-Trichlorobenzene	<9.6		9.6	0.54	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4,5-Trichlorophenol	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4,6-Trichlorophenol	<9.6		9.6	0.82	ug/L		04/01/20 18:31	04/06/20 20:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*76*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
2-Fluorophenol	*68*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:15*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*77*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
Phenol-d5	*72*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
Terphenyl-d14	*34*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
2,4,6-Tribromophenol	*80*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:15*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.58**	**J**	1.0	0.31	ug/L			03/31/20 05:11	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**180**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:30	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:30	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:30	1
Barium	**35**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:30	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:30	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Calcium	**12000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:30	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:30	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:30	1
Iron	**430**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:30	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:30	1
Magnesium	**8300**		500	33	ug/L		03/29/20 13:03	03/30/20 23:30	1
Manganese	**46**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Nickel	**3.5**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:30	1
Potassium	**2100**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:30	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:30	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:30	1
Sodium	**12000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:30	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Vanadium	**1.0**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:30	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.33**		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:26	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6B (032520)
Date Collected: 03/25/20 11:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 19:42	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 19:42	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 19:42	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 19:42	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 19:42	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 19:42	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 19:42	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 19:42	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 19:42	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 19:42	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 19:42	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 19:42	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 19:42	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 19:42	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 19:42	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 19:42	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 19:42	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 19:42	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 19:42	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 19:42	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 19:42	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 19:42	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 19:42	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 19:42	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:42	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 19:42	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 19:42	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 19:42	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 19:42	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6B (032520)
Date Collected: 03/25/20 11:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 19:42	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 19:42	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 19:42	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Trichloroethene	**4.5**		1.0	0.48	ug/L			04/04/20 19:42	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 19:42	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:42	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 19:42	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 19:42	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 19:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 19:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*04/04/20 19:42*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 19:42*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 19:42*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:30	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*101*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:30*	*1*
Terphenyl-d14	*78*			*03/30/20 08:57*	*03/31/20 15:30*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.4**		1.0	0.31	ug/L			03/31/20 05:34	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:05	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:05	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:05	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 20:05	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 20:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:05	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 20:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 20:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:05	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:05	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:05	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Trichloroethene	**5.4**		1.0	0.48	ug/L			04/04/20 20:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:05	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 20:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*04/04/20 20:05*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 122*		*04/04/20 20:05*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*04/04/20 20:05*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:51	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:51*	*1*
Terphenyl-d14	*88*			*03/30/20 08:57*	*03/31/20 15:51*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.3**		1.0	0.31	ug/L			03/31/20 05:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:28	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:28	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:28	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:28	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:28	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 20:28	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:28	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:28	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
cis-1,2-Dichloroethene	**0.48**	**J**	1.0	0.41	ug/L			04/04/20 20:28	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:28	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:28	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:28	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:28	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:28	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:28	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:28	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
1,1-Dichloroethene	**0.55**	**J**	1.0	0.36	ug/L			04/04/20 20:28	1
1,2-Dichloroethene, Total	**0.48**	**J**	2.0	0.37	ug/L			04/04/20 20:28	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:28	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:28	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:28	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:28	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:28	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:28	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:28	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:28	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:28	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:28	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:28	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:28	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:28	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:28	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Trichloroethene	**5.7**		1.0	0.48	ug/L			04/04/20 20:28	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:28	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:28	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:28	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:28	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 20:28*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/04/20 20:28*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 20:28*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/04/20 20:28*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:13	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*84*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:13*	*1*
Terphenyl-d14	*77*			*03/30/20 08:57*	*03/31/20 16:13*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.6**		1.0	0.31	ug/L			03/31/20 06:20	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-7B (032520)
Date Collected: 03/25/20 12:05
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:52	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:52	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:52	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:52	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:52	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 20:52	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:52	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:52	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
cis-1,2-Dichloroethene	**0.54**	**J**	1.0	0.41	ug/L			04/04/20 20:52	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:52	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:52	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:52	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:52	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:52	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:52	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:52	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
1,1-Dichloroethene	**0.60**	**J**	1.0	0.36	ug/L			04/04/20 20:52	1
1,2-Dichloroethene, Total	**0.54**	**J**	2.0	0.37	ug/L			04/04/20 20:52	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:52	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:52	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:52	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:52	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:52	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:52	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:52	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:52	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:52	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:52	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:52	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-7B (032520)
Date Collected: 03/25/20 12:05
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:52	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:52	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:52	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Trichloroethene	**6.4**		1.0	0.48	ug/L			04/04/20 20:52	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:52	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:52	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:52	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:52	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 20:52*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 20:52*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 20:52*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/04/20 20:52*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:34	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*86*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:34*	*1*
Terphenyl-d14	*81*			*03/30/20 08:57*	*03/31/20 16:34*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.4**		1.0	0.31	ug/L			03/31/20 06:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 21:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 21:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 21:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 21:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 21:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 21:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 21:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 21:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 21:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 21:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 21:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 21:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 21:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 21:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 21:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 21:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
1,1-Dichloroethene	**0.53**	**J**	1.0	0.36	ug/L			04/04/20 21:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 21:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 21:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 21:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 21:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 21:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 21:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 21:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 21:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 21:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 21:15	1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 21:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 21:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 21:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 21:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 21:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 21:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 21:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 21:15*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/04/20 21:15*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:37	1
Acetophenone	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 20:37	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 20:37	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,1'-Biphenyl	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.92	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:37	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 20:37	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,3-Dichlorobenzene	<9.7		9.7	0.58	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 20:37	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dimethyl phthalate	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:37	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 20:37	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 20:37	1
Fluorene	<9.7		9.7	0.94	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 20:37	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 20:37	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Nitrophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 20:37	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 20:37	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:37	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:37	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*68*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
2-Fluorophenol	*62*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:37*	*1*

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*74*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
Phenol-d5	*67*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
Terphenyl-d14	*40*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
2,4,6-Tribromophenol	*71*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:37*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**7.3**		1.0	0.40	mg/L			04/04/20 05:12	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.0**		1.0	0.31	ug/L			03/31/20 07:06	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2900**		200	24	ug/L		03/29/20 13:03	03/30/20 23:34	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:34	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:34	1
Barium	**38**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:34	1
Beryllium	**0.11**	**J**	4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:34	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Calcium	**4800**		500	25	ug/L		03/29/20 13:03	03/30/20 23:34	1
Chromium	**10**		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:34	1
Cobalt	**3.4**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Copper	**6.0**	**J**	20	1.8	ug/L		03/29/20 13:03	03/30/20 23:34	1
Iron	**11000**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:34	1
Lead	**4.7**	**J**	10	3.9	ug/L		03/29/20 13:03	03/30/20 23:34	1
Magnesium	**2700**		500	33	ug/L		03/29/20 13:03	03/30/20 23:34	1
Manganese	**1000**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Nickel	**12**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:34	1
Potassium	**740**	**J**	1000	17	ug/L		03/29/20 13:03	03/30/20 23:34	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:34	1
Silver	**1.3**	**J B**	10	0.60	ug/L		03/29/20 13:03	03/30/20 23:34	1
Sodium	**6700**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:34	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Vanadium	**6.5**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Zinc	**15**	**J**	20	7.0	ug/L		03/29/20 13:03	03/30/20 23:34	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**5800**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:44	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**3.0**		1.0	0.50	mg/L			04/01/20 19:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 21:38	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 21:38	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 21:38	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 21:38	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 21:38	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 21:38	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 21:38	1
Chloroform	**1.2**		1.0	0.50	ug/L			04/04/20 21:38	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 21:38	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 21:38	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
cis-1,2-Dichloroethene	**18**		1.0	0.41	ug/L			04/04/20 21:38	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 21:38	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 21:38	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 21:38	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 21:38	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 21:38	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 21:38	1
1,1-Dichloroethane	**7.1**		1.0	0.38	ug/L			04/04/20 21:38	1
1,2-Dichloroethane	**1.2**		1.0	0.50	ug/L			04/04/20 21:38	1
1,1-Dichloroethene	**150**		1.0	0.36	ug/L			04/04/20 21:38	1
1,2-Dichloroethene, Total	**18**		2.0	0.37	ug/L			04/04/20 21:38	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 21:38	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 21:38	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 21:38	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 21:38	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 21:38	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 21:38	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:38	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 21:38	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 21:38	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 21:38	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 21:38	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 21:38	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 21:38	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 21:38	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
1,1,1-Trichloroethane	**52**		1.0	0.37	ug/L			04/04/20 21:38	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 21:38	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:38	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 21:38	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 21:38	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 21:38	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 21:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 21:38*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 21:38*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/04/20 21:38*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 21:38*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**570**		10	4.8	ug/L			04/06/20 20:22	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/06/20 20:22*	*10*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/06/20 20:22*	*10*
Dibromofluoromethane (Surr)	*124*	*X*	*80 - 122*		*04/06/20 20:22*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/06/20 20:22*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.0**		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:55	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:55*	*1*
Terphenyl-d14	*91*			*03/30/20 08:57*	*03/31/20 16:55*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**13**		1.0	0.40	mg/L			04/04/20 04:21	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**47**		1.0	0.31	ug/L			03/31/20 07:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	0.91	J	1.0	0.50	mg/L			04/01/20 19:46	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6D (032520)

Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 22:01	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 22:01	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 22:01	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 22:01	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 22:01	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 22:01	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 22:01	1
Chloroform	**0.56**	**J**	1.0	0.50	ug/L			04/04/20 22:01	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 22:01	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 22:01	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
cis-1,2-Dichloroethene	**8.3**		1.0	0.41	ug/L			04/04/20 22:01	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 22:01	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 22:01	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 22:01	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 22:01	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 22:01	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 22:01	1
1,1-Dichloroethane	**2.8**		1.0	0.38	ug/L			04/04/20 22:01	1
1,2-Dichloroethane	**0.56**	**J**	1.0	0.50	ug/L			04/04/20 22:01	1
1,1-Dichloroethene	**64**		1.0	0.36	ug/L			04/04/20 22:01	1
1,2-Dichloroethene, Total	**8.3**		2.0	0.37	ug/L			04/04/20 22:01	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 22:01	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 22:01	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 22:01	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 22:01	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 22:01	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 22:01	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 22:01	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 22:01	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 22:01	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 22:01	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 22:01	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6D (032520)

Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 22:01	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 22:01	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 22:01	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
1,1,1-Trichloroethane	**19**		1.0	0.37	ug/L			04/04/20 22:01	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 22:01	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 22:01	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 22:01	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 22:01	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 22:01	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 22:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 22:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 22:01*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 22:01*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 22:01*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**230**		5.0	2.4	ug/L			04/06/20 20:46	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/06/20 20:46*	*5*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/06/20 20:46*	*5*
Dibromofluoromethane (Surr)	*123*	*X*	*80 - 122*		*04/06/20 20:46*	*5*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*04/06/20 20:46*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**5.4**		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 17:17	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 17:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/30/20 08:57*	*03/31/20 17:17*	*1*
Terphenyl-d14	*98*			*03/30/20 08:57*	*03/31/20 17:17*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.9**		1.0	0.40	mg/L			04/04/20 05:24	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**95**		10	3.1	ug/L			04/01/20 22:32	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/31/20 00:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.6		1.0	0.50	mg/L			04/01/20 20:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 15:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 15:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 15:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 15:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 15:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 15:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 15:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 15:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 15:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 15:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 15:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 15:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 15:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 15:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/06/20 15:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 15:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 15:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 15:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 15:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 15:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 15:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 15:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 15:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 15:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 15:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 15:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 15:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 15:15	1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 15:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 15:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 15:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 15:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 15:15	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			04/06/20 15:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/06/20 15:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*88*		*73 - 131*		*04/06/20 15:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/06/20 15:15*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/06/20 15:15*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:59	1
Acetophenone	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:59	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 20:59	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,1'-Biphenyl	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.92	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:59	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 20:59	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,3-Dichlorobenzene	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 20:59	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dimethyl phthalate	<9.7		9.7	0.96	ug/L		04/01/20 18:31	04/06/20 20:59	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:59	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 20:59	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 20:59	1
Fluorene	<9.7		9.7	0.93	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 20:59	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 20:59	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Nitrophenol	<49		49	1.8	ug/L		04/01/20 18:31	04/06/20 20:59	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 20:59	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 20:59	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:59	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:59	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*82*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
2-Fluorophenol	*74*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:59*	*1*

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*85*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
Phenol-d5	*78*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
Terphenyl-d14	*33*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
2,4,6-Tribromophenol	*83*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:59*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.71**	**J**	1.0	0.31	ug/L			03/31/20 08:14	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**170**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:39	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:39	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:39	1
Barium	**33**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:39	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:39	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Calcium	**11000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:39	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:39	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:39	1
Iron	**420**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:39	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:39	1
Magnesium	**7400**		500	33	ug/L		03/29/20 13:03	03/30/20 23:39	1
Manganese	**35**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Nickel	**3.4**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:39	1
Potassium	**2000**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:39	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:39	1
Silver	**1.4**	**J B**	10	0.60	ug/L		03/29/20 13:03	03/30/20 23:39	1
Sodium	**11000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:39	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:39	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.31**		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:09	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: Trip Blank

Date Collected: 03/25/20 00:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-11

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**13**		10	7.0	ug/L			04/04/20 18:09	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 18:09	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 18:09	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 18:09	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 18:09	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 18:09	1
Chloroform	**0.96**	**J**	1.0	0.50	ug/L			04/04/20 18:09	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 18:09	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 18:09	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 18:09	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 18:09	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 18:09	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 18:09	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 18:09	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 18:09	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 18:09	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 18:09	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 18:09	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 18:09	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 18:09	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 18:09	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 18:09	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 18:09	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 18:09	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 18:09	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:09	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 18:09	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 18:09	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 18:09	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: Trip Blank
Date Collected: 03/25/20 00:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 18:09	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 18:09	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 18:09	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:09	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 18:09	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 18:09	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 18:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/04/20 18:09*	*1*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*		*04/04/20 18:09*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*04/04/20 18:09*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/04/20 18:09*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-182103-1	SW-1C (032520)	107	90	98	101
680-182103-2	SW-2B (032520)	106	89	95	101
680-182103-3	SW-6B (032520)	106	93	99	101
680-182103-4	SW-6C (032520)	107	93	96	103
680-182103-5	SW-6D (032520)	107	95	98	102
680-182103-6	SW-7B (032520)	105	94	99	100
680-182103-7	PW-2B (032520)	106	94	98	100
680-182103-8	PW-6C (032520)	105	94	100	101
680-182103-8 - DL	PW-6C (032520)	107	104	124 X	95
680-182103-9	PW-6D (032520)	105	94	99	101
680-182103-9 - DL	PW-6D (032520)	108	105	123 X	92
680-182103-10	DUP-04 (032520)	109	88	98	102
680-182103-11	Trip Blank	108	90	93	102
LB 680-613667/1-A	Method Blank	109	102	120	93
LCS 680-613993/4	Lab Control Sample	114	101	108	105
LCS 680-614058/4	Lab Control Sample	111	110	114	102
LCS 680-614064/4	Lab Control Sample	110	101	108	102
LCSD 680-613993/5	Lab Control Sample Dup	105	98	103	97
LCSD 680-614058/5	Lab Control Sample Dup	116	107	114	104
LCSD 680-614064/5	Lab Control Sample Dup	112	105	110	99
MB 680-613993/10	Method Blank	108	94	97	100
MB 680-614058/10	Method Blank	109	103	121	94
MB 680-614064/10	Method Blank	107	92	97	100

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	NBZ	PHL	TPHL	TBP
Lab Sample ID	Client Sample ID	(32-113)	(26-109)	(32-118)	(27-110)	(10-126)	(39-124)
680-182103-1	SW-1C (032520)	80	70	81	73	30	73
680-182103-2	SW-2B (032520)	76	68	77	72	34	80
680-182103-7	PW-2B (032520)	68	62	74	67	40	71
680-182103-10	DUP-04 (032520)	82	74	85	78	33	83
LCS 680-613607/15-A	Lab Control Sample	83	71	71	77	94	83
MB 680-613607/14-A	Method Blank	92	75	90	85	104	87

Surrogate Legend

FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPHL = Terphenyl-d14
TBP = 2,4,6-Tribromophenol

Surrogate Summary

Client: ARCADIS U.S., Inc. Job ID: 680-182103-1
Project/Site: ATK Orbital, Elkton MD

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		NBZ	TPHL								
Lab Sample ID	Client Sample ID	(41-144)									
680-182103-3	SW-6B (032520)	101	78								
680-182103-4	SW-6C (032520)	95	88								
680-182103-5	SW-6D (032520)	84	77								
680-182103-6	SW-7B (032520)	86	81								
680-182103-8	PW-6C (032520)	99	91								
680-182103-9	PW-6D (032520)	99	98								
LCS 460-684564/2-A	Lab Control Sample	100	108								
LCSD 460-684564/3-A	Lab Control Sample Dup	95	101								
MB 460-684564/1-A	Method Blank	73	87								

Surrogate Legend

NBZ = Nitrobenzene-d5

TPHL = Terphenyl-d14

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613993/10
Matrix: Water
Analysis Batch: 613993

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 17:45	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 17:45	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 17:45	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 17:45	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 17:45	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 17:45	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 17:45	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 17:45	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 17:45	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 17:45	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/04/20 17:45	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 17:45	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 17:45	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 17:45	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 17:45	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 17:45	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 17:45	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 17:45	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 17:45	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 17:45	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 17:45	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 17:45	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 17:45	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 17:45	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 17:45	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 17:45	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 17:45	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 17:45	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 17:45	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 17:45	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 17:45	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 17:45	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 17:45	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 17:45	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 17:45	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 17:45	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 17:45	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 17:45	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 17:45	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 17:45	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 17:45	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 17:45	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 17:45	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 17:45	1

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

Lab Sample ID: MB 680-613993/10
Matrix: Water
Analysis Batch: 613993

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 17:45	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 17:45	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 17:45	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 17:45	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 17:45	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 17:45	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 17:45	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 17:45	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 17:45	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 17:45	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 17:45	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 17:45	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 17:45	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 17:45	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 17:45	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 17:45	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 17:45	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 17:45	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 17:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/04/20 17:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 17:45*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 122*		*04/04/20 17:45*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/04/20 17:45*	*1*

Lab Sample ID: LCS 680-613993/4
Matrix: Water
Analysis Batch: 613993

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	285		ug/L		114	70 - 135
Benzene	50.0	55.9		ug/L		112	80 - 120
Bromobenzene	50.0	54.2		ug/L		108	80 - 121
Bromochloromethane	50.0	55.1		ug/L		110	80 - 120
Bromodichloromethane	50.0	53.0		ug/L		106	80 - 120
Bromoform	50.0	54.7		ug/L		109	74 - 126
Bromomethane	50.1	58.9		ug/L		118	62 - 130
2-Butanone	250	276		ug/L		110	80 - 131
Carbon disulfide	50.0	56.6		ug/L		113	80 - 120
Carbon tetrachloride	50.0	55.1		ug/L		110	76 - 123
Chlorobenzene	50.0	54.5		ug/L		109	80 - 120
Chloroethane	50.0	53.8		ug/L		107	66 - 135
2-Chloroethyl vinyl ether	50.0	53.1		ug/L		106	71 - 135
Chloroform	50.0	53.4		ug/L		107	80 - 120
Chloromethane	50.0	56.7		ug/L		113	69 - 131
2-Chlorotoluene	50.0	54.9		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613993/4
Matrix: Water
Analysis Batch: 613993

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorotoluene	50.0	55.6		ug/L		111	80 - 120
cis-1,2-Dichloroethene	50.0	57.1		ug/L		114	80 - 120
cis-1,3-Dichloropropene	50.0	56.0		ug/L		112	80 - 120
Dibromochloromethane	50.0	52.4		ug/L		105	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	53.4		ug/L		107	71 - 134
1,2-Dibromoethane	50.0	54.4		ug/L		109	80 - 120
Dibromomethane	50.0	53.0		ug/L		106	80 - 120
1,2-Dichlorobenzene	50.0	53.0		ug/L		106	80 - 120
1,3-Dichlorobenzene	50.0	52.9		ug/L		106	80 - 120
1,4-Dichlorobenzene	50.0	51.6		ug/L		103	80 - 120
Dichlorodifluoromethane	50.1	60.6		ug/L		121	47 - 155
1,1-Dichloroethane	50.0	54.2		ug/L		108	80 - 120
1,2-Dichloroethane	50.0	51.2		ug/L		102	80 - 120
1,1-Dichloroethene	50.0	57.4		ug/L		115	76 - 120
1,2-Dichloroethene, Total	100	115		ug/L		115	80 - 120
1,2-Dichloropropane	50.0	56.2		ug/L		112	80 - 120
1,3-Dichloropropane	50.0	54.0		ug/L		108	80 - 120
2,2-Dichloropropane	50.0	57.3		ug/L		115	76 - 126
1,1-Dichloropropene	50.0	57.3		ug/L		115	80 - 120
Ethylbenzene	50.0	56.3		ug/L		113	80 - 120
Hexachlorobutadiene	50.0	57.0		ug/L		114	60 - 140
2-Hexanone	250	276		ug/L		110	74 - 127
Isopropylbenzene	50.0	56.8		ug/L		114	80 - 120
Methylene Chloride	50.0	50.1		ug/L		100	80 - 120
4-Methyl-2-pentanone	250	272		ug/L		109	76 - 124
Methyl tert-butyl ether	50.0	51.4		ug/L		103	80 - 120
m-Xylene & p-Xylene	50.0	57.3		ug/L		115	80 - 120
n-Butylbenzene	50.0	57.2		ug/L		114	80 - 120
N-Propylbenzene	50.0	57.3		ug/L		115	80 - 120
o-Xylene	50.0	54.8		ug/L		110	80 - 120
p-Isopropyltoluene	50.0	55.4		ug/L		111	80 - 120
sec-Butylbenzene	50.0	56.1		ug/L		112	80 - 120
Styrene	50.0	59.1		ug/L		118	80 - 120
tert-Butylbenzene	50.0	55.6		ug/L		111	80 - 121
1,1,1,2-Tetrachloroethane	50.0	53.6		ug/L		107	80 - 121
1,1,2,2-Tetrachloroethane	50.0	53.1		ug/L		106	80 - 120
Tetrachloroethene	50.0	55.1		ug/L		110	80 - 121
Toluene	50.0	55.1		ug/L		110	80 - 113
trans-1,2-Dichloroethene	50.0	57.9		ug/L		116	80 - 120
trans-1,3-Dichloropropene	50.0	56.2		ug/L		112	80 - 120
1,2,3-Trichlorobenzene	50.0	55.1		ug/L		110	61 - 141
1,2,4-Trichlorobenzene	50.0	55.6		ug/L		111	68 - 128
1,1,1-Trichloroethane	50.0	53.6		ug/L		107	80 - 120
1,1,2-Trichloroethane	50.0	52.4		ug/L		105	80 - 120
Trichloroethene	50.0	56.1		ug/L		112	80 - 120
Trichlorofluoromethane	50.0	55.2		ug/L		110	60 - 141
1,2,3-Trichloropropane	50.0	52.5		ug/L		105	80 - 123
1,2,4-Trimethylbenzene	50.0	54.5		ug/L		109	80 - 120
1,3,5-Trimethylbenzene	50.0	54.8		ug/L		110	80 - 120

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

Lab Sample ID: LCS 680-613993/4
Matrix: Water
Analysis Batch: 613993

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate	100	116		ug/L		116	67 - 135
Vinyl chloride	50.1	59.5		ug/L		119	71 - 128
Xylenes, Total	100	112		ug/L		112	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*114*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*
Dibromofluoromethane (Surr)	*108*		*80 - 122*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*

Lab Sample ID: LCSD 680-613993/5
Matrix: Water
Analysis Batch: 613993

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
Acetone	250	280		ug/L		112	70 - 135	2	30
Benzene	50.0	52.9		ug/L		106	80 - 120	5	20
Bromobenzene	50.0	51.2		ug/L		102	80 - 121	6	20
Bromochloromethane	50.0	52.9		ug/L		106	80 - 120	4	20
Bromodichloromethane	50.0	50.6		ug/L		101	80 - 120	5	20
Bromoform	50.0	51.7		ug/L		103	74 - 126	6	20
Bromomethane	50.1	57.0		ug/L		114	62 - 130	3	20
2-Butanone	250	273		ug/L		109	80 - 131	1	20
Carbon disulfide	50.0	52.6		ug/L		105	80 - 120	7	20
Carbon tetrachloride	50.0	50.2		ug/L		100	76 - 123	9	20
Chlorobenzene	50.0	50.3		ug/L		101	80 - 120	8	20
Chloroethane	50.0	50.2		ug/L		100	66 - 135	7	20
2-Chloroethyl vinyl ether	50.0	52.3		ug/L		105	71 - 135	2	50
Chloroform	50.0	50.3		ug/L		101	80 - 120	6	20
Chloromethane	50.0	52.0		ug/L		104	69 - 131	9	30
2-Chlorotoluene	50.0	50.7		ug/L		101	80 - 120	8	20
4-Chlorotoluene	50.0	51.9		ug/L		104	80 - 120	7	20
cis-1,2-Dichloroethene	50.0	53.6		ug/L		107	80 - 120	6	20
cis-1,3-Dichloropropene	50.0	53.2		ug/L		106	80 - 120	5	20
Dibromochloromethane	50.0	50.8		ug/L		102	80 - 121	3	20
1,2-Dibromo-3-Chloropropane	50.0	51.1		ug/L		102	71 - 134	4	20
1,2-Dibromoethane	50.0	52.6		ug/L		105	80 - 120	3	20
Dibromomethane	50.0	52.0		ug/L		104	80 - 120	2	20
1,2-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120	7	20
1,3-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120	7	20
1,4-Dichlorobenzene	50.0	47.4		ug/L		95	80 - 120	9	20
Dichlorodifluoromethane	50.1	56.5		ug/L		113	47 - 155	7	40
1,1-Dichloroethane	50.0	50.5		ug/L		101	80 - 120	7	20
1,2-Dichloroethane	50.0	49.2		ug/L		98	80 - 120	4	50
1,1-Dichloroethene	50.0	53.1		ug/L		106	76 - 120	8	20
1,2-Dichloroethene, Total	100	108		ug/L		108	80 - 120	7	20
1,2-Dichloropropane	50.0	53.1		ug/L		106	80 - 120	6	20
1,3-Dichloropropane	50.0	52.2		ug/L		104	80 - 120	3	20

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

Lab Sample ID: LCSD 680-613993/5
Matrix: Water
Analysis Batch: 613993

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
2,2-Dichloropropane	50.0	52.9		ug/L		106	76 - 126	8	20
1,1-Dichloropropene	50.0	52.6		ug/L		105	80 - 120	9	20
Ethylbenzene	50.0	51.8		ug/L		104	80 - 120	8	20
Hexachlorobutadiene	50.0	51.2		ug/L		102	60 - 140	11	20
2-Hexanone	250	274		ug/L		110	74 - 127	1	20
Isopropylbenzene	50.0	51.9		ug/L		104	80 - 120	9	20
Methylene Chloride	50.0	47.9		ug/L		96	80 - 120	5	20
4-Methyl-2-pentanone	250	267		ug/L		107	76 - 124	2	20
Methyl tert-butyl ether	50.0	50.0		ug/L		100	80 - 120	3	20
m-Xylene & p-Xylene	50.0	52.9		ug/L		106	80 - 120	8	20
n-Butylbenzene	50.0	52.3		ug/L		105	80 - 120	9	20
N-Propylbenzene	50.0	52.3		ug/L		105	80 - 120	9	20
o-Xylene	50.0	50.7		ug/L		101	80 - 120	8	30
p-Isopropyltoluene	50.0	49.7		ug/L		99	80 - 120	11	20
sec-Butylbenzene	50.0	51.5		ug/L		103	80 - 120	8	20
Styrene	50.0	54.6		ug/L		109	80 - 120	8	20
tert-Butylbenzene	50.0	51.1		ug/L		102	80 - 121	8	20
1,1,1,2-Tetrachloroethane	50.0	50.7		ug/L		101	80 - 121	5	20
1,1,2,2-Tetrachloroethane	50.0	49.9		ug/L		100	80 - 120	6	20
Tetrachloroethene	50.0	51.7		ug/L		103	80 - 121	6	20
Toluene	50.0	51.6		ug/L		103	80 - 113	6	20
trans-1,2-Dichloroethene	50.0	53.9		ug/L		108	80 - 120	7	20
trans-1,3-Dichloropropene	50.0	54.2		ug/L		108	80 - 120	4	30
1,2,3-Trichlorobenzene	50.0	51.7		ug/L		103	61 - 141	6	20
1,2,4-Trichlorobenzene	50.0	52.0		ug/L		104	68 - 128	7	20
1,1,1-Trichloroethane	50.0	49.8		ug/L		100	80 - 120	7	20
1,1,2-Trichloroethane	50.0	51.9		ug/L		104	80 - 120	1	20
Trichloroethene	50.0	52.3		ug/L		105	80 - 120	7	20
Trichlorofluoromethane	50.0	51.1		ug/L		102	60 - 141	8	20
1,2,3-Trichloropropane	50.0	50.2		ug/L		100	80 - 123	4	30
1,2,4-Trimethylbenzene	50.0	50.1		ug/L		100	80 - 120	8	20
1,3,5-Trimethylbenzene	50.0	50.3		ug/L		101	80 - 120	9	20
Vinyl acetate	100	115		ug/L		115	67 - 135	1	20
Vinyl chloride	50.1	54.8		ug/L		109	71 - 128	8	20
Xylenes, Total	100	104		ug/L		104	80 - 120	8	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*105*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*
Dibromofluoromethane (Surr)	*103*		*80 - 122*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*

Lab Sample ID: LB 680-613667/1-A
Matrix: Water
Analysis Batch: 614058

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

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<200		200	140	ug/L			04/06/20 14:52	20

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

Lab Sample ID: LB 680-613667/1-A
Matrix: Water
Analysis Batch: 614058

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

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<20		20	8.6	ug/L			04/06/20 14:52	20
Bromobenzene	<20		20	10	ug/L			04/06/20 14:52	20
Bromochloromethane	<20		20	9.0	ug/L			04/06/20 14:52	20
Bromodichloromethane	<20		20	8.8	ug/L			04/06/20 14:52	20
Bromoform	<20		20	8.6	ug/L			04/06/20 14:52	20
Bromomethane	<100		100	50	ug/L			04/06/20 14:52	20
2-Butanone	<200		200	68	ug/L			04/06/20 14:52	20
Carbon disulfide	<40		40	20	ug/L			04/06/20 14:52	20
Carbon tetrachloride	<20		20	6.6	ug/L			04/06/20 14:52	20
Chlorobenzene	<20		20	5.2	ug/L			04/06/20 14:52	20
Chloroethane	<100		100	50	ug/L			04/06/20 14:52	20
2-Chloroethyl vinyl ether	<200		200	100	ug/L			04/06/20 14:52	20
Chloroform	<20		20	10	ug/L			04/06/20 14:52	20
Chloromethane	<20		20	8.0	ug/L			04/06/20 14:52	20
2-Chlorotoluene	<20		20	5.4	ug/L			04/06/20 14:52	20
4-Chlorotoluene	<20		20	9.0	ug/L			04/06/20 14:52	20
cis-1,2-Dichloroethene	<20		20	8.2	ug/L			04/06/20 14:52	20
cis-1,3-Dichloropropene	<20		20	8.0	ug/L			04/06/20 14:52	20
Dibromochloromethane	<20		20	6.4	ug/L			04/06/20 14:52	20
1,2-Dibromo-3-Chloropropane	<100		100	22	ug/L			04/06/20 14:52	20
1,2-Dibromoethane	<20		20	8.8	ug/L			04/06/20 14:52	20
Dibromomethane	<20		20	7.0	ug/L			04/06/20 14:52	20
1,2-Dichlorobenzene	<20		20	7.4	ug/L			04/06/20 14:52	20
1,3-Dichlorobenzene	<20		20	8.6	ug/L			04/06/20 14:52	20
1,4-Dichlorobenzene	<20		20	9.2	ug/L			04/06/20 14:52	20
Dichlorodifluoromethane	<20		20	12	ug/L			04/06/20 14:52	20
1,1-Dichloroethane	<20		20	7.6	ug/L			04/06/20 14:52	20
1,2-Dichloroethane	<20		20	10	ug/L			04/06/20 14:52	20
1,1-Dichloroethene	<20		20	7.2	ug/L			04/06/20 14:52	20
1,2-Dichloroethene, Total	<40		40	7.4	ug/L			04/06/20 14:52	20
1,2-Dichloropropane	<20		20	13	ug/L			04/06/20 14:52	20
1,3-Dichloropropane	<20		20	6.8	ug/L			04/06/20 14:52	20
2,2-Dichloropropane	<20		20	7.4	ug/L			04/06/20 14:52	20
1,1-Dichloropropene	<20		20	6.8	ug/L			04/06/20 14:52	20
Ethylbenzene	<20		20	6.6	ug/L			04/06/20 14:52	20
Hexachlorobutadiene	<100		100	50	ug/L			04/06/20 14:52	20
2-Hexanone	<200		200	40	ug/L			04/06/20 14:52	20
Isopropylbenzene	<20		20	7.0	ug/L			04/06/20 14:52	20
Methylene Chloride	<100		100	50	ug/L			04/06/20 14:52	20
4-Methyl-2-pentanone	<200		200	42	ug/L			04/06/20 14:52	20
Methyl tert-butyl ether	<200		200	6.0	ug/L			04/06/20 14:52	20
m-Xylene & p-Xylene	<20		20	7.0	ug/L			04/06/20 14:52	20
n-Butylbenzene	<20		20	9.4	ug/L			04/06/20 14:52	20
N-Propylbenzene	<20		20	7.6	ug/L			04/06/20 14:52	20
o-Xylene	<20		20	4.6	ug/L			04/06/20 14:52	20
p-Isopropyltoluene	<20		20	9.6	ug/L			04/06/20 14:52	20
sec-Butylbenzene	<20		20	8.4	ug/L			04/06/20 14:52	20
Styrene	<20		20	5.4	ug/L			04/06/20 14:52	20
tert-Butylbenzene	<20		20	9.0	ug/L			04/06/20 14:52	20

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

Lab Sample ID: LB 680-613667/1-A
Matrix: Water
Analysis Batch: 614058

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

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<20		20	7.4	ug/L			04/06/20 14:52	20
1,1,2,2-Tetrachloroethane	<20		20	12	ug/L			04/06/20 14:52	20
Tetrachloroethene	<20		20	15	ug/L			04/06/20 14:52	20
Toluene	<20		20	9.6	ug/L			04/06/20 14:52	20
trans-1,2-Dichloroethene	<20		20	7.4	ug/L			04/06/20 14:52	20
trans-1,3-Dichloropropene	<20		20	8.4	ug/L			04/06/20 14:52	20
1,2,3-Trichlorobenzene	<100		100	50	ug/L			04/06/20 14:52	20
1,2,4-Trichlorobenzene	<100		100	50	ug/L			04/06/20 14:52	20
1,1,1-Trichloroethane	<20		20	7.4	ug/L			04/06/20 14:52	20
1,1,2-Trichloroethane	<20		20	6.6	ug/L			04/06/20 14:52	20
Trichloroethene	<20		20	9.6	ug/L			04/06/20 14:52	20
Trichlorofluoromethane	<20		20	8.4	ug/L			04/06/20 14:52	20
1,2,3-Trichloropropane	<20		20	7.8	ug/L			04/06/20 14:52	20
1,2,4-Trimethylbenzene	<20		20	9.4	ug/L			04/06/20 14:52	20
1,3,5-Trimethylbenzene	<20		20	6.2	ug/L			04/06/20 14:52	20
Vinyl acetate	<40		40	16	ug/L			04/06/20 14:52	20
Vinyl chloride	<20		20	10	ug/L			04/06/20 14:52	20
Xylenes, Total	<20		20	4.6	ug/L			04/06/20 14:52	20

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/06/20 14:52*	*20*
1,2-Dichloroethane-d4 (Surr)	*102*		*73 - 131*		*04/06/20 14:52*	*20*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*04/06/20 14:52*	*20*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/06/20 14:52*	*20*

Lab Sample ID: MB 680-614058/10
Matrix: Water
Analysis Batch: 614058

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 14:05	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 14:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 14:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 14:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 14:05	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 14:05	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 14:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 14:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 14:05	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 14:05	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 14:05	1
Chloroform	<1.0		1.0	0.50	ug/L			04/06/20 14:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 14:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 14:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 14:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 14:05	1

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

Lab Sample ID: MB 680-614058/10
Matrix: Water
Analysis Batch: 614058

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 14:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 14:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 14:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 14:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 14:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 14:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 14:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 14:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/06/20 14:05	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 14:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 14:05	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 14:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 14:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 14:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 14:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 14:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 14:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 14:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 14:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 14:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 14:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 14:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 14:05	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 14:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 14:05	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 14:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 14:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 14:05	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 14:05	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 14:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 14:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 14:05	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 14:05	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 14:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 14:05	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 14:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 14:05	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 14:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 14:05	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 14:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 14:05	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 14:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 14:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 14:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/06/20 14:05	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 14:05	1

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

Lab Sample ID: MB 680-614058/10
Matrix: Water
Analysis Batch: 614058

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 14:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/06/20 14:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/06/20 14:05*	*1*
Dibromofluoromethane (Surr)	*121*		*80 - 122*		*04/06/20 14:05*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*04/06/20 14:05*	*1*

Lab Sample ID: LCS 680-614058/4
Matrix: Water
Analysis Batch: 614058

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	310		ug/L		124	70 - 135
Benzene	50.0	52.1		ug/L		104	80 - 120
Bromobenzene	50.0	58.9		ug/L		118	80 - 121
Bromochloromethane	50.0	53.8		ug/L		108	80 - 120
Bromodichloromethane	50.0	55.6		ug/L		111	80 - 120
Bromoform	50.0	61.1		ug/L		122	74 - 126
Bromomethane	50.0	107	E *	ug/L		213	62 - 130
2-Butanone	250	270		ug/L		108	80 - 131
Carbon disulfide	50.0	50.1		ug/L		100	80 - 120
Carbon tetrachloride	50.0	55.8		ug/L		112	76 - 123
Chlorobenzene	50.0	54.8		ug/L		110	80 - 120
Chloroethane	50.0	56.4		ug/L		113	66 - 135
2-Chloroethyl vinyl ether	50.0	52.3		ug/L		105	71 - 135
Chloroform	50.0	53.0		ug/L		106	80 - 120
Chloromethane	50.0	49.4		ug/L		99	69 - 131
2-Chlorotoluene	50.0	55.5		ug/L		111	80 - 120
4-Chlorotoluene	50.0	56.8		ug/L		114	80 - 120
cis-1,2-Dichloroethene	50.0	56.6		ug/L		113	80 - 120
cis-1,3-Dichloropropene	50.0	56.6		ug/L		113	80 - 120
Dibromochloromethane	50.0	56.8		ug/L		114	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	54.5		ug/L		109	71 - 134
1,2-Dibromoethane	50.0	55.7		ug/L		111	80 - 120
Dibromomethane	50.0	57.4		ug/L		115	80 - 120
1,2-Dichlorobenzene	50.0	52.9		ug/L		106	80 - 120
1,3-Dichlorobenzene	50.0	53.0		ug/L		106	80 - 120
1,4-Dichlorobenzene	50.0	52.8		ug/L		106	80 - 120
Dichlorodifluoromethane	50.0	73.9		ug/L		148	47 - 155
1,1-Dichloroethane	50.0	52.2		ug/L		104	80 - 120
1,2-Dichloroethane	50.0	54.1		ug/L		108	80 - 120
1,1-Dichloroethene	50.0	57.1		ug/L		114	76 - 120
1,2-Dichloroethene, Total	100	112		ug/L		112	80 - 120
1,2-Dichloropropane	50.0	53.8		ug/L		108	80 - 120
1,3-Dichloropropane	50.0	52.9		ug/L		106	80 - 120
2,2-Dichloropropane	50.0	66.6	*	ug/L		133	76 - 126
1,1-Dichloropropene	50.0	52.2		ug/L		104	80 - 120

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

Lab Sample ID: LCS 680-614058/4
Matrix: Water
Analysis Batch: 614058

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethylbenzene	50.0	54.4		ug/L		109	80 - 120
Hexachlorobutadiene	50.0	63.9		ug/L		128	60 - 140
2-Hexanone	250	264		ug/L		106	74 - 127
Isopropylbenzene	50.0	55.2		ug/L		110	80 - 120
Methylene Chloride	50.0	51.3		ug/L		103	80 - 120
4-Methyl-2-pentanone	250	257		ug/L		103	76 - 124
Methyl tert-butyl ether	50.0	54.5		ug/L		109	80 - 120
m-Xylene & p-Xylene	50.0	55.2		ug/L		110	80 - 120
n-Butylbenzene	50.0	46.7		ug/L		93	80 - 120
N-Propylbenzene	50.0	55.5		ug/L		111	80 - 120
o-Xylene	50.0	56.6		ug/L		113	80 - 120
p-Isopropyltoluene	50.0	52.6		ug/L		105	80 - 120
sec-Butylbenzene	50.0	53.2		ug/L		106	80 - 120
Styrene	50.0	57.9		ug/L		116	80 - 120
tert-Butylbenzene	50.0	53.2		ug/L		106	80 - 121
1,1,1,2-Tetrachloroethane	50.0	59.3		ug/L		119	80 - 121
1,1,2,2-Tetrachloroethane	50.0	55.9		ug/L		112	80 - 120
Tetrachloroethene	50.0	57.6		ug/L		115	80 - 121
Toluene	50.0	53.0		ug/L		106	80 - 113
trans-1,2-Dichloroethene	50.0	55.2		ug/L		110	80 - 120
trans-1,3-Dichloropropene	50.0	54.6		ug/L		109	80 - 120
1,2,3-Trichlorobenzene	50.0	63.3		ug/L		127	61 - 141
1,2,4-Trichlorobenzene	50.0	60.9		ug/L		122	68 - 128
1,1,1-Trichloroethane	50.0	54.0		ug/L		108	80 - 120
1,1,2-Trichloroethane	50.0	54.2		ug/L		108	80 - 120
Trichloroethene	50.0	56.0		ug/L		112	80 - 120
Trichlorofluoromethane	50.0	56.8		ug/L		114	60 - 141
1,2,3-Trichloropropane	50.0	54.6		ug/L		109	80 - 123
1,2,4-Trimethylbenzene	50.0	54.4		ug/L		109	80 - 120
1,3,5-Trimethylbenzene	50.0	53.4		ug/L		107	80 - 120
Vinyl acetate	100	150	*	ug/L		150	67 - 135
Vinyl chloride	50.0	54.8		ug/L		110	71 - 128
Xylenes, Total	100	112		ug/L		112	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*111*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*
Dibromofluoromethane (Surr)	*114*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 680-614058/5
Matrix: Water
Analysis Batch: 614058

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
Acetone	250	289		ug/L		116	70 - 135	7	30
Benzene	50.0	54.6		ug/L		109	80 - 120	5	20
Bromobenzene	50.0	60.3		ug/L		121	80 - 121	2	20

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

Lab Sample ID: LCSD 680-614058/5
Matrix: Water
Analysis Batch: 614058

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
Bromochloromethane	50.0	51.9		ug/L		104	80 - 120	4	20
Bromodichloromethane	50.0	55.1		ug/L		110	80 - 120	1	20
Bromoform	50.0	62.5		ug/L		125	74 - 126	2	20
Bromomethane	50.0	109	E *	ug/L		218	62 - 130	2	20
2-Butanone	250	268		ug/L		107	80 - 131	1	20
Carbon disulfide	50.0	54.0		ug/L		108	80 - 120	7	20
Carbon tetrachloride	50.0	60.6		ug/L		121	76 - 123	8	20
Chlorobenzene	50.0	56.8		ug/L		114	80 - 120	4	20
Chloroethane	50.0	59.5		ug/L		119	66 - 135	5	20
2-Chloroethyl vinyl ether	50.0	51.9		ug/L		104	71 - 135	1	50
Chloroform	50.0	53.6		ug/L		107	80 - 120	1	20
Chloromethane	50.0	54.6		ug/L		109	69 - 131	10	30
2-Chlorotoluene	50.0	55.9		ug/L		112	80 - 120	1	20
4-Chlorotoluene	50.0	56.6		ug/L		113	80 - 120	0	20
cis-1,2-Dichloroethene	50.0	57.4		ug/L		115	80 - 120	1	20
cis-1,3-Dichloropropene	50.0	56.1		ug/L		112	80 - 120	1	20
Dibromochloromethane	50.0	56.4		ug/L		113	80 - 121	1	20
1,2-Dibromo-3-Chloropropane	50.0	55.9		ug/L		112	71 - 134	3	20
1,2-Dibromoethane	50.0	55.6		ug/L		111	80 - 120	0	20
Dibromomethane	50.0	56.4		ug/L		113	80 - 120	2	20
1,2-Dichlorobenzene	50.0	53.4		ug/L		107	80 - 120	1	20
1,3-Dichlorobenzene	50.0	54.9		ug/L		110	80 - 120	4	20
1,4-Dichlorobenzene	50.0	53.7		ug/L		107	80 - 120	2	20
Dichlorodifluoromethane	50.0	88.4	*	ug/L		177	47 - 155	18	40
1,1-Dichloroethane	50.0	54.5		ug/L		109	80 - 120	4	20
1,2-Dichloroethane	50.0	51.9		ug/L		104	80 - 120	4	50
1,1-Dichloroethene	50.0	60.1		ug/L		120	76 - 120	5	20
1,2-Dichloroethene, Total	100	117		ug/L		117	80 - 120	4	20
1,2-Dichloropropane	50.0	54.1		ug/L		108	80 - 120	0	20
1,3-Dichloropropane	50.0	52.8		ug/L		106	80 - 120	0	20
2,2-Dichloropropane	50.0	71.2	*	ug/L		142	76 - 126	7	20
1,1-Dichloropropene	50.0	57.5		ug/L		115	80 - 120	10	20
Ethylbenzene	50.0	56.6		ug/L		113	80 - 120	4	20
Hexachlorobutadiene	50.0	69.9		ug/L		140	60 - 140	9	20
2-Hexanone	250	259		ug/L		104	74 - 127	2	20
Isopropylbenzene	50.0	57.9		ug/L		116	80 - 120	5	20
Methylene Chloride	50.0	50.4		ug/L		101	80 - 120	2	20
4-Methyl-2-pentanone	250	257		ug/L		103	76 - 124	0	20
Methyl tert-butyl ether	50.0	54.3		ug/L		109	80 - 120	0	20
m-Xylene & p-Xylene	50.0	56.2		ug/L		112	80 - 120	2	20
n-Butylbenzene	50.0	50.1		ug/L		100	80 - 120	7	20
N-Propylbenzene	50.0	58.2		ug/L		116	80 - 120	5	20
o-Xylene	50.0	57.5		ug/L		115	80 - 120	2	30
p-Isopropyltoluene	50.0	55.5		ug/L		111	80 - 120	5	20
sec-Butylbenzene	50.0	54.9		ug/L		110	80 - 120	3	20
Styrene	50.0	57.9		ug/L		116	80 - 120	0	20
tert-Butylbenzene	50.0	55.9		ug/L		112	80 - 121	5	20
1,1,1,2-Tetrachloroethane	50.0	60.9	*	ug/L		122	80 - 121	3	20
1,1,2,2-Tetrachloroethane	50.0	56.3		ug/L		113	80 - 120	1	20

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

Lab Sample ID: LCSD 680-614058/5
Matrix: Water
Analysis Batch: 614058

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
Tetrachloroethene			50.0	60.5		ug/L		121	80 - 121	5	20
Toluene			50.0	54.5		ug/L		109	80 - 113	3	20
trans-1,2-Dichloroethene			50.0	59.2		ug/L		118	80 - 120	7	20
trans-1,3-Dichloropropene			50.0	53.8		ug/L		108	80 - 120	1	30
1,2,3-Trichlorobenzene			50.0	66.4		ug/L		133	61 - 141	5	20
1,2,4-Trichlorobenzene			50.0	65.0	*	ug/L		130	68 - 128	7	20
1,1,1-Trichloroethane			50.0	58.3		ug/L		117	80 - 120	8	20
1,1,2-Trichloroethane			50.0	53.8		ug/L		108	80 - 120	1	20
Trichloroethene			50.0	59.6		ug/L		119	80 - 120	6	20
Trichlorofluoromethane			50.0	63.8		ug/L		128	60 - 141	12	20
1,2,3-Trichloropropane			50.0	54.5		ug/L		109	80 - 123	0	30
1,2,4-Trimethylbenzene			50.0	56.0		ug/L		112	80 - 120	3	20
1,3,5-Trimethylbenzene			50.0	54.5		ug/L		109	80 - 120	2	20
Vinyl acetate			100	148	*	ug/L		148	67 - 135	1	20
Vinyl chloride			50.0	59.8		ug/L		120	71 - 128	9	20
Xylenes, Total			100	114		ug/L		114	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*116*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*
Dibromofluoromethane (Surr)	*114*		*80 - 122*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Lab Sample ID: MB 680-614064/10
Matrix: Water
Analysis Batch: 614064

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 13:19	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 13:19	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 13:19	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 13:19	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 13:19	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 13:19	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 13:19	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 13:19	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 13:19	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 13:19	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 13:19	1
Chloroform	<1.0		1.0	0.50	ug/L			04/06/20 13:19	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 13:19	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 13:19	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 13:19	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 13:19	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 13:19	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 13:19	1

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

Lab Sample ID: MB 680-614064/10
Matrix: Water
Analysis Batch: 614064

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 13:19	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 13:19	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 13:19	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 13:19	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 13:19	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 13:19	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/06/20 13:19	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 13:19	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 13:19	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 13:19	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 13:19	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 13:19	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 13:19	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 13:19	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 13:19	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 13:19	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 13:19	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 13:19	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 13:19	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 13:19	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 13:19	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:19	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 13:19	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 13:19	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 13:19	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 13:19	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 13:19	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 13:19	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:19	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 13:19	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 13:19	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 13:19	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 13:19	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 13:19	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:19	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:19	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 13:19	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 13:19	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 13:19	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 13:19	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:19	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 13:19	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/06/20 13:19	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 13:19	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 13:19	1

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

Lab Sample ID: MB 680-614064/10
Matrix: Water
Analysis Batch: 614064

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

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/06/20 13:19*	*1*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*		*04/06/20 13:19*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 122*		*04/06/20 13:19*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/06/20 13:19*	*1*

Lab Sample ID: LCS 680-614064/4
Matrix: Water
Analysis Batch: 614064

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	287		ug/L		115	70 - 135
Benzene	50.0	55.0		ug/L		110	80 - 120
Bromobenzene	50.0	51.8		ug/L		104	80 - 121
Bromochloromethane	50.0	52.0		ug/L		104	80 - 120
Bromodichloromethane	50.0	53.1		ug/L		106	80 - 120
Bromoform	50.0	51.8		ug/L		104	74 - 126
Bromomethane	50.1	61.1		ug/L		122	62 - 130
2-Butanone	250	275		ug/L		110	80 - 131
Carbon disulfide	50.0	56.5		ug/L		113	80 - 120
Carbon tetrachloride	50.0	54.3		ug/L		109	76 - 123
Chlorobenzene	50.0	51.5		ug/L		103	80 - 120
Chloroethane	50.0	54.3		ug/L		109	66 - 135
2-Chloroethyl vinyl ether	50.0	52.5		ug/L		105	71 - 135
Chloroform	50.0	52.5		ug/L		105	80 - 120
Chloromethane	50.0	61.0		ug/L		122	69 - 131
2-Chlorotoluene	50.0	52.5		ug/L		105	80 - 120
4-Chlorotoluene	50.0	53.2		ug/L		106	80 - 120
cis-1,2-Dichloroethene	50.0	56.5		ug/L		113	80 - 120
cis-1,3-Dichloropropene	50.0	54.9		ug/L		110	80 - 120
Dibromochloromethane	50.0	52.2		ug/L		104	80 - 121
1,2-Dibromo-3-Chloropropane	50.0	51.8		ug/L		104	71 - 134
1,2-Dibromoethane	50.0	52.9		ug/L		106	80 - 120
Dibromomethane	50.0	53.3		ug/L		107	80 - 120
1,2-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120
1,3-Dichlorobenzene	50.0	50.2		ug/L		100	80 - 120
1,4-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120
Dichlorodifluoromethane	50.1	71.2		ug/L		142	47 - 155
1,1-Dichloroethane	50.0	53.4		ug/L		107	80 - 120
1,2-Dichloroethane	50.0	50.5		ug/L		101	80 - 120
1,1-Dichloroethene	50.0	59.5		ug/L		119	76 - 120
1,2-Dichloroethene, Total	100	115		ug/L		115	80 - 120
1,2-Dichloropropane	50.0	54.5		ug/L		109	80 - 120
1,3-Dichloropropane	50.0	52.4		ug/L		105	80 - 120
2,2-Dichloropropane	50.0	56.8		ug/L		114	76 - 126
1,1-Dichloropropene	50.0	55.7		ug/L		111	80 - 120
Ethylbenzene	50.0	53.6		ug/L		107	80 - 120
Hexachlorobutadiene	50.0	55.3		ug/L		111	60 - 140
2-Hexanone	250	284		ug/L		114	74 - 127

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

Lab Sample ID: LCS 680-614064/4
Matrix: Water
Analysis Batch: 614064

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Isopropylbenzene	50.0	54.2		ug/L		108	80 - 120
Methylene Chloride	50.0	50.0		ug/L		100	80 - 120
4-Methyl-2-pentanone	250	268		ug/L		107	76 - 124
Methyl tert-butyl ether	50.0	50.2		ug/L		100	80 - 120
m-Xylene & p-Xylene	50.0	53.3		ug/L		107	80 - 120
n-Butylbenzene	50.0	54.6		ug/L		109	80 - 120
N-Propylbenzene	50.0	54.0		ug/L		108	80 - 120
o-Xylene	50.0	52.1		ug/L		104	80 - 120
p-Isopropyltoluene	50.0	52.7		ug/L		105	80 - 120
sec-Butylbenzene	50.0	53.3		ug/L		107	80 - 120
Styrene	50.0	56.1		ug/L		112	80 - 120
tert-Butylbenzene	50.0	52.3		ug/L		105	80 - 121
1,1,1,2-Tetrachloroethane	50.0	51.4		ug/L		103	80 - 121
1,1,2,2-Tetrachloroethane	50.0	50.0		ug/L		100	80 - 120
Tetrachloroethene	50.0	54.9		ug/L		110	80 - 121
Toluene	50.0	53.9		ug/L		108	80 - 113
trans-1,2-Dichloroethene	50.0	58.0		ug/L		116	80 - 120
trans-1,3-Dichloropropene	50.0	52.3		ug/L		105	80 - 120
1,2,3-Trichlorobenzene	50.0	51.6		ug/L		103	61 - 141
1,2,4-Trichlorobenzene	50.0	52.8		ug/L		106	68 - 128
1,1,1-Trichloroethane	50.0	53.7		ug/L		107	80 - 120
1,1,2-Trichloroethane	50.0	52.6		ug/L		105	80 - 120
Trichloroethene	50.0	55.0		ug/L		110	80 - 120
Trichlorofluoromethane	50.0	58.9		ug/L		118	60 - 141
1,2,3-Trichloropropane	50.0	49.0		ug/L		98	80 - 123
1,2,4-Trimethylbenzene	50.0	52.1		ug/L		104	80 - 120
1,3,5-Trimethylbenzene	50.0	52.1		ug/L		104	80 - 120
Vinyl acetate	100	134		ug/L		134	67 - 135
Vinyl chloride	50.1	64.1		ug/L		128	71 - 128
Xylenes, Total	100	105		ug/L		105	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*
Dibromofluoromethane (Surr)	*108*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 680-614064/5
Matrix: Water
Analysis Batch: 614064

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
Acetone	250	305		ug/L		122	70 - 135	6	30
Benzene	50.0	55.5		ug/L		111	80 - 120	1	20
Bromobenzene	50.0	52.9		ug/L		106	80 - 121	2	20
Bromochloromethane	50.0	54.8		ug/L		110	80 - 120	5	20
Bromodichloromethane	50.0	54.8		ug/L		110	80 - 120	3	20
Bromoform	50.0	54.2		ug/L		108	74 - 126	5	20

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

Lab Sample ID: LCSD 680-614064/5
Matrix: Water
Analysis Batch: 614064

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
Bromomethane	50.1	59.3		ug/L		118	62 - 130	3	20
2-Butanone	250	286		ug/L		114	80 - 131	4	20
Carbon disulfide	50.0	56.2		ug/L		112	80 - 120	1	20
Carbon tetrachloride	50.0	53.8		ug/L		108	76 - 123	1	20
Chlorobenzene	50.0	52.3		ug/L		105	80 - 120	2	20
Chloroethane	50.0	59.7		ug/L		119	66 - 135	9	20
2-Chloroethyl vinyl ether	50.0	55.6		ug/L		111	71 - 135	6	50
Chloroform	50.0	53.6		ug/L		107	80 - 120	2	20
Chloromethane	50.0	60.5		ug/L		121	69 - 131	1	30
2-Chlorotoluene	50.0	52.4		ug/L		105	80 - 120	0	20
4-Chlorotoluene	50.0	54.3		ug/L		109	80 - 120	2	20
cis-1,2-Dichloroethene	50.0	58.0		ug/L		116	80 - 120	3	20
cis-1,3-Dichloropropene	50.0	56.8		ug/L		114	80 - 120	3	20
Dibromochloromethane	50.0	54.7		ug/L		109	80 - 121	5	20
1,2-Dibromo-3-Chloropropane	50.0	52.2		ug/L		104	71 - 134	1	20
1,2-Dibromoethane	50.0	55.8		ug/L		112	80 - 120	5	20
Dibromomethane	50.0	55.4		ug/L		111	80 - 120	4	20
1,2-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120	0	20
1,3-Dichlorobenzene	50.0	49.6		ug/L		99	80 - 120	1	20
1,4-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120	1	20
Dichlorodifluoromethane	50.1	70.4		ug/L		141	47 - 155	1	40
1,1-Dichloroethane	50.0	53.3		ug/L		107	80 - 120	0	20
1,2-Dichloroethane	50.0	52.1		ug/L		104	80 - 120	3	50
1,1-Dichloroethene	50.0	59.4		ug/L		119	76 - 120	0	20
1,2-Dichloroethene, Total	100	115		ug/L		115	80 - 120	1	20
1,2-Dichloropropane	50.0	57.0		ug/L		114	80 - 120	5	20
1,3-Dichloropropane	50.0	54.5		ug/L		109	80 - 120	4	20
2,2-Dichloropropane	50.0	55.3		ug/L		111	76 - 126	3	20
1,1-Dichloropropene	50.0	55.0		ug/L		110	80 - 120	1	20
Ethylbenzene	50.0	54.2		ug/L		108	80 - 120	1	20
Hexachlorobutadiene	50.0	54.1		ug/L		108	60 - 140	2	20
2-Hexanone	250	297		ug/L		119	74 - 127	4	20
Isopropylbenzene	50.0	54.2		ug/L		108	80 - 120	0	20
Methylene Chloride	50.0	51.0		ug/L		102	80 - 120	2	20
4-Methyl-2-pentanone	250	283		ug/L		113	76 - 124	5	20
Methyl tert-butyl ether	50.0	53.3		ug/L		107	80 - 120	6	20
m-Xylene & p-Xylene	50.0	54.8		ug/L		110	80 - 120	3	20
n-Butylbenzene	50.0	52.6		ug/L		105	80 - 120	4	20
N-Propylbenzene	50.0	54.2		ug/L		108	80 - 120	0	20
o-Xylene	50.0	53.2		ug/L		106	80 - 120	2	30
p-Isopropyltoluene	50.0	51.5		ug/L		103	80 - 120	2	20
sec-Butylbenzene	50.0	53.7		ug/L		107	80 - 120	1	20
Styrene	50.0	57.5		ug/L		115	80 - 120	2	20
tert-Butylbenzene	50.0	52.7		ug/L		105	80 - 121	1	20
1,1,1,2-Tetrachloroethane	50.0	52.5		ug/L		105	80 - 121	2	20
1,1,2,2-Tetrachloroethane	50.0	51.6		ug/L		103	80 - 120	3	20
Tetrachloroethene	50.0	54.7		ug/L		109	80 - 121	0	20
Toluene	50.0	54.4		ug/L		109	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	57.3		ug/L		115	80 - 120	1	20

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

Lab Sample ID: LCSD 680-614064/5
Matrix: Water
Analysis Batch: 614064

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
trans-1,3-Dichloropropene			50.0	53.7		ug/L		107	80 - 120	3	30
1,2,3-Trichlorobenzene			50.0	52.4		ug/L		105	61 - 141	1	20
1,2,4-Trichlorobenzene			50.0	53.4		ug/L		107	68 - 128	1	20
1,1,1-Trichloroethane			50.0	53.5		ug/L		107	80 - 120	0	20
1,1,2-Trichloroethane			50.0	54.7		ug/L		109	80 - 120	4	20
Trichloroethene			50.0	55.1		ug/L		110	80 - 120	0	20
Trichlorofluoromethane			50.0	58.2		ug/L		116	60 - 141	1	20
1,2,3-Trichloropropane			50.0	52.3		ug/L		105	80 - 123	7	30
1,2,4-Trimethylbenzene			50.0	53.0		ug/L		106	80 - 120	2	20
1,3,5-Trimethylbenzene			50.0	53.0		ug/L		106	80 - 120	2	20
Vinyl acetate			100	140	*	ug/L		140	67 - 135	5	20
Vinyl chloride			50.1	64.3		ug/L		128	71 - 128	0	20
Xylenes, Total			100	108		ug/L		108	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*112*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*
Dibromofluoromethane (Surr)	*110*		*80 - 122*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-613607/14-A
Matrix: Water
Analysis Batch: 614121

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<10		10	0.76	ug/L		04/01/20 18:31	04/06/20 13:56	1
Acenaphthylene	<10		10	0.85	ug/L		04/01/20 18:31	04/06/20 13:56	1
Acetophenone	<10		10	0.57	ug/L		04/01/20 18:31	04/06/20 13:56	1
Anthracene	<10		10	0.69	ug/L		04/01/20 18:31	04/06/20 13:56	1
Atrazine	<10		10	1.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzaldehyde	<10		10	1.1	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzo[a]anthracene	<10		10	0.55	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzo[a]pyrene	<10		10	0.71	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzo[b]fluoranthene	<10		10	2.6	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzo[g,h,i]perylene	<10		10	0.87	ug/L		04/01/20 18:31	04/06/20 13:56	1
Benzo[k]fluoranthene	<10		10	1.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
1,1'-Biphenyl	<10		10	0.58	ug/L		04/01/20 18:31	04/06/20 13:56	1
Bis(2-chloroethoxy)methane	<10		10	0.94	ug/L		04/01/20 18:31	04/06/20 13:56	1
Bis(2-chloroethyl)ether	<10		10	1.1	ug/L		04/01/20 18:31	04/06/20 13:56	1
bis (2-chloroisopropyl) ether	<10		10	0.78	ug/L		04/01/20 18:31	04/06/20 13:56	1
Bis(2-ethylhexyl) phthalate	<10		10	1.6	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Bromophenyl phenyl ether	<10		10	0.77	ug/L		04/01/20 18:31	04/06/20 13:56	1
Butyl benzyl phthalate	<10		10	1.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
Caprolactam	<10		10	0.79	ug/L		04/01/20 18:31	04/06/20 13:56	1
Carbazole	<10		10	0.71	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Chloroaniline	<20		20	2.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Chloro-3-methylphenol	<10		10	1.0	ug/L		04/01/20 18:31	04/06/20 13:56	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-613607/14-A
Matrix: Water
Analysis Batch: 614121

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<10		10	0.80	ug/L		04/01/20 18:31	04/06/20 13:56	1
2-Chlorophenol	<10		10	0.87	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Chlorophenyl phenyl ether	<10		10	0.84	ug/L		04/01/20 18:31	04/06/20 13:56	1
Chrysene	<10		10	0.51	ug/L		04/01/20 18:31	04/06/20 13:56	1
Dibenz(a,h)anthracene	<10		10	1.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
Dibenzofuran	<10		10	0.79	ug/L		04/01/20 18:31	04/06/20 13:56	1
1,2-Dichlorobenzene	<10		10	0.53	ug/L		04/01/20 18:31	04/06/20 13:56	1
1,3-Dichlorobenzene	<10		10	0.59	ug/L		04/01/20 18:31	04/06/20 13:56	1
1,4-Dichlorobenzene	<10		10	0.54	ug/L		04/01/20 18:31	04/06/20 13:56	1
3,3'-Dichlorobenzidine	<60		60	30	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4-Dichlorophenol	<10		10	1.1	ug/L		04/01/20 18:31	04/06/20 13:56	1
Diethyl phthalate	<10		10	0.88	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4-Dimethylphenol	<10		10	4.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
Dimethyl phthalate	<10		10	0.99	ug/L		04/01/20 18:31	04/06/20 13:56	1
Di-n-butyl phthalate	<10		10	0.83	ug/L		04/01/20 18:31	04/06/20 13:56	1
4,6-Dinitro-2-methylphenol	<50		50	10	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4-Dinitrophenol	<50		50	10	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4-Dinitrotoluene	<10		10	1.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,6-Dinitrotoluene	<10		10	1.1	ug/L		04/01/20 18:31	04/06/20 13:56	1
Di-n-octyl phthalate	<10		10	1.4	ug/L		04/01/20 18:31	04/06/20 13:56	1
Fluoranthene	<10		10	0.74	ug/L		04/01/20 18:31	04/06/20 13:56	1
Fluorene	<10		10	0.96	ug/L		04/01/20 18:31	04/06/20 13:56	1
Hexachlorobenzene	<10		10	0.79	ug/L		04/01/20 18:31	04/06/20 13:56	1
Hexachlorobutadiene	<10		10	0.62	ug/L		04/01/20 18:31	04/06/20 13:56	1
Hexachlorocyclopentadiene	<10		10	2.5	ug/L		04/01/20 18:31	04/06/20 13:56	1
Hexachloroethane	<10		10	0.76	ug/L		04/01/20 18:31	04/06/20 13:56	1
Indeno[1,2,3-cd]pyrene	<10		10	1.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
Isophorone	<10		10	0.90	ug/L		04/01/20 18:31	04/06/20 13:56	1
2-Methylnaphthalene	<10		10	0.78	ug/L		04/01/20 18:31	04/06/20 13:56	1
2-Methylphenol	<10		10	0.89	ug/L		04/01/20 18:31	04/06/20 13:56	1
3 & 4 Methylphenol	<10		10	1.3	ug/L		04/01/20 18:31	04/06/20 13:56	1
2-Nitroaniline	<50		50	1.3	ug/L		04/01/20 18:31	04/06/20 13:56	1
3-Nitroaniline	<50		50	5.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Nitroaniline	<50		50	5.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
Nitrobenzene	<10		10	0.73	ug/L		04/01/20 18:31	04/06/20 13:56	1
2-Nitrophenol	<10		10	0.76	ug/L		04/01/20 18:31	04/06/20 13:56	1
4-Nitrophenol	<50		50	1.9	ug/L		04/01/20 18:31	04/06/20 13:56	1
N-Nitrosodi-n-propylamine	<10		10	0.72	ug/L		04/01/20 18:31	04/06/20 13:56	1
N-Nitrosodiphenylamine	<10		10	0.92	ug/L		04/01/20 18:31	04/06/20 13:56	1
Pentachlorophenol	<50		50	2.0	ug/L		04/01/20 18:31	04/06/20 13:56	1
Phenanthrene	<10		10	0.77	ug/L		04/01/20 18:31	04/06/20 13:56	1
Phenol	<10		10	0.83	ug/L		04/01/20 18:31	04/06/20 13:56	1
Pyrene	<10		10	0.63	ug/L		04/01/20 18:31	04/06/20 13:56	1
1,2,4-Trichlorobenzene	<10		10	0.56	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4,5-Trichlorophenol	<10		10	1.2	ug/L		04/01/20 18:31	04/06/20 13:56	1
2,4,6-Trichlorophenol	<10		10	0.85	ug/L		04/01/20 18:31	04/06/20 13:56	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-613607/14-A
Matrix: Water
Analysis Batch: 614121

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613607

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	92		32 - 113	04/01/20 18:31	04/06/20 13:56	1
2-Fluorophenol	75		26 - 109	04/01/20 18:31	04/06/20 13:56	1
Nitrobenzene-d5	90		32 - 118	04/01/20 18:31	04/06/20 13:56	1
Phenol-d5	85		27 - 110	04/01/20 18:31	04/06/20 13:56	1
Terphenyl-d14	104		10 - 126	04/01/20 18:31	04/06/20 13:56	1
2,4,6-Tribromophenol	87		39 - 124	04/01/20 18:31	04/06/20 13:56	1

Lab Sample ID: LCS 680-613607/15-A
Matrix: Water
Analysis Batch: 614121

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613607

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	100	71.1		ug/L		71	48 - 130
Acenaphthylene	100	81.7		ug/L		82	48 - 130
Anthracene	100	87.4		ug/L		87	49 - 130
Atrazine	100	82.9		ug/L		83	39 - 130
Benzaldehyde	100	75.0		ug/L		75	14 - 130
Benzo[a]anthracene	100	79.3		ug/L		79	44 - 130
Benzo[a]pyrene	100	70.6		ug/L		71	44 - 130
Benzo[b]fluoranthene	100	78.1		ug/L		78	43 - 130
Benzo[g,h,i]perylene	100	75.1		ug/L		75	41 - 130
Benzo[k]fluoranthene	100	80.8		ug/L		81	40 - 130
1,1'-Biphenyl	100	80.3		ug/L		80	45 - 130
Bis(2-chloroethoxy)methane	100	79.3		ug/L		79	47 - 130
Bis(2-chloroethyl)ether	100	80.9		ug/L		81	32 - 130
bis (2-chloroisopropyl) ether	100	83.6		ug/L		84	26 - 130
Bis(2-ethylhexyl) phthalate	100	81.1		ug/L		81	45 - 130
4-Bromophenyl phenyl ether	100	80.9		ug/L		81	47 - 130
Butyl benzyl phthalate	100	97.4		ug/L		97	50 - 130
Caprolactam	100	77.2		ug/L		77	26 - 130
Carbazole	100	97.1		ug/L		97	54 - 130
4-Chloroaniline	100	64.1		ug/L		64	42 - 130
4-Chloro-3-methylphenol	100	78.3		ug/L		78	47 - 130
2-Chloronaphthalene	100	78.3		ug/L		78	44 - 130
2-Chlorophenol	100	78.4		ug/L		78	39 - 130
4-Chlorophenyl phenyl ether	100	77.6		ug/L		78	45 - 130
Chrysene	100	77.6		ug/L		78	47 - 130
Dibenz(a,h)anthracene	100	79.4		ug/L		79	41 - 130
Dibenzofuran	100	82.8		ug/L		83	50 - 130
1,2-Dichlorobenzene	100	71.0		ug/L		71	31 - 130
1,3-Dichlorobenzene	100	61.5		ug/L		61	30 - 130
1,4-Dichlorobenzene	100	63.0		ug/L		63	31 - 130
3,3'-Dichlorobenzidine	100	90.4		ug/L		90	46 - 130
2,4-Dichlorophenol	100	78.1		ug/L		78	44 - 130
Diethyl phthalate	100	95.3		ug/L		95	53 - 130
2,4-Dimethylphenol	100	64.9		ug/L		65	37 - 130
Dimethyl phthalate	100	89.0		ug/L		89	53 - 130
Di-n-butyl phthalate	100	98.3		ug/L		98	51 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-613607/15-A
Matrix: Water
Analysis Batch: 614121

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613607

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,6-Dinitro-2-methylphenol	200	181		ug/L		90	42 - 130
2,4-Dinitrophenol	200	194		ug/L		97	31 - 130
2,4-Dinitrotoluene	100	91.6		ug/L		92	52 - 130
2,6-Dinitrotoluene	100	82.3		ug/L		82	52 - 130
Di-n-octyl phthalate	100	76.7		ug/L		77	42 - 130
Fluoranthene	100	86.8		ug/L		87	47 - 130
Fluorene	100	87.0		ug/L		87	50 - 130
Hexachlorobenzene	100	75.0		ug/L		75	43 - 130
Hexachlorobutadiene	100	51.6		ug/L		52	27 - 130
Hexachlorocyclopentadiene	100	26.5		ug/L		26	11 - 130
Hexachloroethane	100	52.7		ug/L		53	29 - 130
Indeno[1,2,3-cd]pyrene	100	75.2		ug/L		75	31 - 130
Isophorone	100	73.4		ug/L		73	47 - 130
2-Methylnaphthalene	100	75.2		ug/L		75	40 - 130
2-Methylphenol	100	78.1		ug/L		78	40 - 130
3 & 4 Methylphenol	100	77.5		ug/L		77	42 - 130
2-Nitroaniline	100	79.3		ug/L		79	51 - 130
3-Nitroaniline	100	85.6		ug/L		86	53 - 130
4-Nitroaniline	100	79.6		ug/L		80	49 - 130
Nitrobenzene	100	68.2		ug/L		68	43 - 130
2-Nitrophenol	100	70.9		ug/L		71	43 - 130
4-Nitrophenol	200	167		ug/L		83	44 - 130
N-Nitrosodi-n-propylamine	100	85.6		ug/L		86	42 - 130
N-Nitrosodiphenylamine	100	88.4		ug/L		88	50 - 130
Pentachlorophenol	200	175		ug/L		87	33 - 130
Phenanthrene	100	90.4		ug/L		90	51 - 130
Phenol	100	69.0		ug/L		69	35 - 130
Pyrene	100	95.5		ug/L		96	52 - 130
1,2,4-Trichlorobenzene	100	63.0		ug/L		63	33 - 130
2,4,5-Trichlorophenol	100	83.8		ug/L		84	48 - 130
2,4,6-Trichlorophenol	100	88.2		ug/L		88	47 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*83*		*32 - 113*
2-Fluorophenol	*71*		*26 - 109*
Nitrobenzene-d5	*71*		*32 - 118*
Phenol-d5	*77*		*27 - 110*
Terphenyl-d14	*94*		*10 - 126*
2,4,6-Tribromophenol	*83*		*39 - 124*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 460-684564/1-A
Matrix: Water
Analysis Batch: 684764

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 684564

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:56	03/31/20 11:58	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:56	03/31/20 11:58	1

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	73		41 - 144	03/30/20 08:56	03/31/20 11:58	1
Terphenyl-d14	87			03/30/20 08:56	03/31/20 11:58	1

Lab Sample ID: LCS 460-684564/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 684640 — **Prep Batch: 684564**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	0.800	0.664		ug/L		83	10 - 150
Naphthalene	0.800	0.687		ug/L		86	33 - 124

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5	100		41 - 144
Terphenyl-d14	108		

Lab Sample ID: LCSD 460-684564/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 684640 — **Prep Batch: 684564**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	0.800	0.735		ug/L		92	10 - 150	10	30
Naphthalene	0.800	0.698		ug/L		87	33 - 124	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Nitrobenzene-d5	95		41 - 144
Terphenyl-d14	101		

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-613972/33 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 613972

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			04/04/20 00:46	1

Lab Sample ID: LCS 680-613972/34 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 613972

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	10.0	9.94		mg/L		99	90 - 110

Lab Sample ID: LCSD 680-613972/35 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 613972

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	10.0	9.94		mg/L		99	90 - 110	0	15

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 680-182103-8 MS
Matrix: Water
Analysis Batch: 613972

Client Sample ID: PW-6C (032520)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	13		10.0	23.6		mg/L		102	80 - 120

Lab Sample ID: 680-182103-8 MSD
Matrix: Water
Analysis Batch: 613972

Client Sample ID: PW-6C (032520)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	13		10.0	23.6		mg/L		103	80 - 120	0	15

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 550-206823/1002
Matrix: Water
Analysis Batch: 206823

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/30/20 23:04	1

Lab Sample ID: LCS 550-206823/4
Matrix: Water
Analysis Batch: 206823

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	25.0		ug/L		100	85 - 115

Lab Sample ID: LCSD 550-206823/5
Matrix: Water
Analysis Batch: 206823

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
Perchlorate	25.0	24.9		ug/L		99	85 - 115	1	15

Lab Sample ID: MB 550-207036/1002
Matrix: Water
Analysis Batch: 207036

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			04/01/20 21:01	1

Lab Sample ID: LCS 550-207036/4
Matrix: Water
Analysis Batch: 207036

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.1		ug/L		96	85 - 115

Method: 314.0 - Perchlorate (IC) (Continued)

Lab Sample ID: LCSD 550-207036/5
Matrix: Water
Analysis Batch: 207036

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
Perchlorate			25.0	24.1		ug/L		96	85 - 115	0	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-613127/1-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<200		200	24	ug/L		03/29/20 13:03	03/30/20 22:30	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 22:30	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 22:30	1
Barium	<10		10	1.7	ug/L		03/29/20 13:03	03/30/20 22:30	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 22:30	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Calcium	<500		500	25	ug/L		03/29/20 13:03	03/30/20 22:30	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 22:30	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 22:30	1
Dissolved Iron	18.1	J	50	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Iron	18.1	J	50	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 22:30	1
Magnesium	<500		500	33	ug/L		03/29/20 13:03	03/30/20 22:30	1
Manganese	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 22:30	1
Potassium	<1000		1000	17	ug/L		03/29/20 13:03	03/30/20 22:30	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 22:30	1
Silver	0.798	J	10	0.60	ug/L		03/29/20 13:03	03/30/20 22:30	1
Sodium	<1000		1000	480	ug/L		03/29/20 13:03	03/30/20 22:30	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 22:30	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 22:30	1

Lab Sample ID: LCS 680-613127/2-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum			5000	4840		ug/L		97	80 - 120
Antimony			50.0	44.7		ug/L		89	80 - 120
Arsenic			100	103		ug/L		103	80 - 120
Barium			100	96.9		ug/L		97	80 - 120
Beryllium			50.0	53.8		ug/L		108	80 - 120
Cadmium			50.0	51.6		ug/L		103	80 - 120
Calcium			5000	4830		ug/L		97	80 - 120
Chromium			100	97.8		ug/L		98	80 - 120
Cobalt			50.1	51.8		ug/L		103	80 - 120
Copper			100	96.4		ug/L		96	80 - 120
Dissolved Iron			5010	4870		ug/L		97	80 - 120

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-613127/2-A
Matrix: Water
Analysis Batch: 613384

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 613127

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4870		ug/L		97	80 - 120
Lead	454	442		ug/L		97	80 - 120
Magnesium	5010	4860		ug/L		97	80 - 120
Manganese	400	389		ug/L		97	80 - 120
Nickel	99.5	95.3		ug/L		96	80 - 120
Potassium	8000	7260		ug/L		91	80 - 120
Selenium	100	103		ug/L		103	80 - 120
Silver	50.0	49.0		ug/L		98	80 - 120
Sodium	5040	4680		ug/L		93	80 - 120
Thallium	40.0	39.9		ug/L		100	80 - 120
Vanadium	99.8	96.2		ug/L		96	80 - 120
Zinc	101	97.9		ug/L		97	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 680-613438/1-A
Matrix: Water
Analysis Batch: 613671

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613438

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 16:00	1

Lab Sample ID: LCS 680-613438/2-A
Matrix: Water
Analysis Batch: 613671

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613438

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.61		ug/L		105	80 - 120

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-613757/2
Matrix: Water
Analysis Batch: 613757

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			04/01/20 17:15	1

Lab Sample ID: LCS 680-613757/3
Matrix: Water
Analysis Batch: 613757

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	19.5		mg/L		97	80 - 120

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCSD 680-613757/4
Matrix: Water
Analysis Batch: 613757

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon			20.0	19.7		mg/L		98	80 - 120	1	25

GC/MS VOA

Leach Batch: 613667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 680-613667/1-A	Method Blank	Total/NA	Water	1311	

Analysis Batch: 613993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	8260B	
680-182103-2	SW-2B (032520)	Total/NA	Water	8260B	
680-182103-3	SW-6B (032520)	Total/NA	Water	8260B	
680-182103-4	SW-6C (032520)	Total/NA	Water	8260B	
680-182103-5	SW-6D (032520)	Total/NA	Water	8260B	
680-182103-6	SW-7B (032520)	Total/NA	Water	8260B	
680-182103-7	PW-2B (032520)	Total/NA	Water	8260B	
680-182103-8	PW-6C (032520)	Total/NA	Water	8260B	
680-182103-9	PW-6D (032520)	Total/NA	Water	8260B	
680-182103-11	Trip Blank	Total/NA	Water	8260B	
MB 680-613993/10	Method Blank	Total/NA	Water	8260B	
LCS 680-613993/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-613993/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 614058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-8 - DL	PW-6C (032520)	Total/NA	Water	8260B	
680-182103-9 - DL	PW-6D (032520)	Total/NA	Water	8260B	
LB 680-613667/1-A	Method Blank	Total/NA	Water	8260B	613667
MB 680-614058/10	Method Blank	Total/NA	Water	8260B	
LCS 680-614058/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-614058/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 614064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-10	DUP-04 (032520)	Total/NA	Water	8260B	
MB 680-614064/10	Method Blank	Total/NA	Water	8260B	
LCS 680-614064/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-614064/5	Lab Control Sample Dup	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 613607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	3520C	
680-182103-2	SW-2B (032520)	Total/NA	Water	3520C	
680-182103-7	PW-2B (032520)	Total/NA	Water	3520C	
680-182103-10	DUP-04 (032520)	Total/NA	Water	3520C	
MB 680-613607/14-A	Method Blank	Total/NA	Water	3520C	
LCS 680-613607/15-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 614121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	8270D	613607
680-182103-2	SW-2B (032520)	Total/NA	Water	8270D	613607
680-182103-7	PW-2B (032520)	Total/NA	Water	8270D	613607
680-182103-10	DUP-04 (032520)	Total/NA	Water	8270D	613607

GC/MS Semi VOA (Continued)

Analysis Batch: 614121 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-613607/14-A	Method Blank	Total/NA	Water	8270D	613607
LCS 680-613607/15-A	Lab Control Sample	Total/NA	Water	8270D	613607

Prep Batch: 684564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-3	SW-6B (032520)	Total/NA	Water	3510C	
680-182103-4	SW-6C (032520)	Total/NA	Water	3510C	
680-182103-5	SW-6D (032520)	Total/NA	Water	3510C	
680-182103-6	SW-7B (032520)	Total/NA	Water	3510C	
680-182103-8	PW-6C (032520)	Total/NA	Water	3510C	
680-182103-9	PW-6D (032520)	Total/NA	Water	3510C	
MB 460-684564/1-A	Method Blank	Total/NA	Water	3510C	
LCS 460-684564/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 460-684564/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 684640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 460-684564/2-A	Lab Control Sample	Total/NA	Water	8270D SIM	684564
LCSD 460-684564/3-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	684564

Analysis Batch: 684764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-3	SW-6B (032520)	Total/NA	Water	8270D SIM	684564
680-182103-4	SW-6C (032520)	Total/NA	Water	8270D SIM	684564
680-182103-5	SW-6D (032520)	Total/NA	Water	8270D SIM	684564
680-182103-6	SW-7B (032520)	Total/NA	Water	8270D SIM	684564
680-182103-8	PW-6C (032520)	Total/NA	Water	8270D SIM	684564
680-182103-9	PW-6D (032520)	Total/NA	Water	8270D SIM	684564
MB 460-684564/1-A	Method Blank	Total/NA	Water	8270D SIM	684564

HPLC/IC

Analysis Batch: 206823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	314.0	
680-182103-2	SW-2B (032520)	Total/NA	Water	314.0	
680-182103-3	SW-6B (032520)	Total/NA	Water	314.0	
680-182103-4	SW-6C (032520)	Total/NA	Water	314.0	
680-182103-5	SW-6D (032520)	Total/NA	Water	314.0	
680-182103-6	SW-7B (032520)	Total/NA	Water	314.0	
680-182103-7	PW-2B (032520)	Total/NA	Water	314.0	
680-182103-8	PW-6C (032520)	Total/NA	Water	314.0	
680-182103-10	DUP-04 (032520)	Total/NA	Water	314.0	
MB 550-206823/1002	Method Blank	Total/NA	Water	314.0	
LCS 550-206823/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-206823/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 207036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-9	PW-6D (032520)	Total/NA	Water	314.0	
MB 550-207036/1002	Method Blank	Total/NA	Water	314.0	

HPLC/IC (Continued)

Analysis Batch: 207036 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 550-207036/4	Lab Control Sample	Total/NA	Water	314.0	
LCSD 550-207036/5	Lab Control Sample Dup	Total/NA	Water	314.0	

Analysis Batch: 613972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-7	PW-2B (032520)	Total/NA	Water	300.0-1993 R2.1	
680-182103-8	PW-6C (032520)	Total/NA	Water	300.0-1993 R2.1	
680-182103-9	PW-6D (032520)	Total/NA	Water	300.0-1993 R2.1	
MB 680-613972/33	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-613972/34	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-613972/35	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	
680-182103-8 MS	PW-6C (032520)	Total/NA	Water	300.0-1993 R2.1	
680-182103-8 MSD	PW-6C (032520)	Total/NA	Water	300.0-1993 R2.1	

Metals

Prep Batch: 613127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total Recoverable	Water	3005A	
680-182103-2	SW-2B (032520)	Total Recoverable	Water	3005A	
680-182103-7	PW-2B (032520)	Dissolved	Water	3005A	
680-182103-7	PW-2B (032520)	Total Recoverable	Water	3005A	
680-182103-8	PW-6C (032520)	Dissolved	Water	3005A	
680-182103-9	PW-6D (032520)	Dissolved	Water	3005A	
680-182103-10	DUP-04 (032520)	Total Recoverable	Water	3005A	
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 613384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total Recoverable	Water	6010C	613127
680-182103-2	SW-2B (032520)	Total Recoverable	Water	6010C	613127
680-182103-7	PW-2B (032520)	Dissolved	Water	6010C	613127
680-182103-7	PW-2B (032520)	Total Recoverable	Water	6010C	613127
680-182103-8	PW-6C (032520)	Dissolved	Water	6010C	613127
680-182103-9	PW-6D (032520)	Dissolved	Water	6010C	613127
680-182103-10	DUP-04 (032520)	Total Recoverable	Water	6010C	613127
MB 680-613127/1-A	Method Blank	Total Recoverable	Water	6010C	613127
LCS 680-613127/2-A	Lab Control Sample	Total Recoverable	Water	6010C	613127

Prep Batch: 613438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	7470A	
680-182103-2	SW-2B (032520)	Total/NA	Water	7470A	
680-182103-7	PW-2B (032520)	Total/NA	Water	7470A	
680-182103-10	DUP-04 (032520)	Total/NA	Water	7470A	
MB 680-613438/1-A	Method Blank	Total/NA	Water	7470A	
LCS 680-613438/2-A	Lab Control Sample	Total/NA	Water	7470A	

QC Association Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-182103-1
Project/Site: ATK Orbital, Elkton MD

Metals

Analysis Batch: 613671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-1	SW-1C (032520)	Total/NA	Water	7470A	613438
680-182103-2	SW-2B (032520)	Total/NA	Water	7470A	613438
680-182103-7	PW-2B (032520)	Total/NA	Water	7470A	613438
680-182103-10	DUP-04 (032520)	Total/NA	Water	7470A	613438
MB 680-613438/1-A	Method Blank	Total/NA	Water	7470A	613438
LCS 680-613438/2-A	Lab Control Sample	Total/NA	Water	7470A	613438

General Chemistry

Analysis Batch: 613757

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182103-7	PW-2B (032520)	Total/NA	Water	5310 B-2011	
680-182103-8	PW-6C (032520)	Total/NA	Water	5310 B-2011	
680-182103-9	PW-6D (032520)	Total/NA	Water	5310 B-2011	
MB 680-613757/2	Method Blank	Total/NA	Water	5310 B-2011	
LCS 680-613757/3	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-613757/4	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)

Lab Sample ID: 680-182103-1

Date Collected: 03/25/20 11:30
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 18:55	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3520C			1027.6 mL	1 mL	613607	04/01/20 18:31	EHS	TAL SAV
Total/NA	Analysis	8270D		1			614121	04/06/20 19:52	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	314.0		1			206823	03/31/20 04:48	NEL	TAL PHX
	Instrument ID: IC4									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:25	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613438	03/31/20 13:20	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 17:13	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: SW-2B (032520)

Lab Sample ID: 680-182103-2

Date Collected: 03/25/20 13:00
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 19:19	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3520C			1038.7 mL	1 mL	613607	04/01/20 18:31	EHS	TAL SAV
Total/NA	Analysis	8270D		1			614121	04/06/20 20:15	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	314.0		1			206823	03/31/20 05:11	NEL	TAL PHX
	Instrument ID: IC4									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:30	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613438	03/31/20 13:20	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 17:26	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: SW-6B (032520)

Lab Sample ID: 680-182103-3

Date Collected: 03/25/20 11:00
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 19:42	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 15:30	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 05:34	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: SW-6C (032520)

Lab Sample ID: 680-182103-4

Date Collected: 03/25/20 10:00

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 20:05	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 15:51	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 05:57	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: SW-6D (032520)

Lab Sample ID: 680-182103-5

Date Collected: 03/25/20 09:25

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 20:28	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 16:13	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 06:20	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: SW-7B (032520)

Lab Sample ID: 680-182103-6

Date Collected: 03/25/20 12:05

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 20:52	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 16:34	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	314.0		1			206823	03/31/20 06:43	NEL	TAL PHX
	Instrument ID: IC4									

Client Sample ID: PW-2B (032520)

Lab Sample ID: 680-182103-7

Date Collected: 03/25/20 13:00

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 21:15	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3520C			1025.7 mL	1 mL	613607	04/01/20 18:31	EHS	TAL SAV
Total/NA	Analysis	8270D		1			614121	04/06/20 20:37	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613972	04/04/20 05:12	CS	TAL SAV
	Instrument ID: CICK									

Client Sample ID: PW-2B (032520)

Lab Sample ID: 680-182103-7

Date Collected: 03/25/20 13:00

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	314.0		1			206823	03/31/20 07:06	NEL	TAL PHX
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/30/20 23:44	BCB	TAL SAV
	Instrument ID: ICPE									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:34	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613438	03/31/20 13:20	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 17:30	BCB	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613757	04/01/20 19:29	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: PW-6C (032520)

Lab Sample ID: 680-182103-8

Date Collected: 03/25/20 10:00

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	614058	04/06/20 20:22	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 21:38	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 16:55	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613972	04/04/20 04:21	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		1			206823	03/31/20 07:29	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/30/20 23:48	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613757	04/01/20 19:46	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: PW-6D (032520)

Lab Sample ID: 680-182103-9

Date Collected: 03/25/20 09:25

Matrix: Water

Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	5	5 mL	5 mL	614058	04/06/20 20:46	P1C	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 22:01	Y1S	TAL SAV
	Instrument ID: CMSB									

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 680-182103-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: PW-6D (032520)
Lab Sample ID: 680-182103-9

Date Collected: 03/25/20 09:25
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			250 mL	2 mL	684564	03/30/20 08:57	OTS	TAL EDI
Total/NA	Analysis	8270D SIM		1			684764	03/31/20 17:17	CAZ	TAL EDI
	Instrument ID: CBNAMS9									
Total/NA	Analysis	300.0-1993 R2.1		1	5 mL	5 mL	613972	04/04/20 05:24	CS	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	314.0		10			207036	04/01/20 22:32	NEL	TAL PHX
	Instrument ID: IC4									
Dissolved	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Dissolved	Analysis	6010C		1			613384	03/31/20 00:02	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Analysis	5310 B-2011		1	40 mL	40 mL	613757	04/01/20 20:04	RKJ	TAL SAV
	Instrument ID: TOC7									

Client Sample ID: DUP-04 (032520)
Lab Sample ID: 680-182103-10

Date Collected: 03/25/20 12:00
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	614064	04/06/20 15:15	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3520C			1027.2 mL	1 mL	613607	04/01/20 18:31	EHS	TAL SAV
Total/NA	Analysis	8270D		1			614121	04/06/20 20:59	T1C	TAL SAV
	Instrument ID: CMSE									
Total/NA	Analysis	314.0		1			206823	03/31/20 08:14	NEL	TAL PHX
	Instrument ID: IC4									
Total Recoverable	Prep	3005A			50 mL	50 mL	613127	03/29/20 13:03	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			613384	03/30/20 23:39	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	7470A			50 mL	50 mL	613438	03/31/20 13:20	BCB	TAL SAV
Total/NA	Analysis	7470A		1			613671	04/01/20 17:09	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: Trip Blank
Lab Sample ID: 680-182103-11

Date Collected: 03/25/20 00:00
Matrix: Water
Date Received: 03/27/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	613993	04/04/20 18:09	Y1S	TAL SAV
	Instrument ID: CMSB									

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Baltimore #201

Chain of Custody Record

397793

eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-25-20	COC No:
Company Name: Arcadis Inc.	Tel/Email:	Lab Contact:	Carrier:	_____ of _____ COCs
Address: 7550 Teaquer Rd. Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton MD	☐ 2 days			Job / SDG No.:
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOC 8260B	1,4-Dioxane	Perchlorate 314.0	8270D SVOC	6010C dissolved iron	6010C 7470A Metals	300 ORGFM Sulfate	SM5310 TOC	Sample Specific Notes:
SW-1C (032520)	3-25-20	1130	G	GW	7			3		1	2		1			dissolved iron is filtered
SW-2B (032520)		1300			7			3		1	2		1			
SW-6B (032520)		1400			6			3	2	1						
SW-6C (032520)		1000			6			3	2	1						
SW-6D (032520)		0925			6			3	2	1						
SW-7B (032520)		1205			6			3	2	1						
PW-2B (032520)		1300			12	1		3		1	2	1	1	1	3	
PW-6C (032520)		1000			11	1		3	2	1		1		1	3	
PW-6D (032520)		0925			11	1		3	2	1		1		1	3	
DUP-04 (032520)	3-25-20	1200	G	GW	7			3		1	2		1			
Trip Blank					2			2								

680-182103 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

1.2/1.6 0.9/1.3

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Arcadis	3-25-20 0000		EA	3/26/20 1000
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	EA	3/26/20 1700		TA	3.27.20 900
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605660.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/8/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X			
SW-6B (032520) (680-182103-3)	3/25/20	11:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-6C (032520) (680-182103-4)	3/25/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-6D (032520) (680-182103-5)	3/25/20	09:25 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-7B (032520) (680-182103-6)	3/25/20	12:05 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
PW-6C (032520) (680-182103-8)	3/25/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
PW-6D (032520) (680-182103-9)	3/25/20	09:25 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	3-27-20 1600	TA	Josiah D	3.28.20 1130	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: IR11 3.9°C VIA FedEx

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/8/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SW-1C (032520) (680-182103-1)	3/25/20	11:30 Eastern		Water			X	1	
SW-2B (032520) (680-182103-2)	3/25/20	13:00 Eastern		Water			X	1	
SW-6B (032520) (680-182103-3)	3/25/20	11:00 Eastern		Water			X	1	
SW-6C (032520) (680-182103-4)	3/25/20	10:00 Eastern		Water			X	1	
SW-6D (032520) (680-182103-5)	3/25/20	09:25 Eastern		Water			X	1	
SW-7B (032520) (680-182103-6)	3/25/20	12:05 Eastern		Water			X	1	
PW-2B (032520) (680-182103-7)	3/25/20	13:00 Eastern		Water			X	1	
PW-6C (032520) (680-182103-8)	3/25/20	10:00 Eastern		Water			X	1	
PW-6D (032520) (680-182103-9)	3/25/20	09:25 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3-27-20 1600	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company TAMA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (0.8°C) RESAT

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/8/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
DUP-04 (032520) (680-182103-10)	3/25/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the labo

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-182103-1

Login Number: 182103

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Sims, Robert D

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	Containers received broken. No volume could be salvaged for analysis.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 680-182103-1

Login Number: 182103
List Number: 3
Creator: Rivera, Kenneth

List Source: Eurofins TestAmerica, Edison
List Creation: 03/28/20 03:20 PM

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	3.9°C, IR #11
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: ARCADIS U.S., Inc.

Job Number: 680-182103-1

Login Number: 182103
List Number: 2
Creator: Doerr, Bret C

List Source: Eurofins TestAmerica, Phoenix
List Creation: 03/28/20 09:55 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 680-182103-1
Project/Site: ATK Orbital, Elkton MD

Laboratory: Eurofins TestAmerica, Savannah

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

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Phoenix

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Environmental Lead Laboratory Accreditation Program (ELLAP)	154268	10-01-21
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	154268	10-01-21
Arizona	State	AZ0728	06-08-20
California	Los Angeles County Sanitation Districts	9254471	06-10-20
California	State	2941	06-11-20
Nevada	State	AZ1030	08-09-20
Oregon	NELAP	AZ100001	03-09-20 *
USDA	US Federal Programs	P330-19-00227	08-27-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

APPENDIX F

Data Validation Reports

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatile, Metals and Miscellaneous Analyses

SDG #680-181769-1

Analyses Performed By:
Test America

Savannah, GA

Report #36740R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-181769-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
GM-1B (031720)	680-181769-1	WG	3/17/2020		X	X		X	X
GM-4B (031720)	680-181769-2	WG	3/17/2020		X	X			X
GM-10S (031720)	680-181769-3	WG	3/17/2020		X	X		X	X
GM-14M (031720)	680-181769-4	WG	3/17/2020		X	X		X	X
GM-14S (031720)	680-181769-5	WG	3/17/2020		X	X			X
GM-15M (031720)	680-181769-6	WG	3/17/2020		X				X
DUP-01 (031720)	680-181769-7	WG	3/17/2020	GM-14M (031720)	X	X		X	X
TRIP BLANK (03172020)	680-181769-8	WQ	3/17/2020		X				

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
All field samples	1,2-Dichloroethane-d4	AC
	4-Bromofluorobenzene	AC
	Dibromofluoromethane	>UL
	Toluene-d8	>UL
Trip Blank	1,2-Dichloroethane-d4	AC

Sample Locations	Surrogate	Recovery
Trip Blank	4-Bromofluorobenzene	AC
	Dibromofluoromethane	>UL
	Toluene-d8	AC

Notes:

UL Upper control limit

AC Acceptable

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J
< LL but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Surrogates diluted below the calibration curve due to the high concentration of a target compounds	Non-detect	UJ[1]
	Detect	J[1]

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
All field samples	Bromomethane	>UL	>UL
	2,2-Dichloropropane	>UL	>UL
	Vinyl Acetate	>UL	AC

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
GM-14M / DUP-01	cis-1,2-Dichloroethene	190	190	0.0%
	1,1-Dichloroethane	6.7	6.8	1.5%
	1,2-Dichloroethane	0.74 J	0.73 J	AC
	1,1-Dichloroethene	21	20	4.9%
	1,2-Dichloroethene	190	190	0.0%
	trans-1,2-Dichloroethene	0.8 J	0.89 J	AC
	1,1,1-Trichloroethane	1.8	1.0 U	AC
	Trichloroethene	59	58	1.7%
	Vinyl chloride	10	9.7	3.0%

Notes:

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AC	Acceptable			

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
GM-14M / DUP-01	1,4-Dioxane	3.0	2.8	6.9%

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
GM-14M / DUP-01	Iron, Dissolved	8800	8800	0.0%

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X		X	
C. Equipment/Field Blanks	X				X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location GM-1B for TOC exhibited recoveries and RPDs within the control limits.

4.1 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
MW-14M / DUP-01	Perchlorate	U	U	AC
	Sulfate	6.0	5.8	3.4%
	TOC	1.7	1.7	AC

Notes:

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 4, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 5, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

397787 eurofins | Environment Testing TestAmerica

Baltimore #201

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-17-20	COC No:
Company Name: Arcadis	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD, 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO # 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	8260 B - VOC	8270D SIM 1,4 Dioxane	314.0 Perchlorate	6010C - Dissolved Iron	SM5310 TOC	300 ORGFM Sulfate	Sample Specific Notes:
GM-1B (031720)	3-17-20	1220	G	GW	11	1		3	2	1	1	3	1	Dissolved Iron = filtered
GM-4B (031720)		1340			6			3	2	1				
GM-10S (031720)		1430			11	1		3	2	1	1	3	1	
GM-14M (031720)		1030			11	1		3	2	1	1	3	1	
GM-14S (031720)		1005			6			3	2	1				
GM-15M (031720)		1215			4			3		1				
DUP-01 (031720)	3-17-20	1200	G	GW	11	1		3	2	1	1	3	1	
Trip Blank	-	-	-	-	2			2						

680-181769 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

4.8/5.2, 1.3/1.7

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Arcadis	3-18/0600		3/18/20 16:00	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	E+A	3/18/20 1700			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
				SAV	3-19-2020 / 0845

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604701.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181769-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 3/31/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-1B (031720) (680-181769-1)	3/17/20	12:20 Eastern		Water			X	1	
GM-4B (031720) (680-181769-2)	3/17/20	13:40 Eastern		Water			X	1	
GM-10S (031720) (680-181769-3)	3/17/20	14:30 Eastern		Water			X	1	
GM-14M (031720) (680-181769-4)	3/17/20	10:30 Eastern		Water			X	1	
GM-14S (031720) (680-181769-5)	3/17/20	10:05 Eastern		Water			X	1	
GM-15M (031720) (680-181769-6)	3/17/20	12:15 Eastern		Water			X	1	
DUP-01 (031720) (680-181769-7)	3/17/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		3-19-20 1700				
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3/20/20 9130	Company TA-PHL

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
	Yes	1.7c

Ver: 01/16/2019

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 19:13	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 19:13	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 19:13	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 19:13	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 19:13	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 19:13	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 19:13	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 19:13	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 19:13	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
cis-1,2-Dichloroethene	**2.6**	J	1.0	0.41	ug/L			03/28/20 19:13	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 19:13	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 19:13	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 19:13	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 19:13	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 19:13	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 19:13	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 19:13	1
1,1-Dichloroethane	**1.0**	J	1.0	0.38	ug/L			03/28/20 19:13	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
1,1-Dichloroethene	**3.3**	J	1.0	0.36	ug/L			03/28/20 19:13	1
1,2-Dichloroethene, Total	**2.6**	J	2.0	0.37	ug/L			03/28/20 19:13	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 19:13	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 19:13	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 19:13	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 19:13	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 19:13	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 19:13	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 19:13	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 19:13	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:13	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 19:13	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 19:13	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 19:13	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 19:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 19:13	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 19:13	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 19:13	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 19:13	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:13	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:13	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 19:13	1
Trichloroethene	**50**	J	1.0	0.48	ug/L			03/28/20 19:13	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 19:13	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 19:13	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:13	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 19:13	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 19:13	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 19:13	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 19:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*119*		*80 - 120*		*03/28/20 19:13*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 19:13*	*1*
Dibromofluoromethane (Surr)	*142*	*X*	*80 - 122*		*03/28/20 19:13*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/28/20 19:13*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 02:45	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 02:45	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 02:45	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 02:45	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 02:45	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 02:45	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 02:45	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 02:45	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
cis-1,2-Dichloroethene	**1.6**	**H**	1.0	0.41	ug/L			04/01/20 02:45	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 02:45	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 02:45	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 02:45	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 02:45	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 02:45	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 02:45	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 02:45	1
1,1-Dichloroethane	**0.81**	**J H**	1.0	0.38	ug/L			04/01/20 02:45	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
1,1-Dichloroethene	**2.2**	**H**	1.0	0.36	ug/L			04/01/20 02:45	1
1,2-Dichloroethene, Total	**1.6**	**J H**	2.0	0.37	ug/L			04/01/20 02:45	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 02:45	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 02:45	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 02:45	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 02:45	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 02:45	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 02:45	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 02:45	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 02:45	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 02:45	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 02:45	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 02:45	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 02:45	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 02:45	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 02:45	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 02:45	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 02:45	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 02:45	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 02:45	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 02:45	1
Trichloroethene	**41**	**H**	1.0	0.48	ug/L			04/01/20 02:45	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 02:45	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 02:45	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 02:45	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 02:45	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 02:45	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 02:45	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 02:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 02:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*04/01/20 02:45*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-1B (031720)
Date Collected: 03/17/20 12:20
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/01/20 02:45*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/01/20 02:45*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**2.3**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:02	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*81*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:02*	*1*
Terphenyl-d14	*80*			*03/23/20 14:46*	*03/24/20 03:02*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**1.7**		1.0	0.40	mg/L			03/26/20 17:49	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**94**		10	3.1	ug/L			03/25/20 05:29	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/20/20 13:04	03/22/20 14:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.53**	**J**	1.0	0.50	mg/L			03/27/20 05:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 19:37	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 19:37	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/28/20 19:37	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 19:37	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 19:37	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 19:37	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 19:37	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 19:37	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 19:37	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 19:37	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 19:37	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 19:37	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 19:37	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 19:37	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 19:37	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 19:37	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 19:37	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 19:37	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 19:37	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 19:37	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 19:37	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 19:37	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/28/20 19:37	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 19:37	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 19:37	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 19:37	1
Methyl tert-butyl ether	**0.80**	**J**	10	0.30	ug/L			03/28/20 19:37	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 19:37	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:37	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 19:37	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 19:37	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 19:37	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 19:37	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 19:37	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 19:37	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 19:37	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 19:37	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 19:37	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 19:37	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 19:37	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 19:37	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 19:37	1
Trichloroethene	**5.1**	J	1.0	0.48	ug/L			03/28/20 19:37	1
Trichlorofluoromethane	**0.93**	**J**	1.0	0.42	ug/L			03/28/20 19:37	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 19:37	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 19:37	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 19:37	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 19:37	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 19:37	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 19:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*121*	*X*	*80 - 120*		*03/28/20 19:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*03/28/20 19:37*	*1*
Dibromofluoromethane (Surr)	*143*	*X*	*80 - 122*		*03/28/20 19:37*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/28/20 19:37*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:08	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:08	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:08	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:08	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:08	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:08	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:08	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:08	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
cis-1,2-Dichloroethene	<1.0	H	1.0	0.41	ug/L			04/01/20 03:08	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:08	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:08	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:08	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:08	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:08	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:08	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:08	1
1,1-Dichloroethane	<1.0	H	1.0	0.38	ug/L			04/01/20 03:08	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
1,1-Dichloroethene	<1.0	H	1.0	0.36	ug/L			04/01/20 03:08	1
1,2-Dichloroethene, Total	<2.0	H	2.0	0.37	ug/L			04/01/20 03:08	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:08	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:08	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:08	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:08	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:08	1
Methyl tert-butyl ether	**0.70**	**J H**	10	0.30	ug/L			04/01/20 03:08	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:08	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:08	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:08	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:08	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:08	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:08	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:08	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:08	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:08	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:08	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:08	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:08	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:08	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:08	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:08	1
Trichloroethene	**4.3**	**H**	1.0	0.48	ug/L			04/01/20 03:08	1
Trichlorofluoromethane	**0.67**	**J H**	1.0	0.42	ug/L			04/01/20 03:08	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:08	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:08	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:08	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:08	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 03:08	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 03:08*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/01/20 03:08*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-4B (031720)
Date Collected: 03/17/20 13:40
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 03:08*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/01/20 03:08*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**0.40**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:23	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*89*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:23*	*1*
Terphenyl-d14	*88*			*03/23/20 14:46*	*03/24/20 03:23*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.0**	~~cn~~	1.0	0.31	ug/L			03/24/20 03:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:00	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:00	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:00	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:00	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:00	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 20:00	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:00	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:00	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 20:00	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:00	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:00	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:00	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:00	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:00	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:00	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:00	1
1,1-Dichloroethane	**5.1**	J	1.0	0.38	ug/L			03/28/20 20:00	1
1,2-Dichloroethane	**1.0**	J	1.0	0.50	ug/L			03/28/20 20:00	1
1,1-Dichloroethene	**33**	J	1.0	0.36	ug/L			03/28/20 20:00	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 20:00	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:00	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:00	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:00	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:00	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:00	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:00	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:00	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:00	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:00	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:00	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:00	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:00	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:00	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:00	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 20:00	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 20:00	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:00	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:00	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:00	1
Trichloroethene	**12**	J	1.0	0.48	ug/L			03/28/20 20:00	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:00	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:00	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:00	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:00	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/28/20 20:00	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 20:00	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*117*		*80 - 120*		*03/28/20 20:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:00*	*1*
Dibromofluoromethane (Surr)	*139*	*X*	*80 - 122*		*03/28/20 20:00*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*03/28/20 20:00*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:31	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:31	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:31	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:31	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:31	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:31	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:31	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:31	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
cis-1,2-Dichloroethene	<1.0	H	1.0	0.41	ug/L			04/01/20 03:31	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:31	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:31	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:31	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)
Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:31	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:31	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:31	1
1,1-Dichloroethane	**3.9**	**H**	1.0	0.38	ug/L			04/01/20 03:31	1
1,2-Dichloroethane	**0.83**	**J H**	1.0	0.50	ug/L			04/01/20 03:31	1
1,1-Dichloroethene	**25**	**H**	1.0	0.36	ug/L			04/01/20 03:31	1
1,2-Dichloroethene, Total	<2.0	H	2.0	0.37	ug/L			04/01/20 03:31	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:31	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:31	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:31	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:31	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:31	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 03:31	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:31	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:31	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:31	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:31	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:31	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:31	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:31	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:31	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:31	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:31	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:31	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:31	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:31	1
Trichloroethene	**11**	**H**	1.0	0.48	ug/L			04/01/20 03:31	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 03:31	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:31	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:31	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:31	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:31	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 03:31	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 03:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*04/01/20 03:31*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-10S (031720)

Date Collected: 03/17/20 14:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 03:31*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/01/20 03:31*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**4.7**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 03:45	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 03:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*83*		*41 - 144*	*03/23/20 14:46*	*03/24/20 03:45*	*1*
Terphenyl-d14	*83*			*03/23/20 14:46*	*03/24/20 03:45*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.1**		1.0	0.40	mg/L			03/26/20 18:02	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**20**	**cn**	1.0	0.31	ug/L			03/24/20 03:27	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/20/20 13:04	03/24/20 12:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/27/20 06:30	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:24	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:24	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:24	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:24	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:24	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:24	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 20:24	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 20:24	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:24	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:24	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
cis-1,2-Dichloroethene	**190**	J	1.0	0.41	ug/L			03/28/20 20:24	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:24	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:24	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:24	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:24	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:24	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:24	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:24	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:24	1
1,1-Dichloroethane	**6.7**	J	1.0	0.38	ug/L			03/28/20 20:24	1
1,2-Dichloroethane	**0.74**	J	1.0	0.50	ug/L			03/28/20 20:24	1
1,1-Dichloroethene	**21**	J	1.0	0.36	ug/L			03/28/20 20:24	1
1,2-Dichloroethene, Total	**190**	J	2.0	0.37	ug/L			03/28/20 20:24	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:24	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:24	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 20:24	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:24	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:24	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:24	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:24	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:24	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:24	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:24	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:24	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:24	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:24	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:24	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:24	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:24	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 20:24	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 20:24	1
trans-1,2-Dichloroethene	**0.82**	J	1.0	0.37	ug/L			03/28/20 20:24	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:24	1
1,1,1-Trichloroethane	**1.8**	J	1.0	0.37	ug/L			03/28/20 20:24	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:24	1
Trichloroethene	**59**	J	1.0	0.48	ug/L			03/28/20 20:24	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:24	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:24	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:24	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:24	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 20:24	1
Vinyl chloride	**10**	J	1.0	0.50	ug/L			03/28/20 20:24	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*119*		*80 - 120*		*03/28/20 20:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:24*	*1*
Dibromofluoromethane (Surr)	*135*	*X*	*80 - 122*		*03/28/20 20:24*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/28/20 20:24*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 03:55	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 03:55	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:55	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 03:55	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 03:55	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 03:55	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 03:55	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 03:55	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 03:55	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:55	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
cis-1,2-Dichloroethene	**140**	H	1.0	0.41	ug/L			04/01/20 03:55	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 03:55	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 03:55	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 03:55	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 03:55	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 03:55	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 03:55	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 03:55	1
1,1-Dichloroethane	**5.3**	**H**	1.0	0.38	ug/L			04/01/20 03:55	1
1,2-Dichloroethane	**0.60**	**J H**	1.0	0.50	ug/L			04/01/20 03:55	1
1,1-Dichloroethene	**15**	**H**	1.0	0.36	ug/L			04/01/20 03:55	1
1,2-Dichloroethene, Total	**140**	**H**	2.0	0.37	ug/L			04/01/20 03:55	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 03:55	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 03:55	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 03:55	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 03:55	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 03:55	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 03:55	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 03:55	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:55	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 03:55	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 03:55	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:55	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 03:55	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 03:55	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 03:55	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 03:55	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 03:55	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 03:55	1
trans-1,2-Dichloroethene	**0.74**	**J H**	1.0	0.37	ug/L			04/01/20 03:55	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 03:55	1
1,1,1-Trichloroethane	**1.5**	**H**	1.0	0.37	ug/L			04/01/20 03:55	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 03:55	1
Trichloroethene	**51**	**H**	1.0	0.48	ug/L			04/01/20 03:55	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 03:55	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 03:55	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 03:55	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 03:55	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 03:55	1
Vinyl chloride	**8.8**	**H**	1.0	0.50	ug/L			04/01/20 03:55	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 03:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/01/20 03:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 03:55*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14M (031720)
Date Collected: 03/17/20 10:30
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 03:55*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/01/20 03:55*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**3.0**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:06	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*76*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:06*	*1*
Terphenyl-d14	*52*			*03/23/20 14:46*	*03/24/20 04:06*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**6.0**		1.0	0.40	mg/L			03/26/20 18:15	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0	cn	1.0	0.31	ug/L			03/24/20 03:50	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**8800**		50	17	ug/L		03/20/20 13:04	03/22/20 14:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.7**		1.0	0.50	mg/L			03/27/20 06:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 20:48	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 20:48	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 20:48	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 20:48	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 20:48	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 20:48	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 20:48	1
Chloroform	**0.68**	J	1.0	0.50	ug/L			03/28/20 20:48	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 20:48	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 20:48	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
cis-1,2-Dichloroethene	**35**	J	1.0	0.41	ug/L			03/28/20 20:48	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 20:48	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 20:48	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 20:48	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 20:48	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 20:48	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 20:48	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 20:48	1
1,1-Dichloroethane	**6.3**	J	1.0	0.38	ug/L			03/28/20 20:48	1
1,2-Dichloroethane	**3.4**	J	1.0	0.50	ug/L			03/28/20 20:48	1
1,1-Dichloroethene	**47**	J	1.0	0.36	ug/L			03/28/20 20:48	1
1,2-Dichloroethene, Total	**35**	J	2.0	0.37	ug/L			03/28/20 20:48	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 20:48	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 20:48	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 20:48	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 20:48	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 20:48	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 20:48	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 20:48	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:48	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 20:48	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 20:48	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 20:48	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 20:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 20:48	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 20:48	1
Tetrachloroethene	**0.89**	**J**	1.0	0.74	ug/L			03/28/20 20:48	1
Toluene	**2.0**	J	1.0	0.48	ug/L			03/28/20 20:48	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 20:48	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 20:48	1
1,1,1-Trichloroethane	**6.6**	J	1.0	0.37	ug/L			03/28/20 20:48	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 20:48	1
Trichloroethene	**160**	J	1.0	0.48	ug/L			03/28/20 20:48	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 20:48	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 20:48	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 20:48	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 20:48	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 20:48	1
Vinyl chloride	**5.3**	J	1.0	0.50	ug/L			03/28/20 20:48	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 20:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*115*		*80 - 120*		*03/28/20 20:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/28/20 20:48*	*1*
Dibromofluoromethane (Surr)	*133*	*X*	*80 - 122*		*03/28/20 20:48*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/28/20 20:48*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 04:18	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 04:18	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:18	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 04:18	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 04:18	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 04:18	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 04:18	1
Chloroform	**0.52**	**J H**	1.0	0.50	ug/L			04/01/20 04:18	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 04:18	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:18	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
cis-1,2-Dichloroethene	**24**	**H**	1.0	0.41	ug/L			04/01/20 04:18	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 04:18	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 04:18	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 04:18	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:18	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:18	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 04:18	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 04:18	1
1,1-Dichloroethane	**4.9**	**H**	1.0	0.38	ug/L			04/01/20 04:18	1
1,2-Dichloroethane	**2.5**	**H**	1.0	0.50	ug/L			04/01/20 04:18	1
1,1-Dichloroethene	**35**	**H**	1.0	0.36	ug/L			04/01/20 04:18	1
1,2-Dichloroethene, Total	**24**	**H**	2.0	0.37	ug/L			04/01/20 04:18	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 04:18	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 04:18	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 04:18	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 04:18	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 04:18	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 04:18	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:18	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:18	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 04:18	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 04:18	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:18	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:18	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:18	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 04:18	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 04:18	1
Toluene	**1.7**	**H**	1.0	0.48	ug/L			04/01/20 04:18	1
trans-1,2-Dichloroethene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:18	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:18	1
1,1,1-Trichloroethane	**4.5**	**H**	1.0	0.37	ug/L			04/01/20 04:18	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 04:18	1
Trichloroethene	**130**	**H**	1.0	0.48	ug/L			04/01/20 04:18	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 04:18	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 04:18	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:18	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 04:18	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 04:18	1
Vinyl chloride	**4.7**	**H**	1.0	0.50	ug/L			04/01/20 04:18	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 04:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*80 - 120*		*04/01/20 04:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*04/01/20 04:18*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-14S (031720)
Date Collected: 03/17/20 10:05
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/01/20 04:18*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/01/20 04:18*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.3**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:27	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:27*	*1*
Terphenyl-d14	*74*			*03/23/20 14:46*	*03/24/20 04:27*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**6.1**	~~cn~~	1.0	0.31	ug/L			03/24/20 04:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 21:11	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 21:11	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 21:11	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 21:11	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 21:11	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 21:11	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 21:11	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 21:11	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
cis-1,2-Dichloroethene	**0.77**	**J**	1.0	0.41	ug/L			03/28/20 21:11	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 21:11	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 21:11	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 21:11	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 21:11	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 21:11	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 21:11	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 21:11	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 21:11	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 21:11	1
1,2-Dichloroethene, Total	**1.5**	**J**	2.0	0.37	ug/L			03/28/20 21:11	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 21:11	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 21:11	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 21:11	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 21:11	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 21:11	1
Methyl tert-butyl ether	**0.66**	**J**	10	0.30	ug/L			03/28/20 21:11	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 21:11	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:11	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 21:11	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 21:11	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 21:11	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 21:11	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 21:11	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,1,2,2-Tetrachloroethane	**11**	J	1.0	0.62	ug/L			03/28/20 21:11	1
Tetrachloroethene	**2.1**	J	1.0	0.74	ug/L			03/28/20 21:11	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 21:11	1
trans-1,2-Dichloroethene	**0.69**	J	1.0	0.37	ug/L			03/28/20 21:11	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:11	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:11	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 21:11	1
Trichloroethene	**4.0**	J	1.0	0.48	ug/L			03/28/20 21:11	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 21:11	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 21:11	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:11	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 21:11	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 21:11	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 21:11	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*117*		*80 - 120*		*03/28/20 21:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*		*03/28/20 21:11*	*1*
Dibromofluoromethane (Surr)	*134*	*X*	*80 - 122*		*03/28/20 21:11*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/28/20 21:11*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 04:41	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:41	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 04:41	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 04:41	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 04:41	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 04:41	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 04:41	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:41	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
cis-1,2-Dichloroethene	**0.55**	J H	1.0	0.41	ug/L			04/01/20 04:41	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 04:41	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 04:41	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 04:41	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 04:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 04:41	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 04:41	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 04:41	1
1,1-Dichloroethane	<1.0	H	1.0	0.38	ug/L			04/01/20 04:41	1
1,2-Dichloroethane	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
1,1-Dichloroethene	<1.0	H	1.0	0.36	ug/L			04/01/20 04:41	1
1,2-Dichloroethene, Total	**1.1**	**J H**	2.0	0.37	ug/L			04/01/20 04:41	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 04:41	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 04:41	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 04:41	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 04:41	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 04:41	1
Methyl tert-butyl ether	**0.66**	**J H**	10	0.30	ug/L			04/01/20 04:41	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 04:41	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:41	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 04:41	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 04:41	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:41	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 04:41	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 04:41	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1,2,2-Tetrachloroethane	**11**	**H**	1.0	0.62	ug/L			04/01/20 04:41	1
Tetrachloroethene	**1.6**	**H**	1.0	0.74	ug/L			04/01/20 04:41	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 04:41	1
trans-1,2-Dichloroethene	**0.53**	**J H**	1.0	0.37	ug/L			04/01/20 04:41	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 04:41	1
1,1,1-Trichloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 04:41	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 04:41	1
Trichloroethene	**3.8**	**H**	1.0	0.48	ug/L			04/01/20 04:41	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 04:41	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 04:41	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 04:41	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 04:41	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 04:41	1
Vinyl chloride	<1.0	H	1.0	0.50	ug/L			04/01/20 04:41	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 04:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/01/20 04:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 04:41*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: GM-15M (031720)
Date Collected: 03/17/20 12:15
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 04:41*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/01/20 04:41*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	32	cn	1.0	0.31	ug/L			03/24/20 05:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 21:35	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 21:35	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 21:35	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 21:35	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 21:35	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 21:35	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 21:35	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 21:35	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 21:35	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 21:35	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
cis-1,2-Dichloroethene	**190**	J	1.0	0.41	ug/L			03/28/20 21:35	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 21:35	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 21:35	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 21:35	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 21:35	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 21:35	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 21:35	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 21:35	1
1,1-Dichloroethane	**6.8**	J	1.0	0.38	ug/L			03/28/20 21:35	1
1,2-Dichloroethane	**0.73**	J	1.0	0.50	ug/L			03/28/20 21:35	1
1,1-Dichloroethene	**20**	J	1.0	0.36	ug/L			03/28/20 21:35	1
1,2-Dichloroethene, Total	**190**	J	2.0	0.37	ug/L			03/28/20 21:35	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 21:35	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 21:35	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 21:35	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 21:35	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 21:35	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 21:35	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 21:35	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:35	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 21:35	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 21:35	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 21:35	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 21:35	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 21:35	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 21:35	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 21:35	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 21:35	1
trans-1,2-Dichloroethene	**0.89**	J	1.0	0.37	ug/L			03/28/20 21:35	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 21:35	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 21:35	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 21:35	1
Trichloroethene	**58**	J	1.0	0.48	ug/L			03/28/20 21:35	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 21:35	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 21:35	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 21:35	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 21:35	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 21:35	1
Vinyl chloride	**9.7**	J	1.0	0.50	ug/L			03/28/20 21:35	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 21:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*118*		*80 - 120*		*03/28/20 21:35*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/28/20 21:35*	*1*
Dibromofluoromethane (Surr)	*132*	*X*	*80 - 122*		*03/28/20 21:35*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/28/20 21:35*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10	H	10	7.0	ug/L			04/01/20 05:04	1
Benzene	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
Bromobenzene	<1.0	H	1.0	0.50	ug/L			04/01/20 05:04	1
Bromochloromethane	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
Bromodichloromethane	<1.0	H	1.0	0.44	ug/L			04/01/20 05:04	1
Bromoform	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
Bromomethane	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Butanone	<10	H	10	3.4	ug/L			04/01/20 05:04	1
Carbon disulfide	<2.0	H	2.0	1.0	ug/L			04/01/20 05:04	1
Carbon tetrachloride	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Chlorobenzene	<1.0	H	1.0	0.26	ug/L			04/01/20 05:04	1
Chloroethane	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Chloroethyl vinyl ether	<10	H	10	5.0	ug/L			04/01/20 05:04	1
Chloroform	<1.0	H	1.0	0.50	ug/L			04/01/20 05:04	1
Chloromethane	<1.0	H	1.0	0.40	ug/L			04/01/20 05:04	1
2-Chlorotoluene	<1.0	H	1.0	0.27	ug/L			04/01/20 05:04	1
4-Chlorotoluene	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
cis-1,2-Dichloroethene	**130**	H	1.0	0.41	ug/L			04/01/20 05:04	1
cis-1,3-Dichloropropene	<1.0	H	1.0	0.40	ug/L			04/01/20 05:04	1
Dibromochloromethane	<1.0	H	1.0	0.32	ug/L			04/01/20 05:04	1
1,2-Dibromo-3-Chloropropane	<5.0	H	5.0	1.1	ug/L			04/01/20 05:04	1
1,2-Dibromoethane	<1.0	H	1.0	0.44	ug/L			04/01/20 05:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
1,2-Dichlorobenzene	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,3-Dichlorobenzene	<1.0	H	1.0	0.43	ug/L			04/01/20 05:04	1
1,4-Dichlorobenzene	<1.0	H	1.0	0.46	ug/L			04/01/20 05:04	1
Dichlorodifluoromethane	<1.0	H	1.0	0.60	ug/L			04/01/20 05:04	1
1,1-Dichloroethane	**4.9**	**H**	1.0	0.38	ug/L			04/01/20 05:04	1
1,2-Dichloroethane	**0.70**	**J H**	1.0	0.50	ug/L			04/01/20 05:04	1
1,1-Dichloroethene	**15**	**H**	1.0	0.36	ug/L			04/01/20 05:04	1
1,2-Dichloroethene, Total	**130**	**H**	2.0	0.37	ug/L			04/01/20 05:04	1
1,2-Dichloropropane	<1.0	H	1.0	0.67	ug/L			04/01/20 05:04	1
1,3-Dichloropropane	<1.0	H	1.0	0.34	ug/L			04/01/20 05:04	1
2,2-Dichloropropane	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,1-Dichloropropene	<1.0	H	1.0	0.34	ug/L			04/01/20 05:04	1
Ethylbenzene	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Hexachlorobutadiene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
2-Hexanone	<10	H	10	2.0	ug/L			04/01/20 05:04	1
Isopropylbenzene	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
Methylene Chloride	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
4-Methyl-2-pentanone	<10	H	10	2.1	ug/L			04/01/20 05:04	1
Methyl tert-butyl ether	<10	H	10	0.30	ug/L			04/01/20 05:04	1
m-Xylene & p-Xylene	<1.0	H	1.0	0.35	ug/L			04/01/20 05:04	1
n-Butylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 05:04	1
N-Propylbenzene	<1.0	H	1.0	0.38	ug/L			04/01/20 05:04	1
o-Xylene	<1.0	H	1.0	0.23	ug/L			04/01/20 05:04	1
p-Isopropyltoluene	<1.0	H	1.0	0.48	ug/L			04/01/20 05:04	1
sec-Butylbenzene	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
Styrene	<1.0	H	1.0	0.27	ug/L			04/01/20 05:04	1
tert-Butylbenzene	<1.0	H	1.0	0.45	ug/L			04/01/20 05:04	1
1,1,1,2-Tetrachloroethane	<1.0	H	1.0	0.37	ug/L			04/01/20 05:04	1
1,1,2,2-Tetrachloroethane	<1.0	H	1.0	0.62	ug/L			04/01/20 05:04	1
Tetrachloroethene	<1.0	H	1.0	0.74	ug/L			04/01/20 05:04	1
Toluene	<1.0	H	1.0	0.48	ug/L			04/01/20 05:04	1
trans-1,2-Dichloroethene	**0.65**	**J H**	1.0	0.37	ug/L			04/01/20 05:04	1
trans-1,3-Dichloropropene	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
1,2,3-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
1,2,4-Trichlorobenzene	<5.0	H	5.0	2.5	ug/L			04/01/20 05:04	1
1,1,1-Trichloroethane	**1.4**	**H**	1.0	0.37	ug/L			04/01/20 05:04	1
1,1,2-Trichloroethane	<1.0	H	1.0	0.33	ug/L			04/01/20 05:04	1
Trichloroethene	**50**	**H**	1.0	0.48	ug/L			04/01/20 05:04	1
Trichlorofluoromethane	<1.0	H	1.0	0.42	ug/L			04/01/20 05:04	1
1,2,3-Trichloropropane	<1.0	H	1.0	0.39	ug/L			04/01/20 05:04	1
1,2,4-Trimethylbenzene	<1.0	H	1.0	0.47	ug/L			04/01/20 05:04	1
1,3,5-Trimethylbenzene	<1.0	H	1.0	0.31	ug/L			04/01/20 05:04	1
Vinyl acetate	<2.0	H	2.0	0.81	ug/L			04/01/20 05:04	1
Vinyl chloride	**8.5**	**H**	1.0	0.50	ug/L			04/01/20 05:04	1
Xylenes, Total	<1.0	H	1.0	0.23	ug/L			04/01/20 05:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 05:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*04/01/20 05:04*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: DUP-01 (031720)
Date Collected: 03/17/20 12:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/01/20 05:04*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/01/20 05:04*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**2.8**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 04:48	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/23/20 14:46	03/24/20 04:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*72*		*41 - 144*	*03/23/20 14:46*	*03/24/20 04:48*	*1*
Terphenyl-d14	*46*			*03/23/20 14:46*	*03/24/20 04:48*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.8**		1.0	0.40	mg/L			03/26/20 18:27	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0	cn	1.0	0.31	ug/L			03/24/20 05:45	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**8800**		50	17	ug/L		03/20/20 13:04	03/22/20 14:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.7**		1.0	0.50	mg/L			03/27/20 07:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: Trip Blank
Date Collected: 03/17/20 00:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/28/20 16:04	1
Benzene	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/28/20 16:04	1
Bromoform	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
2-Butanone	<10		10	3.4	ug/L			03/28/20 16:04	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/28/20 16:04	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/28/20 16:04	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/28/20 16:04	1
Chloroform	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/28/20 16:04	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/28/20 16:04	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/28/20 16:04	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/28/20 16:04	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/28/20 16:04	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/28/20 16:04	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/28/20 16:04	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/28/20 16:04	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/28/20 16:04	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/28/20 16:04	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/28/20 16:04	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/28/20 16:04	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/28/20 16:04	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/28/20 16:04	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/28/20 16:04	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/28/20 16:04	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
2-Hexanone	<10		10	2.0	ug/L			03/28/20 16:04	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/28/20 16:04	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/28/20 16:04	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/28/20 16:04	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 16:04	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/28/20 16:04	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/28/20 16:04	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
Styrene	<1.0		1.0	0.27	ug/L			03/28/20 16:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181769-1

Client Sample ID: Trip Blank
Date Collected: 03/17/20 00:00
Date Received: 03/19/20 08:45

Lab Sample ID: 680-181769-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/28/20 16:04	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/28/20 16:04	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/28/20 16:04	1
Toluene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/28/20 16:04	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/28/20 16:04	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/28/20 16:04	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/28/20 16:04	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/28/20 16:04	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/28/20 16:04	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/28/20 16:04	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/28/20 16:04	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/28/20 16:04	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/28/20 16:04	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/28/20 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*125*	*X*	*80 - 120*		*03/28/20 16:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*03/28/20 16:04*	*1*
Dibromofluoromethane (Surr)	*160*	*X*	*80 - 122*		*03/28/20 16:04*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/28/20 16:04*	*1*

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatile, Metals and Miscellaneous Analyses

SDG #680-1818091

Analyses Performed By:
Test America

Savannah, GA

Report #36741R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-181809-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
GM-9M (031820)	680-181809-1	WG	3/18/2020		X	X			X
EB-01 (031820)	680-181809-10	WQ	3/18/2020		X	X		X	X
TRIP BLANK (03182020)	680-181809-11	WQ	3/18/2020		X				
MW-1 (031820)	680-181809-2	WG	3/18/2020		X				X
MW-2 (031820)	680-181809-3	WG	3/18/2020		X			X	X
MW-5 (031820)	680-181809-4	WG	3/18/2020		X				X
MW-10 (031820)	680-181809-5	WG	3/18/2020		X				X
MW-12 (031820)	680-181809-6	WG	3/18/2020		X			X	X
MW-13 (031820)	680-181809-7	WG	3/18/2020		X				X
MW-23 (031820)	680-181809-8	WG	3/18/2020		X				X
GM-24 (031820)	680-181809-9	WG	3/18/2020		X	X			X

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were non-detect. No other qualification of the sample results was required.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
GM-9M MW-1 MW-2	Bromomethane	>UL	>UL
MW-5 MW-10 MW-12	Chloroethane	>UL	>UL
MW-23 GM-24 EB-01	trans-1,3-Dichloropropene	AC	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data validation.

7. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
MW-1	1,1,1-Trichloroethane	--	250	250 D
MW-2	Chloroethane	--	730	730 D
	1,1-Dichloroethane	--	4000	4000 D
	1,1-Dichloroethene	--	120	120 D
	1,1,1-Trichloroethane	--	11000	11000 D

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than and/or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
C. Trip blanks		X	X		
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample EB-01 exhibited recoveries and RPD within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location MW-2 for TOC and sulfate exhibited recoveries and RPDs within the control limits.

The MS/MSD performed on samples MW-13 and GM-24 for perchlorate exhibited recoveries and RPDs within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water

matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 4, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

397788 eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-18-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd, Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling:
Project Name: ATK Orbital				Job / SDG No.:
Site: Elkton, MD				
PO# 300447 69				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs 8260B	1,4-Dioxane	Perchlorate 314.0	Sulfate 300	SM5310 TOC	6010C Dissolved iron	8270D SVOC	Sample Specific Notes:
GM-9M (031820)	3-18-20	940	G	GW	6			3	2	1					iron is filtered
MW-1 (031820)		1350			4			3		1					
MW-2 (031820)		1235			11	1		3	X	1	1	3	1		
MW-5 (031820)		1455			4			3		1					
MW-10 (031820)		1320			4			3		1					
MW-12 (031820)		1440			11	1		3	X	1	1	3	1		
MW-13 (031820)		1110			4			3		1					
MW-23 (031820)		1210			4			3		1					
GM-24 (031820)		1010		GW	6			3	2	1					
EB-01 (031820)	3-18-20	1700	G		16	1		6	2	2	1	3	1	1	
Trip Blank					2			2							

680-181809 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time	Received by	Company	Date/Time
Relinquished by:	Arcadis	3-19-2000			03.20.2020 0900
Relinquished by:			Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: 3.1/0.5	Company: (cf) 3.5/0.9°c	Date/Time:

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604853.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181809-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/1/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-9M (031820) (680-181809-1)	3/18/20	09:40 Eastern		Water			X	1	
MW-1 (031820) (680-181809-2)	3/18/20	13:50 Eastern		Water			X	1	
MW-2 (031820) (680-181809-3)	3/18/20	12:35 Eastern		Water			X	1	
MW-5 (031820) (680-181809-4)	3/18/20	14:55 Eastern		Water			X	1	
MW-10 (031820) (680-181809-5)	3/18/20	13:20 Eastern		Water			X	1	
MW-12 (031820) (680-181809-6)	3/18/20	14:40 Eastern		Water			X	1	
MW-13 (031820) (680-181809-7)	3/18/20	11:10 Eastern		Water			X	1	
MW-23 (031820) (680-181809-8)	3/18/20	12:10 Eastern		Water			X	1	
GM-24 (031820) (680-181809-9)	3/18/20	10:10 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-20-20 1730	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-21-20 0910	Company DAPRX

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: RE SAT (1.4C)

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-604853.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181809-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/1/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
EB-01 (031820) (680-181809-10)	3/18/20	17:00 Eastern		Water			X	2	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the labo

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 3-20-20 1730	Company TA	Received by: [signature]	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 2-21-20 0910	Company TAPHO
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: RESAT 1.4°C		

Ver: 01/16/2019

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-9M (031820)
Date Collected: 03/18/20 09:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 15:36	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 15:36	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 15:36	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 15:36	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 15:36	1
Carbon tetrachloride	**0.79**	**J**	1.0	0.33	ug/L			03/30/20 15:36	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 15:36	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 15:36	1
Chloroform	**0.91**	**J**	1.0	0.50	ug/L			03/30/20 15:36	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 15:36	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 15:36	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
cis-1,2-Dichloroethene	**2.2**		1.0	0.41	ug/L			03/30/20 15:36	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 15:36	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 15:36	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 15:36	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 15:36	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 15:36	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 15:36	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 15:36	1
1,1-Dichloroethane	**16**		1.0	0.38	ug/L			03/30/20 15:36	1
1,2-Dichloroethane	**2.9**		1.0	0.50	ug/L			03/30/20 15:36	1
1,1-Dichloroethene	**63**		1.0	0.36	ug/L			03/30/20 15:36	1
1,2-Dichloroethene, Total	**2.3**		2.0	0.37	ug/L			03/30/20 15:36	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 15:36	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 15:36	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 15:36	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 15:36	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 15:36	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 15:36	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 15:36	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 15:36	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:36	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 15:36	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 15:36	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 15:36	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 15:36	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 15:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-9M (031820)
Date Collected: 03/18/20 09:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 15:36	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 15:36	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 15:36	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 15:36	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 15:36	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 15:36	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:36	1
1,1,1-Trichloroethane	**11**		1.0	0.37	ug/L			03/30/20 15:36	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 15:36	1
Trichloroethene	**120**		1.0	0.48	ug/L			03/30/20 15:36	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 15:36	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 15:36	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:36	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 15:36	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 15:36	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 15:36	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 15:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 15:36*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 15:36*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 15:36*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 15:36*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.4**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*82*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:09*	*1*
Terphenyl-d14	*82*			*03/23/20 14:46*	*03/24/20 05:09*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**620**		100	31	ug/L			03/25/20 05:52	100

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-1 (031820)
Date Collected: 03/18/20 13:50
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 11:42	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 11:42	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 11:42	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 11:42	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 11:42	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 11:42	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Chlorobenzene	**1.3**		1.0	0.26	ug/L			03/30/20 11:42	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 11:42	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 11:42	1
Chloroform	**4.6**		1.0	0.50	ug/L			03/30/20 11:42	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 11:42	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 11:42	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
cis-1,2-Dichloroethene	**0.70**	J	1.0	0.41	ug/L			03/30/20 11:42	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 11:42	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 11:42	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 11:42	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 11:42	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 11:42	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 11:42	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 11:42	1
1,1-Dichloroethane	**36**		1.0	0.38	ug/L			03/30/20 11:42	1
1,2-Dichloroethane	**0.69**	J	1.0	0.50	ug/L			03/30/20 11:42	1
1,1-Dichloroethene	**140**		1.0	0.36	ug/L			03/30/20 11:42	1
1,2-Dichloroethene, Total	**0.70**	J	2.0	0.37	ug/L			03/30/20 11:42	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 11:42	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 11:42	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 11:42	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 11:42	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 11:42	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 11:42	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 11:42	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 11:42	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 11:42	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 11:42	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 11:42	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 11:42	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 11:42	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-1 (031820)
Date Collected: 03/18/20 13:50
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 11:42	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 11:42	1
Tetrachloroethene	**0.93**	**J**	1.0	0.74	ug/L			03/30/20 11:42	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 11:42	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 11:42	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 11:42	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 11:42	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 11:42	1
Trichloroethene	**9.8**		1.0	0.48	ug/L			03/30/20 11:42	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 11:42	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 11:42	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 11:42	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 11:42	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 11:42	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 11:42	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 11:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 11:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 11:42*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/30/20 11:42*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 11:42*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**250**	D	5.0	1.9	ug/L			03/31/20 18:43	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/31/20 18:43*	*5*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*		*03/31/20 18:43*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/31/20 18:43*	*5*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*03/31/20 18:43*	*5*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1900**		200	63	ug/L			03/25/20 06:15	200

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-2 (031820)
Date Collected: 03/18/20 12:35
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:05	1
Benzene	**0.47**	**J**	1.0	0.43	ug/L			03/30/20 12:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:05	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:05	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Chlorobenzene	**62**		1.0	0.26	ug/L			03/30/20 12:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 12:05	1
Chloroform	**2.3**		1.0	0.50	ug/L			03/30/20 12:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 12:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 12:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:05	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:05	1
o-Xylene	**0.85**	**J**	1.0	0.23	ug/L			03/30/20 12:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:05	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:05	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-2 (031820)

Date Collected: 03/18/20 12:35
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**1.0**		1.0	0.74	ug/L			03/30/20 12:05	1
Toluene	**0.99**	**J**	1.0	0.48	ug/L			03/30/20 12:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 12:05	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 12:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:05	1
Trichloroethene	**9.1**		1.0	0.48	ug/L			03/30/20 12:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:05	1
1,2,3-Trichloropropane	**1.1**		1.0	0.39	ug/L			03/30/20 12:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:05	1
Vinyl chloride	**5.6**		1.0	0.50	ug/L			03/30/20 12:05	1
Xylenes, Total	**0.85**	**J**	1.0	0.23	ug/L			03/30/20 12:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 12:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 12:05*	*1*
Dibromofluoromethane (Surr)	*81*		*80 - 122*		*03/30/20 12:05*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*03/30/20 12:05*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	**730**	D	500	250	ug/L			03/31/20 19:06	100
1,1-Dichloroethane	**4000**	D	100	38	ug/L			03/31/20 19:06	100
1,1-Dichloroethene	**120**	D	100	36	ug/L			03/31/20 19:06	100
1,1,1-Trichloroethane	**11000**	D	100	37	ug/L			03/31/20 19:06	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/31/20 19:06*	*100*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*03/31/20 19:06*	*100*
Dibromofluoromethane (Surr)	*106*		*80 - 122*		*03/31/20 19:06*	*100*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*03/31/20 19:06*	*100*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**5.3**		1.0	0.40	mg/L			03/26/20 20:34	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**490**		100	31	ug/L			03/25/20 06:38	100

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**2.5**		1.0	0.50	mg/L			03/30/20 13:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-5 (031820)
Date Collected: 03/18/20 14:55
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:29	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:29	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:29	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:29	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Chlorobenzene	**0.28**	**J**	1.0	0.26	ug/L			03/30/20 12:29	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 12:29	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:29	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:29	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
cis-1,2-Dichloroethene	**17**		1.0	0.41	ug/L			03/30/20 12:29	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:29	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:29	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:29	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:29	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:29	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:29	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:29	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
1,2-Dichloroethene, Total	**17**		2.0	0.37	ug/L			03/30/20 12:29	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:29	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:29	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:29	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:29	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:29	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:29	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:29	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:29	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:29	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 12:29	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:29	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:29	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:29	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:29	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-5 (031820)
Date Collected: 03/18/20 14:55
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:29	1
Tetrachloroethene	**84**		1.0	0.74	ug/L			03/30/20 12:29	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 12:29	1
trans-1,2-Dichloroethene	**0.37**	**J**	1.0	0.37	ug/L			03/30/20 12:29	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 12:29	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:29	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:29	1
Trichloroethene	**110**		1.0	0.48	ug/L			03/30/20 12:29	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:29	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 12:29	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:29	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:29	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:29	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 12:29	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 12:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 12:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*03/30/20 12:29*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 12:29*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 12:29*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	**3.6**		1.0	0.38	ug/L			03/31/20 15:12	1
1,1-Dichloroethene	**2.5**		1.0	0.36	ug/L			03/31/20 15:12	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/31/20 15:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 15:12*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*03/31/20 15:12*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 122*		*03/31/20 15:12*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*03/31/20 15:12*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		10	3.1	ug/L			03/25/20 07:01	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-10 (031820)
Date Collected: 03/18/20 13:20
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 12:52	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 12:52	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:52	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 12:52	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 12:52	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 12:52	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 12:52	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 12:52	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 12:52	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 12:52	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
cis-1,2-Dichloroethene	**0.48**	**J**	1.0	0.41	ug/L			03/30/20 12:52	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 12:52	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 12:52	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 12:52	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 12:52	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 12:52	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 12:52	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 12:52	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
1,2-Dichloroethene, Total	**0.48**	**J**	2.0	0.37	ug/L			03/30/20 12:52	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 12:52	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 12:52	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 12:52	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 12:52	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 12:52	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 12:52	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 12:52	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:52	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 12:52	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 12:52	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 12:52	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 12:52	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 12:52	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 12:52	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-10 (031820)
Date Collected: 03/18/20 13:20
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 12:52	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 12:52	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 12:52	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 12:52	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 12:52	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 12:52	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 12:52	1
Trichloroethene	**4.3**		1.0	0.48	ug/L			03/30/20 12:52	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 12:52	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 12:52	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 12:52	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 12:52	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 12:52	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 12:52	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 12:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 12:52*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 12:52*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 122*		*03/30/20 12:52*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 12:52*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	**3.2**		1.0	0.38	ug/L			03/31/20 16:45	1
1,1-Dichloroethene	**4.2**		1.0	0.36	ug/L			03/31/20 16:45	1
1,1,1-Trichloroethane	**8.3**		1.0	0.37	ug/L			03/31/20 16:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*03/31/20 16:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*73 - 131*		*03/31/20 16:45*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 122*		*03/31/20 16:45*	*1*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*		*03/31/20 16:45*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		10	3.1	ug/L			03/25/20 07:24	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-12 (031820)
Date Collected: 03/18/20 14:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 13:15	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 13:15	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:15	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 13:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 13:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 13:15	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 13:15	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 13:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 13:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 13:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 13:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 13:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 13:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 13:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 13:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 13:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 13:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 13:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 13:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 13:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 13:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 13:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 13:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 13:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 13:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 13:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 13:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 13:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 13:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 13:15	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 13:15	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-12 (031820)
Date Collected: 03/18/20 14:40
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 13:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 13:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 13:15	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 13:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 13:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:15	1
1,1,1-Trichloroethane	**1.0**		1.0	0.37	ug/L			03/30/20 13:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 13:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 13:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 13:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 13:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 13:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 13:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 13:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 13:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 13:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 13:15*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*03/30/20 13:15*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*03/30/20 13:15*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**18**		1.0	0.40	mg/L			03/26/20 20:46	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**640**		100	31	ug/L			03/25/20 07:47	100

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.4**		1.0	0.50	mg/L			03/30/20 14:49	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-13 (031820)
Date Collected: 03/18/20 11:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 14:10	10
Benzene	<10		10	4.3	ug/L			03/30/20 14:10	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 14:10	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 14:10	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 14:10	10
Bromoform	<10		10	4.3	ug/L			03/30/20 14:10	10
Bromomethane	<50		50	25	ug/L			03/30/20 14:10	10
2-Butanone	<100		100	34	ug/L			03/30/20 14:10	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 14:10	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 14:10	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 14:10	10
Chloroethane	<50		50	25	ug/L			03/30/20 14:10	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L	R		03/30/20 14:10	10
Chloroform	<10		10	5.0	ug/L			03/30/20 14:10	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 14:10	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 14:10	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 14:10	10
cis-1,2-Dichloroethene	**9.7**	**J**	10	4.1	ug/L			03/30/20 14:10	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 14:10	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 14:10	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 14:10	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 14:10	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 14:10	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 14:10	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 14:10	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 14:10	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 14:10	10
1,1-Dichloroethane	<10		10	3.8	ug/L			03/30/20 14:10	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 14:10	10
1,1-Dichloroethene	<10		10	3.6	ug/L			03/30/20 14:10	10
1,2-Dichloroethene, Total	**9.7**	**J**	20	3.7	ug/L			03/30/20 14:10	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 14:10	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 14:10	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 14:10	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 14:10	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 14:10	10
2-Hexanone	<100		100	20	ug/L			03/30/20 14:10	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 14:10	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 14:10	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 14:10	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 14:10	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 14:10	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 14:10	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 14:10	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 14:10	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 14:10	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 14:10	10
Styrene	<10		10	2.7	ug/L			03/30/20 14:10	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-13 (031820)
Date Collected: 03/18/20 11:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 14:10	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 14:10	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 14:10	10
Toluene	<10		10	4.8	ug/L			03/30/20 14:10	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 14:10	10
trans-1,3-Dichloropropene	<10		10	4.2	ug/L			03/30/20 14:10	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 14:10	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 14:10	10
1,1,1-Trichloroethane	<10		10	3.7	ug/L			03/30/20 14:10	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 14:10	10
Trichloroethene	**32**		10	4.8	ug/L			03/30/20 14:10	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 14:10	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 14:10	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 14:10	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 14:10	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 14:10	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 14:10	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 14:10	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 14:10*	*10*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*		*03/30/20 14:10*	*10*
Dibromofluoromethane (Surr)	*101*		*80 - 122*		*03/30/20 14:10*	*10*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/30/20 14:10*	*10*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**76**		10	3.1	ug/L			03/25/20 08:55	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-23 (031820)
Date Collected: 03/18/20 12:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 13:39	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 13:39	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:39	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 13:39	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 13:39	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 13:39	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 13:39	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 13:39	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 13:39	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 13:39	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 13:39	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 13:39	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 13:39	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 13:39	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 13:39	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 13:39	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 13:39	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 13:39	1
1,1-Dichloroethane	**6.0**		1.0	0.38	ug/L			03/30/20 13:39	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
1,1-Dichloroethene	**3.9**		1.0	0.36	ug/L			03/30/20 13:39	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 13:39	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 13:39	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 13:39	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 13:39	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 13:39	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 13:39	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 13:39	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 13:39	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:39	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 13:39	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 13:39	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 13:39	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 13:39	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 13:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: MW-23 (031820)
Date Collected: 03/18/20 12:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 13:39	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 13:39	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 13:39	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 13:39	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 13:39	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 13:39	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 13:39	1
1,1,1-Trichloroethane	**20**		1.0	0.37	ug/L			03/30/20 13:39	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 13:39	1
Trichloroethene	**0.94**	**J**	1.0	0.48	ug/L			03/30/20 13:39	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 13:39	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 13:39	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 13:39	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 13:39	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 13:39	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 13:39	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 13:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 13:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 13:39*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 13:39*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 13:39*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**15**		1.0	0.31	ug/L			03/24/20 08:48	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-24 (031820)
Date Collected: 03/18/20 10:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 14:49	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 14:49	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 14:49	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 14:49	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 14:49	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 14:49	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 14:49	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 14:49	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 14:49	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 14:49	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 14:49	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 14:49	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 14:49	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 14:49	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 14:49	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 14:49	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 14:49	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 14:49	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 14:49	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 14:49	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 14:49	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 14:49	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 14:49	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 14:49	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 14:49	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 14:49	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 14:49	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 14:49	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:49	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 14:49	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 14:49	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 14:49	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 14:49	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 14:49	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: GM-24 (031820)
Date Collected: 03/18/20 10:10
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 14:49	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 14:49	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 14:49	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 14:49	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 14:49	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:49	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:49	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 14:49	1
Trichloroethene	**7.2**		1.0	0.48	ug/L			03/30/20 14:49	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 14:49	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 14:49	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:49	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 14:49	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 14:49	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 14:49	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 14:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 14:49*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 14:49*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 14:49*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 14:49*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**0.44**		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*83*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:30*	*1*
Terphenyl-d14	*85*			*03/23/20 14:46*	*03/24/20 05:30*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**160**		10	3.1	ug/L			04/01/20 22:55	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 16:00	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 16:00	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			03/30/20 16:00	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 16:00	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 16:00	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 16:00	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			03/30/20 16:00	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 16:00	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 16:00	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 16:00	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 16:00	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 16:00	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 16:00	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 16:00	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 16:00	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 16:00	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 16:00	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 16:00	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 16:00	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 16:00	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 16:00	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 16:00	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 16:00	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 16:00	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 16:00	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 16:00	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 16:00	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 16:00	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:00	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 16:00	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 16:00	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 16:00	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 16:00	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 16:00	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 16:00	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 16:00	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 16:00	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:00	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 16:00	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 16:00	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 16:00	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 16:00	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 16:00	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:00	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 16:00	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 16:00	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 16:00	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 16:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:00*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:00*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:00*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/23/20 14:46	03/24/20 05:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*84*		*41 - 144*	*03/23/20 14:46*	*03/24/20 05:52*	*1*
Terphenyl-d14	*90*			*03/23/20 14:46*	*03/24/20 05:52*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
Acenaphthylene	<9.8		9.8	0.83	ug/L		03/25/20 13:30	03/27/20 19:36	1
Acetophenone	<9.8		9.8	0.56	ug/L		03/25/20 13:30	03/27/20 19:36	1
Anthracene	<9.8		9.8	0.67	ug/L		03/25/20 13:30	03/27/20 19:36	1
Atrazine	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzaldehyde	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[a]anthracene	<9.8		9.8	0.54	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[a]pyrene	<9.8		9.8	0.69	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[b]fluoranthene	<9.8		9.8	2.5	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[g,h,i]perylene	<9.8		9.8	0.85	ug/L		03/25/20 13:30	03/27/20 19:36	1
Benzo[k]fluoranthene	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,1'-Biphenyl	<9.8		9.8	0.57	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-chloroethoxy)methane	<9.8		9.8	0.92	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-chloroethyl)ether	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
bis (2-chloroisopropyl) ether	<9.8		9.8	0.76	ug/L		03/25/20 13:30	03/27/20 19:36	1
Bis(2-ethylhexyl) phthalate	<9.8		9.8	1.6	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Bromophenyl phenyl ether	<9.8		9.8	0.75	ug/L		03/25/20 13:30	03/27/20 19:36	1
Butyl benzyl phthalate	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
Caprolactam	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
Carbazole	<9.8		9.8	0.69	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chloroaniline	<20		20	2.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chloro-3-methylphenol	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Chloronaphthalene	<9.8		9.8	0.78	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Chlorophenol	<9.8		9.8	0.85	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Chlorophenyl phenyl ether	<9.8		9.8	0.82	ug/L		03/25/20 13:30	03/27/20 19:36	1
Chrysene	<9.8		9.8	0.50	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dibenz(a,h)anthracene	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dibenzofuran	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,2-Dichlorobenzene	<9.8		9.8	0.52	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,3-Dichlorobenzene	<9.8		9.8	0.58	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,4-Dichlorobenzene	<9.8		9.8	0.53	ug/L		03/25/20 13:30	03/27/20 19:36	1
3,3'-Dichlorobenzidine	<59		59	29	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dichlorophenol	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Diethyl phthalate	<9.8		9.8	0.86	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dimethylphenol	<9.8		9.8	3.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
Dimethyl phthalate	<9.8		9.8	0.97	ug/L		03/25/20 13:30	03/27/20 19:36	1
Di-n-butyl phthalate	<9.8		9.8	0.81	ug/L		03/25/20 13:30	03/27/20 19:36	1
4,6-Dinitro-2-methylphenol	<49		49	9.8	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dinitrophenol	<49		49	9.8	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4-Dinitrotoluene	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,6-Dinitrotoluene	<9.8		9.8	1.1	ug/L		03/25/20 13:30	03/27/20 19:36	1
Di-n-octyl phthalate	<9.8		9.8	1.4	ug/L		03/25/20 13:30	03/27/20 19:36	1
Fluoranthene	<9.8		9.8	0.72	ug/L		03/25/20 13:30	03/27/20 19:36	1
Fluorene	<9.8		9.8	0.94	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorobenzene	<9.8		9.8	0.77	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorobutadiene	<9.8		9.8	0.60	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachlorocyclopentadiene	<9.8		9.8	2.4	ug/L		03/25/20 13:30	03/27/20 19:36	1
Hexachloroethane	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
Indeno[1,2,3-cd]pyrene	<9.8		9.8	0.98	ug/L		03/25/20 13:30	03/27/20 19:36	1
Isophorone	<9.8		9.8	0.88	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Methylnaphthalene	<9.8		9.8	0.76	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Methylphenol	<9.8		9.8	0.87	ug/L		03/25/20 13:30	03/27/20 19:36	1
3 & 4 Methylphenol	<9.8		9.8	1.3	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Nitroaniline	<49		49	1.3	ug/L		03/25/20 13:30	03/27/20 19:36	1
3-Nitroaniline	<49		49	4.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Nitroaniline	<49		49	4.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
Nitrobenzene	<9.8		9.8	0.71	ug/L		03/25/20 13:30	03/27/20 19:36	1
2-Nitrophenol	<9.8		9.8	0.74	ug/L		03/25/20 13:30	03/27/20 19:36	1
4-Nitrophenol	<49		49	1.9	ug/L		03/25/20 13:30	03/27/20 19:36	1
N-Nitrosodi-n-propylamine	<9.8		9.8	0.70	ug/L		03/25/20 13:30	03/27/20 19:36	1
N-Nitrosodiphenylamine	<9.8		9.8	0.90	ug/L		03/25/20 13:30	03/27/20 19:36	1
Pentachlorophenol	<49		49	2.0	ug/L		03/25/20 13:30	03/27/20 19:36	1
Phenanthrene	<9.8		9.8	0.75	ug/L		03/25/20 13:30	03/27/20 19:36	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: EB-01 (031820)
Date Collected: 03/18/20 17:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	<9.8		9.8	0.81	ug/L		03/25/20 13:30	03/27/20 19:36	1
Pyrene	<9.8		9.8	0.61	ug/L		03/25/20 13:30	03/27/20 19:36	1
1,2,4-Trichlorobenzene	<9.8		9.8	0.55	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4,5-Trichlorophenol	<9.8		9.8	1.2	ug/L		03/25/20 13:30	03/27/20 19:36	1
2,4,6-Trichlorophenol	<9.8		9.8	0.83	ug/L		03/25/20 13:30	03/27/20 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*79*		*32 - 113*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
2-Fluorophenol	*69*		*26 - 109*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Nitrobenzene-d5	*74*		*32 - 118*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Phenol-d5	*72*		*27 - 110*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
Terphenyl-d14	*83*		*10 - 126*	*03/25/20 13:30*	*03/27/20 19:36*	*1*
2,4,6-Tribromophenol	*86*		*39 - 124*	*03/25/20 13:30*	*03/27/20 19:36*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			03/26/20 20:59	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/24/20 10:20	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 19:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: Trip Blank
Date Collected: 03/18/20 00:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-11
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.3	J	10	7.0	ug/L			03/30/20 14:57	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 14:57	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
Bromomethane	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 14:57	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 14:57	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 14:57	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 14:57	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 14:57	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 14:57	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 14:57	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 14:57	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 14:57	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 14:57	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 14:57	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 14:57	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 14:57	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 14:57	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 14:57	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 14:57	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 14:57	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 14:57	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 14:57	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 14:57	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 14:57	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 14:57	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 14:57	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 14:57	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:57	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 14:57	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 14:57	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 14:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181809-1

Client Sample ID: Trip Blank
Date Collected: 03/18/20 00:00
Date Received: 03/20/20 09:00

Lab Sample ID: 680-181809-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 14:57	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 14:57	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 14:57	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 14:57	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 14:57	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 14:57	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 14:57	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 14:57	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 14:57	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 14:57	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 14:57	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 14:57	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 14:57	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 14:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/30/20 14:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*03/30/20 14:57*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 122*		*03/30/20 14:57*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*03/30/20 14:57*	*1*

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatile, Metals and Miscellaneous Analyses

SDG #680-181894-1

Analyses Performed By:
Test America

Savannah, GA

Report #36742R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-181894-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
GM-21M (031920)	680-181894-1	WG	3/19/2020		X	X		X	X
TRIP BLANK (03192020)	680-181894-10	WQ	3/19/2020		X				
GM-21S (031920)	680-181894-2	WG	3/19/2020		X	X			X
GM-22M (031920)	680-181894-3	WG	3/19/2020		X	X		X	X
GM-22S (031920)	680-181894-4	WG	3/19/2020		X	X			X
GM-26M (031920)	680-181894-5	WG	3/19/2020		X	X		X	X
GM-26S (031920)	680-181894-6	WG	3/19/2020		X	X			X
GM-31M (031920)	680-181894-7	WG	3/19/2020		X	X			X
GM-31S (031920)	680-181894-8	WG	3/19/2020		X	X			X
DUP-02 (031920)	680-181894-9	WG	3/19/2020	GM-31S (031920)	X	X			X

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were non-detect. No other qualification of the sample results was required.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
GM-21M GM-26S GM-31M GM-31S DUP-02 Trip Blank	Bromomethane	>UL	>UL
	2,2-Dichloropropane	>UL	>UL
	1,1,1,2-Tetrachlorethane	>UL	>UL
	Vinyl Acetate	>UL	>UL
	Bromoform	AC	>UL
	1,2-Dibromomethane	AC	>UL
	Dibromomethane	AC	>UL
	trans-1,3-Dichloropropene	AC	>UL
GM-21S GM-22M GM-22S	Bromomethane	>UL	>UL
	Chloroethane	>UL	>UL
	trans-1,3-Dichloropropene	AC	>UL
GM-26M	Chloromethane	>UL	AC
	cis-1,2-Dichloroethene	>UL	>UL
	cis-1,3-Dichloropropene	>UL	>UL
	1,2-Dichloroethane	>UL	>UL
	1,2-Dichloroethene	>UL	AC
	2,2-Dichloropropane	>UL	>UL
	Vinyl Acetate	>UL	>UL
	Bromomethane	AC	>UL
	1,2-Dibromoethane	AC	>UL
	1,3-Dichloropropane	AC	>UL
	2-Hexanone	AC	>UL
	4-Methyl-2-pentanone	AC	>UL
	MTBE	AC	>UL
GM-26M	1,1,1,2-Tetrachloroethane	AC	>UL

Sample Locations	Compound	LCS Recovery	LCSD Recovery
	trans-1,3-Dichloropropene	AC	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

Sample locations associated with LCS/LCSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
GM-21M GM-26S GM-31M GM-31S DUP-02 Trip Blank	Bromomethane
GM-26M	Bromomethane

The criteria used to evaluate the RPD between the LCS/LCSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
GM-31S / DUP-02	All VOCs	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
GM-21M	Trichloroethene	--	170	170 D

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than and/or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks	X				X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X	X		
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
GM-31S / DUP-02	1,4-Dioxane	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X		X	
C. Equipment/Field Blanks	X				X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location GM-26S for perchlorate exhibited recoveries and RPDs within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
GM-31S / DUP-02	Perchlorate	1.1	1.1	AC

Notes:

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 4, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Baltimore #201

Chain of Custody Record 397789

eurofins | Environment Testing TestAmerica

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-19-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: 7550 Teague Rd Ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD, 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO# 30044569	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOC 8260B	1,4-Dioxane	340 Perchlorate	6010C dissolved iron	SM5310 TOC	300 oRGFM Sulfate	Sample Specific Notes:
GM-21M (031920)	3-19-20	1335	G	GW	11			3	2	1	1	3	1	dissolved iron is filtered
GM-21S (031920)		1230			6			3	2	1				
GM-22M (031920)		1055			11			3	2	1	1	3	1	
GM-22S (031920)		0955			6			3	2	1				
GM-26M (031920)		1450			11			3	2	1	1	3	1	
GM-26S (031920)		1315			6			3	2	1				
GM-31M (031920)		1110			6			3	2	1				
GM-31S (031920)		1000			6			3	2	1				
DUP-02 (031920)	3-19-20	1200	G	GW	6			3	2	1				
Trip Blank					2			2						

680-181894 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: Corr'd: | Therm ID No.:

	Company	Date/Time		Company	Date/Time
Relinquished by:	Arcadis	3-20-20 0600	Received by:		3/20/20 9:50
Relinquished by:	3/20/20 1730		Received by: Banda	03-21-2020	0950
Relinquished by:			Received in Laboratory by: 2.9/3.0 (CF) 3.3		3.4°C

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605018.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-181894-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/2/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI 1,4-Dioxane	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-21M (031920) (680-181894-1)	3/19/20	13:35 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-21S (031920) (680-181894-2)	3/19/20	12:30 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-22M (031920) (680-181894-3)	3/19/20	10:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-22S (031920) (680-181894-4)	3/19/20	09:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-26M (031920) (680-181894-5)	3/19/20	14:50 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-26S (031920) (680-181894-6)	3/19/20	13:15 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-31M (031920) (680-181894-7)	3/19/20	11:10 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-31S (031920) (680-181894-8)	3/19/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
DUP-02 (031920) (680-181894-9)	3/19/20	12:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	03-23-2020 1350		via FedEx	3/24/20 1000	[illegible]
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: X Yes ∆ No	Custody Seal No.: 116448	Cooler Temperature(s) °C and Other Remarks: 4.7°C IR11

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605023.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181894-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/2/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-21M (031920) (680-181894-1)	3/19/20	13:35 Eastern		Water			X	1	
GM-21S (031920) (680-181894-2)	3/19/20	12:30 Eastern		Water			X	1	
GM-22M (031920) (680-181894-3)	3/19/20	10:55 Eastern		Water			X	1	
GM-22S (031920) (680-181894-4)	3/19/20	09:55 Eastern		Water			X	1	
GM-26M (031920) (680-181894-5)	3/19/20	14:50 Eastern		Water			X	1	
GM-26S (031920) (680-181894-6)	3/19/20	13:15 Eastern		Water			X	1	
GM-31M (031920) (680-181894-7)	3/19/20	11:10 Eastern		Water			X	1	
GM-31S (031920) (680-181894-8)	3/19/20	10:00 Eastern		Water			X	1	
DUP-02 (031920) (680-181894-9)	3/19/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 03-23-2020	Company: 1414	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: TA-PHX	Date/Time: 09:15	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 03-24-20 09:30	Company: TA PHX
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

TEMP 2-8-C

Ver: 01/16/2019

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920)
Date Collected: 03/19/20 13:35
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-1
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 18:41	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 18:41	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 18:41	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 18:41	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 18:41	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 18:41	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 18:41	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 18:41	1
Carbon tetrachloride	**0.83**	**J**	1.0	0.33	ug/L			03/30/20 18:41	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 18:41	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 18:41	1
Chloroform	**0.92**	**J**	1.0	0.50	ug/L			03/30/20 18:41	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 18:41	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 18:41	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
cis-1,2-Dichloroethene	**12**		1.0	0.41	ug/L			03/30/20 18:41	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 18:41	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 18:41	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 18:41	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 18:41	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 18:41	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 18:41	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 18:41	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 18:41	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 18:41	1
1,1-Dichloroethane	**1.8**		1.0	0.38	ug/L			03/30/20 18:41	1
1,2-Dichloroethane	**0.86**	**J**	1.0	0.50	ug/L			03/30/20 18:41	1
1,1-Dichloroethene	**31**		1.0	0.36	ug/L			03/30/20 18:41	1
1,2-Dichloroethene, Total	**12**		2.0	0.37	ug/L			03/30/20 18:41	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 18:41	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 18:41	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 18:41	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 18:41	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 18:41	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 18:41	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 18:41	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 18:41	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 18:41	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 18:41	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:41	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 18:41	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 18:41	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 18:41	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 18:41	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 18:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21M (031920)
Date Collected: 03/19/20 13:35
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-1
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 18:41	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:41	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 18:41	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 18:41	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 18:41	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 18:41	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 18:41	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:41	1
1,1,1-Trichloroethane	**5.1**		1.0	0.37	ug/L			03/30/20 18:41	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 18:41	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 18:41	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 18:41	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:41	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 18:41	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 18:41	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 18:41	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 18:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*03/30/20 18:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*73 - 131*		*03/30/20 18:41*	*1*
Dibromofluoromethane (Surr)	*117*		*80 - 122*		*03/30/20 18:41*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 18:41*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**170**	D	5.0	2.4	ug/L			04/02/20 15:15	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/02/20 15:15*	*5*
1,2-Dichloroethane-d4 (Surr)	*115*		*73 - 131*		*04/02/20 15:15*	*5*
Dibromofluoromethane (Surr)	*115*		*80 - 122*		*04/02/20 15:15*	*5*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*		*04/02/20 15:15*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**3.0**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 02:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*71*		*41 - 144*	*03/24/20 15:33*	*03/25/20 02:35*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**1.5**		1.0	0.40	mg/L			03/30/20 13:46	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**210**		50	16	ug/L			03/27/20 01:06	50

Client: ARCADIS U.S., Inc.
Job ID: 680-181894-1
Project/Site: ATK Orbital, Elkton MD

Client Sample ID: GM-21M (031920)
Lab Sample ID: 680-181894-1
Date Collected: 03/19/20 13:35
Matrix: GW
Date Received: 03/21/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	59		50	17	ug/L		03/25/20 14:00	03/26/20 20:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:23	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21S (031920)
Date Collected: 03/19/20 12:30
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-2
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 16:23	10
Benzene	<10		10	4.3	ug/L			03/30/20 16:23	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 16:23	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 16:23	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 16:23	10
Bromoform	<10		10	4.3	ug/L			03/30/20 16:23	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 16:23	10
2-Butanone	<100		100	34	ug/L			03/30/20 16:23	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 16:23	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 16:23	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 16:23	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 16:23	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L	R		03/30/20 16:23	10
Chloroform	<10		10	5.0	ug/L			03/30/20 16:23	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 16:23	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 16:23	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 16:23	10
cis-1,2-Dichloroethene	**27**		10	4.1	ug/L			03/30/20 16:23	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 16:23	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 16:23	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 16:23	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 16:23	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 16:23	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 16:23	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 16:23	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 16:23	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 16:23	10
1,1-Dichloroethane	**11**		10	3.8	ug/L			03/30/20 16:23	10
1,2-Dichloroethane	**5.9**	J	10	5.0	ug/L			03/30/20 16:23	10
1,1-Dichloroethene	**200**		10	3.6	ug/L			03/30/20 16:23	10
1,2-Dichloroethene, Total	**27**		20	3.7	ug/L			03/30/20 16:23	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 16:23	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 16:23	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 16:23	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 16:23	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 16:23	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 16:23	10
2-Hexanone	<100		100	20	ug/L			03/30/20 16:23	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 16:23	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 16:23	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 16:23	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 16:23	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 16:23	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 16:23	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 16:23	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 16:23	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 16:23	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 16:23	10
Styrene	<10		10	2.7	ug/L			03/30/20 16:23	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-21S (031920)
Date Collected: 03/19/20 12:30
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-2
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 16:23	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 16:23	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 16:23	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 16:23	10
Toluene	<10		10	4.8	ug/L			03/30/20 16:23	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 16:23	10
trans-1,3-Dichloropropene	<10		10	4.2	ug/L			03/30/20 16:23	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:23	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:23	10
1,1,1-Trichloroethane	**72**		10	3.7	ug/L			03/30/20 16:23	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 16:23	10
Trichloroethene	**1000**		10	4.8	ug/L			03/30/20 16:23	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 16:23	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 16:23	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 16:23	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 16:23	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 16:23	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 16:23	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 16:23	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:23*	*10*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:23*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:23*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:23*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**25**		2.0	0.87	ug/L		03/24/20 15:33	03/25/20 08:36	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/24/20 15:33*	*03/25/20 08:36*	*5*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**600**		50	16	ug/L			03/27/20 01:28	50

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22M (031920)
Date Collected: 03/19/20 10:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-3
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 16:47	10
Benzene	<10		10	4.3	ug/L			03/30/20 16:47	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 16:47	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 16:47	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 16:47	10
Bromoform	<10		10	4.3	ug/L			03/30/20 16:47	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 16:47	10
2-Butanone	<100		100	34	ug/L			03/30/20 16:47	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 16:47	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 16:47	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 16:47	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 16:47	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L	R		03/30/20 16:47	10
Chloroform	<10		10	5.0	ug/L			03/30/20 16:47	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 16:47	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 16:47	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 16:47	10
cis-1,2-Dichloroethene	**23**		10	4.1	ug/L			03/30/20 16:47	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 16:47	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 16:47	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 16:47	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 16:47	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 16:47	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 16:47	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 16:47	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 16:47	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 16:47	10
1,1-Dichloroethane	**12**		10	3.8	ug/L			03/30/20 16:47	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 16:47	10
1,1-Dichloroethene	**240**		10	3.6	ug/L			03/30/20 16:47	10
1,2-Dichloroethene, Total	**23**		20	3.7	ug/L			03/30/20 16:47	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 16:47	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 16:47	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 16:47	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 16:47	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 16:47	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 16:47	10
2-Hexanone	<100		100	20	ug/L			03/30/20 16:47	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 16:47	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 16:47	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 16:47	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 16:47	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 16:47	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 16:47	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 16:47	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 16:47	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 16:47	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 16:47	10
Styrene	<10		10	2.7	ug/L			03/30/20 16:47	10

Client Sample ID: GM-22M (031920)
Date Collected: 03/19/20 10:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-3
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 16:47	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 16:47	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 16:47	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 16:47	10
Toluene	<10		10	4.8	ug/L			03/30/20 16:47	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 16:47	10
trans-1,3-Dichloropropene	<10		10	4.2	ug/L			03/30/20 16:47	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:47	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 16:47	10
1,1,1-Trichloroethane	**110**		10	3.7	ug/L			03/30/20 16:47	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 16:47	10
Trichloroethene	**1100**		10	4.8	ug/L			03/30/20 16:47	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 16:47	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 16:47	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 16:47	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 16:47	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 16:47	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 16:47	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 16:47	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/30/20 16:47*	*10*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/30/20 16:47*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 16:47*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 16:47*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**11**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:17*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.2**		1.0	0.40	mg/L			03/30/20 13:58	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**66**		10	3.1	ug/L			03/27/20 01:51	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.57**	**J**	1.0	0.50	mg/L			03/30/20 15:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22S (031920)
Date Collected: 03/19/20 09:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-4
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<100		100	70	ug/L			03/30/20 17:10	10
Benzene	<10		10	4.3	ug/L			03/30/20 17:10	10
Bromobenzene	<10		10	5.0	ug/L			03/30/20 17:10	10
Bromochloromethane	<10		10	4.5	ug/L			03/30/20 17:10	10
Bromodichloromethane	<10		10	4.4	ug/L			03/30/20 17:10	10
Bromoform	<10		10	4.3	ug/L			03/30/20 17:10	10
Bromomethane	<50	*	50	25	ug/L			03/30/20 17:10	10
2-Butanone	<100		100	34	ug/L			03/30/20 17:10	10
Carbon disulfide	<20		20	10	ug/L			03/30/20 17:10	10
Carbon tetrachloride	<10		10	3.3	ug/L			03/30/20 17:10	10
Chlorobenzene	<10		10	2.6	ug/L			03/30/20 17:10	10
Chloroethane	<50	*	50	25	ug/L			03/30/20 17:10	10
2-Chloroethyl vinyl ether	<100		100	50	ug/L	R		03/30/20 17:10	10
Chloroform	<10		10	5.0	ug/L			03/30/20 17:10	10
Chloromethane	<10		10	4.0	ug/L			03/30/20 17:10	10
2-Chlorotoluene	<10		10	2.7	ug/L			03/30/20 17:10	10
4-Chlorotoluene	<10		10	4.5	ug/L			03/30/20 17:10	10
cis-1,2-Dichloroethene	**17**		10	4.1	ug/L			03/30/20 17:10	10
cis-1,3-Dichloropropene	<10		10	4.0	ug/L			03/30/20 17:10	10
Dibromochloromethane	<10		10	3.2	ug/L			03/30/20 17:10	10
1,2-Dibromo-3-Chloropropane	<50		50	11	ug/L			03/30/20 17:10	10
1,2-Dibromoethane	<10		10	4.4	ug/L			03/30/20 17:10	10
Dibromomethane	<10		10	3.5	ug/L			03/30/20 17:10	10
1,2-Dichlorobenzene	<10		10	3.7	ug/L			03/30/20 17:10	10
1,3-Dichlorobenzene	<10		10	4.3	ug/L			03/30/20 17:10	10
1,4-Dichlorobenzene	<10		10	4.6	ug/L			03/30/20 17:10	10
Dichlorodifluoromethane	<10		10	6.0	ug/L			03/30/20 17:10	10
1,1-Dichloroethane	**9.6**	**J**	10	3.8	ug/L			03/30/20 17:10	10
1,2-Dichloroethane	<10		10	5.0	ug/L			03/30/20 17:10	10
1,1-Dichloroethene	**200**		10	3.6	ug/L			03/30/20 17:10	10
1,2-Dichloroethene, Total	**17**	**J**	20	3.7	ug/L			03/30/20 17:10	10
1,2-Dichloropropane	<10		10	6.7	ug/L			03/30/20 17:10	10
1,3-Dichloropropane	<10		10	3.4	ug/L			03/30/20 17:10	10
2,2-Dichloropropane	<10		10	3.7	ug/L			03/30/20 17:10	10
1,1-Dichloropropene	<10		10	3.4	ug/L			03/30/20 17:10	10
Ethylbenzene	<10		10	3.3	ug/L			03/30/20 17:10	10
Hexachlorobutadiene	<50		50	25	ug/L			03/30/20 17:10	10
2-Hexanone	<100		100	20	ug/L			03/30/20 17:10	10
Isopropylbenzene	<10		10	3.5	ug/L			03/30/20 17:10	10
Methylene Chloride	<50		50	25	ug/L			03/30/20 17:10	10
4-Methyl-2-pentanone	<100		100	21	ug/L			03/30/20 17:10	10
Methyl tert-butyl ether	<100		100	3.0	ug/L			03/30/20 17:10	10
m-Xylene & p-Xylene	<10		10	3.5	ug/L			03/30/20 17:10	10
n-Butylbenzene	<10		10	4.7	ug/L			03/30/20 17:10	10
N-Propylbenzene	<10		10	3.8	ug/L			03/30/20 17:10	10
o-Xylene	<10		10	2.3	ug/L			03/30/20 17:10	10
p-Isopropyltoluene	<10		10	4.8	ug/L			03/30/20 17:10	10
sec-Butylbenzene	<10		10	4.2	ug/L			03/30/20 17:10	10
Styrene	<10		10	2.7	ug/L			03/30/20 17:10	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-22S (031920)
Date Collected: 03/19/20 09:55
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-4
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<10		10	4.5	ug/L			03/30/20 17:10	10
1,1,1,2-Tetrachloroethane	<10		10	3.7	ug/L			03/30/20 17:10	10
1,1,2,2-Tetrachloroethane	<10		10	6.2	ug/L			03/30/20 17:10	10
Tetrachloroethene	<10		10	7.4	ug/L			03/30/20 17:10	10
Toluene	<10		10	4.8	ug/L			03/30/20 17:10	10
trans-1,2-Dichloroethene	<10		10	3.7	ug/L			03/30/20 17:10	10
trans-1,3-Dichloropropene	<10		10	4.2	ug/L			03/30/20 17:10	10
1,2,3-Trichlorobenzene	<50		50	25	ug/L			03/30/20 17:10	10
1,2,4-Trichlorobenzene	<50		50	25	ug/L			03/30/20 17:10	10
1,1,1-Trichloroethane	**77**		10	3.7	ug/L			03/30/20 17:10	10
1,1,2-Trichloroethane	<10		10	3.3	ug/L			03/30/20 17:10	10
Trichloroethene	**890**		10	4.8	ug/L			03/30/20 17:10	10
Trichlorofluoromethane	<10		10	4.2	ug/L			03/30/20 17:10	10
1,2,3-Trichloropropane	<10		10	3.9	ug/L			03/30/20 17:10	10
1,2,4-Trimethylbenzene	<10		10	4.7	ug/L			03/30/20 17:10	10
1,3,5-Trimethylbenzene	<10		10	3.1	ug/L			03/30/20 17:10	10
Vinyl acetate	<20		20	8.1	ug/L			03/30/20 17:10	10
Vinyl chloride	<10		10	5.0	ug/L			03/30/20 17:10	10
Xylenes, Total	<10		10	2.3	ug/L			03/30/20 17:10	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 17:10*	*10*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*03/30/20 17:10*	*10*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*03/30/20 17:10*	*10*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:10*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**10**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:38*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**55**		10	3.1	ug/L			03/27/20 02:14	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)
Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 16:44	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 16:44	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 16:44	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 16:44	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 16:44	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 16:44	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 16:44	1
Carbon tetrachloride	**2.6**		1.0	0.33	ug/L			03/30/20 16:44	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 16:44	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 16:44	1
Chloroform	**1.4**		1.0	0.50	ug/L			03/30/20 16:44	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 16:44	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 16:44	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
cis-1,2-Dichloroethene	**8.0**		1.0	0.41	ug/L			03/30/20 16:44	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 16:44	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 16:44	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 16:44	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 16:44	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 16:44	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 16:44	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 16:44	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 16:44	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 16:44	1
1,1-Dichloroethane	**1.1**		1.0	0.38	ug/L			03/30/20 16:44	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
1,1-Dichloroethene	**17**		1.0	0.36	ug/L			03/30/20 16:44	1
1,2-Dichloroethene, Total	**8.0**		2.0	0.37	ug/L			03/30/20 16:44	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 16:44	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 16:44	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 16:44	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 16:44	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 16:44	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 16:44	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 16:44	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 16:44	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 16:44	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 16:44	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:44	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 16:44	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 16:44	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 16:44	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 16:44	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 16:44	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)
Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 16:44	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 16:44	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 16:44	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 16:44	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 16:44	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 16:44	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 16:44	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 16:44	1
1,1,1-Trichloroethane	**2.6**		1.0	0.37	ug/L			03/30/20 16:44	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 16:44	1
Trichloroethene	**120**		1.0	0.48	ug/L			03/31/20 15:58	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 16:44	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 16:44	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 16:44	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 16:44	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			03/30/20 16:44	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 16:44	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 16:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*80 - 120*		*03/30/20 16:44*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/31/20 15:58*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 16:44*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*03/31/20 15:58*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*03/30/20 16:44*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 122*		*03/31/20 15:58*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 16:44*	*1*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*		*03/31/20 15:58*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**1.5**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 03:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*75*		*41 - 144*	*03/24/20 15:33*	*03/25/20 03:59*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**2.6**		1.0	0.40	mg/L			03/30/20 14:11	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**94**		10	3.1	ug/L			03/27/20 02:37	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26M (031920)
Date Collected: 03/19/20 14:50
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-5
Matrix: GW

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			03/30/20 15:58	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26S (031920)
Date Collected: 03/19/20 13:15
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-6
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:07	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:07	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:07	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:07	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 17:07	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 17:07	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:07	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:07	1
Carbon tetrachloride	**1.8**		1.0	0.33	ug/L			03/30/20 17:07	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:07	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
2-Chloroethyl vinyl ether	<10	R	10	5.0	ug/L			03/30/20 17:07	1
Chloroform	**0.56**	**J**	1.0	0.50	ug/L			03/30/20 17:07	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:07	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:07	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
cis-1,2-Dichloroethene	**6.9**		1.0	0.41	ug/L			03/30/20 17:07	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:07	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:07	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:07	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			03/30/20 17:07	1
Dibromomethane	<1.0		1.0	0.35	ug/L			03/30/20 17:07	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:07	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:07	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:07	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:07	1
1,1-Dichloroethane	**0.59**	**J**	1.0	0.38	ug/L			03/30/20 17:07	1
1,2-Dichloroethane	**0.50**	**J**	1.0	0.50	ug/L			03/30/20 17:07	1
1,1-Dichloroethene	**10**		1.0	0.36	ug/L			03/30/20 17:07	1
1,2-Dichloroethene, Total	**6.9**		2.0	0.37	ug/L			03/30/20 17:07	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:07	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:07	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			03/30/20 17:07	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:07	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:07	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:07	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:07	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:07	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:07	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:07	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:07	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:07	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:07	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:07	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:07	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:07	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-26S (031920)

Date Collected: 03/19/20 13:15
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-6

Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:07	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:07	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:07	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:07	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:07	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:07	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:07	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:07	1
1,1,1-Trichloroethane	**1.6**		1.0	0.37	ug/L			03/30/20 17:07	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:07	1
Trichloroethene	**170**		1.0	0.48	ug/L			03/30/20 17:07	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:07	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:07	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:07	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:07	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:07	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:07	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/30/20 17:07*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:07*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*03/30/20 17:07*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:07*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**1.5**		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 04:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*41 - 144*	*03/24/20 15:33*	*03/25/20 04:21*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**130**		10	3.1	ug/L			03/27/20 03:00	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31M (031920)
Date Collected: 03/19/20 11:10
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-7
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:31	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:31	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:31	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 17:31	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 17:31	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:31	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:31	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:31	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 17:31	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:31	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:31	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 17:31	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:31	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:31	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:31	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 17:31	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 17:31	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:31	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:31	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:31	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 17:31	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 17:31	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 17:31	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:31	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:31	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:31	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:31	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:31	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:31	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:31	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:31	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:31	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:31	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:31	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:31	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:31	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31M (031920)
Date Collected: 03/19/20 11:10
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-7
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:31	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:31	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:31	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:31	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:31	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:31	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 17:31	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:31	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 17:31	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:31	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:31	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:31	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:31	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:31	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:31	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*03/30/20 17:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:31*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 122*		*03/30/20 17:31*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:31*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 04:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*63*		*41 - 144*	*03/24/20 15:33*	*03/25/20 04:42*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/25/20 04:20	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31S (031920)
Date Collected: 03/19/20 10:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-8
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 17:54	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 17:54	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 17:54	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 17:54	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 17:54	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 17:54	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 17:54	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 17:54	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
2-Chloroethyl vinyl ether	<10	R	10	5.0	ug/L			03/30/20 17:54	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 17:54	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 17:54	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 17:54	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 17:54	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 17:54	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 17:54	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 17:54	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 17:54	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 17:54	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 17:54	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 17:54	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 17:54	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 17:54	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 17:54	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 17:54	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 17:54	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:54	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 17:54	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 17:54	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 17:54	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 17:54	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 17:54	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 17:54	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:54	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 17:54	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 17:54	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 17:54	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 17:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: GM-31S (031920)
Date Collected: 03/19/20 10:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-8
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 17:54	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 17:54	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 17:54	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 17:54	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 17:54	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 17:54	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 17:54	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 17:54	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 17:54	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 17:54	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 17:54	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 17:54	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 17:54	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 17:54	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 17:54	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 17:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 17:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*03/30/20 17:54*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*03/30/20 17:54*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/30/20 17:54*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 05:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*73*		*41 - 144*	*03/24/20 15:33*	*03/25/20 05:03*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.1**		1.0	0.31	ug/L			03/25/20 04:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: DUP-02 (031920)
Date Collected: 03/19/20 12:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-9
Matrix: GW

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 18:18	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 18:18	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 18:18	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 18:18	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 18:18	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 18:18	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 18:18	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 18:18	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 18:18	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 18:18	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 18:18	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 18:18	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 18:18	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 18:18	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 18:18	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 18:18	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 18:18	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 18:18	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 18:18	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 18:18	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 18:18	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 18:18	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 18:18	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 18:18	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 18:18	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:18	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 18:18	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 18:18	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 18:18	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 18:18	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 18:18	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 18:18	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:18	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 18:18	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 18:18	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 18:18	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 18:18	1

Client Sample ID: DUP-02 (031920)
Date Collected: 03/19/20 12:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-9
Matrix: GW

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 18:18	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 18:18	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 18:18	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 18:18	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 18:18	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 18:18	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 18:18	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 18:18	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 18:18	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 18:18	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 18:18	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 18:18	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 18:18	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 18:18	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 18:18	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 18:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 18:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 18:18*	*1*
Dibromofluoromethane (Surr)	*116*		*80 - 122*		*03/30/20 18:18*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*03/30/20 18:18*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/24/20 15:33	03/25/20 05:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*66*		*41 - 144*	*03/24/20 15:33*	*03/25/20 05:24*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.1**		1.0	0.31	ug/L			03/25/20 05:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: Trip Blank
Date Collected: 03/19/20 00:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-10
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			03/30/20 15:57	1
Benzene	<1.0		1.0	0.43	ug/L			03/30/20 15:57	1
Bromobenzene	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			03/30/20 15:57	1
Bromoform	<1.0		1.0	0.43	ug/L			03/30/20 15:57	1
Bromomethane	<5.0	UJ	5.0	2.5	ug/L			03/30/20 15:57	1
2-Butanone	<10		10	3.4	ug/L			03/30/20 15:57	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			03/30/20 15:57	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			03/30/20 15:57	1
Chloroethane	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		03/30/20 15:57	1
Chloroform	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Chloromethane	<1.0		1.0	0.40	ug/L			03/30/20 15:57	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			03/30/20 15:57	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			03/30/20 15:57	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			03/30/20 15:57	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			03/30/20 15:57	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			03/30/20 15:57	1
1,2-Dibromoethane	<1.0	*	1.0	0.44	ug/L			03/30/20 15:57	1
Dibromomethane	<1.0	*	1.0	0.35	ug/L			03/30/20 15:57	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			03/30/20 15:57	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			03/30/20 15:57	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			03/30/20 15:57	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			03/30/20 15:57	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			03/30/20 15:57	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			03/30/20 15:57	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			03/30/20 15:57	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			03/30/20 15:57	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			03/30/20 15:57	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			03/30/20 15:57	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
2-Hexanone	<10		10	2.0	ug/L			03/30/20 15:57	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			03/30/20 15:57	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			03/30/20 15:57	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			03/30/20 15:57	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			03/30/20 15:57	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:57	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			03/30/20 15:57	1
o-Xylene	<1.0		1.0	0.23	ug/L			03/30/20 15:57	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			03/30/20 15:57	1
Styrene	<1.0		1.0	0.27	ug/L			03/30/20 15:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181894-1

Client Sample ID: Trip Blank
Date Collected: 03/19/20 00:00
Date Received: 03/21/20 09:50

Lab Sample ID: 680-181894-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			03/30/20 15:57	1
1,1,1,2-Tetrachloroethane	<1.0	*	1.0	0.37	ug/L			03/30/20 15:57	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			03/30/20 15:57	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			03/30/20 15:57	1
Toluene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
trans-1,3-Dichloropropene	<1.0	*	1.0	0.42	ug/L			03/30/20 15:57	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			03/30/20 15:57	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			03/30/20 15:57	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			03/30/20 15:57	1
Trichloroethene	<1.0		1.0	0.48	ug/L			03/30/20 15:57	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			03/30/20 15:57	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			03/30/20 15:57	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			03/30/20 15:57	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			03/30/20 15:57	1
Vinyl acetate	<2.0	*	2.0	0.81	ug/L			03/30/20 15:57	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			03/30/20 15:57	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			03/30/20 15:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*03/30/20 15:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*03/30/20 15:57*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*03/30/20 15:57*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*03/30/20 15:57*	*1*

ATK – Elkton

DATA REVIEW

Elkton, MD

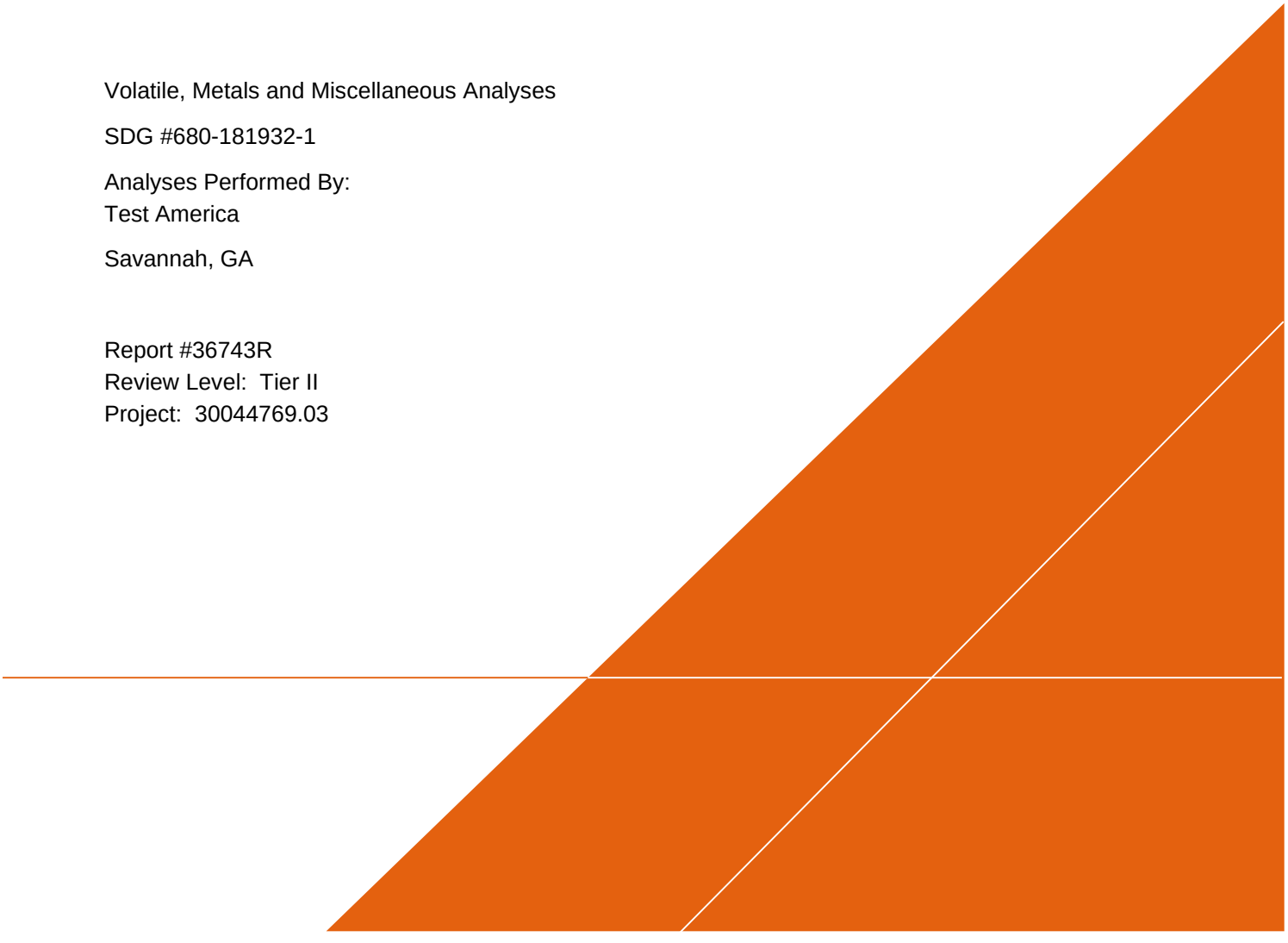
Volatile, Metals and Miscellaneous Analyses

SDG #680-181932-1

Analyses Performed By:
Test America

Savannah, GA

Report #36743R
Review Level: Tier II
Project: 30044769.03



SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-181932-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
MW-11 (032020)	680-181932-1	WG	3/20/2020		X				X
EB-01 (032020)	680-181932-10	WQ	3/20/2020						X
MW-19 (032020)	680-181932-2	WG	3/20/2020		X				X
MW-20 (032020)	680-181932-3	WG	3/20/2020		X			X	X
MW-22 (032020)	680-181932-4	WG	3/20/2020		X			X	X
MW-25 (032020)	680-181932-5	WG	3/20/2020		X			X	X
MW-28 (032020)	680-181932-6	WG	3/20/2020		X			X	X
MW-29 (032020)	680-181932-7	WG	3/20/2020		X				X
DUP-03 (032020)	680-181932-8	WG	3/20/2020	MW-22 (032020)	X			X	X
TRIP BLANK (03202020)	680-181932-9	WQ	3/20/2020		X				

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
MW-25 MW-29 Trip Blank	1,2-Dichloroethane-d4	AC
	4-Bromofluorobenzene	AC
	Dibromofluoromethane	>UL
	Toluene-d8	AC

Notes:

Sample Locations	Surrogate	Recovery

UCL	Upper control limit
AC	Acceptable

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J
< LL but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Surrogates diluted below the calibration curve due to the high concentration of a target compounds	Non-detect	UJ[1]
	Detect	J[1]

Note:

[1] A more concentrated analysis was not performed with surrogate compounds within the calibration range; therefore, no determination of extraction efficiency could be made.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
MW-19	Bromomethane	>UL	>UL
	Chloroethane	>UL	>UL
MW-22 MW-25 MW-28 MW-29 DUP-03 Trip Blank	Bromomethane	>UL	>UL
	2,2-Dichloropropane	>UL	>UL
MW-20	Chloromethane	>UL	>UL
	2,2-Dichloropropane	>UL	>UL
	1,1,1,2-Tetrachloroethane	>UL	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-22 / DUP-03	cis-1,2-Dichloroethene	5.8	6.1	5.0%
	1,1-Dichloroethane	27	26	3.8%

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-22 / DUP-03	1,1-Dichloroethene	9.1	9.4	3.2%
	1,2-Dichloroethene	5.8	6.1	5.0%
	Tetrachloroethene	16	16	0.0%
	1,1,1-Trichloroethane	55	61	10.3%
	Tricholoroethene	32	34	6.1%

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-22 / DUP-03	Iron (D)	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X		X	
C. Equipment/Field Blanks	X				X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Total vs. Dissolved	X				X
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location DUP-03 for sulfate exhibited recoveries and RPDs within the control limits.

The MS/MSD performed on sample location MW-19 for perchlorate exhibited recoveries and RPDs within the control limits.

The MS/MSD performed on sample location MW-22 for TOC exhibited recoveries and RPDs within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
MW-22 / DUP-03	Perchlorate	56	58	3.5%
	Sulfate	23	23	0.0%
	TOC	0.77 J	0.71 J	AC

Notes:

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 5, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

baltimore #201

Chain of Custody Record

397790

eurofins | Environment Testing TestAmerica

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-20-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	1 of ____ COCs
Address: 7550 Teague Rd. Ste. 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOC	Perchlorate	6010C dissolved iron	SM5310 TOC	300 ORGFM Sulfate	TKN - nitrate+nitrite	Sample Specific Notes:
MW-11 (032020)	3-20-20	1105	G	GW	1								1	dissolved iron is filtered
MW-19 (032020)		1200			4			3	1					
MW-20 (032020)		1315			5			3	1				1	
MW-22 (032020)		1140			10	1		3	1	1	3	1	1	
MW-25 (032020)		0945			9	1		3	1	1	3	1		
MW-28 (032020)		1030			9	1		3	1	1	3	1		
MW-29 (032020)		0930			4			3	1					
DUP-03 (032020)	3-20-20	1200	G	GW	10	1		3	1	1	3	1	1	
Trip Blank					2			2						
EB-01 (032020)	3-20-20	1200				1							1	

680-181932 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ____ Corr'd: ____		Therm ID No.: ____
Relinquished by:	Company: Arcadis	Date/Time: 3-20-20 0600	Received by:	Company:	Date/Time: 3/23/20 10:00
Relinquished by:	Company: 3/23/20 1730	Date/Time:	Received by:	Company: 03-24-2020	Date/Time: 0840
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: 2.6 (CF) 3.0°c	Date/Time:

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605218.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181932-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/3/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-19 (032020) (680-181932-2)	3/20/20	12:00 Eastern		Water			X	1	
MW-20 (032020) (680-181932-3)	3/20/20	13:15 Eastern		Water			X	1	
MW-22 (032020) (680-181932-4)	3/20/20	11:40 Eastern		Water			X	1	
MW-25 (032020) (680-181932-5)	3/20/20	09:45 Eastern		Water			X	1	
MW-28 (032020) (680-181932-6)	3/20/20	10:30 Eastern		Water			X	1	
MW-29 (032020) (680-181932-7)	3/20/20	09:30 Eastern		Water			X	1	
DUP-03 (032020) (680-181932-8)	3/20/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 3-24-20 1600	Company TA	Received by: [signature]	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 3.25.20 0915	Company AHC
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:	(4.1°C) FEP	

Ver: 01/16/2019

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-11 (032020)
Date Collected: 03/20/20 11:05
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	2.9		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-19 (032020)
Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 05:29	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 05:29	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 05:29	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 05:29	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 05:29	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 05:29	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/01/20 05:29	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/01/20 05:29	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 05:29	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 05:29	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 05:29	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 05:29	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 05:29	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 05:29	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 05:29	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 05:29	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 05:29	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 05:29	1
1,1-Dichloroethane	**3.8**		1.0	0.38	ug/L			04/01/20 05:29	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
1,1-Dichloroethene	**16**		1.0	0.36	ug/L			04/01/20 05:29	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 05:29	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 05:29	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 05:29	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 05:29	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 05:29	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 05:29	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 05:29	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 05:29	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 05:29	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 05:29	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 05:29	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 05:29	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 05:29	1

R

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-19 (032020)

Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 05:29	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 05:29	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 05:29	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 05:29	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 05:29	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 05:29	1
1,1,1-Trichloroethane	**10**		1.0	0.37	ug/L			04/01/20 05:29	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 05:29	1
Trichloroethene	**2.6**		1.0	0.48	ug/L			04/01/20 05:29	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 05:29	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 05:29	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 05:29	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 05:29	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 05:29	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 05:29	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 05:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/01/20 05:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 131*		*04/01/20 05:29*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/01/20 05:29*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/01/20 05:29*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**890**		100	31	ug/L			03/27/20 22:08	100

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-20 (032020)
Date Collected: 03/20/20 13:15
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 21:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 21:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 21:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 21:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 21:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/02/20 21:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 21:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 21:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 21:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 21:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 21:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 21:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 21:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 21:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 21:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 21:15	1
1,1-Dichloroethane	**40**		1.0	0.38	ug/L			04/02/20 21:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
1,1-Dichloroethene	**12**		1.0	0.36	ug/L			04/02/20 21:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 21:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 21:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 21:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 21:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 21:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 21:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 21:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 21:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 21:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 21:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 21:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 21:15	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-20 (032020)
Date Collected: 03/20/20 13:15
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 21:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 21:15	1
Tetrachloroethene	**0.99**	**J**	1.0	0.74	ug/L			04/02/20 21:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 21:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 21:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:15	1
1,1,1-Trichloroethane	**37**		1.0	0.37	ug/L			04/02/20 21:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 21:15	1
Trichloroethene	**2.9**		1.0	0.48	ug/L			04/02/20 21:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 21:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 21:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 21:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 21:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 21:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/02/20 21:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/02/20 21:15*	*1*
Dibromofluoromethane (Surr)	*121*		*80 - 122*		*04/02/20 21:15*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*04/02/20 21:15*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**490**		100	31	ug/L			03/27/20 23:16	100

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**7.5**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-22 (032020)
Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 13:48	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 13:48	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 13:48	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 13:48	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 13:48	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 13:48	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 13:48	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 13:48	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
cis-1,2-Dichloroethene	**5.8**		1.0	0.41	ug/L			04/01/20 13:48	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 13:48	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 13:48	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 13:48	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 13:48	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 13:48	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 13:48	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 13:48	1
1,1-Dichloroethane	**27**		1.0	0.38	ug/L			04/01/20 13:48	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
1,1-Dichloroethene	**9.1**		1.0	0.36	ug/L			04/01/20 13:48	1
1,2-Dichloroethene, Total	**5.8**		2.0	0.37	ug/L			04/01/20 13:48	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 13:48	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 13:48	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 13:48	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 13:48	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 13:48	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 13:48	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 13:48	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:48	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 13:48	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 13:48	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 13:48	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 13:48	1

Client Sample ID: MW-22 (032020)
Date Collected: 03/20/20 11:40
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 13:48	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 13:48	1
Tetrachloroethene	**16**		1.0	0.74	ug/L			04/01/20 13:48	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 13:48	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 13:48	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:48	1
1,1,1-Trichloroethane	**55**		1.0	0.37	ug/L			04/01/20 13:48	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 13:48	1
Trichloroethene	**32**		1.0	0.48	ug/L			04/01/20 13:48	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 13:48	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 13:48	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:48	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 13:48	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 13:48	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 13:48	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 13:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/01/20 13:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/01/20 13:48*	*1*
Dibromofluoromethane (Surr)	*121*		*80 - 122*		*04/01/20 13:48*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/01/20 13:48*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.0	0.40	mg/L			04/02/20 21:51	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**56**		2.0	0.63	ug/L			03/27/20 23:39	2

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.77**	**J**	1.0	0.50	mg/L			03/31/20 20:18	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**0.55**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-25 (032020)
Date Collected: 03/20/20 09:45
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:12	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:12	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:12	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:12	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:12	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 14:12	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:12	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:12	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 14:12	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:12	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:12	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:12	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:12	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:12	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:12	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:12	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 14:12	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
1,1-Dichloroethene	**0.52**	**J**	1.0	0.36	ug/L			04/01/20 14:12	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 14:12	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:12	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:12	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:12	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:12	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:12	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:12	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:12	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:12	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:12	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:12	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:12	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:12	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-25 (032020)
Date Collected: 03/20/20 09:45
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:12	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:12	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:12	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:12	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:12	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:12	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:12	1
Trichloroethene	**0.52**	**J**	1.0	0.48	ug/L			04/01/20 14:12	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:12	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:12	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:12	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:12	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:12	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:12	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/01/20 14:12*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/01/20 14:12*	*1*
Dibromofluoromethane (Surr)	*123*	*X*	*80 - 122*		*04/01/20 14:12*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*04/01/20 14:12*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**41**		1.0	0.40	mg/L			04/02/20 22:04	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**110**		5.0	1.6	ug/L			03/28/20 00:02	5

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/25/20 14:00	03/26/20 20:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**1.1**		1.0	0.50	mg/L			03/31/20 21:08	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-28 (032020)
Date Collected: 03/20/20 10:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:36	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:36	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/01/20 14:36	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:36	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:36	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:36	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 14:36	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:36	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:36	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
cis-1,2-Dichloroethene	**3.4**		1.0	0.41	ug/L			04/01/20 14:36	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:36	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:36	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:36	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:36	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:36	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:36	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:36	1
1,1-Dichloroethane	**18**		1.0	0.38	ug/L			04/01/20 14:36	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
1,1-Dichloroethene	**1.9**		1.0	0.36	ug/L			04/01/20 14:36	1
1,2-Dichloroethene, Total	**3.4**		2.0	0.37	ug/L			04/01/20 14:36	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:36	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:36	1
2,2-Dichloropropane	<1.0	*	1.0	0.37	ug/L			04/01/20 14:36	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:36	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:36	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:36	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:36	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:36	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:36	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:36	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:36	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:36	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:36	1

Client Sample ID: MW-28 (032020)
Date Collected: 03/20/20 10:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:36	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:36	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:36	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:36	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:36	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:36	1
1,1,1-Trichloroethane	**8.4**		1.0	0.37	ug/L			04/01/20 14:36	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:36	1
Trichloroethene	**13**		1.0	0.48	ug/L			04/01/20 14:36	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:36	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:36	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:36	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:36	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:36	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:36	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/01/20 14:36*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/01/20 14:36*	*1*
Dibromofluoromethane (Surr)	*122*		*80 - 122*		*04/01/20 14:36*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/01/20 14:36*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**20**		1.0	0.40	mg/L			04/02/20 22:17	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**150**		5.0	1.6	ug/L			03/28/20 00:25	5

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**9800**		50	17	ug/L		03/25/20 14:00	03/26/20 20:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**6.3**		1.0	0.50	mg/L			03/31/20 21:24	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-29 (032020)
Date Collected: 03/20/20 09:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 14:59	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 14:59	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 14:59	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 14:59	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 14:59	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 14:59	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 14:59	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 14:59	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
cis-1,2-Dichloroethene	**1.2**	J	1.0	0.41	ug/L			04/01/20 14:59	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 14:59	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 14:59	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 14:59	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 14:59	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 14:59	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 14:59	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 14:59	1
1,1-Dichloroethane	**3.7**	J	1.0	0.38	ug/L			04/01/20 14:59	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
1,1-Dichloroethene	**8.1**	J	1.0	0.36	ug/L			04/01/20 14:59	1
1,2-Dichloroethene, Total	**1.2**	J	2.0	0.37	ug/L			04/01/20 14:59	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 14:59	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 14:59	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 14:59	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 14:59	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 14:59	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 14:59	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 14:59	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:59	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 14:59	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 14:59	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 14:59	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 14:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: MW-29 (032020)
Date Collected: 03/20/20 09:30
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 14:59	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 14:59	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 14:59	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 14:59	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 14:59	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 14:59	1
1,1,1-Trichloroethane	**9.6**	J	1.0	0.37	ug/L			04/01/20 14:59	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 14:59	1
Trichloroethene	**14**	J	1.0	0.48	ug/L			04/01/20 14:59	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 14:59	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 14:59	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 14:59	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 14:59	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 14:59	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 14:59	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/01/20 14:59*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 131*		*04/01/20 14:59*	*1*
Dibromofluoromethane (Surr)	*124*	*X*	*80 - 122*		*04/01/20 14:59*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*04/01/20 14:59*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**2500**		100	31	ug/L			03/28/20 00:48	100

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: DUP-03 (032020)
Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 15:23	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 15:23	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 15:23	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 15:23	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 15:23	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 15:23	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 15:23	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 15:23	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
cis-1,2-Dichloroethene	**6.1**		1.0	0.41	ug/L			04/01/20 15:23	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 15:23	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 15:23	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 15:23	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 15:23	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 15:23	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 15:23	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 15:23	1
1,1-Dichloroethane	**26**		1.0	0.38	ug/L			04/01/20 15:23	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
1,1-Dichloroethene	**9.4**		1.0	0.36	ug/L			04/01/20 15:23	1
1,2-Dichloroethene, Total	**6.1**		2.0	0.37	ug/L			04/01/20 15:23	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 15:23	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 15:23	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 15:23	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 15:23	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 15:23	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 15:23	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 15:23	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 15:23	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 15:23	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 15:23	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 15:23	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 15:23	1

Client Sample ID: DUP-03 (032020)
Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 15:23	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 15:23	1
Tetrachloroethene	**16**		1.0	0.74	ug/L			04/01/20 15:23	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 15:23	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 15:23	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 15:23	1
1,1,1-Trichloroethane	**61**		1.0	0.37	ug/L			04/01/20 15:23	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 15:23	1
Trichloroethene	**34**		1.0	0.48	ug/L			04/01/20 15:23	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 15:23	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 15:23	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 15:23	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 15:23	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 15:23	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 15:23	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 15:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*80 - 120*		*04/01/20 15:23*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/01/20 15:23*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 122*		*04/01/20 15:23*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/01/20 15:23*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.0	0.40	mg/L			04/02/20 20:23	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**58**		2.0	0.63	ug/L			03/28/20 01:11	2

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**55**		50	17	ug/L		03/25/20 14:00	03/26/20 20:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**0.71**	**J**	1.0	0.50	mg/L			03/31/20 21:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**0.54**		0.25	0.25	mg/L			03/31/20 13:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: Trip Blank
Date Collected: 03/20/20 00:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/01/20 13:01	1
Benzene	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/01/20 13:01	1
Bromoform	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
2-Butanone	<10		10	3.4	ug/L			04/01/20 13:01	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/01/20 13:01	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/01/20 13:01	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/01/20 13:01	1
Chloroform	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/01/20 13:01	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/01/20 13:01	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/01/20 13:01	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/01/20 13:01	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/01/20 13:01	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/01/20 13:01	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/01/20 13:01	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/01/20 13:01	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/01/20 13:01	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/01/20 13:01	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/01/20 13:01	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/01/20 13:01	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/01/20 13:01	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/01/20 13:01	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/01/20 13:01	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/01/20 13:01	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
2-Hexanone	<10		10	2.0	ug/L			04/01/20 13:01	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/01/20 13:01	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/01/20 13:01	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/01/20 13:01	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:01	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/01/20 13:01	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/01/20 13:01	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
Styrene	<1.0		1.0	0.27	ug/L			04/01/20 13:01	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: Trip Blank
Date Collected: 03/20/20 00:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/01/20 13:01	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/01/20 13:01	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/01/20 13:01	1
Toluene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/01/20 13:01	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/01/20 13:01	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/01/20 13:01	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/01/20 13:01	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/01/20 13:01	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/01/20 13:01	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/01/20 13:01	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/01/20 13:01	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/01/20 13:01	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/01/20 13:01	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/01/20 13:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*80 - 120*		*04/01/20 13:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/01/20 13:01*	*1*
Dibromofluoromethane (Surr)	*125*	*X*	*80 - 122*		*04/01/20 13:01*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/01/20 13:01*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181932-1

Client Sample ID: EB-01 (032020)
Date Collected: 03/20/20 12:00
Date Received: 03/24/20 08:40

Lab Sample ID: 680-181932-10
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	<0.25		0.25	0.25	mg/L			03/31/20 13:40	1

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatiles and Miscellaneous Analyses

SDG #680-181985-1

Analyses Performed By:
Test America

Savannah, GA

Report #36744R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-181985-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
GM-2B (032320)	680-181985-1	WG	3/23/2020		X	X			X
GM-16M (032320)	680-181985-2	WG	3/23/2020		X	X			X
GM-16S (032320)	680-181985-3	WG	3/23/2020		X	X			X
GM-27 (032320)	680-181985-4	WG	3/23/2020		X	X			X
TRIP BLANK (03232020)	680-181985-5	WQ	3/23/2020		X				

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were non-detect. No other qualification of the sample results was required.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
Trip Blank	1,2-Dichloroethane-d4	AC
	4-Bromofluorobenzene	AC
	Dibromofluoromethane	>UL
	Toluene-d8	AC

Notes:

Sample Locations	Surrogate	Recovery

UL	Upper control limit
AC	Acceptable

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J
< LL but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Surrogates diluted below the calibration curve due to the high concentration of a target compounds	Non-detect	UJ[1]
	Detect	J[1]

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
Trip Blank	Bromomethane	>UL	>UL
	2,2-Dichloropropane	>UL	>UL

Sample Locations	Compound	LCS Recovery	LCSD Recovery
Trip Blank	1,1,1,12-Tetrachloroethane	>UL	>UL
GM-2B GM-16M GM-16S GM-27	Bromomethane	>UL	>UL
	Chloroethane	>UL	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks	X				X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 314.0. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 5, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Baltimore #201

Chain of Custody Record

397791

eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact			
Company Name: Arcadis Inc	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-23-20
Address: 2550 Teague Rd Ste 210	Tel/Email:	Lab Contact:	Carrier:
City/State/Zip: Hanover, MD 21076			
Phone:			
Fax:			
Project Name: ATK Orbital			
Site: Elkton MD			
PO# 30044769			

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

☐ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

COC No: 1 of 1 COCs

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOCs 8260B	3/4.0 Perchlorate	1,4-Dioxane	Sample Specific Notes:
GM-2B (032320)	3-23-20	1050	G	GW	6			3	1	2	
GM-16M (032320)	|	0920	|	|	6			3	1	2	
GM-16S (032320)	|	0920	|	|	6			3	1	2	
GM-27 (032320)	3-23-20	1100	G	GW	6			3	1	2	
Trip Blank								2			

680-181985 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

2.8 3.2

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Arcadis	3/24/20 0600	[signature]	ETA	3/24/20 0945
[signature]	ETA	3/24/20 1700	[signature]	TA	3-25-20 925
			Received in Laboratory by:		

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605337.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-181985-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/6/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X		X	
GM-2B (032320) (680-181985-1)	3/23/20	10:50 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-16M (032320) (680-181985-2)	3/23/20	09:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-16S (032320) (680-181985-3)	3/23/20	09:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-27 (032320) (680-181985-4)	3/23/20	11:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3-25-26 1600	TA	J.a Fedex	3/26/20 1000	EUROFINS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No.: 164498	Cooler Temperature(s) °C and Other Remarks: 4.1°C IR11

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605354.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-181985-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/6/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-2B (032320) (680-181985-1)	3/23/20	10:50 Eastern		Water			X	1	
GM-16M (032320) (680-181985-2)	3/23/20	09:20 Eastern		Water			X	1	
GM-16S (032320) (680-181985-3)	3/23/20	09:20 Eastern		Water			X	1	
GM-27 (032320) (680-181985-4)	3/23/20	11:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3/26/20 1600	TA			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-26-20 0615	Company TAK

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (3.1°C) REPO

Ver: 01/16/2019

4/6/2020

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-2B (032320)
Date Collected: 03/23/20 10:50
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 20:43	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 20:43	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 20:43	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 20:43	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 20:43	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 20:43	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 20:43	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/02/20 20:43	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 20:43	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 20:43	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
cis-1,2-Dichloroethene	**10**		1.0	0.41	ug/L			04/02/20 20:43	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 20:43	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 20:43	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 20:43	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 20:43	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 20:43	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 20:43	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 20:43	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 20:43	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 20:43	1
1,1-Dichloroethene	**0.76**	**J**	1.0	0.36	ug/L			04/02/20 20:43	1
1,2-Dichloroethene, Total	**10**		2.0	0.37	ug/L			04/02/20 20:43	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 20:43	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 20:43	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 20:43	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 20:43	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 20:43	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 20:43	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 20:43	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 20:43	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 20:43	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 20:43	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 20:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-2B (032320)
Date Collected: 03/23/20 10:50
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 20:43	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 20:43	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 20:43	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 20:43	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 20:43	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 20:43	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 20:43	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 20:43	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 20:43	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 20:43	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 20:43	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 20:43	1
Vinyl chloride	**0.55**	**J**	1.0	0.50	ug/L			04/02/20 20:43	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 20:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 20:43*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/02/20 20:43*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/02/20 20:43*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/02/20 20:43*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 18:58	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 18:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*52*		*41 - 144*	*03/27/20 09:24*	*03/27/20 18:58*	*1*
Terphenyl-d14	*49*			*03/27/20 09:24*	*03/27/20 18:58*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 03:51	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16M (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 21:06	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 21:06	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 21:06	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 21:06	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 21:06	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 21:06	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 21:06	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/02/20 21:06	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 21:06	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 21:06	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 21:06	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 21:06	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 21:06	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 21:06	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 21:06	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 21:06	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 21:06	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 21:06	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 21:06	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 21:06	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 21:06	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 21:06	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 21:06	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 21:06	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 21:06	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 21:06	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 21:06	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 21:06	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:06	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 21:06	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 21:06	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 21:06	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16M (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 21:06	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 21:06	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 21:06	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 21:06	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 21:06	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 21:06	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 21:06	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 21:06	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 21:06	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 21:06	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 21:06	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 21:06	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 21:06	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 21:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 21:06*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/02/20 21:06*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/02/20 21:06*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/02/20 21:06*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 19:20	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 19:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*106*		*41 - 144*	*03/27/20 09:24*	*03/27/20 19:20*	*1*
Terphenyl-d14	*104*			*03/27/20 09:24*	*03/27/20 19:20*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 04:14	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16S (032320)
Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<50		50	35	ug/L			04/03/20 04:24	5
Benzene	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromobenzene	<5.0		5.0	2.5	ug/L			04/03/20 04:24	5
Bromochloromethane	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
Bromodichloromethane	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromoform	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Bromomethane	<25	*	25	13	ug/L			04/03/20 04:24	5
2-Butanone	<50		50	17	ug/L			04/03/20 04:24	5
Carbon disulfide	<10		10	5.0	ug/L			04/03/20 04:24	5
Carbon tetrachloride	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Chlorobenzene	<5.0		5.0	1.3	ug/L			04/03/20 04:24	5
Chloroethane	<25	*	25	13	ug/L			04/03/20 04:24	5
2-Chloroethyl vinyl ether	<50		50	25	ug/L	R		04/03/20 04:24	5
Chloroform	<5.0		5.0	2.5	ug/L			04/03/20 04:24	5
Chloromethane	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
2-Chlorotoluene	<5.0		5.0	1.4	ug/L			04/03/20 04:24	5
4-Chlorotoluene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
cis-1,2-Dichloroethene	**150**		5.0	2.1	ug/L			04/03/20 04:24	5
cis-1,3-Dichloropropene	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
Dibromochloromethane	<5.0		5.0	1.6	ug/L			04/03/20 04:24	5
1,2-Dibromo-3-Chloropropane	<25		25	5.5	ug/L			04/03/20 04:24	5
1,2-Dibromoethane	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
Dibromomethane	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
1,2-Dichlorobenzene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,3-Dichlorobenzene	<5.0		5.0	2.2	ug/L			04/03/20 04:24	5
1,4-Dichlorobenzene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
Dichlorodifluoromethane	<5.0		5.0	3.0	ug/L			04/03/20 04:24	5
1,1-Dichloroethane	**11**		5.0	1.9	ug/L			04/03/20 04:24	5
1,2-Dichloroethane	**3.2**	**J**	5.0	2.5	ug/L			04/03/20 04:24	5
1,1-Dichloroethene	**89**		5.0	1.8	ug/L			04/03/20 04:24	5
1,2-Dichloroethene, Total	**150**		10	1.9	ug/L			04/03/20 04:24	5
1,2-Dichloropropane	<5.0		5.0	3.4	ug/L			04/03/20 04:24	5
1,3-Dichloropropane	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
2,2-Dichloropropane	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,1-Dichloropropene	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Ethylbenzene	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Hexachlorobutadiene	<25		25	13	ug/L			04/03/20 04:24	5
2-Hexanone	<50		50	10	ug/L			04/03/20 04:24	5
Isopropylbenzene	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
Methylene Chloride	<25		25	13	ug/L			04/03/20 04:24	5
4-Methyl-2-pentanone	<50		50	11	ug/L			04/03/20 04:24	5
Methyl tert-butyl ether	<50		50	1.5	ug/L			04/03/20 04:24	5
m-Xylene & p-Xylene	<5.0		5.0	1.8	ug/L			04/03/20 04:24	5
n-Butylbenzene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
N-Propylbenzene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
o-Xylene	<5.0		5.0	1.2	ug/L			04/03/20 04:24	5
p-Isopropyltoluene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
sec-Butylbenzene	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
Styrene	<5.0		5.0	1.4	ug/L			04/03/20 04:24	5

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-16S (032320)

Date Collected: 03/23/20 09:20
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<5.0		5.0	2.3	ug/L			04/03/20 04:24	5
1,1,1,2-Tetrachloroethane	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
1,1,2,2-Tetrachloroethane	<5.0		5.0	3.1	ug/L			04/03/20 04:24	5
Tetrachloroethene	<5.0		5.0	3.7	ug/L			04/03/20 04:24	5
Toluene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
trans-1,2-Dichloroethene	<5.0		5.0	1.9	ug/L			04/03/20 04:24	5
trans-1,3-Dichloropropene	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
1,2,3-Trichlorobenzene	<25		25	13	ug/L			04/03/20 04:24	5
1,2,4-Trichlorobenzene	<25		25	13	ug/L			04/03/20 04:24	5
1,1,1-Trichloroethane	**27**		5.0	1.9	ug/L			04/03/20 04:24	5
1,1,2-Trichloroethane	<5.0		5.0	1.7	ug/L			04/03/20 04:24	5
Trichloroethene	**550**		5.0	2.4	ug/L			04/03/20 04:24	5
Trichlorofluoromethane	<5.0		5.0	2.1	ug/L			04/03/20 04:24	5
1,2,3-Trichloropropane	<5.0		5.0	2.0	ug/L			04/03/20 04:24	5
1,2,4-Trimethylbenzene	<5.0		5.0	2.4	ug/L			04/03/20 04:24	5
1,3,5-Trimethylbenzene	<5.0		5.0	1.6	ug/L			04/03/20 04:24	5
Vinyl acetate	<10		10	4.1	ug/L			04/03/20 04:24	5
Vinyl chloride	**18**		5.0	2.5	ug/L			04/03/20 04:24	5
Xylenes, Total	<5.0		5.0	1.2	ug/L			04/03/20 04:24	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 04:24*	*5*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*04/03/20 04:24*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 04:24*	*5*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 04:24*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**12**		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 19:41	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 19:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/27/20 09:24*	*03/27/20 19:41*	*1*
Terphenyl-d14	*93*			*03/27/20 09:24*	*03/27/20 19:41*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**230**		50	16	ug/L			03/31/20 01:45	50

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-27 (032320)
Date Collected: 03/23/20 11:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 15:39	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 15:39	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/02/20 15:39	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 15:39	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 15:39	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 15:39	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/02/20 15:39	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/02/20 15:39	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 15:39	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 15:39	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 15:39	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 15:39	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 15:39	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 15:39	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 15:39	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 15:39	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 15:39	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 15:39	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 15:39	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 15:39	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 15:39	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 15:39	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 15:39	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 15:39	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 15:39	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 15:39	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 15:39	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 15:39	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 15:39	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 15:39	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 15:39	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 15:39	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: GM-27 (032320)
Date Collected: 03/23/20 11:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 15:39	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 15:39	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 15:39	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 15:39	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 15:39	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 15:39	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 15:39	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 15:39	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 15:39	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 15:39	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 15:39	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 15:39	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 15:39	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 15:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/02/20 15:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*73 - 131*		*04/02/20 15:39*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/02/20 15:39*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/02/20 15:39*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/27/20 09:24	03/27/20 20:02	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/27/20 09:24	03/27/20 20:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/27/20 09:24*	*03/27/20 20:02*	*1*
Terphenyl-d14	*93*			*03/27/20 09:24*	*03/27/20 20:02*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/28/20 05:00	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-181985-1

Client Sample ID: Trip Blank
Date Collected: 03/23/20 00:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/02/20 14:58	1
Benzene	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/02/20 14:58	1
Bromoform	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
2-Butanone	<10		10	3.4	ug/L			04/02/20 14:58	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/02/20 14:58	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/02/20 14:58	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/02/20 14:58	1
Chloroform	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/02/20 14:58	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/02/20 14:58	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/02/20 14:58	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/02/20 14:58	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/02/20 14:58	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/02/20 14:58	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/02/20 14:58	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/02/20 14:58	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/02/20 14:58	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/02/20 14:58	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/02/20 14:58	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/02/20 14:58	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/02/20 14:58	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/02/20 14:58	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/02/20 14:58	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/02/20 14:58	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
2-Hexanone	<10		10	2.0	ug/L			04/02/20 14:58	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/02/20 14:58	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/02/20 14:58	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/02/20 14:58	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:58	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/02/20 14:58	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/02/20 14:58	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 14:58	1

Client Sample ID: Trip Blank
Date Collected: 03/23/20 00:00
Date Received: 03/25/20 09:25

Lab Sample ID: 680-181985-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 14:58	1
1,1,1,2-Tetrachloroethane	<1.0	✓	1.0	0.37	ug/L			04/02/20 14:58	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 14:58	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 14:58	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 14:58	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 14:58	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 14:58	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 14:58	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 14:58	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 14:58	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 14:58	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 14:58	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 14:58	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 14:58	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*80 - 120*		*04/02/20 14:58*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/02/20 14:58*	*1*
Dibromofluoromethane (Surr)	*125*	*X*	*80 - 122*		*04/02/20 14:58*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*04/02/20 14:58*	*1*

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

Lab Sample ID: MB 680-613689/9
Matrix: Water
Analysis Batch: 613689

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<1.0		1.0	0.27	ug/L			04/02/20 13:24	1
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/02/20 13:24	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/02/20 13:24	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/02/20 13:24	1
Toluene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/02/20 13:24	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/02/20 13:24	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/02/20 13:24	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/02/20 13:24	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/02/20 13:24	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/02/20 13:24	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/02/20 13:24	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/02/20 13:24	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/02/20 13:24	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/02/20 13:24	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/02/20 13:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/02/20 13:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/02/20 13:24*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 122*		*04/02/20 13:24*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/02/20 13:24*	*1*

Lab Sample ID: LCS 680-613689/4
Matrix: Water
Analysis Batch: 613689

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	283		ug/L		113	70 - 135
Benzene	50.0	54.4		ug/L		109	80 - 120
Bromobenzene	50.0	60.6		ug/L		121	80 - 121
Bromochloromethane	50.0	52.1		ug/L		104	80 - 120
Bromodichloromethane	50.0	53.8		ug/L		108	80 - 120
Bromoform	50.0	60.3		ug/L		121	74 - 126
Bromomethane	50.0	79.9	*	ug/L		160	62 - 130
2-Butanone	250	248		ug/L		99	80 - 131
Carbon disulfide	50.0	53.1		ug/L		106	80 - 120
Carbon tetrachloride	50.0	59.7		ug/L		119	76 - 123
Chlorobenzene	50.0	56.9		ug/L		114	80 - 120
Chloroethane	50.0	54.7		ug/L		109	66 - 135
2-Chloroethyl vinyl ether	50.0	49.1		ug/L		98	71 - 135
Chloroform	50.0	54.0		ug/L		108	80 - 120
Chloromethane	50.0	43.7		ug/L		87	69 - 131
2-Chlorotoluene	50.0	57.8		ug/L		116	80 - 120

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatile, Metals and Miscellaneous Analyses

SDG #680-182056-1

Analyses Performed By:
Test America

Savannah, GA

Report #36745R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-182056-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
BS-1 (032420)	680-182056-1	WG	3/24/2020		X	X		X	X
GM-30M (032420)	680-182056-2	WG	3/24/2020		X	X			X
GM-32 (032420)	680-182056-3	WG	3/24/2020		X	X			X
GM-32D (032420)	680-182056-4	WG	3/24/2020		X	X			X
EB-03 (032420)	680-182056-5	WQ	3/24/2020		X	X		X	X
TRIP BLANK (03242020)	680-182056-6	WQ	3/24/2020		X				

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were non-detect. No other qualification of the sample results was required.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
BS-1 GM-30M GM-32 GM-32D EB-03	Bromomethane	>UL	>UL
	Chloroethane	>UL	>UL
Trip Blank	Bromomethane	>UL	>UL
	Chloroethane	>UL	>UL
	Dichlorodifluoromethane	AC	>UL
	2,2-Dichloropropane	AC	>UL
	Vinyl Acetate	AC	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data validation.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks		X		X	
C. Trip blanks		X	X		
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 7470A, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.
SW-846 7470	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
BS-1	Silver	Detected sample results <RL and <BAL	“UB” at the RL

Note:

RL Reporting limit

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte’s concentration detected in the parent sample exceeds the MS/MSD concentration by a

factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. General Assessment – Total vs. Dissolved

When the dissolved concentration exceeded the associated total concentration, and both results were five times greater than the LOQ, then the %D between the total and dissolved concentrations must be less than 10%.

The calculated %D between the total and the dissolved sample results were within the control limit, with the exception of the analytes presented in the following table.

Sample Location	Analytes	%D
BS-1	Iron	19.5%

The criteria used to evaluate total and dissolved %D are presented in the following table. In the case of a total and dissolved %D deviation, the sample results are qualified. The qualifications are applied to the associated total and dissolved sample results associated with the sample location referenced above.

Sample Concentration	Control Limit	Sample Result	Qualification
Dissolved sample concentration > total sample concentration and > 5x RL	>10%	Non-detect	UJ
		Detect	J

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X	X		
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)	X				X
Total vs. Dissolved		X	X		
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location EB-03 for TOC exhibited recoveries and RPDs within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate was not included in the data package.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)	X				X
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 5, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Baltimore #201

Chain of Custody Record

397792 eurofins | Environment Testing TestAmerica

Address: #201

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zampato	Date: 3-24-20	COC No:
Company Name: Arcadis Inc	Tel/Email:	Lab Contact:	Carrier:	of COCs
Address: 7550 Teague Rd, Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton, MD	☐ 2 days			Job / SDG No.:
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOC 8260B	1,4-Dioxane 8270D SVOC	6010C, 7470A	6010C Dissolved iron	300.0 Sulfate	SM5310 TOC	Sample Specific Notes:
BS-1 (032420)	3-24-20	1200	G	GW	11	1		3	1	2	1	1	3	dissolved iron is filtered
GM-30M (032420)		1155			6			3	1	2				
GM-32 (032420)		0930			6			3	1	2				
GM-32D (032420)		1020			6			3	1	2				
EB-03 (032420)	3-24-20	1200	G	GW	11	1		3	1	2	1	1	3	
Trip Blank					2			2						

680-182056-01 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

3.8 4.2

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:

Relinquished by:	Company: Arcadis	Date/Time: 3-25-20 0700	Received by:	Company:	Date/Time: 3/25/20	11:25
Relinquished by:	Company: 3/25/20 17:10	Date/Time:	Received by:	Company: TA	Date/Time: 3.26.20	910
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:	

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605660.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/7/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-30M (032420) (680-182056-2)	3/24/20	11:55 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-32 (032420) (680-182056-3)	3/24/20	09:30 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
GM-32D (032420) (680-182056-4)	3/24/20	10:20 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-27-20 1600	TA		3.28.20 11:30	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: IR11 3.9°C VIA FedEx

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/7/2020	Analysis Requested		Preservation Codes:
City: Phoenix	TAT Requested (days):			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 Z - other (specify) Other:
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
BS-1 (032420) (680-182056-1)	3/24/20	12:00 Eastern		Water			X	1	
GM-32 (032420) (680-182056-3)	3/24/20	09:30 Eastern		Water			X	1	
GM-32D (032420) (680-182056-4)	3/24/20	10:20 Eastern		Water			X	1	
EB-03 (032420) (680-182056-5)	3/24/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3-27-20 1600	TA			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company TAPX

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (0.8°C) FEDEX

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605664.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182056-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/7/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GM-30M (032420) (680-182056-2)	3/24/20	11:55 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3-27-20 1600	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				3-28-20	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0820	Company TAPA

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		0.8°C FEDEX

Ver: 01/16/2019

4/7/2020

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 07:31	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 07:31	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:31	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 07:31	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 07:31	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 07:31	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:31	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/03/20 07:31	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 07:31	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 07:31	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 07:31	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 07:31	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 07:31	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 07:31	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 07:31	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 07:31	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 07:31	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 07:31	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 07:31	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 07:31	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 07:31	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 07:31	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 07:31	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 07:31	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 07:31	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 07:31	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 07:31	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 07:31	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:31	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 07:31	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 07:31	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 07:31	1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 07:31	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 07:31	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 07:31	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:31	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:31	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 07:31	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 07:31	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 07:31	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 07:31	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:31	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 07:31	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 07:31	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 07:31	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 07:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 07:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 07:31*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 07:31*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*04/03/20 07:31*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
Acenaphthylene	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 18:59	1
Acetophenone	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 18:59	1
Anthracene	<9.9		9.9	0.68	ug/L		03/31/20 14:46	04/02/20 18:59	1
Atrazine	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzaldehyde	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[a]anthracene	<9.9		9.9	0.55	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[a]pyrene	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[b]fluoranthene	<9.9		9.9	2.6	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[g,h,i]perylene	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 18:59	1
Benzo[k]fluoranthene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,1'-Biphenyl	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-chloroethoxy)methane	<9.9		9.9	0.93	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-chloroethyl)ether	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
bis (2-chloroisopropyl) ether	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 18:59	1
Bis(2-ethylhexyl) phthalate	<9.9		9.9	1.6	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Bromophenyl phenyl ether	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 18:59	1
Butyl benzyl phthalate	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
Caprolactam	**7.2**	**J**	9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
Carbazole	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chloroaniline	<20		20	2.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chloro-3-methylphenol	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.9		9.9	0.79	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Chlorophenol	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Chlorophenyl phenyl ether	<9.9		9.9	0.83	ug/L		03/31/20 14:46	04/02/20 18:59	1
Chrysene	<9.9		9.9	0.51	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dibenz(a,h)anthracene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dibenzofuran	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,2-Dichlorobenzene	<9.9		9.9	0.53	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,3-Dichlorobenzene	<9.9		9.9	0.58	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,4-Dichlorobenzene	<9.9		9.9	0.54	ug/L		03/31/20 14:46	04/02/20 18:59	1
3,3'-Dichlorobenzidine	<59		59	30	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dichlorophenol	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Diethyl phthalate	<9.9		9.9	0.87	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dimethylphenol	<9.9		9.9	4.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Dimethyl phthalate	<9.9		9.9	0.98	ug/L		03/31/20 14:46	04/02/20 18:59	1
Di-n-butyl phthalate	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 18:59	1
4,6-Dinitro-2-methylphenol	<50		50	9.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dinitrophenol	<50		50	9.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4-Dinitrotoluene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,6-Dinitrotoluene	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 18:59	1
Di-n-octyl phthalate	<9.9		9.9	1.4	ug/L		03/31/20 14:46	04/02/20 18:59	1
Fluoranthene	<9.9		9.9	0.73	ug/L		03/31/20 14:46	04/02/20 18:59	1
Fluorene	<9.9		9.9	0.95	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorobenzene	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorobutadiene	<9.9		9.9	0.61	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachlorocyclopentadiene	<9.9		9.9	2.5	ug/L		03/31/20 14:46	04/02/20 18:59	1
Hexachloroethane	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
Indeno[1,2,3-cd]pyrene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 18:59	1
Isophorone	<9.9		9.9	0.89	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Methylnaphthalene	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Methylphenol	<9.9		9.9	0.88	ug/L		03/31/20 14:46	04/02/20 18:59	1
3 & 4 Methylphenol	<9.9		9.9	1.3	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Nitroaniline	<50		50	1.3	ug/L		03/31/20 14:46	04/02/20 18:59	1
3-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Nitroaniline	<50		50	5.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Nitrobenzene	<9.9		9.9	0.72	ug/L		03/31/20 14:46	04/02/20 18:59	1
2-Nitrophenol	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 18:59	1
4-Nitrophenol	<50		50	1.9	ug/L		03/31/20 14:46	04/02/20 18:59	1
N-Nitrosodi-n-propylamine	<9.9		9.9	0.71	ug/L		03/31/20 14:46	04/02/20 18:59	1
N-Nitrosodiphenylamine	<9.9		9.9	0.91	ug/L		03/31/20 14:46	04/02/20 18:59	1
Pentachlorophenol	<50		50	2.0	ug/L		03/31/20 14:46	04/02/20 18:59	1
Phenanthrene	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 18:59	1
Phenol	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 18:59	1
Pyrene	<9.9		9.9	0.62	ug/L		03/31/20 14:46	04/02/20 18:59	1
1,2,4-Trichlorobenzene	<9.9		9.9	0.56	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4,5-Trichlorophenol	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 18:59	1
2,4,6-Trichlorophenol	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 18:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*89*		*32 - 113*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
2-Fluorophenol	*77*		*26 - 109*	*03/31/20 14:46*	*04/02/20 18:59*	*1*

Client Sample ID: BS-1 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*83*		*32 - 118*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
Phenol-d5	*81*		*27 - 110*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
Terphenyl-d14	*55*		*10 - 126*	*03/31/20 14:46*	*04/02/20 18:59*	*1*
2,4,6-Tribromophenol	*77*		*39 - 124*	*03/31/20 14:46*	*04/02/20 18:59*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**3.6**		1.0	0.40	mg/L			04/04/20 03:43	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.41**	**J**	1.0	0.31	ug/L			03/31/20 02:08	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**290**		200	24	ug/L		03/29/20 13:03	03/30/20 23:21	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:21	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:21	1
Barium	**8.7**	**J**	10	1.7	ug/L		03/29/20 13:03	03/30/20 23:21	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:21	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Calcium	**13000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:21	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:21	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Copper	**4.4**	**J**	20	1.8	ug/L		03/29/20 13:03	03/30/20 23:21	1
Iron	**330**	~~B~~ J	50	17	ug/L		03/29/20 13:03	03/30/20 23:21	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:21	1
Magnesium	**4100**		500	33	ug/L		03/29/20 13:03	03/30/20 23:21	1
Manganese	**5.1**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 23:21	1
Potassium	**560**	**J**	1000	17	ug/L		03/29/20 13:03	03/30/20 23:21	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:21	1
Silver	10 ~~0.60 J B~~ UB		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:21	1
Sodium	**5800**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:21	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Vanadium	**1.1**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:21	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:21	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**410**	~~B~~ J	50	17	ug/L		03/29/20 13:03	03/31/20 00:12	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:17	04/01/20 15:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**7.0**		1.0	0.50	mg/L			04/01/20 18:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-30M (032420)
Date Collected: 03/24/20 11:55
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 07:54	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 07:54	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:54	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 07:54	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 07:54	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 07:54	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 07:54	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/03/20 07:54	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 07:54	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 07:54	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
cis-1,2-Dichloroethene	**0.43**	**J**	1.0	0.41	ug/L			04/03/20 07:54	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 07:54	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 07:54	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 07:54	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 07:54	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 07:54	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 07:54	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 07:54	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 07:54	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
1,1-Dichloroethene	**0.44**	**J**	1.0	0.36	ug/L			04/03/20 07:54	1
1,2-Dichloroethene, Total	**0.43**	**J**	2.0	0.37	ug/L			04/03/20 07:54	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 07:54	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 07:54	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 07:54	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 07:54	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 07:54	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 07:54	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 07:54	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:54	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 07:54	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 07:54	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 07:54	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 07:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-30M (032420)
Date Collected: 03/24/20 11:55
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 07:54	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 07:54	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 07:54	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 07:54	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 07:54	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 07:54	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 07:54	1
Trichloroethene	**6.4**		1.0	0.48	ug/L			04/03/20 07:54	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 07:54	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 07:54	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 07:54	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 07:54	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 07:54	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 07:54	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 07:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/03/20 07:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*110*		*73 - 131*		*04/03/20 07:54*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/03/20 07:54*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/03/20 07:54*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 14:26	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 14:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*88*		*41 - 144*	*03/30/20 08:57*	*03/31/20 14:26*	*1*
Terphenyl-d14	*67*			*03/30/20 08:57*	*03/31/20 14:26*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**15**		1.0	0.31	ug/L			03/31/20 02:31	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32 (032420)
Date Collected: 03/24/20 09:30
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 08:17	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 08:17	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 08:17	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 08:17	1
Carbon tetrachloride	**0.34**	**J**	1.0	0.33	ug/L			04/03/20 08:17	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 08:17	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/03/20 08:17	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 08:17	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 08:17	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
cis-1,2-Dichloroethene	**1.9**		1.0	0.41	ug/L			04/03/20 08:17	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 08:17	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 08:17	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 08:17	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 08:17	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 08:17	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 08:17	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 08:17	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 08:17	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
1,1-Dichloroethene	**1.9**		1.0	0.36	ug/L			04/03/20 08:17	1
1,2-Dichloroethene, Total	**1.9**	**J**	2.0	0.37	ug/L			04/03/20 08:17	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 08:17	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 08:17	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 08:17	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 08:17	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 08:17	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 08:17	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 08:17	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 08:17	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:17	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 08:17	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 08:17	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 08:17	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 08:17	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32 (032420)
Date Collected: 03/24/20 09:30
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 08:17	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 08:17	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 08:17	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 08:17	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 08:17	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:17	1
1,1,1-Trichloroethane	**0.38**	**J**	1.0	0.37	ug/L			04/03/20 08:17	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 08:17	1
Trichloroethene	**34**		1.0	0.48	ug/L			04/03/20 08:17	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 08:17	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 08:17	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:17	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 08:17	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 08:17	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 08:17	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 08:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 08:17*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 08:17*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 08:17*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 08:17*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 14:48	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/30/20 08:57*	*03/31/20 14:48*	*1*
Terphenyl-d14	*79*			*03/30/20 08:57*	*03/31/20 14:48*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**16**		1.0	0.31	ug/L			03/31/20 02:54	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32D (032420)
Date Collected: 03/24/20 10:20
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 08:41	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 08:41	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:41	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 08:41	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 08:41	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 08:41	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 08:41	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/03/20 08:41	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 08:41	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 08:41	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 08:41	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 08:41	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 08:41	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 08:41	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 08:41	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 08:41	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 08:41	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 08:41	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 08:41	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 08:41	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 08:41	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 08:41	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 08:41	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 08:41	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 08:41	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 08:41	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 08:41	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 08:41	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:41	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 08:41	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 08:41	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 08:41	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: GM-32D (032420)
Date Collected: 03/24/20 10:20
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 08:41	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 08:41	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 08:41	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 08:41	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 08:41	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 08:41	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 08:41	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 08:41	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 08:41	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 08:41	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 08:41	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 08:41	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 08:41	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 08:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/03/20 08:41*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 08:41*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/03/20 08:41*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 08:41*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:09	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*104*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:09*	*1*
Terphenyl-d14	*101*			*03/30/20 08:57*	*03/31/20 15:09*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/31/20 03:16	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/03/20 09:04	1
Benzene	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/03/20 09:04	1
Bromoform	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/03/20 09:04	1
2-Butanone	<10		10	3.4	ug/L			04/03/20 09:04	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/03/20 09:04	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/03/20 09:04	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/03/20 09:04	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/03/20 09:04	1
Chloroform	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/03/20 09:04	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/03/20 09:04	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/03/20 09:04	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/03/20 09:04	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/03/20 09:04	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/03/20 09:04	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/03/20 09:04	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/03/20 09:04	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/03/20 09:04	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/03/20 09:04	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/03/20 09:04	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/03/20 09:04	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/03/20 09:04	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/03/20 09:04	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/03/20 09:04	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/03/20 09:04	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
2-Hexanone	<10		10	2.0	ug/L			04/03/20 09:04	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/03/20 09:04	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/03/20 09:04	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/03/20 09:04	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 09:04	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/03/20 09:04	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/03/20 09:04	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
Styrene	<1.0		1.0	0.27	ug/L			04/03/20 09:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/03/20 09:04	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/03/20 09:04	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/03/20 09:04	1
Toluene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/03/20 09:04	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/03/20 09:04	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/03/20 09:04	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/03/20 09:04	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/03/20 09:04	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/03/20 09:04	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/03/20 09:04	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/03/20 09:04	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/03/20 09:04	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/03/20 09:04	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/03/20 09:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/03/20 09:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*73 - 131*		*04/03/20 09:04*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*04/03/20 09:04*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/03/20 09:04*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
Acenaphthylene	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 19:22	1
Acetophenone	<9.9		9.9	0.56	ug/L		03/31/20 14:46	04/02/20 19:22	1
Anthracene	<9.9		9.9	0.68	ug/L		03/31/20 14:46	04/02/20 19:22	1
Atrazine	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzaldehyde	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[a]anthracene	<9.9		9.9	0.54	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[a]pyrene	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[b]fluoranthene	<9.9		9.9	2.6	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[g,h,i]perylene	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 19:22	1
Benzo[k]fluoranthene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,1'-Biphenyl	<9.9		9.9	0.57	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-chloroethoxy)methane	<9.9		9.9	0.93	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-chloroethyl)ether	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
bis (2-chloroisopropyl) ether	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 19:22	1
Bis(2-ethylhexyl) phthalate	<9.9		9.9	1.6	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Bromophenyl phenyl ether	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 19:22	1
Butyl benzyl phthalate	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
Caprolactam	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
Carbazole	<9.9		9.9	0.70	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chloroaniline	<20		20	2.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chloro-3-methylphenol	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.9		9.9	0.79	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Chlorophenol	<9.9		9.9	0.86	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Chlorophenyl phenyl ether	<9.9		9.9	0.83	ug/L		03/31/20 14:46	04/02/20 19:22	1
Chrysene	<9.9		9.9	0.50	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dibenz(a,h)anthracene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dibenzofuran	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,2-Dichlorobenzene	<9.9		9.9	0.52	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,3-Dichlorobenzene	<9.9		9.9	0.58	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,4-Dichlorobenzene	<9.9		9.9	0.53	ug/L		03/31/20 14:46	04/02/20 19:22	1
3,3'-Dichlorobenzidine	<59		59	30	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dichlorophenol	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Diethyl phthalate	<9.9		9.9	0.87	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dimethylphenol	<9.9		9.9	3.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
Dimethyl phthalate	<9.9		9.9	0.98	ug/L		03/31/20 14:46	04/02/20 19:22	1
Di-n-butyl phthalate	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 19:22	1
4,6-Dinitro-2-methylphenol	<49		49	9.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dinitrophenol	<49		49	9.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4-Dinitrotoluene	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,6-Dinitrotoluene	<9.9		9.9	1.1	ug/L		03/31/20 14:46	04/02/20 19:22	1
Di-n-octyl phthalate	<9.9		9.9	1.4	ug/L		03/31/20 14:46	04/02/20 19:22	1
Fluoranthene	<9.9		9.9	0.73	ug/L		03/31/20 14:46	04/02/20 19:22	1
Fluorene	<9.9		9.9	0.95	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorobenzene	<9.9		9.9	0.78	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorobutadiene	<9.9		9.9	0.61	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachlorocyclopentadiene	<9.9		9.9	2.5	ug/L		03/31/20 14:46	04/02/20 19:22	1
Hexachloroethane	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
Indeno[1,2,3-cd]pyrene	<9.9		9.9	0.99	ug/L		03/31/20 14:46	04/02/20 19:22	1
Isophorone	<9.9		9.9	0.89	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Methylnaphthalene	<9.9		9.9	0.77	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Methylphenol	<9.9		9.9	0.88	ug/L		03/31/20 14:46	04/02/20 19:22	1
3 & 4 Methylphenol	<9.9		9.9	1.3	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Nitroaniline	<49		49	1.3	ug/L		03/31/20 14:46	04/02/20 19:22	1
3-Nitroaniline	<49		49	4.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Nitroaniline	<49		49	4.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
Nitrobenzene	<9.9		9.9	0.72	ug/L		03/31/20 14:46	04/02/20 19:22	1
2-Nitrophenol	<9.9		9.9	0.75	ug/L		03/31/20 14:46	04/02/20 19:22	1
4-Nitrophenol	<49		49	1.9	ug/L		03/31/20 14:46	04/02/20 19:22	1
N-Nitrosodi-n-propylamine	<9.9		9.9	0.71	ug/L		03/31/20 14:46	04/02/20 19:22	1
N-Nitrosodiphenylamine	<9.9		9.9	0.91	ug/L		03/31/20 14:46	04/02/20 19:22	1
Pentachlorophenol	<49		49	2.0	ug/L		03/31/20 14:46	04/02/20 19:22	1
Phenanthrene	<9.9		9.9	0.76	ug/L		03/31/20 14:46	04/02/20 19:22	1
Phenol	<9.9		9.9	0.82	ug/L		03/31/20 14:46	04/02/20 19:22	1
Pyrene	<9.9		9.9	0.62	ug/L		03/31/20 14:46	04/02/20 19:22	1
1,2,4-Trichlorobenzene	<9.9		9.9	0.55	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4,5-Trichlorophenol	<9.9		9.9	1.2	ug/L		03/31/20 14:46	04/02/20 19:22	1
2,4,6-Trichlorophenol	<9.9		9.9	0.84	ug/L		03/31/20 14:46	04/02/20 19:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*88*		*32 - 113*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
2-Fluorophenol	*82*		*26 - 109*	*03/31/20 14:46*	*04/02/20 19:22*	*1*

Client Sample ID: EB-03 (032420)
Date Collected: 03/24/20 12:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-5
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*79*		*32 - 118*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
Phenol-d5	*94*		*27 - 110*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
Terphenyl-d14	*113*		*10 - 126*	*03/31/20 14:46*	*04/02/20 19:22*	*1*
2,4,6-Tribromophenol	*80*		*39 - 124*	*03/31/20 14:46*	*04/02/20 19:22*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<1.0		1.0	0.40	mg/L			04/04/20 04:59	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<1.0		1.0	0.31	ug/L			03/31/20 03:39	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<200		200	24	ug/L		03/29/20 13:03	03/30/20 23:16	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:16	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:16	1
Barium	<10		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:16	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:16	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Calcium	<500		500	25	ug/L		03/29/20 13:03	03/30/20 23:16	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:16	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:16	1
Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:16	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:16	1
Magnesium	<500		500	33	ug/L		03/29/20 13:03	03/30/20 23:16	1
Manganese	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Nickel	<40		40	2.1	ug/L		03/29/20 13:03	03/30/20 23:16	1
Potassium	<1000		1000	17	ug/L		03/29/20 13:03	03/30/20 23:16	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:16	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:16	1
Sodium	<1000		1000	480	ug/L		03/29/20 13:03	03/30/20 23:16	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:16	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:16	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/31/20 00:07	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:17	04/01/20 15:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0	0.50	mg/L			04/01/20 18:40	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: Trip Blank
Date Collected: 03/24/20 00:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 13:46	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 13:46	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
Bromomethane	<5.0	*	5.0	2.5	ug/L			04/06/20 13:46	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 13:46	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 13:46	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 13:46	1
Chloroethane	<5.0	*	5.0	2.5	ug/L			04/06/20 13:46	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L			04/06/20 13:46	1
Chloroform	**8.6**	J	1.0	0.50	ug/L			04/06/20 13:46	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 13:46	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 13:46	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 13:46	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 13:46	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 13:46	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 13:46	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 13:46	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 13:46	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 13:46	1
Dichlorodifluoromethane	<1.0	*	1.0	0.60	ug/L			04/06/20 13:46	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 13:46	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 13:46	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 13:46	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 13:46	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 13:46	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 13:46	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 13:46	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 13:46	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 13:46	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 13:46	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:46	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 13:46	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 13:46	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 13:46	1

R

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182056-1

Client Sample ID: Trip Blank
Date Collected: 03/24/20 00:00
Date Received: 03/26/20 09:10

Lab Sample ID: 680-182056-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 13:46	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 13:46	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 13:46	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 13:46	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 13:46	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 13:46	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 13:46	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 13:46	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 13:46	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 13:46	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 13:46	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/06/20 13:46	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 13:46	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 13:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/06/20 13:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 131*		*04/06/20 13:46*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*04/06/20 13:46*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/06/20 13:46*	*1*

ATK – Elkton

DATA REVIEW

Elkton, MD

Volatile, Semivolatile, Metals and Miscellaneous Analyses

SDG #680-182103-1

Analyses Performed By:
Test America

Savannah, GA

Report #36746R
Review Level: Tier II
Project: 30044769.03

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #680-182103-1 for samples collected in association with the ATK Elkton site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
SW-1C (032520)	680-182103-1	WS	3/25/2020		X	X		X	X
DUP-04 (032520)	680-182103-10	WG	3/25/2020	SW-1C (032520)	X	X		X	X
TRIP BLANK (03252020)	680-182103-11	WQ	3/25/2020		X				
SW-2B (032520)	680-182103-2	WS	3/25/2020		X	X		X	X
SW-6B (032520)	680-182103-3	WS	3/25/2020		X	X		X	X
SW-6C (032520)	680-182103-4	WS	3/25/2020		X	X		X	X
SW-6D (032520)	680-182103-5	WS	3/25/2020		X	X		X	X
SW-7B (032520)	680-182103-6	WS	3/25/2020		X	X		X	X
PW-2B (032520)	680-182103-7	WG	3/25/2020		X	X		X	X
PW-6C (032520)	680-182103-8	WG	3/25/2020		X	X		X	X
PW-6D (032520)	680-182103-9	WG	3/25/2020		X	X		X	X

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8270D (SIM). All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 1999. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines. The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis (preserved) 7 days from collection to analysis (non-preserved)	Cool to <6 °C; preserved to a pH of less than 2 s.u.

Note:

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
PW-6C	Chloroform	Detected sample results <RL and <BAL	“UB” at the RL
PW-6D	Chloroform	Detected sample results >RL and <BAL	“UB” at detected sample concentration

Note:

RL Reporting limit

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC

analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Note: 2-Chloroethyl vinyl ether degrades in the presence of acid. Since the sample was preserved with acid to a pH of less than 2, the results for 2-chloroethyl vinyl ether were rejected.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
DUP-04	Vinyl Acetate	AC	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

Note:
Sample results were not qualified as rejected (R) due to the deviations listed above.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SW-1C / DUP04	All VOC Compounds	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. Compound Identification

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
PW-6C	Trichloroethene	--	570	570 D
PW-6D	Trichloroethene	--	230	230 D

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than and/or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks		X		X	
C. Trip blanks		X	X		
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)		X	X		
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)	X				X
Matrix Spike Duplicate(MSD)	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270 (SIM)	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not included in the data package.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SW-1C / DUP04	All SVOC Compounds	U	U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate(MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 6010, 7470A, 300.0, 314.0 and SM5310B. All samples in this data set were reviewed in accordance with USEPA National Functional Guidelines of October 2004. Formerly, this project was reviewed under the *USEPA Region III Innovative Approaches to Data Validation (June 1995)*. However, these Region III guidelines are no longer used for data validation by USEPA region III. Therefore, in compliance with Region III USEPA regulators, the data that formerly were reviewed with the Region III guidelines will now be validated using the National Functional Guidelines.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  J The reported value was obtained from a reading less than the reporting limit (RL), but greater than or equal to the method detection limit (MDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Preserved to a pH of less than 2.
SW-846 7470	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
PW-2B DUP-04	Silver	Detected sample results <RL and <BAL	"UB" at the RL

Note:

RL Reporting limit

3. Matrix Spike (MS) and Matrix Spike Duplicate(MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations

where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD was not included in the data package.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

A laboratory duplicate was not included in the data package.

4 Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SW-1C / DUP04	Aluminum	150 J	170 J	AC
	Barium	32	33	AC
	Calcium	10000	11000	9.5%
	Iron	390	420	7.4%
	Magnesium	7200	7400	2.7%
	Manganese	34	35	2.9%
	Nickel	3.7 J	3.4 J	AC
	Potassium	2000	2000	0.0%
	Silver	10 U	1.4 J	AC
	Sodium	11000	11000	0.0%
	Mercury	0.20 U	0.31	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6010/7470	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)					
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks	X				X
B. Method Blanks		X	X		
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Field/Lab Duplicate (RPD)		X		X	
Total vs. Dissolved		X		X	
Reporting Limit Verification		X		X	

Notes:

%R Percent recovery

RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Perchlorate by EPA 314.0	Water	28 days from collection to analysis	Cool to <6 °C.
Sulfate by EPA 300.0	Water	28 days from collection to analysis	Cool to <6 °C.
TOC by SM5310B	Water	28 days from collection to analysis	Cool to <6 °C; preserved with H_2SO_4

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample location PW-6C for sulfate exhibited recoveries and RPDs within the control limits.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the

parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices and two times the RL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SW-1C / DUP04	Perchlorate	0.53 J	0.71 J	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA 314, 300 and SM5310B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery
RPD - relative percent difference,

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE:

DATE: May 5, 2020

PEER REVIEW: Joseph C. Houser

DATE: May 6, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

Baltimore #201

Chain of Custody Record

397793

eurofins | Environment Testing TestAmerica

Address: _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Tina Armstrong	Site Contact: Rich Zambito	Date: 3-25-20	COC No:
Company Name: Arcadis Inc.	Tel/Email:	Lab Contact:	Carrier:	_____ of _____ COCs
Address: 7550 Teaquer Rd. Ste 210	Analysis Turnaround Time			Sampler:
City/State/Zip: Hanover, MD 21076	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: ATK Orbital	☐ 1 week			
Site: Elkton MD	☐ 2 days			Job / SDG No.:
PO# 30044769	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOC 8260B	1,4-Dioxane	Perchlorate 314.0	8270D SVOC	6010C dissolved iron	6010C 7470A Metals	300 ORGFM Sulfate	SM5310 TOC	Sample Specific Notes:
SW-1C (032520)	3-25-20	1130	G	GW	7			3		1	2		1			dissolved iron is filtered
SW-2B (032520)		1300			7			3		1	2		1			
SW-6B (032520)		1400			6			3	2	1						
SW-6C (032520)		1000			6			3	2	1						
SW-6D (032520)		0925			6			3	2	1						
SW-7B (032520)		1205			6			3	2	1						
PW-2B (032520)		1300			12	1		3		1	2	1	1	1	3	
PW-6C (032520)		1000			11	1		3	2	1		1		1	3	
PW-6D (032520)		0925			11	1		3	2	1		1		1	3	
DUP-04 (032520)	3-25-20	1200	G	GW	7			3		1	2		1			
Trip Blank					2			2								

680-182103 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

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 & Comments:

1.2/1.6 0.9/1.3

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Arcadis	3-25-20 0000		EA	3/26/20 1000
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	EA	3/26/20 1700		TA	3.27.20 900
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605660.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 777 New Durham Road, ,	Due Date Requested: 4/8/2020			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8270D_SIM/3510C_LVI (MOD) 8270C SIM PAH List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X			
SW-6B (032520) (680-182103-3)	3/25/20	11:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-6C (032520) (680-182103-4)	3/25/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-6D (032520) (680-182103-5)	3/25/20	09:25 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
SW-7B (032520) (680-182103-6)	3/25/20	12:05 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
PW-6C (032520) (680-182103-8)	3/25/20	10:00 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked
PW-6D (032520) (680-182103-9)	3/25/20	09:25 Eastern		Water			X	2	1,4 dioxane has been added. Make sure it is spiked

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	3-27-20 1600	TA	Josiah D	3.28.20 1130	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: IR11 3.9°C VIA FedEx

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/8/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SW-1C (032520) (680-182103-1)	3/25/20	11:30 Eastern		Water			X	1	
SW-2B (032520) (680-182103-2)	3/25/20	13:00 Eastern		Water			X	1	
SW-6B (032520) (680-182103-3)	3/25/20	11:00 Eastern		Water			X	1	
SW-6C (032520) (680-182103-4)	3/25/20	10:00 Eastern		Water			X	1	
SW-6D (032520) (680-182103-5)	3/25/20	09:25 Eastern		Water			X	1	
SW-7B (032520) (680-182103-6)	3/25/20	12:05 Eastern		Water			X	1	
PW-2B (032520) (680-182103-7)	3/25/20	13:00 Eastern		Water			X	1	
PW-6C (032520) (680-182103-8)	3/25/20	10:00 Eastern		Water			X	1	
PW-6D (032520) (680-182103-9)	3/25/20	09:25 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3-27-20 1600	TA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company TAMA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (0.8°C) RESAT

Ver: 01/16/2019

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-605662.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Maryland		Job #: 680-182103-1
Address: 4625 East Cotton Ctr Blvd, Suite 189,	Due Date Requested: 4/8/2020			
City: Phoenix	TAT Requested (days):			
State, Zip: AZ, 85040				
Phone: 602-437-3340(Tel) 602-454-9303(Fax)	PO #:			
Email:	WO #:			
Project Name: ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
DUP-04 (032520) (680-182103-10)	3/25/20	12:00 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the labo

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-28-20 0920	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 18:55	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 18:55	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 18:55	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 18:55	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 18:55	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 18:55	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 18:55	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 18:55	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 18:55	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 18:55	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 18:55	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 18:55	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 18:55	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 18:55	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 18:55	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 18:55	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 18:55	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 18:55	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 18:55	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 18:55	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 18:55	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 18:55	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 18:55	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 18:55	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 18:55	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 18:55	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:55	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 18:55	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 18:55	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 18:55	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 18:55	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 18:55	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 18:55	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:55	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:55	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 18:55	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 18:55	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 18:55	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 18:55	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:55	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 18:55	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 18:55	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 18:55	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 18:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 18:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*		*04/04/20 18:55*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 18:55*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 18:55*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 19:52	1
Acetophenone	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 19:52	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 19:52	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 19:52	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,1'-Biphenyl	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.91	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 19:52	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 19:52	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 19:52	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,3-Dichlorobenzene	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 19:52	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Dimethyl phthalate	<9.7		9.7	0.96	ug/L		04/01/20 18:31	04/06/20 19:52	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 19:52	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 19:52	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 19:52	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 19:52	1
Fluorene	<9.7		9.7	0.93	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 19:52	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 19:52	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 19:52	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 19:52	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 19:52	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 19:52	1
4-Nitrophenol	<49		49	1.8	ug/L		04/01/20 18:31	04/06/20 19:52	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 19:52	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 19:52	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 19:52	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 19:52	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 19:52	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 19:52	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 19:52	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 19:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*80*		*32 - 113*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
2-Fluorophenol	*70*		*26 - 109*	*04/01/20 18:31*	*04/06/20 19:52*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-1C (032520)
Date Collected: 03/25/20 11:30
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-1
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*81*		*32 - 118*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
Phenol-d5	*73*		*27 - 110*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
Terphenyl-d14	*30*		*10 - 126*	*04/01/20 18:31*	*04/06/20 19:52*	*1*
2,4,6-Tribromophenol	*73*		*39 - 124*	*04/01/20 18:31*	*04/06/20 19:52*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.53**	**J**	1.0	0.31	ug/L			03/31/20 04:48	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**150**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:25	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:25	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:25	1
Barium	**32**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:25	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:25	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Calcium	**10000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:25	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:25	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:25	1
Iron	**390**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:25	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:25	1
Magnesium	**7200**		500	33	ug/L		03/29/20 13:03	03/30/20 23:25	1
Manganese	**34**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Nickel	**3.7**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:25	1
Potassium	**2000**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:25	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:25	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:25	1
Sodium	**11000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:25	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:25	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:25	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:13	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 19:19	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 19:19	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 19:19	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 19:19	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 19:19	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 19:19	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 19:19	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 19:19	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 19:19	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 19:19	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 19:19	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 19:19	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 19:19	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 19:19	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 19:19	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 19:19	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 19:19	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 19:19	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 19:19	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 19:19	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 19:19	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 19:19	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 19:19	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 19:19	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 19:19	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 19:19	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:19	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 19:19	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 19:19	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 19:19	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 19:19	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 19:19	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 19:19	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:19	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:19	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 19:19	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 19:19	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 19:19	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 19:19	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:19	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 19:19	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 19:19	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 19:19	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 19:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 19:19*	*1*
1,2-Dichloroethane-d4 (Surr)	*89*		*73 - 131*		*04/04/20 19:19*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 122*		*04/04/20 19:19*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 19:19*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
Acenaphthylene	<9.6		9.6	0.82	ug/L		04/01/20 18:31	04/06/20 20:15	1
Acetophenone	<9.6		9.6	0.55	ug/L		04/01/20 18:31	04/06/20 20:15	1
Anthracene	<9.6		9.6	0.66	ug/L		04/01/20 18:31	04/06/20 20:15	1
Atrazine	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzaldehyde	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[a]anthracene	<9.6		9.6	0.53	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[a]pyrene	<9.6		9.6	0.68	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[b]fluoranthene	<9.6		9.6	2.5	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[g,h,i]perylene	<9.6		9.6	0.84	ug/L		04/01/20 18:31	04/06/20 20:15	1
Benzo[k]fluoranthene	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,1'-Biphenyl	<9.6		9.6	0.56	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-chloroethoxy)methane	<9.6		9.6	0.90	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-chloroethyl)ether	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
bis (2-chloroisopropyl) ether	<9.6		9.6	0.75	ug/L		04/01/20 18:31	04/06/20 20:15	1
Bis(2-ethylhexyl) phthalate	<9.6		9.6	1.5	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Bromophenyl phenyl ether	<9.6		9.6	0.74	ug/L		04/01/20 18:31	04/06/20 20:15	1
Butyl benzyl phthalate	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
Caprolactam	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
Carbazole	<9.6		9.6	0.68	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chloro-3-methylphenol	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.6		9.6	0.77	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Chlorophenol	<9.6		9.6	0.84	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Chlorophenyl phenyl ether	<9.6		9.6	0.81	ug/L		04/01/20 18:31	04/06/20 20:15	1
Chrysene	<9.6		9.6	0.49	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dibenz(a,h)anthracene	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dibenzofuran	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,2-Dichlorobenzene	<9.6		9.6	0.51	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,3-Dichlorobenzene	<9.6		9.6	0.57	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,4-Dichlorobenzene	<9.6		9.6	0.52	ug/L		04/01/20 18:31	04/06/20 20:15	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dichlorophenol	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Diethyl phthalate	<9.6		9.6	0.85	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dimethylphenol	<9.6		9.6	3.9	ug/L		04/01/20 18:31	04/06/20 20:15	1
Dimethyl phthalate	<9.6		9.6	0.95	ug/L		04/01/20 18:31	04/06/20 20:15	1
Di-n-butyl phthalate	<9.6		9.6	0.80	ug/L		04/01/20 18:31	04/06/20 20:15	1
4,6-Dinitro-2-methylphenol	<48		48	9.6	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dinitrophenol	<48		48	9.6	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4-Dinitrotoluene	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,6-Dinitrotoluene	<9.6		9.6	1.1	ug/L		04/01/20 18:31	04/06/20 20:15	1
Di-n-octyl phthalate	<9.6		9.6	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
Fluoranthene	<9.6		9.6	0.71	ug/L		04/01/20 18:31	04/06/20 20:15	1
Fluorene	<9.6		9.6	0.92	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorobenzene	<9.6		9.6	0.76	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorobutadiene	<9.6		9.6	0.60	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachlorocyclopentadiene	<9.6		9.6	2.4	ug/L		04/01/20 18:31	04/06/20 20:15	1
Hexachloroethane	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
Indeno[1,2,3-cd]pyrene	<9.6		9.6	0.96	ug/L		04/01/20 18:31	04/06/20 20:15	1
Isophorone	<9.6		9.6	0.87	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Methylnaphthalene	<9.6		9.6	0.75	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Methylphenol	<9.6		9.6	0.86	ug/L		04/01/20 18:31	04/06/20 20:15	1
3 & 4 Methylphenol	<9.6		9.6	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Nitroaniline	<48		48	1.3	ug/L		04/01/20 18:31	04/06/20 20:15	1
3-Nitroaniline	<48		48	4.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Nitroaniline	<48		48	4.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
Nitrobenzene	<9.6		9.6	0.70	ug/L		04/01/20 18:31	04/06/20 20:15	1
2-Nitrophenol	<9.6		9.6	0.73	ug/L		04/01/20 18:31	04/06/20 20:15	1
4-Nitrophenol	<48		48	1.8	ug/L		04/01/20 18:31	04/06/20 20:15	1
N-Nitrosodi-n-propylamine	<9.6		9.6	0.69	ug/L		04/01/20 18:31	04/06/20 20:15	1
N-Nitrosodiphenylamine	<9.6		9.6	0.89	ug/L		04/01/20 18:31	04/06/20 20:15	1
Pentachlorophenol	<48		48	1.9	ug/L		04/01/20 18:31	04/06/20 20:15	1
Phenanthrene	<9.6		9.6	0.74	ug/L		04/01/20 18:31	04/06/20 20:15	1
Phenol	<9.6		9.6	0.80	ug/L		04/01/20 18:31	04/06/20 20:15	1
Pyrene	<9.6		9.6	0.61	ug/L		04/01/20 18:31	04/06/20 20:15	1
1,2,4-Trichlorobenzene	<9.6		9.6	0.54	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4,5-Trichlorophenol	<9.6		9.6	1.2	ug/L		04/01/20 18:31	04/06/20 20:15	1
2,4,6-Trichlorophenol	<9.6		9.6	0.82	ug/L		04/01/20 18:31	04/06/20 20:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*76*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
2-Fluorophenol	*68*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:15*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-2
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*77*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
Phenol-d5	*72*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
Terphenyl-d14	*34*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:15*	*1*
2,4,6-Tribromophenol	*80*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:15*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.58**	**J**	1.0	0.31	ug/L			03/31/20 05:11	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**180**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:30	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:30	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:30	1
Barium	**35**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:30	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:30	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Calcium	**12000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:30	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:30	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:30	1
Iron	**430**	**B**	50	17	ug/L		03/29/20 13:03	03/30/20 23:30	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:30	1
Magnesium	**8300**		500	33	ug/L		03/29/20 13:03	03/30/20 23:30	1
Manganese	**46**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Nickel	**3.5**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:30	1
Potassium	**2100**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:30	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:30	1
Silver	<10		10	0.60	ug/L		03/29/20 13:03	03/30/20 23:30	1
Sodium	**12000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:30	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Vanadium	**1.0**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:30	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:30	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.33**		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:26	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6B (032520)
Date Collected: 03/25/20 11:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 19:42	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 19:42	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 19:42	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 19:42	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 19:42	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 19:42	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 19:42	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 19:42	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 19:42	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 19:42	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 19:42	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 19:42	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 19:42	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 19:42	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 19:42	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 19:42	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 19:42	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 19:42	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 19:42	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 19:42	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 19:42	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 19:42	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 19:42	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 19:42	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 19:42	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 19:42	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:42	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 19:42	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 19:42	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 19:42	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 19:42	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6B (032520)
Date Collected: 03/25/20 11:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 19:42	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 19:42	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 19:42	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 19:42	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 19:42	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 19:42	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 19:42	1
Trichloroethene	**4.5**		1.0	0.48	ug/L			04/04/20 19:42	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 19:42	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 19:42	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 19:42	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 19:42	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 19:42	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 19:42	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 19:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 19:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*04/04/20 19:42*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 19:42*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 19:42*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:30	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*101*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:30*	*1*
Terphenyl-d14	*78*			*03/30/20 08:57*	*03/31/20 15:30*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.4**		1.0	0.31	ug/L			03/31/20 05:34	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:05	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:05	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:05	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:05	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:05	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 20:05	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:05	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:05	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 20:05	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:05	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:05	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:05	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:05	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:05	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:05	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:05	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:05	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 20:05	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 20:05	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:05	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:05	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:05	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:05	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:05	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:05	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:05	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:05	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:05	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:05	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:05	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:05	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:05	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:05	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:05	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:05	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:05	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:05	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:05	1
Trichloroethene	**5.4**		1.0	0.48	ug/L			04/04/20 20:05	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:05	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:05	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:05	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:05	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:05	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:05	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 20:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*04/04/20 20:05*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 122*		*04/04/20 20:05*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*04/04/20 20:05*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 15:51	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 15:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*95*		*41 - 144*	*03/30/20 08:57*	*03/31/20 15:51*	*1*
Terphenyl-d14	*88*			*03/30/20 08:57*	*03/31/20 15:51*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.3**		1.0	0.31	ug/L			03/31/20 05:57	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:28	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:28	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:28	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:28	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:28	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 20:28	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:28	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:28	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
cis-1,2-Dichloroethene	**0.48**	**J**	1.0	0.41	ug/L			04/04/20 20:28	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:28	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:28	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:28	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:28	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:28	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:28	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:28	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:28	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
1,1-Dichloroethene	**0.55**	**J**	1.0	0.36	ug/L			04/04/20 20:28	1
1,2-Dichloroethene, Total	**0.48**	**J**	2.0	0.37	ug/L			04/04/20 20:28	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:28	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:28	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:28	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:28	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:28	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:28	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:28	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:28	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:28	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:28	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:28	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:28	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:28	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:28	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:28	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:28	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:28	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:28	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:28	1
Trichloroethene	**5.7**		1.0	0.48	ug/L			04/04/20 20:28	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:28	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:28	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:28	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:28	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:28	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:28	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/04/20 20:28*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*04/04/20 20:28*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 20:28*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/04/20 20:28*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:13	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*84*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:13*	*1*
Terphenyl-d14	*77*			*03/30/20 08:57*	*03/31/20 16:13*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.6**		1.0	0.31	ug/L			03/31/20 06:20	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-7B (032520)
Date Collected: 03/25/20 12:05
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 20:52	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 20:52	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 20:52	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 20:52	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 20:52	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 20:52	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 20:52	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 20:52	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
cis-1,2-Dichloroethene	**0.54**	**J**	1.0	0.41	ug/L			04/04/20 20:52	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 20:52	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 20:52	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 20:52	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 20:52	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 20:52	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 20:52	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 20:52	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 20:52	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
1,1-Dichloroethene	**0.60**	**J**	1.0	0.36	ug/L			04/04/20 20:52	1
1,2-Dichloroethene, Total	**0.54**	**J**	2.0	0.37	ug/L			04/04/20 20:52	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 20:52	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 20:52	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 20:52	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 20:52	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 20:52	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 20:52	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 20:52	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:52	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 20:52	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 20:52	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 20:52	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 20:52	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: SW-7B (032520)
Date Collected: 03/25/20 12:05
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 20:52	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 20:52	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 20:52	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 20:52	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 20:52	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 20:52	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 20:52	1
Trichloroethene	**6.4**		1.0	0.48	ug/L			04/04/20 20:52	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 20:52	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 20:52	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 20:52	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 20:52	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 20:52	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 20:52	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 20:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 20:52*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 20:52*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 20:52*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/04/20 20:52*	*1*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	<0.40		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:34	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*86*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:34*	*1*
Terphenyl-d14	*81*			*03/30/20 08:57*	*03/31/20 16:34*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.4**		1.0	0.31	ug/L			03/31/20 06:43	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 21:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 21:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 21:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 21:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 21:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 21:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 21:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 21:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 21:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 21:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 21:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 21:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 21:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 21:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 21:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 21:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 21:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
1,1-Dichloroethene	**0.53**	**J**	1.0	0.36	ug/L			04/04/20 21:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 21:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 21:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 21:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 21:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 21:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 21:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 21:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 21:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 21:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 21:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 21:15	1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 21:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 21:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 21:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:15	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 21:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 21:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 21:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 21:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 21:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 21:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 21:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*04/04/20 21:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 21:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/04/20 21:15*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/04/20 21:15*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:37	1
Acetophenone	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 20:37	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 20:37	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:37	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,1'-Biphenyl	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.92	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:37	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:37	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 20:37	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,3-Dichlorobenzene	<9.7		9.7	0.58	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 20:37	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Dimethyl phthalate	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:37	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:37	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 20:37	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 20:37	1
Fluorene	<9.7		9.7	0.94	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 20:37	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:37	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 20:37	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 20:37	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 20:37	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:37	1
4-Nitrophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 20:37	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 20:37	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:37	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:37	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:37	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 20:37	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:37	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*68*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
2-Fluorophenol	*62*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:37*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-2B (032520)
Date Collected: 03/25/20 13:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-7
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*74*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
Phenol-d5	*67*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
Terphenyl-d14	*40*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:37*	*1*
2,4,6-Tribromophenol	*71*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:37*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**7.3**		1.0	0.40	mg/L			04/04/20 05:12	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**1.0**		1.0	0.31	ug/L			03/31/20 07:06	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2900**		200	24	ug/L		03/29/20 13:03	03/30/20 23:34	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:34	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:34	1
Barium	**38**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:34	1
Beryllium	**0.11**	**J**	4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:34	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Calcium	**4800**		500	25	ug/L		03/29/20 13:03	03/30/20 23:34	1
Chromium	**10**		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:34	1
Cobalt	**3.4**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Copper	**6.0**	**J**	20	1.8	ug/L		03/29/20 13:03	03/30/20 23:34	1
Iron	**11000**	~~B~~	50	17	ug/L		03/29/20 13:03	03/30/20 23:34	1
Lead	**4.7**	**J**	10	3.9	ug/L		03/29/20 13:03	03/30/20 23:34	1
Magnesium	**2700**		500	33	ug/L		03/29/20 13:03	03/30/20 23:34	1
Manganese	**1000**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Nickel	**12**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:34	1
Potassium	**740**	**J**	1000	17	ug/L		03/29/20 13:03	03/30/20 23:34	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:34	1
Silver	10 ~~1.3 J B~~	UB	10	0.60	ug/L		03/29/20 13:03	03/30/20 23:34	1
Sodium	**6700**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:34	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Vanadium	**6.5**	**J**	10	1.0	ug/L		03/29/20 13:03	03/30/20 23:34	1
Zinc	**15**	**J**	20	7.0	ug/L		03/29/20 13:03	03/30/20 23:34	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	**5800**	~~B~~	50	17	ug/L		03/29/20 13:03	03/30/20 23:44	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**3.0**		1.0	0.50	mg/L			04/01/20 19:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 21:38	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 21:38	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 21:38	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 21:38	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 21:38	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 21:38	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 21:38	1
Chloroform	**1.2**	UB	1.0	0.50	ug/L			04/04/20 21:38	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 21:38	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 21:38	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
cis-1,2-Dichloroethene	**18**		1.0	0.41	ug/L			04/04/20 21:38	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 21:38	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 21:38	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 21:38	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 21:38	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 21:38	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 21:38	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 21:38	1
1,1-Dichloroethane	**7.1**		1.0	0.38	ug/L			04/04/20 21:38	1
1,2-Dichloroethane	**1.2**		1.0	0.50	ug/L			04/04/20 21:38	1
1,1-Dichloroethene	**150**		1.0	0.36	ug/L			04/04/20 21:38	1
1,2-Dichloroethene, Total	**18**		2.0	0.37	ug/L			04/04/20 21:38	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 21:38	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 21:38	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 21:38	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 21:38	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 21:38	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 21:38	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 21:38	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:38	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 21:38	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 21:38	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 21:38	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 21:38	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 21:38	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 21:38	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 21:38	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 21:38	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 21:38	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 21:38	1
1,1,1-Trichloroethane	**52**		1.0	0.37	ug/L			04/04/20 21:38	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 21:38	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 21:38	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 21:38	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 21:38	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 21:38	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 21:38	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 21:38	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 21:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 21:38*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 21:38*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*04/04/20 21:38*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 21:38*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**570**	D	10	4.8	ug/L			04/06/20 20:22	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*107*		*80 - 120*		*04/06/20 20:22*	*10*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*		*04/06/20 20:22*	*10*
Dibromofluoromethane (Surr)	*124*	*X*	*80 - 122*		*04/06/20 20:22*	*10*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*04/06/20 20:22*	*10*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**7.0**		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 16:55	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/30/20 08:57*	*03/31/20 16:55*	*1*
Terphenyl-d14	*91*			*03/30/20 08:57*	*03/31/20 16:55*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**13**		1.0	0.40	mg/L			04/04/20 04:21	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**47**		1.0	0.31	ug/L			03/31/20 07:29	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6C (032520)
Date Collected: 03/25/20 10:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-8
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/30/20 23:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	0.91	J	1.0	0.50	mg/L			04/01/20 19:46	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/04/20 22:01	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 22:01	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 22:01	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 22:01	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 22:01	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 22:01	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
~~2-Chloroethyl vinyl ether~~	~~<10~~		~~10~~	~~5.0~~	~~ug/L~~	R		04/04/20 22:01	1
Chloroform	1.0 ~~0.56~~	~~J~~ UB	1.0	0.50	ug/L			04/04/20 22:01	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 22:01	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 22:01	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
cis-1,2-Dichloroethene	8.3		1.0	0.41	ug/L			04/04/20 22:01	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 22:01	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 22:01	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 22:01	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 22:01	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 22:01	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 22:01	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 22:01	1
1,1-Dichloroethane	2.8		1.0	0.38	ug/L			04/04/20 22:01	1
1,2-Dichloroethane	0.56	J	1.0	0.50	ug/L			04/04/20 22:01	1
1,1-Dichloroethene	64		1.0	0.36	ug/L			04/04/20 22:01	1
1,2-Dichloroethene, Total	8.3		2.0	0.37	ug/L			04/04/20 22:01	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 22:01	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 22:01	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 22:01	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 22:01	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 22:01	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 22:01	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 22:01	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 22:01	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 22:01	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 22:01	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 22:01	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 22:01	1

Client Sample ID: PW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 22:01	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 22:01	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 22:01	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 22:01	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 22:01	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 22:01	1
1,1,1-Trichloroethane	**19**		1.0	0.37	ug/L			04/04/20 22:01	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 22:01	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 22:01	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 22:01	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 22:01	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 22:01	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 22:01	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 22:01	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 22:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/04/20 22:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*04/04/20 22:01*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*04/04/20 22:01*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/04/20 22:01*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**230**	D	5.0	2.4	ug/L			04/06/20 20:46	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/06/20 20:46*	*5*
1,2-Dichloroethane-d4 (Surr)	*105*		*73 - 131*		*04/06/20 20:46*	*5*
Dibromofluoromethane (Surr)	*123*	*X*	*80 - 122*		*04/06/20 20:46*	*5*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*04/06/20 20:46*	*5*

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**5.4**		0.40	0.17	ug/L		03/30/20 08:57	03/31/20 17:17	1
Naphthalene	<0.20		0.20	0.12	ug/L		03/30/20 08:57	03/31/20 17:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*99*		*41 - 144*	*03/30/20 08:57*	*03/31/20 17:17*	*1*
Terphenyl-d14	*98*			*03/30/20 08:57*	*03/31/20 17:17*	*1*

Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.9**		1.0	0.40	mg/L			04/04/20 05:24	1

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**95**		10	3.1	ug/L			04/01/20 22:32	10

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: PW-6D (032520)
Date Collected: 03/25/20 09:25
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-9
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Iron	<50		50	17	ug/L		03/29/20 13:03	03/31/20 00:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.6		1.0	0.50	mg/L			04/01/20 20:04	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10		10	7.0	ug/L			04/06/20 15:15	1
Benzene	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/06/20 15:15	1
Bromoform	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Butanone	<10		10	3.4	ug/L			04/06/20 15:15	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/06/20 15:15	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/06/20 15:15	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/06/20 15:15	1
Chloroform	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/06/20 15:15	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/06/20 15:15	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/06/20 15:15	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/06/20 15:15	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/06/20 15:15	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/06/20 15:15	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/06/20 15:15	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/06/20 15:15	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/06/20 15:15	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/06/20 15:15	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/06/20 15:15	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/06/20 15:15	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/06/20 15:15	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/06/20 15:15	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/06/20 15:15	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/06/20 15:15	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
2-Hexanone	<10		10	2.0	ug/L			04/06/20 15:15	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/06/20 15:15	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/06/20 15:15	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/06/20 15:15	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 15:15	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/06/20 15:15	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/06/20 15:15	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
Styrene	<1.0		1.0	0.27	ug/L			04/06/20 15:15	1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/06/20 15:15	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/06/20 15:15	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/06/20 15:15	1
Toluene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/06/20 15:15	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/06/20 15:15	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/06/20 15:15	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/06/20 15:15	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/06/20 15:15	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/06/20 15:15	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/06/20 15:15	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/06/20 15:15	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/06/20 15:15	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/06/20 15:15	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/06/20 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*80 - 120*		*04/06/20 15:15*	*1*
1,2-Dichloroethane-d4 (Surr)	*88*		*73 - 131*		*04/06/20 15:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*04/06/20 15:15*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/06/20 15:15*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
Acenaphthylene	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:59	1
Acetophenone	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:59	1
Anthracene	<9.7		9.7	0.67	ug/L		04/01/20 18:31	04/06/20 20:59	1
Atrazine	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzaldehyde	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[a]anthracene	<9.7		9.7	0.54	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[a]pyrene	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[b]fluoranthene	<9.7		9.7	2.5	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[g,h,i]perylene	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:59	1
Benzo[k]fluoranthene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,1'-Biphenyl	<9.7		9.7	0.56	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-chloroethoxy)methane	<9.7		9.7	0.92	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-chloroethyl)ether	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
bis (2-chloroisopropyl) ether	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:59	1
Bis(2-ethylhexyl) phthalate	<9.7		9.7	1.6	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Bromophenyl phenyl ether	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:59	1
Butyl benzyl phthalate	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
Caprolactam	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
Carbazole	<9.7		9.7	0.69	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chloroaniline	<19		19	2.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chloro-3-methylphenol	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	<9.7		9.7	0.78	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Chlorophenol	<9.7		9.7	0.85	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Chlorophenyl phenyl ether	<9.7		9.7	0.82	ug/L		04/01/20 18:31	04/06/20 20:59	1
Chrysene	<9.7		9.7	0.50	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dibenz(a,h)anthracene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dibenzofuran	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,2-Dichlorobenzene	<9.7		9.7	0.52	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,3-Dichlorobenzene	<9.7		9.7	0.57	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,4-Dichlorobenzene	<9.7		9.7	0.53	ug/L		04/01/20 18:31	04/06/20 20:59	1
3,3'-Dichlorobenzidine	<58		58	29	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dichlorophenol	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Diethyl phthalate	<9.7		9.7	0.86	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dimethylphenol	<9.7		9.7	3.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Dimethyl phthalate	<9.7		9.7	0.96	ug/L		04/01/20 18:31	04/06/20 20:59	1
Di-n-butyl phthalate	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:59	1
4,6-Dinitro-2-methylphenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dinitrophenol	<49		49	9.7	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4-Dinitrotoluene	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,6-Dinitrotoluene	<9.7		9.7	1.1	ug/L		04/01/20 18:31	04/06/20 20:59	1
Di-n-octyl phthalate	<9.7		9.7	1.4	ug/L		04/01/20 18:31	04/06/20 20:59	1
Fluoranthene	<9.7		9.7	0.72	ug/L		04/01/20 18:31	04/06/20 20:59	1
Fluorene	<9.7		9.7	0.93	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorobenzene	<9.7		9.7	0.77	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorobutadiene	<9.7		9.7	0.60	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachlorocyclopentadiene	<9.7		9.7	2.4	ug/L		04/01/20 18:31	04/06/20 20:59	1
Hexachloroethane	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
Indeno[1,2,3-cd]pyrene	<9.7		9.7	0.97	ug/L		04/01/20 18:31	04/06/20 20:59	1
Isophorone	<9.7		9.7	0.88	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Methylnaphthalene	<9.7		9.7	0.76	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Methylphenol	<9.7		9.7	0.87	ug/L		04/01/20 18:31	04/06/20 20:59	1
3 & 4 Methylphenol	<9.7		9.7	1.3	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Nitroaniline	<49		49	1.3	ug/L		04/01/20 18:31	04/06/20 20:59	1
3-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Nitroaniline	<49		49	4.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Nitrobenzene	<9.7		9.7	0.71	ug/L		04/01/20 18:31	04/06/20 20:59	1
2-Nitrophenol	<9.7		9.7	0.74	ug/L		04/01/20 18:31	04/06/20 20:59	1
4-Nitrophenol	<49		49	1.8	ug/L		04/01/20 18:31	04/06/20 20:59	1
N-Nitrosodi-n-propylamine	<9.7		9.7	0.70	ug/L		04/01/20 18:31	04/06/20 20:59	1
N-Nitrosodiphenylamine	<9.7		9.7	0.90	ug/L		04/01/20 18:31	04/06/20 20:59	1
Pentachlorophenol	<49		49	1.9	ug/L		04/01/20 18:31	04/06/20 20:59	1
Phenanthrene	<9.7		9.7	0.75	ug/L		04/01/20 18:31	04/06/20 20:59	1
Phenol	<9.7		9.7	0.81	ug/L		04/01/20 18:31	04/06/20 20:59	1
Pyrene	<9.7		9.7	0.61	ug/L		04/01/20 18:31	04/06/20 20:59	1
1,2,4-Trichlorobenzene	<9.7		9.7	0.55	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4,5-Trichlorophenol	<9.7		9.7	1.2	ug/L		04/01/20 18:31	04/06/20 20:59	1
2,4,6-Trichlorophenol	<9.7		9.7	0.83	ug/L		04/01/20 18:31	04/06/20 20:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*82*		*32 - 113*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
2-Fluorophenol	*74*		*26 - 109*	*04/01/20 18:31*	*04/06/20 20:59*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: DUP-04 (032520)
Date Collected: 03/25/20 12:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-10
Matrix: Water

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*85*		*32 - 118*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
Phenol-d5	*78*		*27 - 110*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
Terphenyl-d14	*33*		*10 - 126*	*04/01/20 18:31*	*04/06/20 20:59*	*1*
2,4,6-Tribromophenol	*83*		*39 - 124*	*04/01/20 18:31*	*04/06/20 20:59*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.71**	**J**	1.0	0.31	ug/L			03/31/20 08:14	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**170**	**J**	200	24	ug/L		03/29/20 13:03	03/30/20 23:39	1
Antimony	<20		20	5.3	ug/L		03/29/20 13:03	03/30/20 23:39	1
Arsenic	<20		20	6.2	ug/L		03/29/20 13:03	03/30/20 23:39	1
Barium	**33**		10	1.7	ug/L		03/29/20 13:03	03/30/20 23:39	1
Beryllium	<4.0		4.0	0.10	ug/L		03/29/20 13:03	03/30/20 23:39	1
Cadmium	<5.0		5.0	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Calcium	**11000**		500	25	ug/L		03/29/20 13:03	03/30/20 23:39	1
Chromium	<10		10	1.6	ug/L		03/29/20 13:03	03/30/20 23:39	1
Cobalt	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Copper	<20		20	1.8	ug/L		03/29/20 13:03	03/30/20 23:39	1
Iron	**420**	~~B~~	50	17	ug/L		03/29/20 13:03	03/30/20 23:39	1
Lead	<10		10	3.9	ug/L		03/29/20 13:03	03/30/20 23:39	1
Magnesium	**7400**		500	33	ug/L		03/29/20 13:03	03/30/20 23:39	1
Manganese	**35**		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Nickel	**3.4**	**J**	40	2.1	ug/L		03/29/20 13:03	03/30/20 23:39	1
Potassium	**2000**		1000	17	ug/L		03/29/20 13:03	03/30/20 23:39	1
Selenium	<20		20	9.9	ug/L		03/29/20 13:03	03/30/20 23:39	1
Silver	10 ~~1.4~~	~~J B~~ UB	10	0.60	ug/L		03/29/20 13:03	03/30/20 23:39	1
Sodium	**11000**		1000	480	ug/L		03/29/20 13:03	03/30/20 23:39	1
Thallium	<25		25	6.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Vanadium	<10		10	1.0	ug/L		03/29/20 13:03	03/30/20 23:39	1
Zinc	<20		20	7.0	ug/L		03/29/20 13:03	03/30/20 23:39	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.31**		0.20	0.080	ug/L		03/31/20 13:20	04/01/20 17:09	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: Trip Blank
Date Collected: 03/25/20 00:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-11
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**13**		10	7.0	ug/L			04/04/20 18:09	1
Benzene	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
Bromobenzene	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
Bromochloromethane	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
Bromodichloromethane	<1.0		1.0	0.44	ug/L			04/04/20 18:09	1
Bromoform	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
Bromomethane	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Butanone	<10		10	3.4	ug/L			04/04/20 18:09	1
Carbon disulfide	<2.0		2.0	1.0	ug/L			04/04/20 18:09	1
Carbon tetrachloride	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Chlorobenzene	<1.0		1.0	0.26	ug/L			04/04/20 18:09	1
Chloroethane	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Chloroethyl vinyl ether	<10		10	5.0	ug/L	R		04/04/20 18:09	1
Chloroform	**0.96**	**J**	1.0	0.50	ug/L			04/04/20 18:09	1
Chloromethane	<1.0		1.0	0.40	ug/L			04/04/20 18:09	1
2-Chlorotoluene	<1.0		1.0	0.27	ug/L			04/04/20 18:09	1
4-Chlorotoluene	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
cis-1,2-Dichloroethene	<1.0		1.0	0.41	ug/L			04/04/20 18:09	1
cis-1,3-Dichloropropene	<1.0		1.0	0.40	ug/L			04/04/20 18:09	1
Dibromochloromethane	<1.0		1.0	0.32	ug/L			04/04/20 18:09	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0	1.1	ug/L			04/04/20 18:09	1
1,2-Dibromoethane	<1.0		1.0	0.44	ug/L			04/04/20 18:09	1
Dibromomethane	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
1,2-Dichlorobenzene	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,3-Dichlorobenzene	<1.0		1.0	0.43	ug/L			04/04/20 18:09	1
1,4-Dichlorobenzene	<1.0		1.0	0.46	ug/L			04/04/20 18:09	1
Dichlorodifluoromethane	<1.0		1.0	0.60	ug/L			04/04/20 18:09	1
1,1-Dichloroethane	<1.0		1.0	0.38	ug/L			04/04/20 18:09	1
1,2-Dichloroethane	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
1,1-Dichloroethene	<1.0		1.0	0.36	ug/L			04/04/20 18:09	1
1,2-Dichloroethene, Total	<2.0		2.0	0.37	ug/L			04/04/20 18:09	1
1,2-Dichloropropane	<1.0		1.0	0.67	ug/L			04/04/20 18:09	1
1,3-Dichloropropane	<1.0		1.0	0.34	ug/L			04/04/20 18:09	1
2,2-Dichloropropane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1-Dichloropropene	<1.0		1.0	0.34	ug/L			04/04/20 18:09	1
Ethylbenzene	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Hexachlorobutadiene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
2-Hexanone	<10		10	2.0	ug/L			04/04/20 18:09	1
Isopropylbenzene	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
Methylene Chloride	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
4-Methyl-2-pentanone	<10		10	2.1	ug/L			04/04/20 18:09	1
Methyl tert-butyl ether	<10		10	0.30	ug/L			04/04/20 18:09	1
m-Xylene & p-Xylene	<1.0		1.0	0.35	ug/L			04/04/20 18:09	1
n-Butylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:09	1
N-Propylbenzene	<1.0		1.0	0.38	ug/L			04/04/20 18:09	1
o-Xylene	<1.0		1.0	0.23	ug/L			04/04/20 18:09	1
p-Isopropyltoluene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
sec-Butylbenzene	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
Styrene	<1.0		1.0	0.27	ug/L			04/04/20 18:09	1

Client: ARCADIS U.S., Inc.
Project/Site: ATK Orbital, Elkton MD

Job ID: 680-182103-1

Client Sample ID: Trip Blank
Date Collected: 03/25/20 00:00
Date Received: 03/27/20 09:00

Lab Sample ID: 680-182103-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	<1.0		1.0	0.45	ug/L			04/04/20 18:09	1
1,1,1,2-Tetrachloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1,2,2-Tetrachloroethane	<1.0		1.0	0.62	ug/L			04/04/20 18:09	1
Tetrachloroethene	<1.0		1.0	0.74	ug/L			04/04/20 18:09	1
Toluene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
trans-1,2-Dichloroethene	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
trans-1,3-Dichloropropene	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
1,2,3-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
1,2,4-Trichlorobenzene	<5.0		5.0	2.5	ug/L			04/04/20 18:09	1
1,1,1-Trichloroethane	<1.0		1.0	0.37	ug/L			04/04/20 18:09	1
1,1,2-Trichloroethane	<1.0		1.0	0.33	ug/L			04/04/20 18:09	1
Trichloroethene	<1.0		1.0	0.48	ug/L			04/04/20 18:09	1
Trichlorofluoromethane	<1.0		1.0	0.42	ug/L			04/04/20 18:09	1
1,2,3-Trichloropropane	<1.0		1.0	0.39	ug/L			04/04/20 18:09	1
1,2,4-Trimethylbenzene	<1.0		1.0	0.47	ug/L			04/04/20 18:09	1
1,3,5-Trimethylbenzene	<1.0		1.0	0.31	ug/L			04/04/20 18:09	1
Vinyl acetate	<2.0		2.0	0.81	ug/L			04/04/20 18:09	1
Vinyl chloride	<1.0		1.0	0.50	ug/L			04/04/20 18:09	1
Xylenes, Total	<1.0		1.0	0.23	ug/L			04/04/20 18:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*80 - 120*		*04/04/20 18:09*	*1*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*		*04/04/20 18:09*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*04/04/20 18:09*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/04/20 18:09*	*1*

APPENDIX G

Well Abandonment Logs

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

MW#3

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) N/A — —

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: R. Schultes WELL DRILLER'S LICENSE NUMBER: 577
CIRCLE: MWD / MSD / MGD

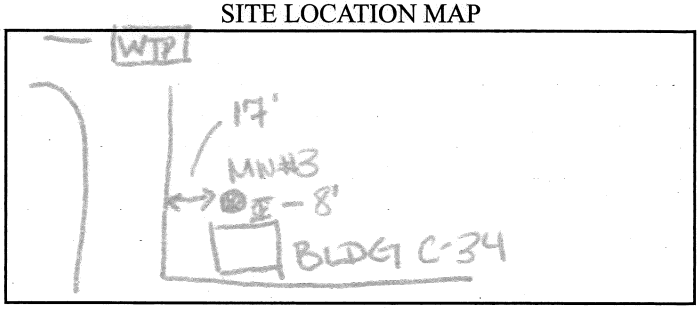
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP _____ BLOCK _____ PARCEL _____
SUBDIVISION: _____
SECTION: _____ LOT: _____
STREET ADDRESS: _____

LATITUDE 39.621569

LONGITUDE 75.866540

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	14.5'	1'

VOLUME OF MATERIAL USED: BENTONITE CHIPS (2) 50LBS BAGS

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____ JETTED
_____ BORED _____ HAND DUG
_____ OTHER (specify) _____

* USE CODE:
_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
X TEST/OBSERVATION _____ GEOTHERMAL

* TYPE OF CASING:
_____ STEEL X PLASTIC
_____ CONCRETE _____ OTHER (specify)
_____

SIZE OF CASING: 4" INCHES IN DIAMETER

DEPTH OF WELL: 14.5 FEET DEEP

WAS ANY CASING REMOVED? X YES _____ NO
If yes, length removed, in feet: 1'

WAS CASING RIPPED OR PERFORATED? _____ YES X NO

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[signature] 577 MWD / MSD / MGS 11/7/19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

MW#4

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) CE — 81 — 0488

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: R. SCHULTES WELL DRILLER'S LICENSE NUMBER: 5717
CIRCLE: MWD / MSD / MGD

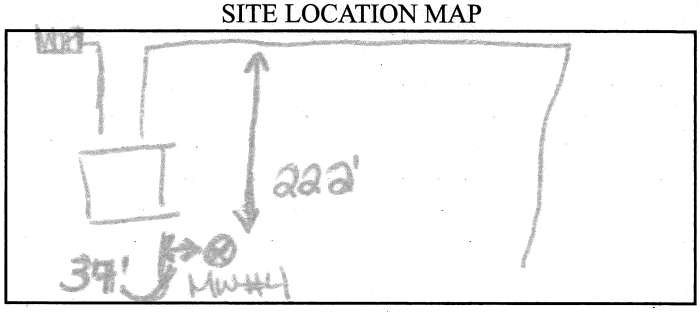
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP _____ BLOCK _____ PARCEL _____
SUBDIVISION: _____
SECTION: _____ LOT: _____
STREET ADDRESS: _____

LATITUDE 39.621980

LONGITUDE 75.865612

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	16.5'	2'

VOLUME OF MATERIAL USED

(2) 50 LBS BAGS

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____ JETTED
_____ BORED _____ HAND DUG
_____ OTHER (specify) _____

* USE CODE:
_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
X TEST/OBSERVATION _____ GEOTHERMAL

* TYPE OF CASING:
_____ STEEL X PLASTIC
_____ CONCRETE _____ OTHER (specify)
_____

SIZE OF CASING: 4" INCHES IN DIAMETER

DEPTH OF WELL: 16.5' FEET DEEP

WAS ANY CASING REMOVED? X YES _____ NO
If yes, length removed, in feet: 2'

WAS CASING RIPPED OR PERFORATED? ____ YES X NO

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[signature] 597 MWD / MSD / MGS 11-13-19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

MW#7

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) CE — 88 — 0716

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: R. SCHULTES WELL DRILLER'S LICENSE NUMBER: 577

CIRCLE: MWD / MSD / MGD

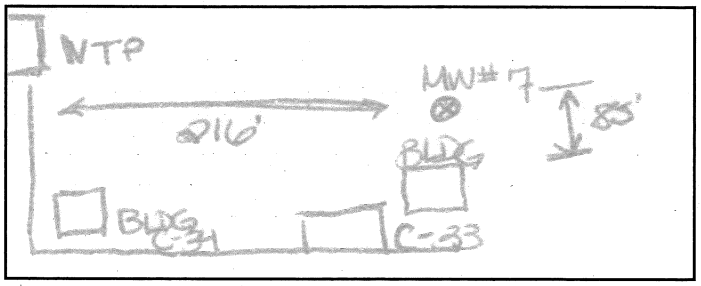
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP_____BLOCK_____PARCEL_____
SUBDIVISION:_____
SECTION:_____LOT:_____
STREET ADDRESS:_____

LATITUDE 39.620982

LONGITUDE 75.866618

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	12'	0

VOLUME OF MATERIAL USED

(1½) 50 LB BAGS

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____JETTED
_____BORED _____HAND DUG
_____OTHER (specify)_____

* USE CODE:
_____DOMESTIC _____MUNICIPAL/PUBLIC
_____IRRIGATION _____INDUSTRIAL
X TEST/OBSERVATION _____GEOTHERMAL

* TYPE OF CASING:
_____STEEL X PLASTIC
_____CONCRETE _____OTHER (specify)
_____

SIZE OF CASING: 4" INCHES IN DIAMETER

DEPTH OF WELL: 12' FEET DEEP

WAS ANY CASING REMOVED? X YES _____ NO
If yes, length removed, in feet: 3'

WAS CASING RIPPED OR PERFORATED? _____ YES X NO

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Zach Chmura 597 MWD / MSD / MGS 11-13-19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

MW#8

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) CE — 88 — 0719

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: B. SCHULTES WELL DRILLER'S LICENSE NUMBER: 577

CIRCLE: MWD / MSD / MGD

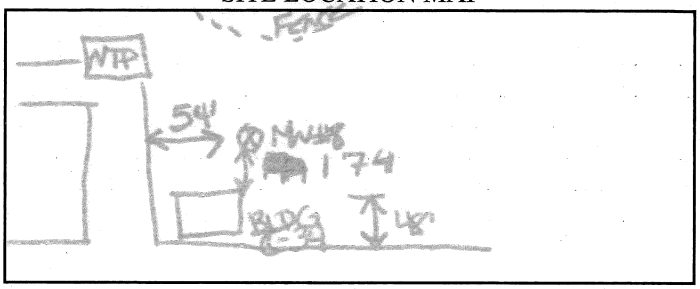
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP_____BLOCK_____PARCEL_____
SUBDIVISION:_____
SECTION:_____LOT:_____
STREET ADDRESS:_____

LATITUDE 39.621282

LONGITUDE 75.866074

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	13'	3'
VOLUME OF MATERIAL USED		
(1.5) 50 LB BAGS		

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____JETTED
_____BORED _____HAND DUG
_____OTHER (specify)_____

* USE CODE:
_____DOMESTIC _____MUNICIPAL/PUBLIC
_____IRRIGATION _____INDUSTRIAL
X TEST/OBSERVATION _____GEOTHERMAL

* TYPE OF CASING:
_____STEEL X PLASTIC
_____CONCRETE _____OTHER (specify)
_____

SIZE OF CASING: 4 INCHES IN DIAMETER

DEPTH OF WELL: 13' FEET DEEP

WAS ANY CASING REMOVED? X YES_____NO
If yes, length removed, in feet: 3'

WAS CASING RIPPED OR PERFORATED?____YES X NO

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Zach Allen 597 MWD / MSD / MGS 11-13-19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

MW# 14

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) CE — 88 — 1500

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: R. SCHULTES WELL DRILLER'S LICENSE NUMBER: 577
CIRCLE: MWD / MSD / MGD

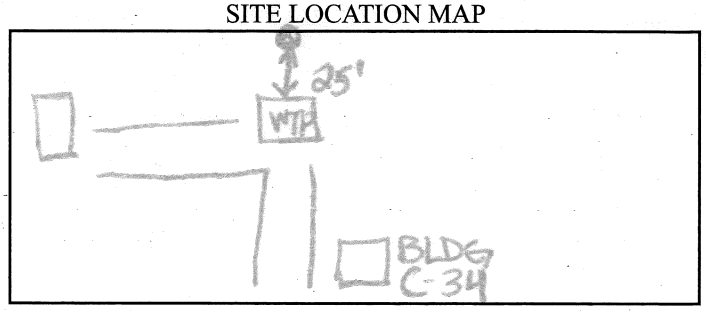
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP _____ BLOCK _____ PARCEL _____
SUBDIVISION: _____
SECTION: _____ LOT: _____
STREET ADDRESS: _____

LATITUDE 39.621389

LONGITUDE 75.865616

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	14'	3'

VOLUME OF MATERIAL USED

(2) 50 LB BAGS

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____ JETTED
_____ BORED _____ HAND DUG
_____ OTHER (specify) _____

* USE CODE:
_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
X TEST/OBSERVATION _____ GEOTHERMAL

* TYPE OF CASING:
_____ STEEL X PLASTIC
_____ CONCRETE _____ OTHER (specify)
_____

SIZE OF CASING: 4" INCHES IN DIAMETER

DEPTH OF WELL: 14' FEET DEEP

WAS ANY CASING REMOVED? X YES _____ NO
If yes, length removed, in feet: 3'

WAS CASING RIPPED OR PERFORATED? _____ YES X NO

Pursuant to § 10-624 of the State Govt. Article of the Maryland Code, personal info requested on this form is used in processing this form pursuant to COMAR 26.04.04. Failure to provide the info may result in this form not being processed. You have the right to inspect, amend, or correct this form. The Maryland Department of the Environment is subject to the Maryland Public Information Act. This form may be made available on the Internet via MDE's website and is subject to inspection or copying, in whole or in part, by the public and other governmental agencies, if not protected by federal or State Law.

[signature] 597 MWD / MSD / MGS 11-13-19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:
* COUNTY ENVIRONMENTAL AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

MW#15

DATE WELL ABANDONED: 11/7/19 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) CE — 88 — 1501

* PERMIT NUMBER OF REPLACEMENT WELL: N/A — —

* PERSON ABANDONING WELL: R. SCHULTES WELL DRILLER'S LICENSE NUMBER: 577

CIRCLE: MWD / MSD / MGD

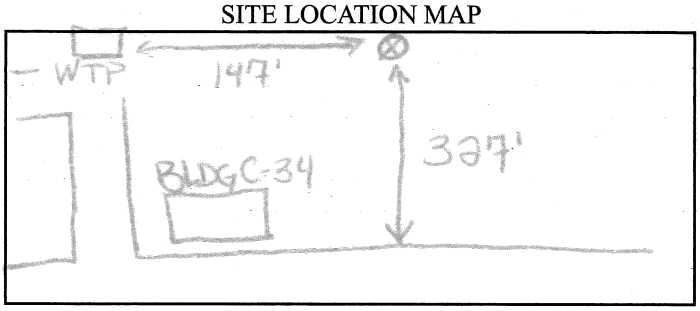
* OWNER'S NAME: NORTHROP GRUMMAN

* WELL LOCATION:
COUNTY: CECIL
NEAREST TOWN: ELKTON
TAX MAP _____ BLOCK _____ PARCEL _____
SUBDIVISION: _____
SECTION: _____ LOT: _____
STREET ADDRESS: _____

LATITUDE 39.620926

LONGITUDE 75.865917

SITE LOCATION MAP



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
BENTONITE CHIPS	13.5'	2'

VOLUME OF MATERIAL USED

1.5 BAGS BENTONITE

* TYPE OF WELL BEING ABANDONED:
X DRILLED _____ JETTED
_____ BORED _____ HAND DUG
_____ OTHER (specify) _____

* USE CODE:
_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
X TEST/OBSERVATION _____ GEOTHERMAL

* TYPE OF CASING:
_____ STEEL X PLASTIC
_____ CONCRETE _____ OTHER (specify)
_____

SIZE OF CASING: 4" INCHES IN DIAMETER

DEPTH OF WELL: 13.5' FEET DEEP

WAS ANY CASING REMOVED? X YES _____ NO
If yes, length removed, in feet: 3'

WAS CASING RIPPED OR PERFORATED? ____ YES X NO

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[signature] 597 MWD / MSD / MGS 11-13-19

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE# CIRCLE ONE DATE

DRILLER

APPENDIX H

Photolog for Beryllium SWMU IEC Verification

Appendix H – Photo Log

Beryllium SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 1

Date: April 7, 2020

Description: Intact Beryllium SWMU fencing, southeast corner of restricted area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

Beryllium SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 2

Date: April 7, 2020

Description: : Intact Beryllium SWMU fencing, eastern boundary of restricted area

Location:

Alliant Techsystems Operations, LLC

Elkton, MD

Appendix H – Photo Log

Beryllium SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 3

Date: April 7, 2020

Description: Intact Beryllium SWMU fencing, northeast corner of restricted area

Location:

Alliant Techsystems Operations, LLC

Elkton, MD

Appendix H – Photo Log

Beryllium SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 4

Date: July 13, 2020

Description: Intact Beryllium SWMU fencing signage

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

Beryllium SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 5

Date: July 13, 2020

Description: Intact Beryllium SWMU fencing

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 6

Date: July 13, 2020

Description: Intact A-Area signage

Location:

Alliant Techsystems Operations, LLC

Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 7

Date: July 13, 2020

Description: Intact Signage In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 8

Date: July 13, 2020

Description: Intact Signage In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 9

Date: July 13, 2020

Description: Intact Signage In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 10

Date: July 13, 2020

Description: Intact Signage In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 11

Date: July 13, 2020

Description: Intact Fencing In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

A-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 12

Date: July 13, 2020

Description: Intact Signage In A-Area

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

C-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 13

Date: July 13, 2020

Description: Undisturbed C-Area SWMU

Location:
Alliant Techsystems Operations, LLC
Elkton, MD

Appendix H – Photo Log

C-Area SWMU IEC Verification
CMI – 2020 Annual Progress Report
Elkton, MD

Photo: 14

Date: July 13, 2020

Description: Undisturbed C-Area SWMU and Intact Signage Denoting Restricted Area

Location:

Alliant Techsystems Operations, LLC

Elkton, MD

APPENDIX I

Groundwater Use Restriction Correspondence

NORTHROP GRUMMAN

Northrop Grumman Corporation
Innovation Systems

45101 Warp Drive
Dulles, VA 20166

Ref: RLZ-18-020

April 29, 2020

Cecil County Health Department
401 Bow Street
Elkton, Maryland 21921

Subject: Off-Site Groundwater Use
Alliant Techsystems Operations LLC
USEPA ID #MDD 003 067 121

Dear Sir or Madam:

As you are aware an environmental investigation, performed under the direction of the United States Environmental Protection Agency (USEPA), has been completed for the Alliant Techsystems Operations LLC (Alliant) facility located at 55 Thiokol Road in Elkton, Maryland (the Site). As a result of this investigation, groundwater remediation is being conducted at the site. Alliant is implementing a Performance Monitoring Plan (PMP) and an Institutional and Engineering Controls Plan (IECP) as approved by USEPA to ensure that groundwater remediation is protective of human health and the environment.

As part of the IECP, no groundwater wells should be installed in the vicinity of the Site (refer to enclosed figure); groundwater in this vicinity may be impacted and should not be used for drinking, bathing, irrigation, etc. It is Alliant's understanding that no formal groundwater use exclusion areas are maintained in Cecil County; however, we are submitting this letter as a formal notification that groundwater use should not be permitted in the area shown on the figure.

Should you have any questions regarding the remedial activities being performed at the site, or the groundwater quality in this area, please contact me at (410) 392-1626.

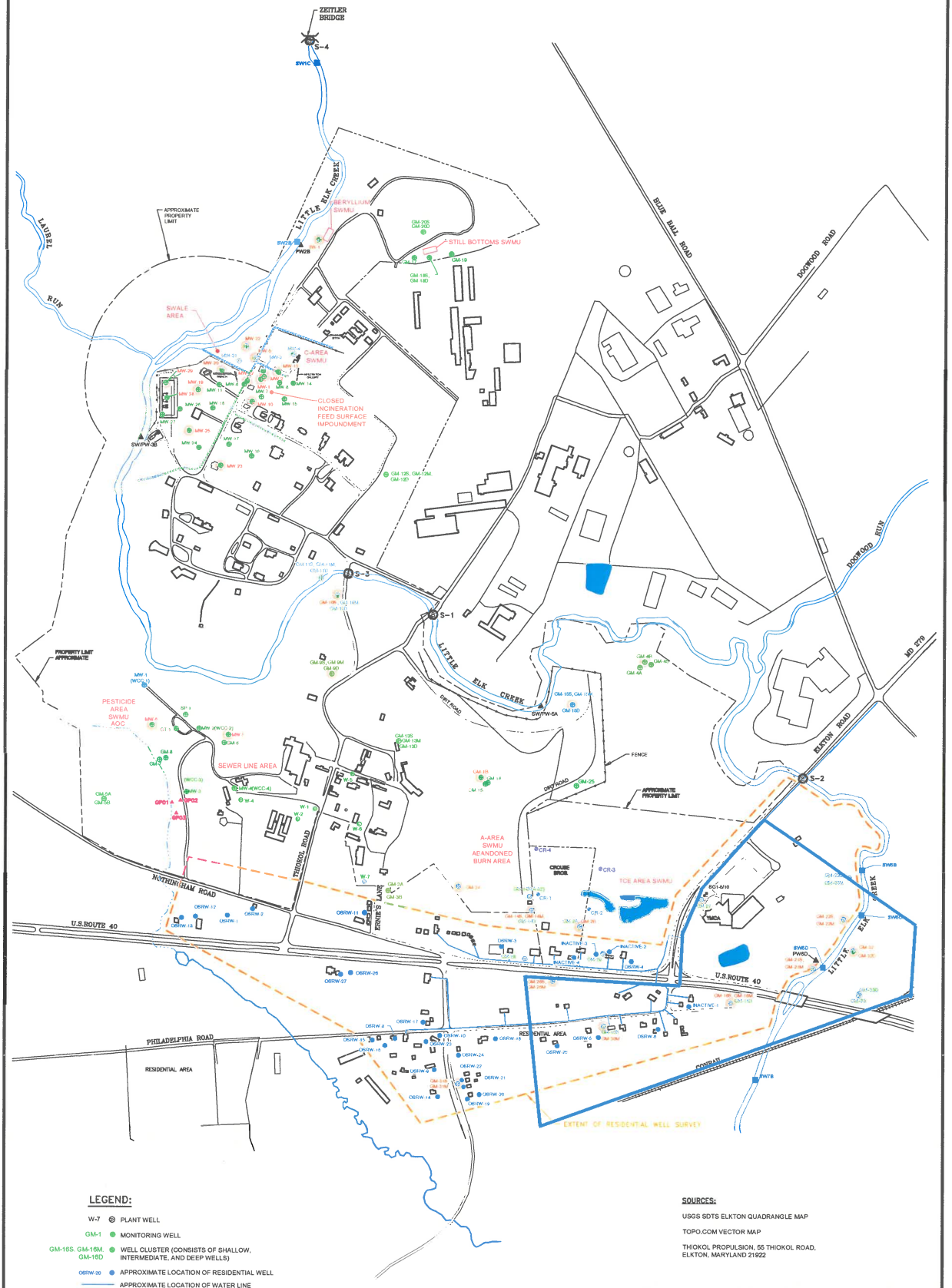
Very truly yours,

Richard L. Zambito, P.E.
Sr. Principal Engineer Environmental

Enclosure

Cc: Mr. John Hopkins, United States Environmental Protection Agency Office of Remediation (3LC10), EPA Region III
Mr. Ed Hammerberg, Maryland Department of the Environment
Mr. Peter Jacobson, Syngenta Crop Protection, Inc.
Mr. Brian Rakvica, Syngenta Crop Protection, Inc.

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Tallahassee-FL\ACTIVE\MD0011\0001\00004\MD001106 MW01.dwg LAYOUT: 2-2 SAVED: 7/14/2017 2:15 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/27/2017 5:27 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: --
MD001106X00



ATK ELKTON LLC
ELKTON, MARYLAND

SITE PLAN AND PERFORMANCE MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2-2

NORTHROP GRUMMAN

Northrop Grumman Corporation
Innovation Systems

45101 Warp Drive
Dulles, VA 20166

Ref: RLZ-20-021

April 29, 2020

Elkton Building and Zoning Department
100 Railroad Avenue, PO Box 157
Elkton, Maryland 21921

Subject: Off-Site Groundwater Use
Alliant Techsystems Operations LLC
USEPA ID #MDD 003 067 121

Dear Sir or Madam:

As you are aware an environmental investigation, performed under the direction of the United States Environmental Protection Agency (USEPA), has been completed for the Alliant Techsystems Operations LLC (Alliant) facility located at 55 Thiokol Road in Elkton, Maryland (the Site). As a result of this investigation, groundwater remediation is being conducted at the site. Alliant is implementing a Performance Monitoring Plan (PMP) and an Institutional and Engineering Controls Plan (IECP) as approved by USEPA to ensure that groundwater remediation is protective of human health and the environment.

As part of the IECP, no groundwater wells should be installed in the vicinity of the Site (refer to enclosed figure); groundwater in this vicinity may be impacted and should not be used for drinking, bathing, irrigation, etc. It is Alliant's understanding that no formal groundwater use exclusion areas are maintained in Cecil County; however, we are submitting this letter as a formal notification that groundwater use should not be permitted in the area shown on the figure.

Should you have any questions regarding the remedial activities being performed at the site, or the groundwater quality in this area, please contact me at(410) 392-1626.

Very truly yours,

Richard L. Zambito, P.E.
Sr. Principal Engineer Environmental

Enclosure

Cc: Mr. John Hopkins, United States Environmental Protection Agency Office of Remediation (3LC10), EPA Region III
Mr. Ed Hammerberg, Maryland Department of the Environment
Mr. Peter Jacobson, Syngenta Crop Protection, Inc.
Mr. Brian Rakvica, Syngenta Crop Protection, Inc.

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Tallahassee-FL\ACT\MD00116\0001\00004\MD001106 MW01.dwg LAYOUT: 2-2 SAVED: 7/14/2017 2:15 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/27/2017 5:27 PM BY: BERNDGEN, WENDY
XREFS: IMAGES: PROJECTNAME: —
MD001106X00

LEGEND:

W-7	PLANT WELL
GM-1	MONITORING WELL
GM-16S, GM-16M, GM-16D	WELL CLUSTER (CONSISTS OF SHALLOW, INTERMEDIATE, AND DEEP WELLS)
OSRW-20	APPROXIMATE LOCATION OF RESIDENTIAL WELL
	APPROXIMATE LOCATION OF WATER LINE
CR-1	APPROXIMATE LOCATION OF MONITORING WELLS TO INVESTIGATE CROUSE PROPERTY GROUNDWATER IMPACTS
S-1	SURFACE WATER GAUGE
SG1-5/10	LOCATION OF SOIL GAS POINT
SW7A	SURFACE WATER PERFORMANCE MONITORING LOCATION
PW6D	PORE WATER PERFORMANCE MONITORING LOCATION
GM-10S	GROUNDWATER PERFORMANCE MONITORING LOCATION

Groundwater Use Notification Area

NOTES:
AOC=AREA OF CONCERN
SWMU=SOLID WASTE MANAGEMENT UNIT
TCE=TRICHLOROETHENE

0 200 400 800
SCALE FEET

SOURCES:

USGS SDTS ELKTON QUADRANGLE MAP
TOPO.COM VECTOR MAP
THIOKOL PROPULSION, 55 THIOKOL ROAD, ELKTON, MARYLAND 21922

ATK ELKTON LLC
ELKTON, MARYLAND

SITE PLAN AND PERFORMANCE MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-2

APPENDIX J

Pesticide Information from GEI

GEI Consultants

Consulting
Engineers and
Scientists

April 23, 2020
Project 1610692.3.3001

Mr. Keith D. Roberts
Director, Environmental Remediation
Olin Corporation
3855 North Ocoee St., Suite 200
Cleveland, TN 37312

Ms. Carrie Hunt
Sr. Associate, Environmental Remediation
Olin Corporation
3855 N Ocoee St., Suite 200
Cleveland, TN 37312

Mr. George Crouse
Syngenta Crop Protection, Inc.
P.O. Box 18300
Greensboro, NC 27 419-8300

Re: Results of Annual Groundwater Monitoring Event:2020
Pesticide Area SWMU Area of Concern
ATK Site – Elkton, Maryland
Permittee: Orbital ATK, Inc.
Permit Number: MDD 003 067 121

GEI Consultants, Inc., P.C. (GEI) is pleased to provide this report presenting the results of the annual groundwater monitoring event for 2020 conducted as part of the corrective measures implemented for the Pesticide Area SWMU Area of Concern (AOC) located at the above-captioned site. The work was performed in accordance with the Performance Monitoring Plan (PMP) contained within the Corrective Measures Implementation Work Plan (prepared by Arcadis U.S., Inc. for Orbital ATK, Inc. and dated July 28, 2017).

Corrective measures specific to the Pesticide Area SWMU have been implemented jointly by Syngenta Crop Protection, LLC (Syngenta) and Olin Corporation (Olin) in cooperation with Alliant Techsystems Operations, LLC, a wholly-owned subsidiary of Northrup Grumman Innovations Systems, Inc., (Alliant). The corrective measures implemented for the Pesticide Area SWMU are documented in Corrective Measures Implementation Report prepared by GEI and dated December 20, 2019.

SUMMARY OF SAMPLING ACTIVITIES

In accordance with the PMP, groundwater samples were collected on March 17, 2020 from Pesticide Area SWMU monitoring wells PESTMW-5 and PESTMW-6. PESTMW-5 monitors

GEI Consultants, Inc., P.C.
100 Sylvan Parkway, Suite 400, Amherst, NY 14228
716.204.7154 Fax: 716.408.9015

groundwater downgradient of the Pesticide Area Cap. PESTMW-6 monitors upgradient groundwater.

Sampling logistics were affected by disruptions associated with the initial onset of the COVID-19 situation. Specifically, the flow through cell required to assess sample stability and adequacy of purging did not arrive from the supplier. The decision was made not to delay the sampling but to proceed as follows:

- Maintain the low flow purge to 50 to 60 minutes
- Collect blind duplicate samples from each well with at least 5 minutes of continued purging between collection of the parent and duplicate samples). Data from the field duplicates is useful for assessing sample stability.

Samples were submitted to Eurofins TestAmerica, Buffalo for laboratory analysis of Target Compound List (TCL) pesticides using USEPA Method 8081B/8082A.

RESULTS AND DATA QUALITY

The analytical results for the Pesticide Area SWMU groundwater samples are tabulated in Table 1. The laboratory report is attached (Attachment 1). Field sampling forms are included as Attachment 2.

Samples were placed on ice and hand delivered by the sampler to the laboratory on March 18, 2020. The condition of the samples upon receipt and holding times are evaluated initially by the laboratory, and then assessed by the reviewer. Laboratory receipt non-conformances were not noted. The samples were analyzed within the required holding times. Laboratory control sample (LCS) and LCS duplicate results were within control limits except for methoxychlor which exhibited a high bias. However, methoxychlor was not detected in the samples and no qualification was necessary. Analytes were not detected in the method blank.

As indicated above, field duplicates were collected from both monitoring wells sampled. No analytes were detected in the parent and duplicate samples from the upgradient well PESTMW-6. In the samples from downgradient well PESTMW-5, analytes were detected as follows:

Analyte	*Units*	*Parent Sample*	*Duplicate Sample*	*Relative Percent Difference*
alpha-BHC	µg/L	0.59	0.62	5.0
beta-BHC	µg/L	0.96	1.0	4.1
delta-BHC	µg/L	2.6	2.9	10.9
Dieldrin	µg/L	0.086	0.079	8.5
Endrin ketone	µg/L	0.14	0.12	15.4
gamma-BHC	µg/L	0.18	0.18	0
Heptachlor epoxide	µg/L	0.0086 J	Not Detected	Not Applicable

Notes:
J Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the reported concentration is an approximate value.

The field duplicate results are in close agreement and suggest the purging produced representative groundwater samples and the analytical precision is acceptable.

Based on this review, the analytical results are deemed acceptable for monitoring groundwater quality at the Pesticide Area SWMU AOC.

DISCUSSION

Monitoring wells PESTMW-5 and PESTMW-6 were previously sampled in 2004 and 2014. The March 2020 results for upgradient well PESTMW-6 are consistent with prior sampling results with no detections of any pesticides other than detections of beta-BHC at 0.029 J ug/L (estimated) and delta-BHC at 0.046 J ug/L (estimated) both of which were reported in 2004 (no detections in 2014 or 2020). March 2020 results for downgradient well PESTMW-5 are generally lower than results obtained in 2004 and 2014.

Please contact Kelly McIntosh at 716-204-7158 or by email at kmcintosh@geiconsultants.com if you have any questions concerning these results or if we can provide any additional information.

Sincerely,

GEI CONSULTANTS, INC., P.C.

Kelly R. McIntosh, Ph.D., P.E.
Senior Consultant

Wai Chin Lachell
Senior Consultant

Table 1. Analytical Results Summary
Annual Monitoring Pesticide Area SWMU AOC
ATK Elkton Site
Elkton, Maryland

Analyte	Units	PEST MW-5	PEST MW-5D (Duplicate of PEST MW-5)	PEST MW-6	PEST MW-6D (Duplicate of PEST MW-6)
		3/17/2020	3/17/2020	3/17/2020	3/17/2020
Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Method: 8081B/8082A)					
4,4'-DDD	ug/L	<0.048	<0.049	<0.048	<0.048
4,4'-DDE	ug/L	<0.048	<0.049	<0.048	<0.048
4,4'-DDT	ug/L	<0.048	<0.049	<0.048	<0.048
Aldrin	ug/L	<0.048	<0.049	<0.048	<0.048
alpha-BHC	ug/L	**0.59**	**0.62**	<0.048	<0.048
beta-BHC	ug/L	**0.96**	**1.0**	<0.048	<0.048
cis-Chlordane	ug/L	<0.048	<0.049	<0.048	<0.048
delta-BHC	ug/L	**2.6**	**2.9**	<0.048	<0.048
Dieldrin	ug/L	**0.086**	**0.079**	<0.048	<0.048
Endosulfan I	ug/L	<0.048	<0.049	<0.048	<0.048
Endosulfan II	ug/L	<0.048	<0.049	<0.048	<0.048
Endosulfan sulfate	ug/L	<0.048	<0.049	<0.048	<0.048
Endrin	ug/L	<0.048	<0.049	<0.048	<0.048
Endrin aldehyde	ug/L	<0.048	<0.049	<0.048	<0.048
Endrin ketone	ug/L	**0.14**	**0.12**	<0.048	<0.048
gamma-BHC (Lindane)	ug/L	**0.18**	**0.18**	<0.048	<0.048
Heptachlor	ug/L	<0.048	<0.049	<0.048	<0.048
Heptachlor epoxide	ug/L	**0.0086**	<0.049	<0.048	<0.048
Methoxychlor	ug/L	<0.048	<0.049	<0.048	<0.048
Toxaphene	ug/L	<4.8	<4.9	<4.8	<4.8
trans-Chlordane	ug/L	<0.048	<0.049	<0.048	<0.048

Notes:

Detections are highlighted using **blue** font.

Attachment 1

Laboratory Report

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-167608-1
Client Project/Site: Syngenta Elkton ATK Annual Monitoring

For:
GEI Consultants, Inc.
100 Sylvan Parkway
Suite 400
Amherst, New York 14228

Attn: Kelly McIntosh

Joseph V. Giacomazza

Authorized for release by:
4/1/2020 4:22:17 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GEI Consultants, Inc. Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Job ID: 480-167608-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

Job Narrative
480-167608-1

Comments
No additional comments.

Receipt
The samples were received on 3/18/2020 5:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6º C.

GC Semi VOA
Method 8081B/8082A: The laboratory control sample (LCS) for preparation batch 680-612307 and analytical batch 680-612500 recovered outside control limits for the following analytes: Methoxychlor. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method 8081B/8082A: The following samples were diluted to bring the concentration of target analytes within the calibration range: PEST MW -5 (480-167608-1) and PEST MW - 5D (480-167608-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Client Sample ID: PEST MW -5
Lab Sample ID: 480-167608-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
alpha-BHC	0.59		0.048	0.0075	ug/L	1		8081B/8082A	Total/NA
beta-BHC	0.96		0.48	0.11	ug/L	10		8081B/8082A	Total/NA
delta-BHC	2.6		0.48	0.12	ug/L	10		8081B/8082A	Total/NA
Dieldrin	0.086		0.048	0.0082	ug/L	1		8081B/8082A	Total/NA
Endrin ketone	0.14		0.048	0.0085	ug/L	1		8081B/8082A	Total/NA
gamma-BHC (Lindane)	0.18		0.048	0.0079	ug/L	1		8081B/8082A	Total/NA
Heptachlor epoxide	0.0086	J p	0.048	0.0077	ug/L	1		8081B/8082A	Total/NA

Client Sample ID: PEST MW - 5D
Lab Sample ID: 480-167608-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
alpha-BHC	0.62		0.049	0.0076	ug/L	1		8081B/8082A	Total/NA
beta-BHC	1.0		0.49	0.12	ug/L	10		8081B/8082A	Total/NA
alpha-BHC	0.62		0.049	0.0076	ug/L	1		8081B/8082A	Total/NA
beta-BHC	1.0		0.49	0.12	ug/L	10		8081B/8082A	Total/NA
delta-BHC	2.9		0.49	0.13	ug/L	10		8081B/8082A	Total/NA
delta-BHC	2.9		0.49	0.13	ug/L	10		8081B/8082A	Total/NA
Dieldrin	0.079		0.049	0.0084	ug/L	1		8081B/8082A	Total/NA
Dieldrin	0.079		0.049	0.0084	ug/L	1		8081B/8082A	Total/NA
Endrin ketone	0.12		0.049	0.0087	ug/L	1		8081B/8082A	Total/NA
Endrin ketone	0.12		0.049	0.0087	ug/L	1		8081B/8082A	Total/NA
gamma-BHC (Lindane)	0.18		0.049	0.0081	ug/L	1		8081B/8082A	Total/NA
gamma-BHC (Lindane)	0.18		0.049	0.0081	ug/L	1		8081B/8082A	Total/NA

Client Sample ID: PEST MW-6
Lab Sample ID: 480-167608-3

No Detections.

Client Sample ID: PEST MW-6D
Lab Sample ID: 480-167608-4

No Detections.

This Detection Summary does not include radiochemical test results.

Client: GEI Consultants, Inc.
Project/Site: Syngenta Elkton ATK Annual Monitoring

Job ID: 480-167608-1

Client Sample ID: PEST MW -5

Date Collected: 03/17/20 12:25
Date Received: 03/18/20 17:00

Lab Sample ID: 480-167608-1

Matrix: Water

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	<0.048		0.048	0.0074	ug/L		03/24/20 13:12	03/25/20 19:26	1
4,4'-DDE	<0.048		0.048	0.0071	ug/L		03/24/20 13:12	03/25/20 19:26	1
4,4'-DDT	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:26	1
Aldrin	<0.048		0.048	0.0070	ug/L		03/24/20 13:12	03/25/20 19:26	1
alpha-BHC	**0.59**		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 19:26	1
cis-Chlordane	<0.048		0.048	0.0096	ug/L		03/24/20 13:12	03/25/20 19:26	1
beta-BHC	**0.96**		0.48	0.11	ug/L		03/24/20 13:12	03/31/20 20:12	10
delta-BHC	**2.6**		0.48	0.12	ug/L		03/24/20 13:12	03/31/20 20:12	10
Dieldrin	**0.086**		0.048	0.0082	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endosulfan I	<0.048		0.048	0.0078	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endosulfan II	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endosulfan sulfate	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endrin	<0.048		0.048	0.0084	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endrin aldehyde	<0.048		0.048	0.016	ug/L		03/24/20 13:12	03/25/20 19:26	1
Endrin ketone	**0.14**		0.048	0.0085	ug/L		03/24/20 13:12	03/25/20 19:26	1
gamma-BHC (Lindane)	**0.18**		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:26	1
trans-Chlordane	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:26	1
Heptachlor	<0.048		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 19:26	1
Heptachlor epoxide	**0.0086**	**J p**	0.048	0.0077	ug/L		03/24/20 13:12	03/25/20 19:26	1
Methoxychlor	<0.048	*	0.048	0.0089	ug/L		03/24/20 13:12	03/25/20 19:26	1
Toxaphene	<4.8		4.8	0.18	ug/L		03/24/20 13:12	03/25/20 19:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*71*		*10 - 130*	*03/24/20 13:12*	*03/25/20 19:26*	*1*
Tetrachloro-m-xylene	*97*		*39 - 130*	*03/24/20 13:12*	*03/25/20 19:26*	*1*

Client Sample ID: PEST MW - 5D

Date Collected: 03/17/20 12:30
Date Received: 03/18/20 17:00

Lab Sample ID: 480-167608-2

Matrix: Water

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	<0.049		0.049	0.0075	ug/L		03/24/20 13:12	03/25/20 19:40	1
Aldrin	<0.049		0.049	0.0071	ug/L		03/24/20 13:12	03/25/20 19:40	1
4,4'-DDE	<0.049		0.049	0.0072	ug/L		03/24/20 13:12	03/25/20 19:40	1
alpha-BHC	**0.62**		0.049	0.0076	ug/L		03/24/20 13:12	03/25/20 19:40	1
4,4'-DDT	<0.049		0.049	0.0083	ug/L		03/24/20 13:12	03/25/20 19:40	1
beta-BHC	**1.0**		0.49	0.12	ug/L		03/24/20 13:12	03/31/20 20:27	10
Aldrin	<0.049		0.049	0.0071	ug/L		03/24/20 13:12	03/25/20 19:40	1
Chlordane (technical)	<0.49		0.49	0.11	ug/L		03/24/20 13:12	03/25/20 19:40	1
alpha-BHC	**0.62**		0.049	0.0076	ug/L		03/24/20 13:12	03/25/20 19:40	1
4,4'-DDD	<0.049		0.049	0.0075	ug/L		03/24/20 13:12	03/25/20 19:40	1
cis-Chlordane	<0.049		0.049	0.0098	ug/L		03/24/20 13:12	03/25/20 19:40	1
4,4'-DDE	<0.049		0.049	0.0072	ug/L		03/24/20 13:12	03/25/20 19:40	1
beta-BHC	**1.0**		0.49	0.12	ug/L		03/24/20 13:12	03/31/20 20:27	10
4,4'-DDT	<0.049		0.049	0.0083	ug/L		03/24/20 13:12	03/25/20 19:40	1
delta-BHC	**2.9**		0.49	0.13	ug/L		03/24/20 13:12	03/31/20 20:27	10
delta-BHC	**2.9**		0.49	0.13	ug/L		03/24/20 13:12	03/31/20 20:27	10
Dieldrin	**0.079**		0.049	0.0084	ug/L		03/24/20 13:12	03/25/20 19:40	1
Dieldrin	**0.079**		0.049	0.0084	ug/L		03/24/20 13:12	03/25/20 19:40	1

Client Sample ID: PEST MW - 5D
Lab Sample ID: 480-167608-2

Date Collected: 03/17/20 12:30
Matrix: Water
Date Received: 03/18/20 17:00

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continue

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endosulfan I	<0.049		0.049	0.0080	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endosulfan I	<0.049		0.049	0.0080	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endosulfan II	<0.049		0.049	0.0083	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endosulfan II	<0.049		0.049	0.0083	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endosulfan sulfate	<0.049		0.049	0.0081	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endosulfan sulfate	<0.049		0.049	0.0081	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin	<0.049		0.049	0.0086	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin	<0.049		0.049	0.0086	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin aldehyde	<0.049		0.049	0.017	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin aldehyde	<0.049		0.049	0.017	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin ketone	**0.12**		0.049	0.0087	ug/L		03/24/20 13:12	03/25/20 19:40	1
Endrin ketone	**0.12**		0.049	0.0087	ug/L		03/24/20 13:12	03/25/20 19:40	1
gamma-BHC (Lindane)	**0.18**		0.049	0.0081	ug/L		03/24/20 13:12	03/25/20 19:40	1
gamma-BHC (Lindane)	**0.18**		0.049	0.0081	ug/L		03/24/20 13:12	03/25/20 19:40	1
Heptachlor	<0.049		0.049	0.0077	ug/L		03/24/20 13:12	03/25/20 19:40	1
trans-Chlordane	<0.049		0.049	0.0083	ug/L		03/24/20 13:12	03/25/20 19:40	1
Heptachlor	<0.049		0.049	0.0077	ug/L		03/24/20 13:12	03/25/20 19:40	1
Heptachlor epoxide	<0.049		0.049	0.0079	ug/L		03/24/20 13:12	03/25/20 19:40	1
Heptachlor epoxide	<0.049		0.049	0.0079	ug/L		03/24/20 13:12	03/25/20 19:40	1
Methoxychlor	<0.049	*	0.049	0.0091	ug/L		03/24/20 13:12	03/25/20 19:40	1
Methoxychlor	<0.049	*	0.049	0.0091	ug/L		03/24/20 13:12	03/25/20 19:40	1
Toxaphene	<4.9		4.9	0.19	ug/L		03/24/20 13:12	03/25/20 19:40	1
Toxaphene	<4.9		4.9	0.19	ug/L		03/24/20 13:12	03/25/20 19:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*81*		*10 - 130*	*03/24/20 13:12*	*03/25/20 19:40*	*1*
DCB Decachlorobiphenyl	*81*		*10 - 130*	*03/24/20 13:12*	*03/25/20 19:40*	*1*
Tetrachloro-m-xylene	*105*		*39 - 130*	*03/24/20 13:12*	*03/25/20 19:40*	*1*
Tetrachloro-m-xylene	*105*		*39 - 130*	*03/24/20 13:12*	*03/25/20 19:40*	*1*

Client Sample ID: PEST MW-6
Lab Sample ID: 480-167608-3

Date Collected: 03/17/20 14:08
Matrix: Water
Date Received: 03/18/20 17:00

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	<0.048		0.048	0.0073	ug/L		03/24/20 13:12	03/25/20 19:55	1
Aldrin	<0.048		0.048	0.0070	ug/L		03/24/20 13:12	03/25/20 19:55	1
4,4'-DDE	<0.048		0.048	0.0071	ug/L		03/24/20 13:12	03/25/20 19:55	1
alpha-BHC	<0.048		0.048	0.0074	ug/L		03/24/20 13:12	03/25/20 19:55	1
4,4'-DDT	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:55	1
beta-BHC	<0.048		0.048	0.011	ug/L		03/24/20 13:12	03/25/20 19:55	1
Aldrin	<0.048		0.048	0.0070	ug/L		03/24/20 13:12	03/25/20 19:55	1
Chlordane (technical)	<0.48		0.48	0.10	ug/L		03/24/20 13:12	03/25/20 19:55	1
alpha-BHC	<0.048		0.048	0.0074	ug/L		03/24/20 13:12	03/25/20 19:55	1
4,4'-DDD	<0.048		0.048	0.0073	ug/L		03/24/20 13:12	03/25/20 19:55	1
cis-Chlordane	<0.048		0.048	0.0095	ug/L		03/24/20 13:12	03/25/20 19:55	1
4,4'-DDE	<0.048		0.048	0.0071	ug/L		03/24/20 13:12	03/25/20 19:55	1
beta-BHC	<0.048		0.048	0.011	ug/L		03/24/20 13:12	03/25/20 19:55	1
4,4'-DDT	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:55	1

Client Sample ID: PEST MW-6
Lab Sample ID: 480-167608-3

Date Collected: 03/17/20 14:08
Matrix: Water
Date Received: 03/18/20 17:00

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continue

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
delta-BHC	<0.048		0.048	0.012	ug/L		03/24/20 13:12	03/25/20 19:55	1
delta-BHC	<0.048		0.048	0.012	ug/L		03/24/20 13:12	03/25/20 19:55	1
Dieldrin	<0.048		0.048	0.0082	ug/L		03/24/20 13:12	03/25/20 19:55	1
Dieldrin	<0.048		0.048	0.0082	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan I	<0.048		0.048	0.0078	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan I	<0.048		0.048	0.0078	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan II	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan II	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan sulfate	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endosulfan sulfate	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin	<0.048		0.048	0.0084	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin	<0.048		0.048	0.0084	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin aldehyde	<0.048		0.048	0.016	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin aldehyde	<0.048		0.048	0.016	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin ketone	<0.048		0.048	0.0085	ug/L		03/24/20 13:12	03/25/20 19:55	1
Endrin ketone	<0.048		0.048	0.0085	ug/L		03/24/20 13:12	03/25/20 19:55	1
gamma-BHC (Lindane)	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:55	1
gamma-BHC (Lindane)	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 19:55	1
Heptachlor	<0.048		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 19:55	1
trans-Chlordane	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 19:55	1
Heptachlor	<0.048		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 19:55	1
Heptachlor epoxide	<0.048		0.048	0.0077	ug/L		03/24/20 13:12	03/25/20 19:55	1
Heptachlor epoxide	<0.048		0.048	0.0077	ug/L		03/24/20 13:12	03/25/20 19:55	1
Methoxychlor	<0.048	*	0.048	0.0089	ug/L		03/24/20 13:12	03/25/20 19:55	1
Methoxychlor	<0.048	*	0.048	0.0089	ug/L		03/24/20 13:12	03/25/20 19:55	1
Toxaphene	<4.8		4.8	0.18	ug/L		03/24/20 13:12	03/25/20 19:55	1
Toxaphene	<4.8		4.8	0.18	ug/L		03/24/20 13:12	03/25/20 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*96*		*10 - 130*	*03/24/20 13:12*	*03/25/20 19:55*	*1*
DCB Decachlorobiphenyl	*96*		*10 - 130*	*03/24/20 13:12*	*03/25/20 19:55*	*1*
Tetrachloro-m-xylene	*87*		*39 - 130*	*03/24/20 13:12*	*03/25/20 19:55*	*1*
Tetrachloro-m-xylene	*87*		*39 - 130*	*03/24/20 13:12*	*03/25/20 19:55*	*1*

Client Sample ID: PEST MW-6D
Lab Sample ID: 480-167608-4

Date Collected: 03/17/20 14:18
Matrix: Water
Date Received: 03/18/20 17:00

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	<0.048		0.048	0.0074	ug/L		03/24/20 13:12	03/25/20 20:09	1
Aldrin	<0.048		0.048	0.0070	ug/L		03/24/20 13:12	03/25/20 20:09	1
4,4'-DDE	<0.048		0.048	0.0071	ug/L		03/24/20 13:12	03/25/20 20:09	1
alpha-BHC	<0.048		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 20:09	1
4,4'-DDT	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 20:09	1
beta-BHC	<0.048		0.048	0.011	ug/L		03/24/20 13:12	03/25/20 20:09	1
Aldrin	<0.048		0.048	0.0070	ug/L		03/24/20 13:12	03/25/20 20:09	1
Chlordane (technical)	<0.48		0.48	0.11	ug/L		03/24/20 13:12	03/25/20 20:09	1
alpha-BHC	<0.048		0.048	0.0075	ug/L		03/24/20 13:12	03/25/20 20:09	1
4,4'-DDD	<0.048		0.048	0.0074	ug/L		03/24/20 13:12	03/25/20 20:09	1

Client Sample ID: PEST MW-6D
Lab Sample ID: 480-167608-4

Date Collected: 03/17/20 14:18
Matrix: Water
Date Received: 03/18/20 17:00

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continue

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-Chlordane	<0.048		0.048	0.0096	ug/L		03/24/20 13:12	03/25/20 20:09	1
4,4'-DDE	<0.048		0.048	0.0071	ug/L		03/24/20 13:12	03/25/20 20:09	1
beta-BHC	<0.048		0.048	0.011	ug/L		03/24/20 13:12	03/25/20 20:09	1
4,4'-DDT	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 20:09	1
delta-BHC	<0.048		0.048	0.012	ug/L		03/24/20 13:12	03/25/20 20:09	1
delta-BHC	<0.048		0.048	0.012	ug/L		03/24/20 13:12	03/25/20 20:09	1
Dieldrin	<0.048		0.048	0.0082	ug/L		03/24/20 13:12	03/25/20 20:09	1
Dieldrin	<0.048		0.048	0.0082	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan I	<0.048		0.048	0.0078	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan I	<0.048		0.048	0.0078	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan II	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan II	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan sulfate	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endosulfan sulfate	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin	<0.048		0.048	0.0084	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin	<0.048		0.048	0.0084	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin aldehyde	<0.048		0.048	0.016	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin aldehyde	<0.048		0.048	0.016	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin ketone	<0.048		0.048	0.0085	ug/L		03/24/20 13:12	03/25/20 20:09	1
Endrin ketone	<0.048		0.048	0.0085	ug/L		03/24/20 13:12	03/25/20 20:09	1
gamma-BHC (Lindane)	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 20:09	1
gamma-BHC (Lindane)	<0.048		0.048	0.0079	ug/L		03/24/20 13:12	03/25/20 20:09	1
Heptachlor	<0.048		0.048	0.0076	ug/L		03/24/20 13:12	03/25/20 20:09	1
trans-Chlordane	<0.048		0.048	0.0081	ug/L		03/24/20 13:12	03/25/20 20:09	1
Heptachlor	<0.048		0.048	0.0076	ug/L		03/24/20 13:12	03/25/20 20:09	1
Heptachlor epoxide	<0.048		0.048	0.0077	ug/L		03/24/20 13:12	03/25/20 20:09	1
Heptachlor epoxide	<0.048		0.048	0.0077	ug/L		03/24/20 13:12	03/25/20 20:09	1
Methoxychlor	<0.048	*	0.048	0.0089	ug/L		03/24/20 13:12	03/25/20 20:09	1
Methoxychlor	<0.048	*	0.048	0.0089	ug/L		03/24/20 13:12	03/25/20 20:09	1
Toxaphene	<4.8		4.8	0.18	ug/L		03/24/20 13:12	03/25/20 20:09	1
Toxaphene	<4.8		4.8	0.18	ug/L		03/24/20 13:12	03/25/20 20:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*86*		*10 - 130*	*03/24/20 13:12*	*03/25/20 20:09*	*1*
DCB Decachlorobiphenyl	*86*		*10 - 130*	*03/24/20 13:12*	*03/25/20 20:09*	*1*
Tetrachloro-m-xylene	*95*		*39 - 130*	*03/24/20 13:12*	*03/25/20 20:09*	*1*
Tetrachloro-m-xylene	*95*		*39 - 130*	*03/24/20 13:12*	*03/25/20 20:09*	*1*

Surrogate Summary

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		DCBP2	TCX1								
Lab Sample ID	Client Sample ID	(10-130)	(39-130)								
480-167608-1	PEST MW -5	71	97								
LCS 680-612307/8-A	Lab Control Sample	56	102								
LCSD 680-612307/9-A	Lab Control Sample Dup	63	91								
MB 680-612307/7-A	Method Blank	115	103								

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		DCBP1	DCBP1	TCX1	TCX1						
Lab Sample ID	Client Sample ID	(10-130)	(10-130)	(39-130)	(39-130)						
480-167608-2	PEST MW - 5D	81	81	105	105						
480-167608-3	PEST MW-6	96	96	87	87						
480-167608-4	PEST MW-6D	86	86	95	95						

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Lab Sample ID: MB 680-612307/7-A
Matrix: Water
Analysis Batch: 612500

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 612307

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	<0.013		0.013	0.0018	ug/L		03/24/20 13:12	03/25/20 18:43	1
Chlordane (technical)	<0.13		0.13	0.028	ug/L		03/24/20 13:12	03/25/20 18:43	1
alpha-BHC	<0.013		0.013	0.0020	ug/L		03/24/20 13:12	03/25/20 18:43	1
4,4'-DDD	<0.013		0.013	0.0019	ug/L		03/24/20 13:12	03/25/20 18:43	1
cis-Chlordane	<0.013		0.013	0.0025	ug/L		03/24/20 13:12	03/25/20 18:43	1
4,4'-DDE	<0.013		0.013	0.0019	ug/L		03/24/20 13:12	03/25/20 18:43	1
beta-BHC	<0.013		0.013	0.0030	ug/L		03/24/20 13:12	03/25/20 18:43	1
4,4'-DDT	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
delta-BHC	<0.013		0.013	0.0033	ug/L		03/24/20 13:12	03/25/20 18:43	1
Dieldrin	<0.013		0.013	0.0022	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endosulfan I	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endosulfan II	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endosulfan sulfate	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endrin	<0.013		0.013	0.0022	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endrin aldehyde	<0.013		0.013	0.0043	ug/L		03/24/20 13:12	03/25/20 18:43	1
Endrin ketone	<0.013		0.013	0.0022	ug/L		03/24/20 13:12	03/25/20 18:43	1
gamma-BHC (Lindane)	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
trans-Chlordane	<0.013		0.013	0.0021	ug/L		03/24/20 13:12	03/25/20 18:43	1
Heptachlor	<0.013		0.013	0.0020	ug/L		03/24/20 13:12	03/25/20 18:43	1
Heptachlor epoxide	<0.013		0.013	0.0020	ug/L		03/24/20 13:12	03/25/20 18:43	1
Methoxychlor	<0.013		0.013	0.0023	ug/L		03/24/20 13:12	03/25/20 18:43	1
Toxaphene	<1.3		1.3	0.048	ug/L		03/24/20 13:12	03/25/20 18:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*115*		*10 - 130*	*03/24/20 13:12*	*03/25/20 18:43*	*1*
Tetrachloro-m-xylene	*103*		*39 - 130*	*03/24/20 13:12*	*03/25/20 18:43*	*1*

Lab Sample ID: LCS 680-612307/8-A
Matrix: Water
Analysis Batch: 612500

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612307

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	0.0250	0.0244		ug/L		98	48 - 130
alpha-BHC	0.0250	0.0293		ug/L		117	45 - 130
4,4'-DDD	0.0250	0.0316		ug/L		126	52 - 130
cis-Chlordane	0.0250	0.0277		ug/L		111	60 - 130
4,4'-DDE	0.0250	0.0275		ug/L		110	48 - 130
beta-BHC	0.0250	0.0286		ug/L		114	50 - 130
4,4'-DDT	0.0250	0.0303		ug/L		121	59 - 130
delta-BHC	0.0250	0.0312		ug/L		125	47 - 140
Dieldrin	0.0250	0.0285		ug/L		114	55 - 130
Endosulfan I	0.0250	0.0225		ug/L		90	27 - 130
Endosulfan II	0.0250	0.0218		ug/L		87	39 - 130
Endosulfan sulfate	0.0250	0.0280		ug/L		112	57 - 130
Endrin	0.0250	0.0297		ug/L		119	62 - 131
Endrin aldehyde	0.0250	0.0287		ug/L		115	39 - 177
Endrin ketone	0.0250	0.0293		ug/L		117	47 - 130

Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

Lab Sample ID: LCS 680-612307/8-A
Matrix: Water
Analysis Batch: 612500

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 612307

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
gamma-BHC (Lindane)			0.0250	0.0293		ug/L		117	47 - 130		
trans-Chlordane			0.0250	0.0279		ug/L		112	50 - 145		
Heptachlor			0.0250	0.0253		ug/L		101	49 - 130		
Heptachlor epoxide			0.0250	0.0276		ug/L		110	54 - 130		
Methoxychlor			0.0250	0.0333	*	ug/L		133	53 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*56*		*10 - 130*
Tetrachloro-m-xylene	*102*		*39 - 130*

Lab Sample ID: LCSD 680-612307/9-A
Matrix: Water
Analysis Batch: 612500

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 612307

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin			0.0250	0.0219		ug/L		88	48 - 130	11	40
alpha-BHC			0.0250	0.0252		ug/L		101	45 - 130	15	30
4,4'-DDD			0.0250	0.0267		ug/L		107	52 - 130	17	40
cis-Chlordane			0.0250	0.0234		ug/L		94	60 - 130	17	50
4,4'-DDE			0.0250	0.0244		ug/L		97	48 - 130	12	30
beta-BHC			0.0250	0.0244		ug/L		98	50 - 130	16	40
4,4'-DDT			0.0250	0.0266		ug/L		106	59 - 130	13	40
delta-BHC			0.0250	0.0270		ug/L		108	47 - 140	15	30
Dieldrin			0.0250	0.0242		ug/L		97	55 - 130	17	30
Endosulfan I			0.0250	0.0212		ug/L		85	27 - 130	6	30
Endosulfan II			0.0250	0.0234		ug/L		94	39 - 130	7	30
Endosulfan sulfate			0.0250	0.0240		ug/L		96	57 - 130	15	40
Endrin			0.0250	0.0252		ug/L		101	62 - 131	16	30
Endrin aldehyde			0.0250	0.0247		ug/L		99	39 - 177	15	40
Endrin ketone			0.0250	0.0248		ug/L		99	47 - 130	17	40
gamma-BHC (Lindane)			0.0250	0.0249		ug/L		99	47 - 130	16	30
trans-Chlordane			0.0250	0.0239		ug/L		96	50 - 145	16	50
Heptachlor			0.0250	0.0214		ug/L		86	49 - 130	17	30
Heptachlor epoxide			0.0250	0.0233		ug/L		93	54 - 130	17	40
Methoxychlor			0.0250	0.0282		ug/L		113	53 - 130	16	40

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
DCB Decachlorobiphenyl	*63*		*10 - 130*
Tetrachloro-m-xylene	*91*		*39 - 130*

QC Association Summary

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

GC Semi VOA

Prep Batch: 612307

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-167608-1	PEST MW -5	Total/NA	Water	3520C	
480-167608-2	PEST MW - 5D	Total/NA	Water	3520C	
480-167608-3	PEST MW-6	Total/NA	Water	3520C	
480-167608-4	PEST MW-6D	Total/NA	Water	3520C	
MB 680-612307/7-A	Method Blank	Total/NA	Water	3520C	
LCS 680-612307/8-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 680-612307/9-A	Lab Control Sample Dup	Total/NA	Water	3520C	

Analysis Batch: 612500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-167608-1	PEST MW -5	Total/NA	Water	8081B/8082A	612307
480-167608-2	PEST MW - 5D	Total/NA	Water	8081B/8082A	612307
480-167608-3	PEST MW-6	Total/NA	Water	8081B/8082A	612307
480-167608-4	PEST MW-6D	Total/NA	Water	8081B/8082A	612307
MB 680-612307/7-A	Method Blank	Total/NA	Water	8081B/8082A	612307
LCS 680-612307/8-A	Lab Control Sample	Total/NA	Water	8081B/8082A	612307
LCSD 680-612307/9-A	Lab Control Sample Dup	Total/NA	Water	8081B/8082A	612307

Analysis Batch: 613477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-167608-1	PEST MW -5	Total/NA	Water	8081B/8082A	612307
480-167608-2	PEST MW - 5D	Total/NA	Water	8081B/8082A	612307

Lab Chronicle

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Client Sample ID: PEST MW -5
Lab Sample ID: 480-167608-1
Date Collected: 03/17/20 12:25
Matrix: Water
Date Received: 03/18/20 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		1	612500	03/25/20 19:26	JCK	TAL SAV
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		10	613477	03/31/20 20:12	JCK	TAL SAV

Client Sample ID: PEST MW - 5D
Lab Sample ID: 480-167608-2
Date Collected: 03/17/20 12:30
Matrix: Water
Date Received: 03/18/20 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		1	612500	03/25/20 19:40	JCK	TAL SAV
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		10	613477	03/31/20 20:27	JCK	TAL SAV

Client Sample ID: PEST MW-6
Lab Sample ID: 480-167608-3
Date Collected: 03/17/20 14:08
Matrix: Water
Date Received: 03/18/20 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		1	612500	03/25/20 19:55	JCK	TAL SAV

Client Sample ID: PEST MW-6D
Lab Sample ID: 480-167608-4
Date Collected: 03/17/20 14:18
Matrix: Water
Date Received: 03/18/20 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			612307	03/24/20 13:12	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		1	612500	03/25/20 20:09	JCK	TAL SAV

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: GEI Consultants, Inc. Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Laboratory: Eurofins TestAmerica, Buffalo

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	88-0686	07-06-20
California	State	2931	04-01-20
Connecticut	State	PH-0568	09-30-20
Florida	NELAP	E87672	06-30-20
Georgia	State	10026 (NY)	03-31-20
Georgia (DW)	State	956	03-31-20
Illinois	NELAP	200003	09-30-20
Iowa	State	374	02-28-21
Kansas	NELAP	E-10187	01-31-20 *
Kentucky (DW)	State	90029	12-31-20
Kentucky (UST)	State	30	03-31-20
Kentucky (WW)	State	KY90029	12-31-20
Louisiana	NELAP	02031	06-30-20
Maine	State	NY00044	12-04-20
Maryland	State	294	03-31-20
Massachusetts	State	M-NY044	06-30-20
Michigan	State	9937	03-31-20
Minnesota	NELAP	1524384	12-31-20
New Hampshire	NELAP	2337	11-18-20
New Jersey	NELAP	NY455	06-30-20
New York	NELAP	10026	04-01-20
North Dakota	State	R-176	03-31-20
Oklahoma	State	9421	09-01-20
Oregon	NELAP	NY200003	06-10-20
Pennsylvania	NELAP	68-00281	07-31-20
Rhode Island	State	LAO00328	12-30-20
Tennessee	State	02970	03-31-20
Texas	NELAP	T104704412-18-10	08-01-20
USDA	US Federal Programs	P330-18-00039	02-06-21
Virginia	NELAP	460185	09-14-20
Washington	State	C784	02-11-21
Wisconsin	State	998310390	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: GEI Consultants, Inc. Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Laboratory: Eurofins TestAmerica, Savannah

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Maryland	State	250	12-31-20

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
8081B/8082A	3520C	Water	4,4'-DDD
8081B/8082A	3520C	Water	4,4'-DDE
8081B/8082A	3520C	Water	4,4'-DDT
8081B/8082A	3520C	Water	Aldrin
8081B/8082A	3520C	Water	alpha-BHC
8081B/8082A	3520C	Water	beta-BHC
8081B/8082A	3520C	Water	Chlordane (technical)
8081B/8082A	3520C	Water	cis-Chlordane
8081B/8082A	3520C	Water	delta-BHC
8081B/8082A	3520C	Water	Dieldrin
8081B/8082A	3520C	Water	Endosulfan I
8081B/8082A	3520C	Water	Endosulfan II
8081B/8082A	3520C	Water	Endosulfan sulfate
8081B/8082A	3520C	Water	Endrin
8081B/8082A	3520C	Water	Endrin aldehyde
8081B/8082A	3520C	Water	Endrin ketone
8081B/8082A	3520C	Water	gamma-BHC (Lindane)
8081B/8082A	3520C	Water	Heptachlor
8081B/8082A	3520C	Water	Heptachlor epoxide
8081B/8082A	3520C	Water	Methoxychlor
8081B/8082A	3520C	Water	Toxaphene
8081B/8082A	3520C	Water	trans-Chlordane

Method Summary

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Method	Method Description	Protocol	Laboratory
8081B/8082A	Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography	SW846	TAL SAV
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Sample Summary

Client: GEI Consultants, Inc.
Job ID: 480-167608-1
Project/Site: Syngenta Elkton ATK Annual Monitoring

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
480-167608-1	PEST MW -5	Water	03/17/20 12:25	03/18/20 17:00	
480-167608-2	PEST MW - 5D	Water	03/17/20 12:30	03/18/20 17:00	
480-167608-3	PEST MW-6	Water	03/17/20 14:08	03/18/20 17:00	
480-167608-4	PEST MW-6D	Water	03/17/20 14:18	03/18/20 17:00	

Chain of Custody Record

Client Information	Sampler: Kelly McIntosh	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact: Kelly McIntosh	Phone: 716 204 7158	E-Mail:	State of Origin:	Page:
Company: GEI Consultants		Accreditations Required (See note):		Job #:
Address: 100 Sylvan Parkway	Due Date Requested:			
City: Amherst, NY	TAT Requested (days): Standard			
State, Zip: NY 14228				
Phone: 716 204 7158	PO #:			
Email: Kmcintosh@geiconsultants.com	WO #:			
Project Name: ATK Elkton Site	Project #: 1610692			
Site: ATK Elkton Site	SSOW#:			

Analysis Requested

480-167608 Chain of Custody

Preservation Codes:

A - HCL
B - NaOH
...cetate
...Acid
...O4
...
...lor
...bic Acid
...ter
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
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	TCL Pesticides	Total Number of cont	Special Instructions/Note:
			Preservation Code:						
Pest MW-5	3/17/20	1225	G	water			X		
Pest MW-5D	3/17/20	1230	↓	↓			X		
Pest MW-6	3/17/20	1408	↓	↓			X		
Pest MW-6D	3/17/20	1418	↓	↓			X		

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
☒ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☒ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Kelly McIntosh	3/18/20/1700		Chuckow Cikolb	03/18/20 1700	TA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 4/16 #1 ICE

Ver: 09/20/2016

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 480-54960.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jerry.lanier@testamericainc.com	State of Origin: Maryland	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Maryland		Job #: 480-167608-1
Address: 5102 LaRoche Avenue, ,	Due Date Requested: 3/30/2020			
City: Savannah	TAT Requested (days):			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: 1610692/ATK Orbital, Elkton MD	Project #: 68012765			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8081B_8082A/3520C_LVI Routine Pesticides	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
PEST MW -5 (480-167608-1)	3/17/20	12:25 Eastern		Water			X	1	
PEST MW - 5D (480-167608-2)	3/17/20	12:30 Eastern		Water			X	1	
PEST MW-6 (480-167608-3)	3/17/20	14:08 Eastern		Water			X	1	
PEST MW-6D (480-167608-4)	3/17/20	14:18 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	03/20/20 1700	TA	[signature]	3-21-2020/0950	SAI
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.1 / 3.5

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: GEI Consultants, Inc.

Job Number: 480-167608-1

Login Number: 167608
List Number: 1
Creator: Stopa, Erik S

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	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 sample IDs on the containers 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	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GEI
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: GEI Consultants, Inc.

Job Number: 480-167608-1

Login Number: 167608
List Number: 2
Creator: Stopa, Erik S

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

Login Sample Receipt Checklist

Client: GEI Consultants, Inc.

Job Number: 480-167608-1

Login Number: 167608
List Number: 3
Creator: Mooken, Darmal

List Source: Eurofins TestAmerica, Savannah
List Creation: 03/21/20 11:50 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Attachment 2

Field Sample Collection Logs

Monitoring Well Development / Sampling Log

GEI Consultants

Site Name:	Well ID:
Elkton-ATK Pesticide Area SWMU	PESTMW-6

Date: 3/17/20

Field Personnel: Kelly McIntosh

Method of Purging/ Sampling: Low Flow Micropurge

Well Depth (ft btoc): 75'

Depth to Water (ft btoc): 56.33

Casing type/dia.: PVC-4 inch

Well Volume (g):

Time	Total Volume (g)	Temp (°F) *	pH *	Cond (us/cm) *	ORP (mV) *	D.O. (mg/L) *	Turbidity (NTU) *	Comments
1308	0							Begin Purge
1338	3.75							Rate: 125mL/min
1345	4.62							125mL/min
1350	5.25							(DTW 56.35) 125mL/min
1400	6.50							125mL/min
1408	Sample Collected:		PESTMW-6					
1418	Field Duplicate Sample		Collected:		PESTMW-6D			

* No Flow-Through Cell

Pump set 3' off well bottom

Monitoring Well Development / Sampling Log

GEI Consultants

Site Name:	Well ID:
Elkton-ATR Pesticide Area SWMU	PESTMW 5

Date 3/17/20

Field Personnel Kelly McIntosh

Method of Purging/ Sampling Low Flow (Micropurge)

Well Depth (ft btoc) 87'

Depth to Water (ft btoc) 79.60 (@ 0932)

Casing type/dia. PVC 4-inch

Well Volume (g)

Time	Total Volume (g)	Temp (°F) *	pH *	Cond (us/cm) *	ORP (mV) *	D.O. (mg/L) *	Turbidity (NTU)	Comments
1135	0							Begin Purge
1145	1.25							Rate: 125 ml/min
1155	2.50							125 ml/min
1205	3.75							125 ml/min
1215	5.00							125 ml/min
1225	6.25							125 ml/min
								125 ml/min
1225	Sample Collected: PESTMW-5							
1230	FIELD DUPLICATE: PESTMW-5D							

* No Flow-Through cell
Pump Set 2ft off bottom of well

APPENDIX K

Soil Management Plan

Owner: Plant Engineering

1. PURPOSE/SCOPE

The purpose of this instruction is to establish responsibilities and procedures for excavation, core drilling, and surface penetrations to ensure personnel safety and prevention of property losses and downtime.

This work instruction applies to any excavation, core drilling, or surface penetration performed in the plant, either by Propulsion Systems and Controls (PS&C) personnel or contractors.

2. PROCESS

A process flow chart is provided in Figure 1.

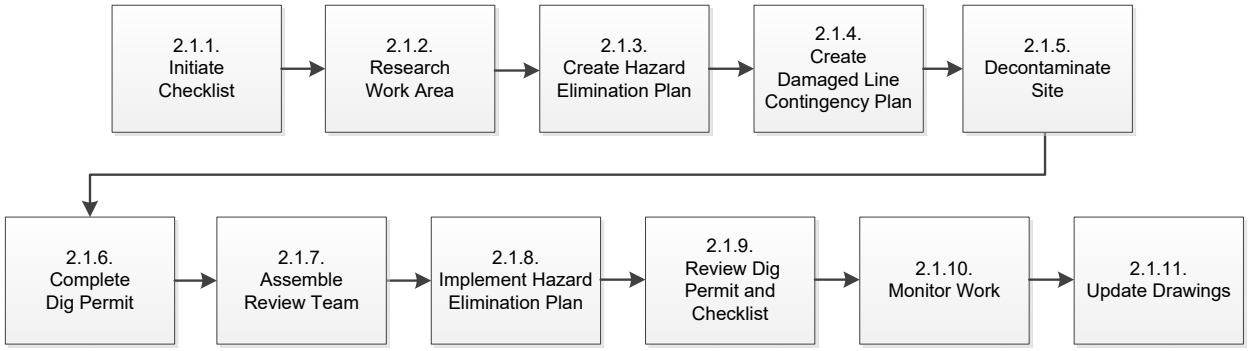

Figure 1. Excavation/Core Drilling/Surface Penetration Process Flow

2.1. Process Steps

2.1.1. Initiate Checklist

The plant engineer uses the Checklist for Excavation, Core Drilling, or Surface Penetrations, Form F15007, to guide and document work.

2.1.2. Research Work Area

Using the Digging/Cutting Permit AutoCAD® drawing, historical drawing research, visual inspection, scanning equipment, and, if required, contracted locating services (Master Locators, Wilmington, Delaware, for example), the plant engineer locates all lines in the proposed work area including but not limited to power, communications, gas, water, sewage, control, steam, condensate, air, and environmentally restricted areas.

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- The plant engineer indicates these locations on the site and on a drawing of the area.
- Consideration is given not only to the utilities path, but also to how deep the lines are below the surface.
- Any planned soil disturbance in an area designated as "Environmentally Restricted" (A-Area, Pesticide, Sewer Line Area, C-Area SWMU, or Beryllium SWMU) will be fully detailed in a request to, and pre-approved in writing by, the site environmental engineer.

Historical drawing research includes but is not limited to the following sources, located in Plant Engineering:

- Plant Engineering drawing database on Plant Engineering Team drive
- Building drawing archive
- Digging/Cutting Permit archive
- Facility map (provide specific reference) of Environmentally Restricted Areas

2.1.2.1 Environmentally Restricted Areas

Per the site's RCRA Corrective Action Permit (issued by the US Environmental Protection Agency), subsurface soil excavation at the A-Area Solid Waste Management Unit (SWMU), Pesticide SWMU, Sewer Line Area, C-Area SWMU, and Beryllium SWMU is required to be restricted except in conformance with an appropriate SMP including a Health and Safety Plan (HASP).

To comply with this requirement and to protect worker health, safety and the environment, the following steps are completed prior to issuance of a permit to conduct planned excavation, core drilling, or any other surface penetration.

- Any planned soil disturbance in one of the designated areas (A-Area, Pesticide, Sewer Line Area, C-Area SWMU, or Beryllium SWMU) is fully detailed in a request to, and pre-approved in writing by, the site environmental engineer.
- The request will fully describe the extent and types of soil disturbance.
- The environmental engineer will define any preliminary investigations in the area to be disturbed, which may include soil and/or shallow groundwater sampling.
- Pending the results of the pre-disturbance investigations, the environmental engineer will define any soil management measures that must be incorporated into the planned activities that will disturb the soil.

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In preparing the soil management activities, the engineer will consider the procedures defined in Appendix A "General Site Procedures for Soil Disturbance in Environmentally Restricted Areas", included at the end of this work instruction.

2.1.3. Create Hazard Elimination Plan

The plant engineer creates a hazard elimination plan to make the area safe for the work to be performed. Lockout/tagout instructions are provided in PRO-015. Form F15008 may be used to create the plan, which includes but is not limited to the following:

- De-energizing electric lines
- Turning off and venting air lines
- Turning off, or being prepared to turn off, gas lines

Note: Although this plan does not require Plant Process Control Board (PPCB) approval, the PPCB is available to help address the plant engineer's or the Review Team's concerns or questions regarding hazard elimination or risk mitigation.

2.1.4. Create Damaged Line Contingency Plan

If a line is damaged and has potential for causing a business impact, the plant engineer prepares a contingency plan that includes but is not limited to the following:

- Name of equipment that would be affected
- Plan for reestablishing the line if damaged
- Business effect of putting the equipment out of commission, including how long the equipment would be down
- Name of equipment that Production could use while the affected equipment is down

2.1.5. Decontaminate Site

If required, the plant engineer ensures the site is decontaminated in accordance with PRO-015. Work may only proceed after the explosives decontamination tag is issued.

2.1.6. Complete Dig Permit

The plant engineer or designee completes a Digging/Cutting Permit, which includes the following:

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- Written description of utilities present in proposed work area
- Reason for work
- Drawing indicating location of utilities and location of proposed work

2.1.6.1. Exceptions

- Shallow hand digging operations, backfilling operations, and mechanical or hand landscaping activity when landscaping work consists only of the deposition, leveling, or rearrangement of top soil do not require a Digging/Cutting Permit.
- The drilling of small-diameter shallow holes (up to 3/4-in. diameter by 2-in. depth) in concrete does not require a Digging/Cutting Permit.

2.1.7. Assemble Review Team

The Review Team meets at the proposed work site with the Digging/Cutting Permit and drawing. The team reviews the research performed by the plant engineer and visually confirms results on-site, including demarcations of locations of hidden utilities. Once in agreement, the Review Team approves the Digging/Cutting Permit and the first page of the F15007 checklist.

- For work to be performed in or on a building, a representative from each of the following departments is part of the Review Team:
  - Person conducting the work – member of Plant Engineering who will perform the work, or is responsible for the contractor who will perform the work.
  - Building owner – supervisor or manager from the area where the work will occur
  - Safety – engineer or technician
  - Plant engineer – if the person conducting the work is not a plant engineer
  - Maintenance manager or designee
- For work to be performed in the ground or outdoor paved surface, a representative from each of the following departments is part of the Review Team:
  - Person conducting the work – member of Plant Engineering who will perform the work, or is responsible for the contractor who will perform the work.
  - Safety – engineer or technician
  - Plant engineer and/or grounds manager or designee – at least one Maintenance manager or designee – if requested by Review Team

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2.1.8. Implement Hazard Elimination Plan

Before commencement of work, the plant engineer implements a hazard elimination plan, ensuring utilities in the work area are de-energized or shut off using lockout/tagout processes. If practical, utilities to the work area are shut off.

2.1.9. Review Dig Permit and Checklist

Before commencement of work, and on the site of the work, the plant engineer and the person who will perform the work review the Digging/Cutting Permit and the F15007 checklist. Preparations and plans on the checklist are completed before work begins.

2.1.10. Monitor Work

A Safety, Health, and Environmental (SH&E) department representative or the plant engineer periodically monitors the operation for compliance with this work instruction, signing and dating the F15007 checklist to document these inspections.

2.1.11. Update Drawings

Upon completion of work, the plant engineer submits to the Plant Engineering draftsman any sketches, drawings, and information required to update or produce as-built drawings. At a minimum, the Digging/Cutting Permit drawing is updated with utility locations and depths learned or newly installed items.

2.2. Prevention Requirements

- The contractor controls the manner and methods of its operations and is directly responsible for the safety of its employees.
  - As a minimum, workers wear safety glasses, gloves, hearing protection, and leather boots with safety toes. Hard hats are worn when appropriate.
  - For cutting concrete, wet methods of cutting are preferred to prevent inhalation of silica dust. When dry cutting concrete, a proper respirator is worn.
  - For handheld saws, chainsaw cutting chaps are worn.
  - When the possibility exists of electric conduits within the work, precautions are taken against electrocution, including but not limited to use of electrical hazard safety boots – indicated by “EH” on the American Society for Testing and Materials (ASTM) label inside the boot – and electrical gloves of a class appropriate for the potential electrical hazard.

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- The contractor maintains a safe work area, which is marked off to warn personnel of hazards.
- The contractor follows procedures for shoring, sloping, and personal protection in excavations and trenches in accordance with Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) Part 1926, Safety and Health Regulations for Construction.

3. REFERENCES

PS&C Documents

Not applicable

PS&C Forms

F15007	Checklist for Excavation, Core Drilling, or Surface Penetrations
F15008	Hazard Elimination Plan

Government/Industry Documents

29 CFR Part 1926	Safety and Health Regulations for Construction

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4. REVISION HISTORY

Issue No.	Description of Change(s)	Date
00	New document created in support of QMS redesign effort.	4/4/16
01	Remove reference to PRO-015 as work instructions should not reference upward.	7/19/17
02	Change OA references to NGIS and MD&C to PS&C.	3/6/19
03	Add requirements for Environmentally Restricted Access (section 2.1.2 and Appendix A).	6/10/19
04	Section 2.1.2 & 2.2.1.1: Add additional environmentally sensitive areas not included in previous revisions. Section 2.1.2.1: Change the word ‘solid’ to the word ‘soil’. Change NGIS references to PS&C and update NG logo.	8/7/20

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APPENDIX A
GENERAL SITE PROCEDURES FOR SOIL DISTURBANCE IN ENVIRONMENTALLY RESTRICTED AREAS

1. HEALTH AND SAFETY

Personnel will be required to have the appropriate Occupational Safety and Health Administration (OSHA) 40-hour HAZWOPER training and annual 8-hour refresher. Prior to initiation of subsurface intrusive activities, a site-specific HASP must be prepared by qualified personnel who are familiar with current subsurface media environmental quality and the particular physical hazards that may be expected at each SWMU. The HASP must incorporate appropriate personal protective equipment (PPE), air monitoring, and engineering controls (e.g., remote-controlled excavation equipment) based on current environmental media quality.

All personnel will be required to be familiar with the site-specific HASP prior to initiating subsurface intrusive work. All new site personnel will be instructed to acknowledge understanding of this document, prior to accessing the site. In addition, all personnel will be required to watch a site-specific on-site safety briefing upon arrival at the site.

1.1. Site Security

The site is not accessible to the public and operates 24/7 security. Chain link fencing is present throughout the perimeter of the site. The fencing is 8 feet high and restricts access to the facility by the public. The Beryllium SWMU is also fenced within the site. Work areas will be appropriately demarcated prior to beginning subsurface activities.

1.2. Dust and Odor Control

Trucks equipped with tarps will be used for the transportation and off-site disposal of impacted soil and construction debris. Soil stockpiles will be covered with tarps and/or polyethylene sheeting when not being utilized.

Subsurface contractors, using both visual and real-time air monitoring, will monitor for volatile organic compounds (VOCs) and particulates at the perimeter of the affected SWMU and within the work area, respectively.

In the event fugitive dust or odor exceeds action thresholds specified in the HASP, the work will temporarily cease until proper engineering controls are in place (e.g., use of a water truck, application of odor suppression foam, tarps/temporary covers).

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1.3. Traffic Control and Road Maintenance

Trucks and subsurface excavation equipment will enter the site via the main entrance. Trucks and excavation equipment will not be allowed to park or idle on Thiokol Road. All trucks/excavation equipment will be staged on-site and loaded in order of arrival. Trucks must yield to facility vehicles with flashing red or yellow lights.

Truck and excavation equipment tires/treads will be broom cleaned or equivalent prior to exiting the site via the construction entrance; therefore, track-out of sediment onto off-site streets, other paved areas, and sidewalks will be minimized. If material has been tracked-out from the site onto the surface of off-site streets, other paved areas, and sidewalks, the deposited material will be removed immediately.

1.4. Processing and Handling of Trees/Stumps/Rootballs and Boulders

Where possible, trees over 12-inches in diameter at the ground level will be protected and left in place. Where clearing is required, the trunks and large branches will be neatly piled on the construction limit boundary and small vegetation will be chipped. Chipped vegetation may be used as a final mulch covering in some areas of the affected area to limit erosion.

1.5. Processing and Handling of Asphalt/Concrete Material

If sub-surface activities require the removal of asphalt or concrete cover material (e.g., in the Pesticide SWMU), this material will be considered potentially impacted from contact with impacted soil and will undergo waste characterization and disposal as described for soils in Section 2 below. Asphalt/concrete will not be recycled.

2. EXCAVATION AND HANDLING PROCEDURES

2.1. Excavation and Handling of SWMU Soil

Excavation will only occur after the limits are established in the field, utilities have been located (utilizing a minimum of three lines of evidence), and applicable best management practices are in place. Surface water drainage patterns will be confirmed, and measures will be taken to address surface water diversion during subsurface activities and erosion control.

Traditional construction equipment (i.e., excavators and off-road dump trucks) may be used for excavation. The contractor will designate an individual to oversee each excavation. The designee will use a laser level or equivalent to direct the equipment operator and stop the excavation, when elevations and grades are met.

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Impacted soil excavated from the affected SWMU will be loaded into off-road dump trucks or equivalent and relocated to an appropriately permitted and NG-approved waste disposal facility.

Workers should have the appropriate training and use the proper PPE during excavation and handling of impacted soils, as specified in the HASP. Appropriate PPE is expected to include, at a minimum, impermeable gloves, safety glasses, long sleeve shirt, long pants, and steel-toed boots. High visibility gear must also be worn during operations at the site.

2.2. Waste Characterization

Waste characteristics of the impacted soils vary; therefore, impacted soils cannot be direct loaded into the on-road Department of Transportation approved trucks. All excavated material will need to be placed within an appropriate staging area while waste characterization results are pending. A copy of the waste characterization analytical results will be maintained at the site.

Permit conditions of likely landfills for disposal of materials from the SWMUs will be evaluated with respect to the contaminants analyzed for or expected to be present in the site materials. In order to limit the amount of time material will be staged on-site, the following will be completed during subsurface activities:

- Pre-authorizations will be established at the waste disposal facilities based on existing data for impacted soil;
- Waste Characterizations samples will be analyzed for the landfill with the strictest sampling protocol on an expedited turnaround time (72 hours). This sampling protocol may include, but not be limited to, the following parameters:
  - Toxicity Characteristic Leaching Procedure (TCLP) metals;
  - TCLP and total volatile organic carbons;
  - TCLP and total semi volatile organic carbons;
  - Organochlorides;
  - Polychlorinated biphenyls; and,
  - BTU/toxicity.

A copy of the approved waste profiles will be maintained at the site.

2.3. Waste Disposal

Once the waste material has been characterized and profiled, the material will be disposed of at an appropriately permitted and NG-approved waste disposal facility.

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2.4. Excavation Backfill and Site Restoration

Open excavations will be backfilled with certified clean fill and topsoil with the exception of footprints currently used for vehicular parking and a truck turn-around. These areas will be backfilled with certified clean fill to within one foot of grade and restored to the original surface finish (asphalt/concrete) as described in the original remedial design documents for the SWMU.

Certified clean fill will be natural mineral soil, void of debris. General backfill should have an organic content of 5%. Backfill will be sampled and results will be maintained at the site. Fill material will be spread in 12-inch lifts and compacted with a minimum of four passes of a vibratory compactor or approved equivalent. The surface will be restored to within a half (0.5) foot of final grade for placement of topsoil and temporary seeding. The various locations where excavation is required have existing cover types consisting of grass, shrubs, and trees. The final re-vegetation plan for each area will match the surrounding features to allow the area to blend into the existing conditions following construction. Erosion control features will include mulching, temporary seeding, silt fences, terraces, and other siltation control products such as coir logs and wattles. Erosion control features will be directed towards products that will biodegrade over time and not require a second disturbance of the site soils (as would occur with removal of silt fencing).

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APPENDIX L

Trend Analysis

ARCADIS Design & Consultancy for natural and built assets

TABLE L-1
Summary Statistics and Trend Results[1,2]
Alliant Techsystems Operations LLC
Elkton, Maryland
June, 2020

Area ID	Well ID	Analyte	Corrective Action Objective	Date Range	Figure	FOD	Detected Results Summary [1]				Mann-Kendall Test [2]				Sen's Estimator of Slope [2]			
							Range	Mean	Median	SD	Result[4]	MK Result Note	P-Value	S Value	Result[4]	Sen's Result Note	Slope (Units/Day)	95% CI (Units/Day)
Area A	GM-1B	Perchlorate	14	11/02 - 03/20	L-1	5 / 5	37.1 - 94	56.2	47.1	23.1	NST	5a	0.117	6	NA	5a	NA	NA
	GM-1B	1,4-Dioxane	0.46	03/04 - 03/20	L-2	4 / 4	2.3 - 15	6.7	4.8	5.7	DWN	5a	0.042	-6	NA	5a	NA	NA
	GM-1B	TCE	5	09/88 - 03/20	L-3	7 / 7	40 - 247	107	97	76.6	DWN	5a	0.015	-15	DWN	5a	-0.0144	-0.0245 to -0.00853
	GM-15M	Perchlorate	14	11/02 - 03/20	L-4	5 / 5	32 - 233	99.4	44	88.5	DWN	5a	0.042	-8	NA	5a	NA	NA
TCE Area	GM-4B	TCE	5	09/88 - 03/20	L-5	5 / 5	5.1 - 36	18.2	14	11.8	DWN	5a	0.042	-8	NA	5a	NA	NA
	GM-9M	Perchlorate	14	02/99 - 03/20	L-6	4 / 4	10 - 620	455	595	298	NST	5a	0.271	3	NA	5a	NA	NA
	GM-9M	1,1-DCA	2.7	09/94 - 03/20	L-7	5 / 5	16 - 57	26.4	18	17.3	DWN	5a	0.025	-9	DWN	5a	-0.00355	-0.0192 to -0.000685
	GM-9M	1,1-DCE	7	09/94 - 03/20	L-8	5 / 5	21 - 84	52.6	52	23.4	NST	5a	0.408	2	NA	5a	NA	NA
	GM-9M	TCE	5	09/94 - 03/20	L-9	5 / 5	120 - 330	163	120	93.2	NST	5a	0.080	-7	NT	5a	-0.000978	-0.0786 to 0
	GM-10S	Perchlorate	14	03/04 - 03/20	L-10	4 / 4	4.2 - 45.7	21	17	17.7	NST	5a	0.375	-2	NA	5a	NA	NA
	GM-10S	1,4-Dioxane	0.46	03/04 - 03/20	L-11	4 / 4	0.89 - 7.6	4.6	5	2.8	NST	5a	0.167	-4	NA	5a	NA	NA
	GM-10S	1,1-DCA	2.7	03/04 - 03/20	L-12	4 / 4	0.88 - 5.1	3	3.05	1.7	NST	5a	0.375	2	NA	5a	NA	NA
	GM-10S	1,1-DCE	7	03/04 - 03/20	L-13	4 / 4	6.3 - 33	19.6	19.5	10.9	NST	5a	0.375	2	NA	5a	NA	NA
	GM-10S	TCE	5	09/94 - 03/20	L-14	5 / 5	3 - 12	7.5	7.8	3.3	NST	5a	0.408	2	NA	5a	NA	NA
	GM-14M	Perchlorate	14	11/02 - 03/20	L-15	6 / 8	12 - 1370	861	1180	632	DWN	--	0.024	-17	DWN	--	-0.209	-0.282 to -0.000301
	GM-14M	1,4-Dioxane	0.46	03/04 - 03/20	L-16	5 / 5	3 - 92	23	6.1	38.6	DWN	5a	0.008	-10	NA	5a	NA	NA
	GM-14M	1,1-DCA	2.7	11/02 - 03/20	L-17	8 / 8	4.5 - 11	7.4	7.6	2.5	NST	--	0.138	-10	NST	--	-0.000691	-0.00129 to 0.000544
	GM-14M	1,1-DCE	7	11/02 - 03/20	L-18	7 / 8	2.5 - 110	65.8	79	47.4	DWN	--	0.024	-17	DWN	--	-0.0156	-0.0248 to -0.0000269
	GM-14M	cis-1,2-DCE	5	03/04 - 03/20	L-19	5 / 5	1.7 - 190	56.3	34	76.2	NST	5a	0.242	4	NA	5a	NA	NA
	GM-14M	TCE	5	09/94 - 03/20	L-20	9 / 9	2.2 - 1900	796	1000	714	DWN	--	0.012	-22	DWN	--	-0.196	-0.260 to -0.126
	GM-14M	VC	2	11/02 - 03/20	L-21	4 / 8	0.99 - 10	5.2	4.95	3.9	UP	--	0.007	20	NT	5c	0.000764	0 to 0.00158
	GM-14S	Perchlorate	14	03/04 - 03/20	L-22	3 / 5	6.1 - 229	85.7	22	124	NST	5a	0.180	-5	NST	5a	-0.0103	-0.0543 to 0.000372
	GM-14S	1,4-Dioxane	0.46	03/04 - 03/20	L-23	3 / 5	7.3 - 52	27.8	24	22.6	NST	5a	0.180	-5	NST	5a	-0.00773	-0.0118 to 0.000446
	GM-14S	1,1,1-TCA	200	09/94 - 03/20	L-24	6 / 6	1 - 360	83.1	7.85	143	NST	5a	0.068	-9	NST	5a	-0.0216	-0.0469 to 0.000875
	GM-14S	1,1-DCA	2.7	03/04 - 03/20	L-25	5 / 5	5.1 - 11	8	8.2	2.3	NST	5a	0.592	0	NA	5a	NA	NA
	GM-14S	1,1-DCE	7	03/04 - 03/20	L-26	5 / 5	18 - 170	61.6	46	61.9	NST	5a	0.408	-2	NA	5a	NA	NA
	GM-14S	cis-1,2-DCE	5	03/04 - 03/20	L-27	5 / 5	13 - 86	58.4	72	32.9	NST	5a	0.500	1	NST	5a	0.00188	-0.129 to 0.0189
	GM-14S	TCE	5	09/94 - 03/20	L-28	6 / 6	7.1 - 2100	498	150	812	NST	5a	0.136	-7	NST	5a	-0.102	-0.265 to 0.00775
	GM-14S	VC	2	03/04 - 03/20	L-29	4 / 5	5.3 - 13	8.3	7.45	3.3	NST	5a	0.408	2	NA	5a	NA	NA

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TCE Area	GM-16M	Perchlorate	14	02/99 - 03/20	L-30	5 / 7	8 - 54	31.2	36.8	17.9	NST	5a	0.563	0	NST	5a	0	-0.0138 to 0.00657
	GM-16M	1,4-Dioxane	0.46	03/04 - 03/20	L-31	3 / 5	0.18 - 4.1	1.8	1	2.1	NST	5a	0.180	-5	NST	5a	-0.000639	-0.00216 to 0.00000448
	GM-16M	1,1,1-TCA	200	09/94 - 03/20	L-32	6 / 8	0.97 - 2.9	2.1	2.3	0.72	DWN	--	0.007	-20	DWN	--	-0.000183	-0.000321 to -0.000135
	GM-16M	TCE	5	09/94 - 03/20	L-33	7 / 8	2.1 - 95	60.3	66	28.8	DWN	--	0.007	-20	DWN	--	-0.00721	-0.0155 to -0.000991
	GM-16S	Perchlorate	14	02/99 - 03/20	L-34	6 / 6	5 - 280	104	50.15	122	UP	5a	0.008	13	UP	5a	0.0292	0.00224 to 0.0479
	GM-16S	1,4-Dioxane	0.46	03/04 - 03/20	L-35	3 / 4	2 - 15	9.7	12	6.8	NST	5a	0.167	4	NA	5a	NA	NA
	GM-16S	1,1,1-TCA	200	09/94 - 03/20	L-36	7 / 7	1.1 - 30	9.2	1.5	13.2	NST	5a	0.155	8	NST	5a	0.000156	-0.000115 to 0.00441
	GM-16S	1,1-DCE	7	11/02 - 03/20	L-37	5 / 5	2.7 - 100	41.8	14	48.5	UP	5a	0.042	8	NA	5a	NA	NA
	GM-16S	cis-1,2-DCE	5	03/04 - 03/20	L-38	4 / 4	0.64 - 150	77.2	79.1	84.1	NST	5a	0.105	5	NA	5a	NA	NA
	GM-16S	TCE	5	09/94 - 03/20	L-39	7 / 7	49 - 740	247	65	283	UP	5a	0.005	17	UP	5a	0.0289	0.00368 to 0.0943
	GM-21M	Perchlorate	14	11/02 - 03/20	L-40	6 / 6	59.9 - 220	146	148	71.9	UP	5a	0.028	11	NST	5a	0.0237	-0.0194 to 0.0483
	GM-21M	1,4-Dioxane	0.46	03/04 - 03/20	L-41	5 / 5	1.6 - 6.4	4.1	3.1	2.1	NST	5a	0.117	-6	NA	5a	NA	NA
	GM-21M	1,1-DCE	7	11/02 - 03/20	L-42	6 / 6	7.7 - 31	16.3	15	7.9	NST	5a	0.298	4	NST	5a	0.000712	-0.00142 to 0.0161
	GM-21M	TCE	5	11/02 - 03/20	L-43	6 / 6	100 - 230	185	190	48.1	NST	5a	0.235	-5	NST	5a	-0.00730	-0.0427 to 0.0464
	GM-21S	Perchlorate	14	11/02 - 03/20	L-44	6 / 6	64 - 890	548	566	274	NST	5a	0.500	1	NST	5a	0.0116	-0.375 to 0.0770
	GM-21S	1,4-Dioxane	0.46	03/04 - 03/20	L-45	5 / 5	19 - 120	46.4	25	42.8	NST	5a	0.242	-4	NA	5a	NA	NA
	GM-21S	1,1,1-TCA	200	11/02 - 03/20	L-46	7 / 7	68 - 210	114	85	60.2	NST	5a	0.052	-12	DWN	5a	-0.0186	-0.0277 to -0.000131
	GM-21S	1,1-DCA	2.7	11/02 - 03/20	L-47	7 / 7	5.8 - 11	9.1	9.3	1.6	NST	5a	0.334	4	NST	5a	0.000171	-0.000209 to 0.00108
	GM-21S	1,1-DCE	7	11/02 - 03/20	L-48	7 / 7	120 - 320	213	210	60.7	NST	5a	0.281	-5	NST	5a	-0.00712	-0.0282 to 0.0202
	GM-21S	TCE	5	11/02 - 03/20	L-49	7 / 7	890 - 1500	1110	1100	199	NST	5a	0.334	-4	NST	5a	-0.0214	-0.139 to 0.0273
	GM-22M	Perchlorate	14	11/02 - 03/20	L-50	6 / 6	66 - 258	124	81.5	80.8	DWN	5a	0.028	-11	DWN	5a	-0.0194	-0.0364 to -0.00435
	GM-22M	1,4-Dioxane	0.46	03/04 - 03/20	L-51	5 / 5	11 - 140	41.8	16	55.3	DWN	5a	0.042	-8	NA	5a	NA	NA
	GM-22M	1,1,1-TCA	200	11/02 - 03/20	L-52	7 / 7	110 - 1100	471	210	427	DWN	5a	0.005	-17	DWN	5a	-0.134	-0.192 to -0.0466
	GM-22M	1,1-DCA	2.7	11/02 - 03/20	L-53	7 / 7	12 - 52	23.9	14	15.8	DWN	5a	0.005	-17	DWN	5a	-0.00462	-0.00878 to -0.00153
	GM-22M	1,1-DCE	7	11/02 - 03/20	L-54	7 / 7	240 - 1200	581	390	371	DWN	5a	0.005	-17	DWN	5a	-0.109	-0.183 to -0.0697
	GM-22M	TCE	5	11/02 - 03/20	L-55	7 / 7	1100 - 6400	3060	1700	2160	DWN	5a	0.005	-17	DWN	5a	-0.659	-1.00 to -0.282
	GM-22S	Perchlorate	14	11/02 - 03/20	L-56	6 / 6	55 - 230	116	82	73.5	DWN	5a	0.001	-15	DWN	5a	-0.0223	-0.0308 to -0.0175
	GM-22S	1,4-Dioxane	0.46	03/04 - 03/20	L-57	5 / 5	10 - 150	43.8	13	60.1	DWN	5a	0.025	-9	DWN	5a	-0.0128	-0.0310 to -0.00463
	GM-22S	1,1,1-TCA	200	11/02 - 03/20	L-58	6 / 6	77 - 780	304	132.5	309	DWN	5a	0.008	-13	DWN	5a	-0.0940	-0.138 to -0.0427
	GM-22S	1,1-DCA	2.7	11/02 - 03/20	L-59	5 / 6	9.6 - 27	16.5	11	8.7	NST	5a	0.136	-7	NST	5a	-0.00267	-0.00416 to 0.000514
	GM-22S	1,1-DCE	7	11/02 - 03/20	L-60	6 / 6	200 - 780	432	310	263	DWN	5a	0.008	-13	DWN	5a	-0.0876	-0.106 to -0.0562
	GM-22S	TCE	5	11/02 - 03/20	L-61	6 / 6	890 - 3200	1800	1350	1030	DWN	5a	0.028	-11	DWN	5a	-0.356	-0.450 to -0.156
	GM-24	Perchlorate	14	11/02 - 03/20	L-62	6 / 6	130 - 362	219	170	105	DWN	5a	0.028	-11	DWN	5a	-0.0319	-0.0427 to -0.0147
	GM-24	TCE	5	11/02 - 03/20	L-63	6 / 6	7.2 - 68	31.7	24.5	21.8	DWN	5a	0.028	-11	DWN	5a	-0.00693	-0.0252 to -0.00177
	GM-26M	Perchlorate	14	11/02 - 03/20	L-64	6 / 6	94 - 160	112	105.5	24.5	NST	5a	0.136	-7	NST	5a	-0.00310	-0.0360 to 0.00952
	GM-26M	1,4-Dioxane	0.46	03/04 - 03/20	L-65	5 / 5	1.5 - 6.6	3.5	2.6	2.4	NST	5a	0.080	-7	DWN	5a	-0.000934	-0.00304 to -0.0000359
	GM-26M	1,1-DCE	7	11/02 - 03/20	L-66	6 / 6	10 - 17	13	12.5	2.6	NST	5a	0.360	-3	NST	5a	-0.000356	-0.00107 to 0.00353
	GM-26M	TCE	5	03/04 - 03/20	L-67	6 / 6	120 - 290	218	225	70.8	DWN	5a	0.028	-11	NA	5a	NA	NA
	GM-26S	Perchlorate	14	11/02 - 03/20	L-68	6 / 6	6.7 - 130	77.3	99	51.3	UP	5a	0.028	11	UP	5a	0.0178	0.000584 to 0.0307
	GM-26S	1,4-Dioxane	0.46	03/04 - 03/20	L-69	3 / 5	1.2 - 2.1	1.6	1.5	0.46	NST	5a	0.080	7	NST	5a	0.000115	-0.00147 to 0.000527
	GM-26S	1,1-DCE	7	11/02 - 03/20	L-70	6 / 6	0.86 - 10	5.2	5.45	3.8	UP	5a	0.008	13	UP	5a	0.00141	0.000819 to 0.00347
	GM-26S	TCE	5	11/02 - 03/20	L-71	6 / 6	15 - 170	97.2	115	66	UP	5a	0.028	11	UP	5a	0.0240	0.000344 to 0.0479
	GM-30M	Perchlorate	14	03/04 - 03/20	L-72	5 / 6	4.9 - 15	10.6	13	4.7	NST	5a	0.136	7	NST	5a	0.00150	-0.00347 to 0.00208
	GM-30M	TCE	5	03/04 - 03/20	L-73	5 / 5	0.7 - 9.3	4.9	5.8	3.5	NST	5a	0.592	0	NA	5a	NA	NA
	GM-32	Perchlorate	14	03/04 - 03/20	L-74	4 / 5	2.6 - 16	8.8	8.2	6	UP	5a	0.008	10	NA	5a	NA	NA
	GM-32	TCE	5	03/04 - 03/20	L-75	5 / 5	7 - 34	18.6	16	10.9	UP	5a	0.008	10	NA	5a	NA	NA
	GM-32D	Benzene	5	06/14 - 03/20	L-76	3 / 4	0.68 - 17	6.2	0.84	9.4	DWN	5a	0.042	-6	NA	5a	NA	NA

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C-Area	MW-01	Perchlorate	4	10/14 - 03/20	L-77	10 / 10	180 - 14700	4470	2755	4900	NST	--	0.078	-17	NST	--	-3.63	-12.4 to 0.869
	MW-01	1,1,1-TCA	200	10/14 - 03/20	L-78	10 / 10	34 - 15100	2870	1800	4440	DWN	--	0.005	-29	DWN	--	-1.87	-3.61 to -0.827
	MW-01	1,1-DCE	7	10/14 - 03/20	L-79	10 / 10	12 - 885	407	405.5	300	DWN	--	0.036	-21	NST	--	-0.300	-0.675 to 0.0213
	MW-01	TCE	5	10/14 - 03/20	L-80	13 / 20	0.66 - 132	28.5	38.5	38.9	NST	--	0.297	17	NA	--	NA	NA
	MW-02	Perchlorate	4	05/14 - 03/20	L-81	11 / 11	68 - 4970	901	490	1410	NST	--	0.106	-17	NST	--	-0.383	-1.09 to 0.223
	MW-02	1,1,1-TCA	200	05/14 - 03/20	L-82	11 / 11	43 - 51000	13000	11000	13500	DWN	--	0.043	-23	NST	--	-5.57	-17.0 to 0.148
	MW-02	1,1-DCE	7	05/14 - 03/20	L-83	8 / 11	52 - 1600	581	520	515	NST	--	0.291	-8	NST	--	-0.231	-0.742 to 0.145
	MW-02	Chlorobenzene	100	05/14 - 03/20	L-84	6 / 11	16 - 170	77.8	49.5	65.6	NST	--	0.206	11	NST	--	0.000565	-0.0312 to 0.0236
	MW-02	TCE	5	05/14 - 03/20	L-85	6 / 11	9.1 - 107	35.7	25.5	35.7	NST	--	0.500	1	NST	--	0	-0.0183 to 0.00773
	MW-05	Perchlorate	4	05/14 - 03/20	L-86	11 / 11	15 - 680	223	160	188	NST	--	0.090	-18	NST	--	-0.0961	-0.262 to 0.00743
	MW-05	1,1-DCE	7	05/14 - 03/20	L-87	11 / 11	0.6 - 9.6	4.4	3.6	2.9	NST	--	0.138	-15	NST	--	-0.00152	-0.00514 to 0.00132
	MW-05	PCE	5	05/14 - 03/20	L-88	11 / 11	13.9 - 240	58.7	49.1	64.2	NST	--	0.267	9	NST	--	0.00769	-0.0347 to 0.0248
	MW-05	TCE	5	05/14 - 03/20	L-89	11 / 11	14 - 431	132	110	125	NST	--	0.193	-12	NST	--	-0.0268	-0.226 to 0.0394
	MW-10	Perchlorate	4	04/14 - 03/20	L-90	11 / 11	46 - 331	188	200	83.9	DWN	--	0.018	-28	DWN	--	-0.0642	-0.152 to -0.00379
	MW-10	1,1-DCE	7	04/14 - 03/20	L-91	11 / 11	2.9 - 15	7.9	8	4.3	NST	--	0.320	-7	NST	--	-0.00206	-0.00715 to 0.00323
	MW-10	TCE	5	04/14 - 03/20	L-92	9 / 11	4.3 - 30	12.8	9.46	9.5	NST	--	0.155	-14	NST	--	-0.00276	-0.0123 to 0.00343
	MW-12	Perchlorate	4	05/14 - 03/20	L-93	11 / 11	190 - 12900	2270	1010	3650	NST	--	0.106	-17	NST	--	-0.583	-3.38 to 0.346
	MW-12	1,1,1-TCA	200	05/14 - 03/20	L-94	10 / 11	1 - 10300	2760	2090	3510	DWN	--	0.010	-31	DWN	--	-1.50	-5.28 to -0.152
	MW-12	1,1-DCE	7	05/14 - 03/20	L-95	9 / 11	0.4 - 865	305	216	295	DWN	--	0.012	-30	DWN	--	-0.154	-0.482 to -0.00953
	MW-13	Perchlorate	4	05/14 - 03/20	L-96	11 / 11	50 - 930	426	364	296	DWN	--	0.043	-23	NST	--	-0.290	-0.508 to 0.0287
	MW-13	1,1-DCE	7	05/14 - 03/20	L-97	10 / 11	3 - 20	11.9	13.05	5.7	NST	--	0.138	-15	NST	--	-0.00332	-0.0115 to 0.00348
	MW-13	Chlorobenzene	100	05/14 - 03/20	L-98	9 / 11	36 - 815	476	450	282	NST	--	0.407	-4	NST	--	-0.0342	-0.464 to 0.398
	MW-13	TCE	5	05/14 - 03/20	L-99	11 / 11	26 - 378	195	194	130	NST	--	0.378	-5	NST	--	-0.0348	-0.218 to 0.178
	MW-19	Perchlorate	4	05/14 - 03/20	L-100	11 / 11	95 - 1310	719	770	325	NST	--	0.267	-9	NST	--	-0.125	-0.586 to 0.164
	MW-19	1,1-DCE	7	05/14 - 03/20	L-101	11 / 11	10 - 32.7	18.1	16.2	5.9	DWN	--	0.025	-26	DWN	--	-0.00236	-0.0121 to -0.00000590
	MW-19	TCE	5	05/14 - 03/20	L-102	11 / 11	1.7 - 6.6	3.4	3	1.3	NST	--	0.067	-20	NST	--	-0.000763	-0.00221 to 0.0000521
	MW-20	Perchlorate	4	05/14 - 03/20	L-103	12 / 12	17.4 - 1700	374	260	493	UP	--	0.050	25	NA	--	NA	NA
	MW-20	1,1,1-TCA	200	05/14 - 03/20	L-104	12 / 12	7 - 732	121	43	203	NST	--	0.205	-13	NA	--	NA	NA
	MW-20	1,1-DCE	7	05/14 - 03/20	L-105	12 / 12	2 - 65	19.8	16	19.6	NST	--	0.445	-3	NA	--	NA	NA
	MW-20	TCE	5	05/14 - 03/20	L-106	12 / 12	1.6 - 12.3	6.2	6.745	3.5	DWN	--	0.037	-27	NA	--	NA	NA
	MW-20	VC	2	05/14 - 03/20	L-107	8 / 12	1.9 - 17.2	5.4	3.95	5.3	DWN	--	0.039	-26	NA	--	NA	NA
	MW-22	Perchlorate	4	05/14 - 03/20	L-108	11 / 11	2.1 - 176	83.7	94.5	59.7	NST	--	0.438	-3	NST	--	-0.0190	-0.0902 to 0.0810
	MW-22	1,1,1-TCA	200	05/14 - 03/20	L-109	11 / 11	6 - 382	61.8	23.7	109	NST	--	0.267	-9	NST	--	-0.0109	-0.0478 to 0.0238
	MW-22	1,1-DCE	7	05/14 - 03/20	L-110	10 / 11	1 - 29.1	7.7	5.25	8.1	NST	--	0.106	17	NST	--	0.00311	-0.00668 to 0.00601
	MW-22	PCE	5	05/14 - 03/20	L-111	11 / 11	13 - 100	51	53.6	28.5	NST	--	0.267	-9	NST	--	-0.00786	-0.0421 to 0.0323
	MW-22	TCE	5	05/14 - 03/20	L-112	11 / 11	18.5 - 150	58.2	55	39.6	NST	--	0.438	3	NST	--	0.000700	-0.0442 to 0.0428
	MW-23	Perchlorate	4	05/14 - 03/20	L-113	13 / 13	7.7 - 67.2	24.2	18	16.9	DWN	--	<0.001	-52	NA	--	NA	NA
	MW-23	1,1-DCE	7	05/14 - 03/20	L-114	13 / 13	1.3 - 19	7.6	7.32	5.5	DWN	--	0.003	-46	NA	--	NA	NA
	MW-25	Perchlorate	4	05/14 - 03/20	L-115	11 / 11	10 - 154	95	105	43.6	NST	--	0.092	-18	NST	--	-0.0289	-0.0879 to 0.00934
	MW-28	Perchlorate	4	05/14 - 03/20	L-116	11 / 11	150 - 3810	1420	1400	962	DWN	--	0.018	-28	DWN	--	-0.811	-1.71 to -0.0646
	MW-28	1,1-DCE	7	05/14 - 03/20	L-117	11 / 11	1.9 - 12.2	7.4	8	3.4	DWN	--	0.003	-37	DWN	--	-0.00454	-0.00638 to -0.00287
	MW-28	TCE	5	05/14 - 03/20	L-118	19 / 22	1 - 84	32	53.5	31.2	NST	--	0.258	-24	NA	--	NA	NA
	MW-29	Perchlorate	4	05/14 - 03/20	L-119	11 / 11	1400 - 4100	2440	2100	880	NST	--	0.195	12	NST	--	0.444	-0.943 to 1.08
	MW-29	1,1-DCE	7	05/14 - 03/20	L-120	11 / 11	5.1 - 17	9.5	8.1	3.5	NST	--	0.175	-13	NST	--	-0.00168	-0.00621 to 0.00136
	MW-29	TCE	5	05/14 - 03/20	L-121	11 / 11	10 - 20.2	15.8	16.5	3	NST	--	0.136	-15	NST	--	-0.00169	-0.00414 to 0.00232

TCE-Area	SW-6B	TCE	5	11/06 - 03/20	L-122	4 / 4	3.8 - 6.9	4.9	4.45	1.4	NST	5a	0.375	-2	NA	5a	NA	NA
	SW-6C	TCE	5	11/06 - 03/20	L-123	4 / 4	4.6 - 7.8	5.7	5.1	1.5	NST	5a	0.375	-2	NA	5a	NA	NA
	SW-6D	TCE	5	11/06 - 03/20	L-124	4 / 4	5.7 - 24	11.3	7.75	8.6	NST	5a	0.375	-2	NA	5a	NA	NA
	SW-7B	TCE	5	11/06 - 03/20	L-125	4 / 4	4.7 - 11	7	6.15	2.8	NST	5a	0.375	-2	NA	5a	NA	NA

Abbreviations:

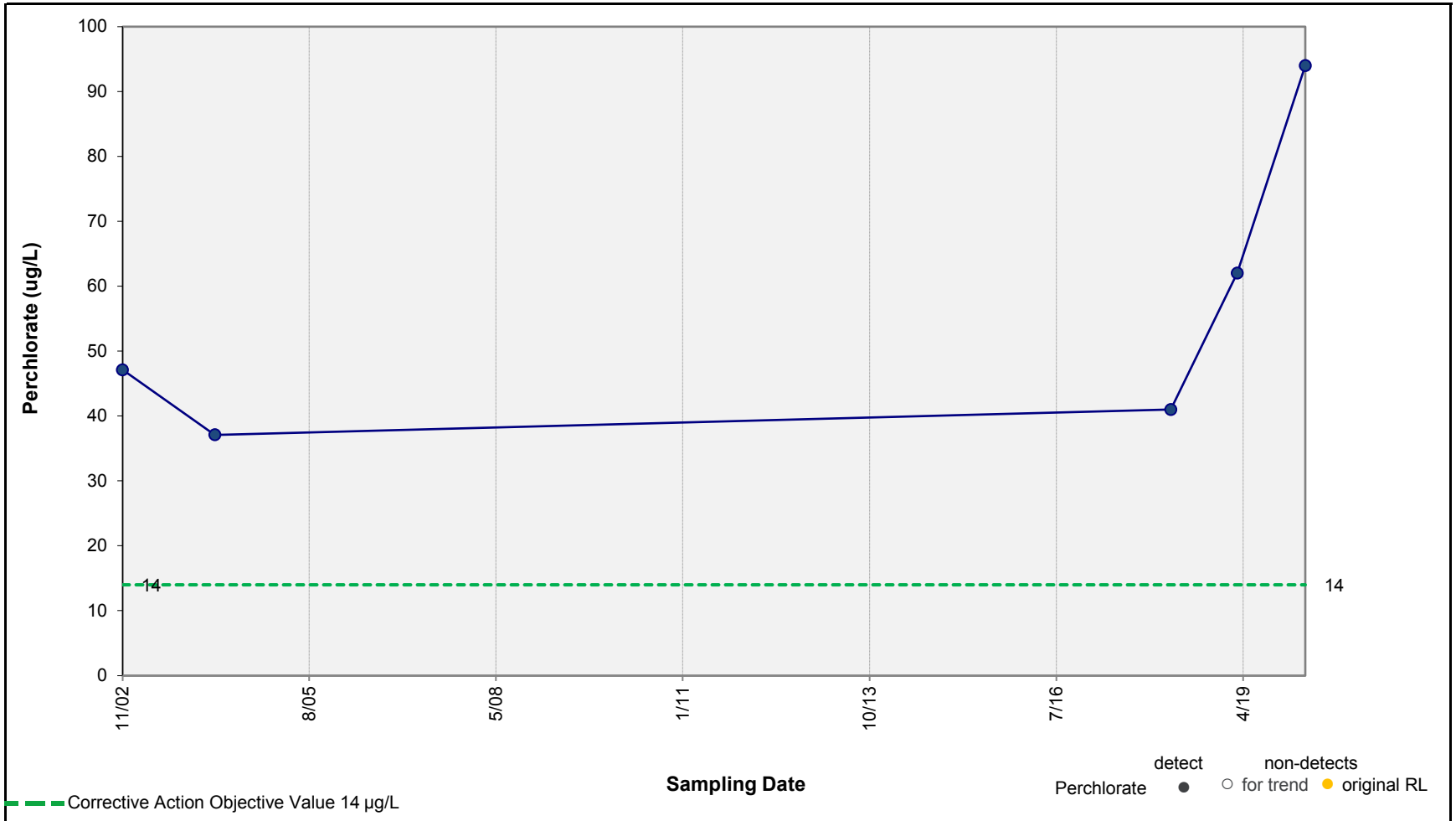
-- = insufficient data for calculating statistics (n < 4) or not available
FOD = frequency of detection (# detects / # samples)
mean = arithmetic mean
SD = standard deviation
NST = no significant trend
NT = no trend
DWN = downward trend
UP = upward trend
H_0 = null hypothesis: no significant trend (slope = 0)
H_a = alternative hypothesis: significant trend (slope ≠ 0)
95% CI = 95% confidence interval

Notes:

1. All analytical results are in µg/L. P-values are reported to 3 decimal places.
2. Trend results are presented when at least four samples and one detected value are available. Significance of trends evaluated at 95% confidence (alpha = 0.05).
3. Non-detects were assigned a common value less than the minimum detected value, equal to the minimum reporting limit (RL) in the dataset (USEPA, 2009). If the minimum RL was greater than the minimum detected value, then the minimum detect was assigned.
4. Statistically significant trend defined as having p-value ≤ 0.05, or 95% confidence.
5a. MK and Sen's Trend results for datasets with fewer than 8 samples may not be reliable and should be treated with caution.
5b. MK Trend results for datasets with an FOD <=20% may not be reliable and should be treated with caution.
5c. Sen's Trend results for datasets with an FOD <=50% may not be reliable and should be treated with caution.

Reference:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.117 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

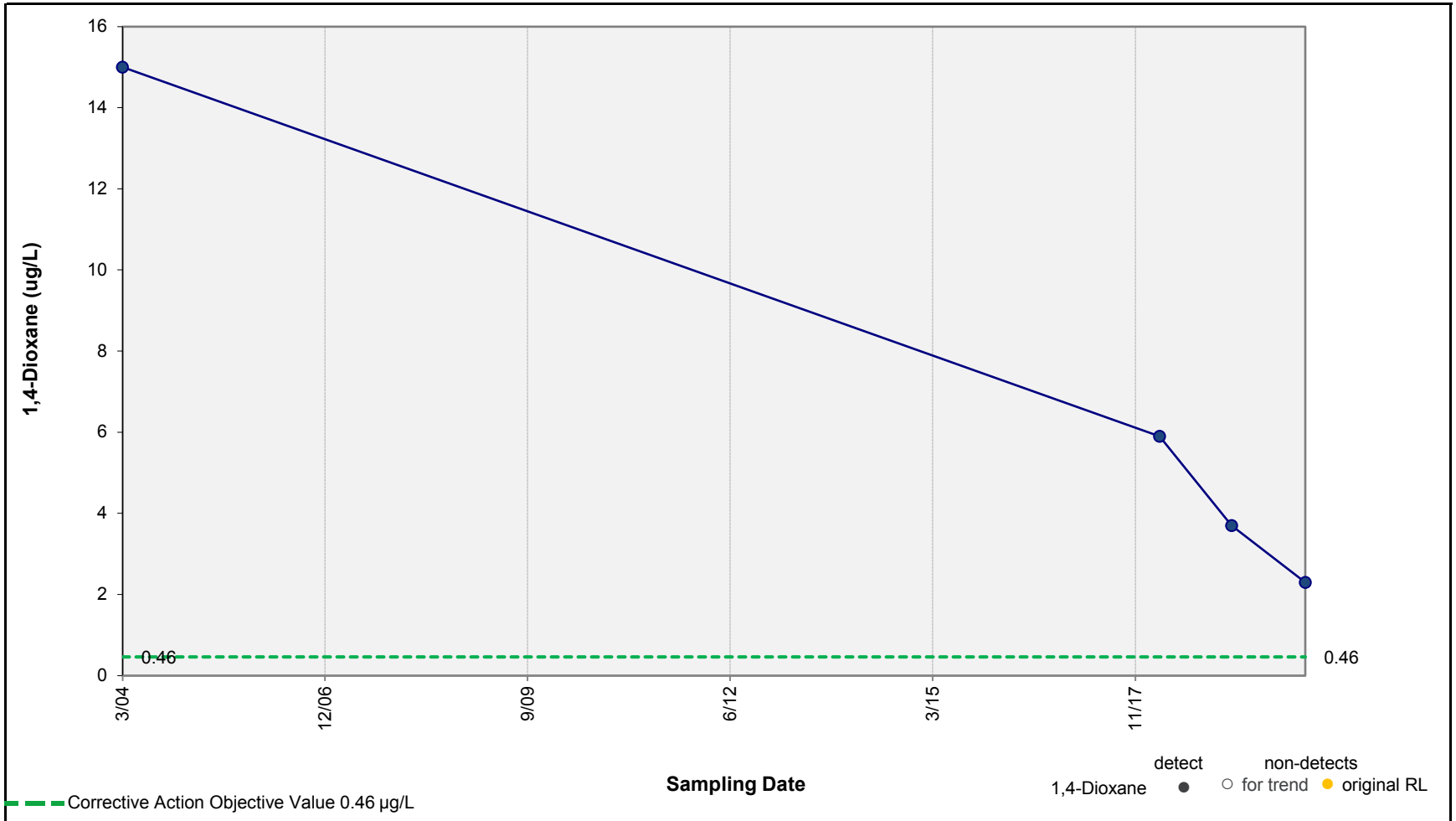
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-1B

Alliant Techsystems Operations LLC, Elkton, Maryland

A-Area SWMU

Figure L-1



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

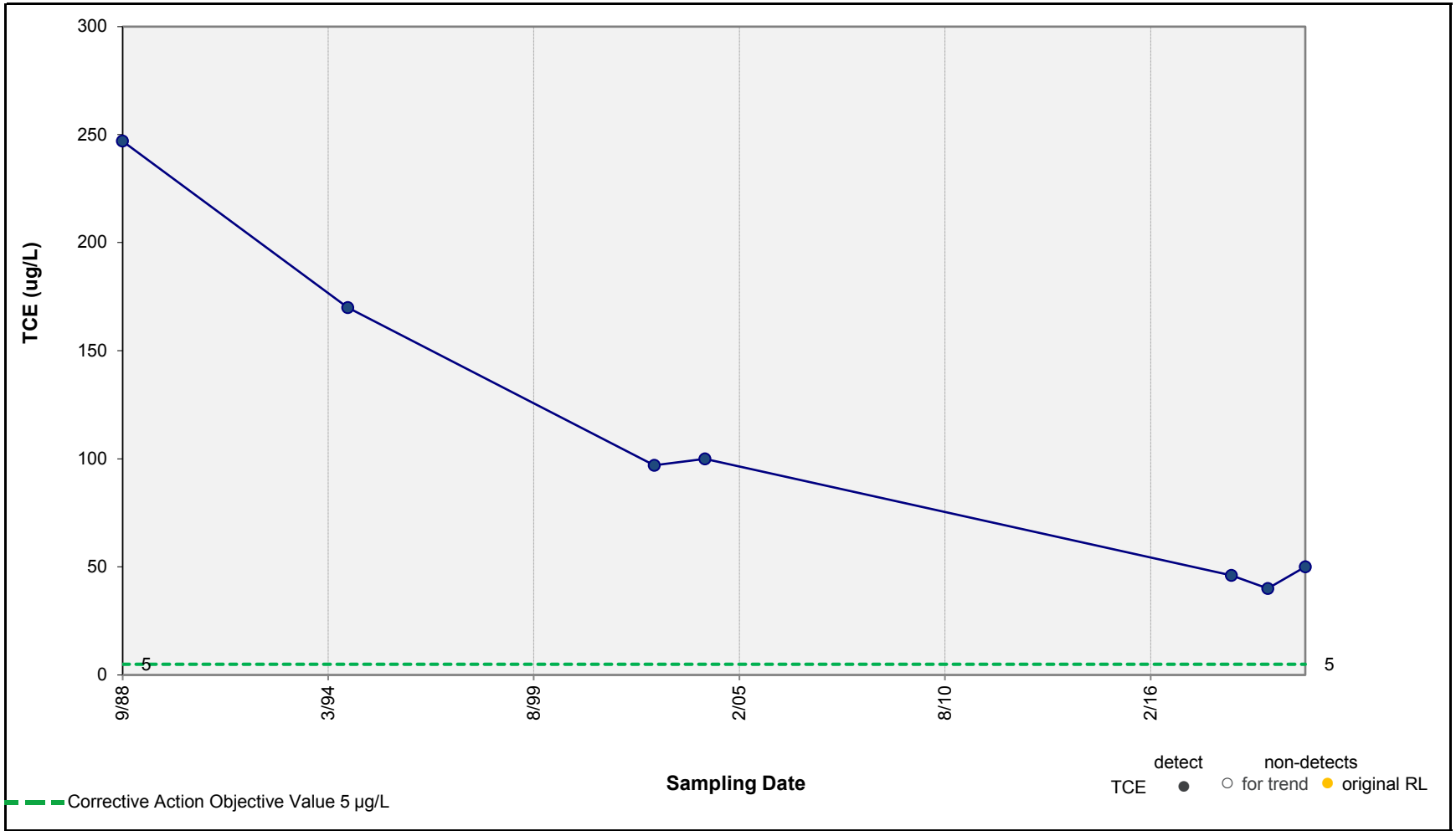
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-1B

Alliant Techsystems Operations LLC, Elkton, Maryland

A-Area SWMU

Figure L-2



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.015 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.4E-02 ug/L Per Day

95% Confidence Interval = -2.5E-02 to -8.5E-03 ug/L Per Day

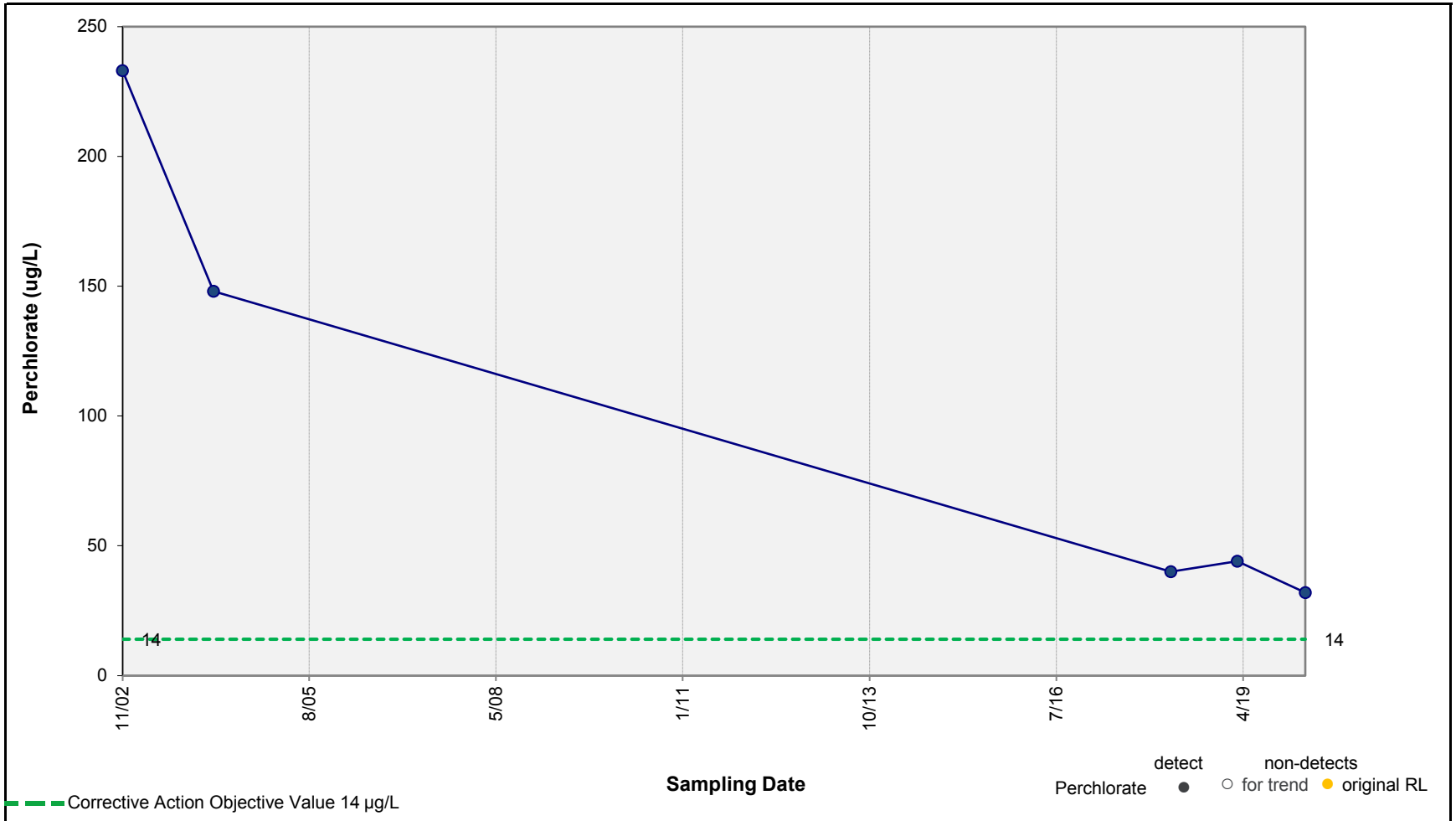
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-1B

Alliant Techsystems Operations LLC, Elkton, Maryland

A-Area SWMU

Figure L-3



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

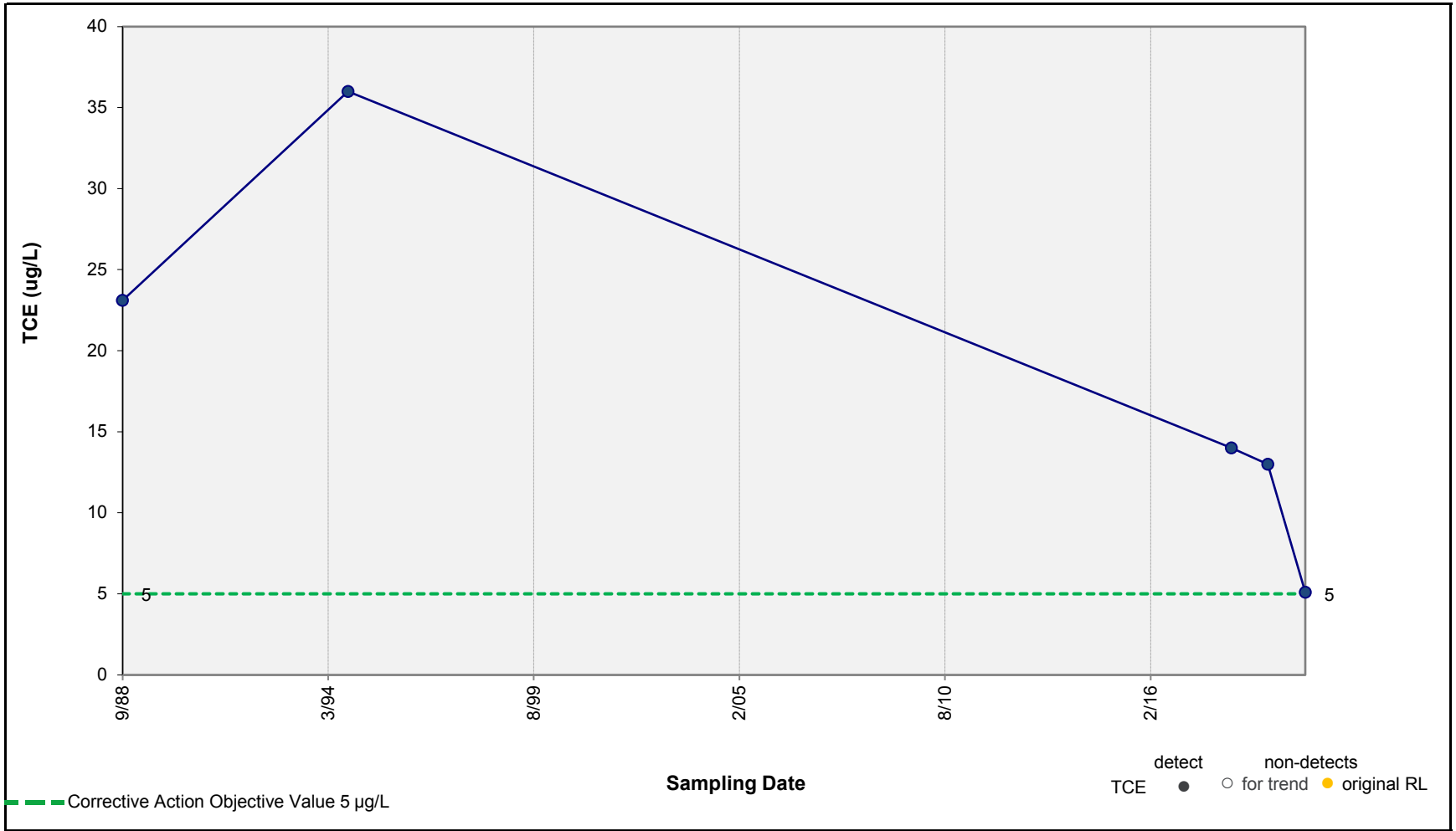
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-15M

Alliant Techsystems Operations LLC, Elkton, Maryland

A-Area SWMU

Figure L-4



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

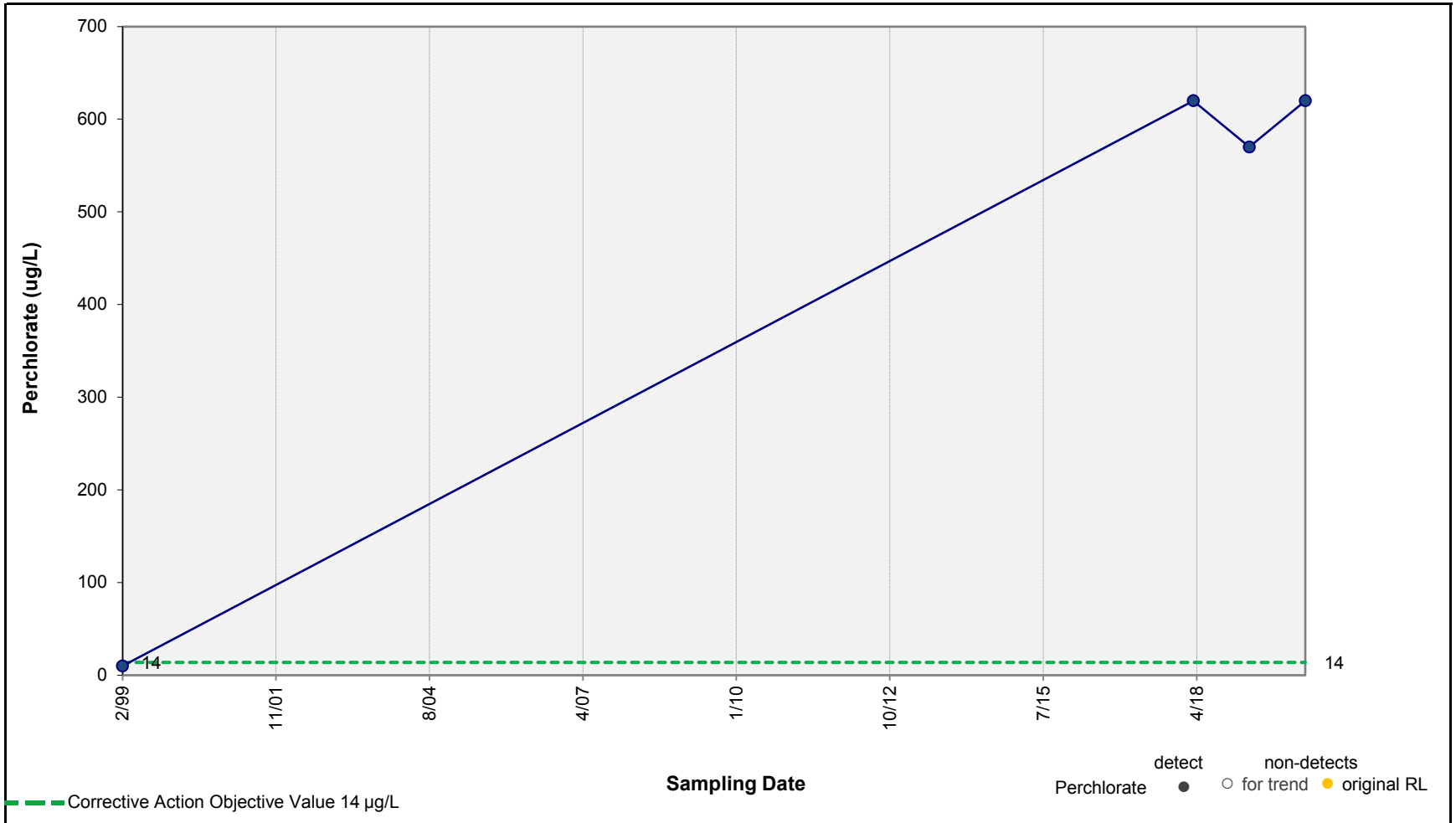
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-4B

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-5



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.271 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

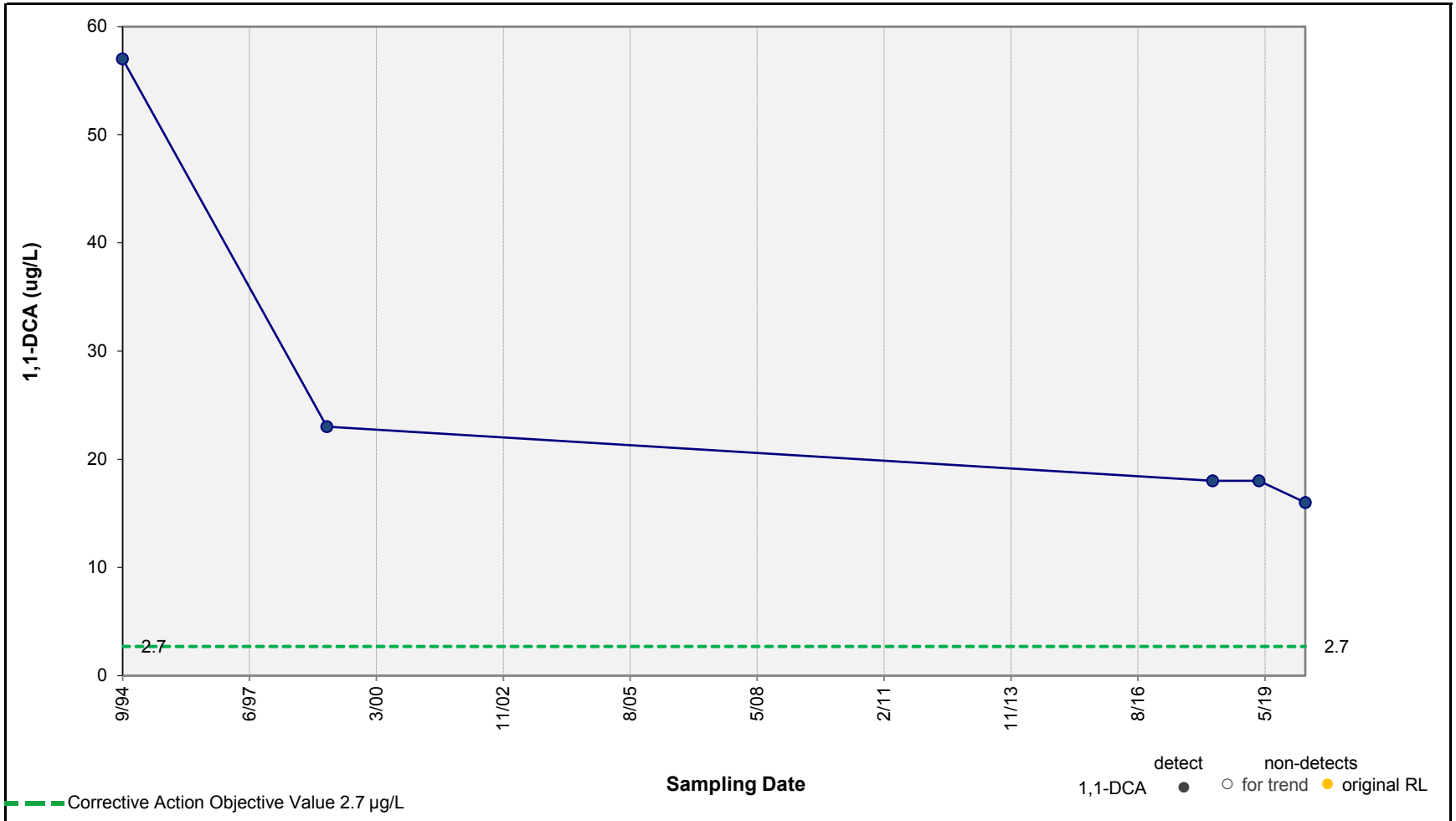
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-9M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-6



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.025 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -3.5E-03 ug/L Per Day

95% Confidence Interval = -1.9E-02 to -6.9E-04 ug/L Per Day

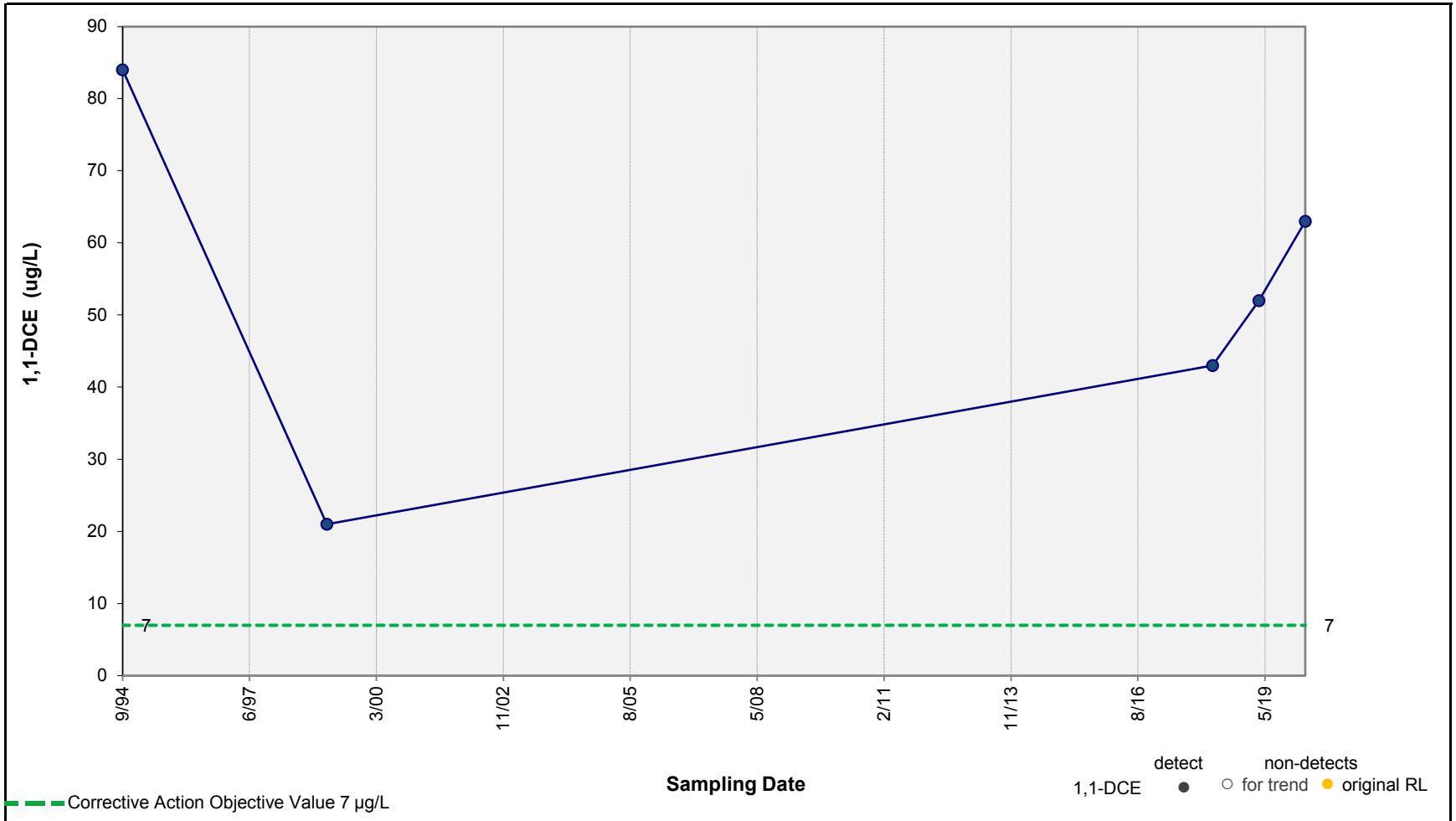
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-9M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-7



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.408 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

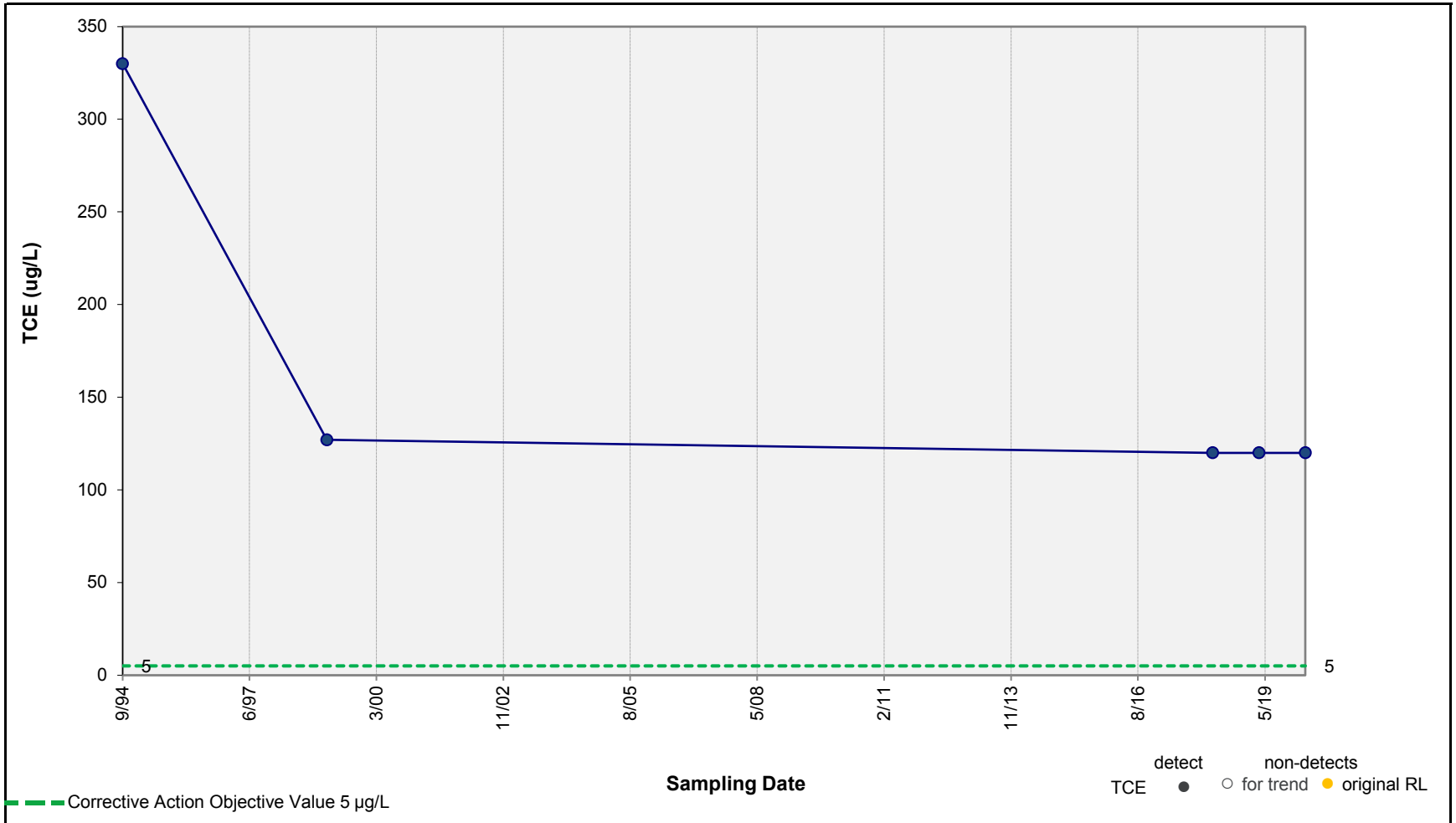
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-9M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-8



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.080 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = -9.8E-04 ug/L Per Day

95% Confidence Interval = -7.9E-02 to 0.0E+00 ug/L Per Day

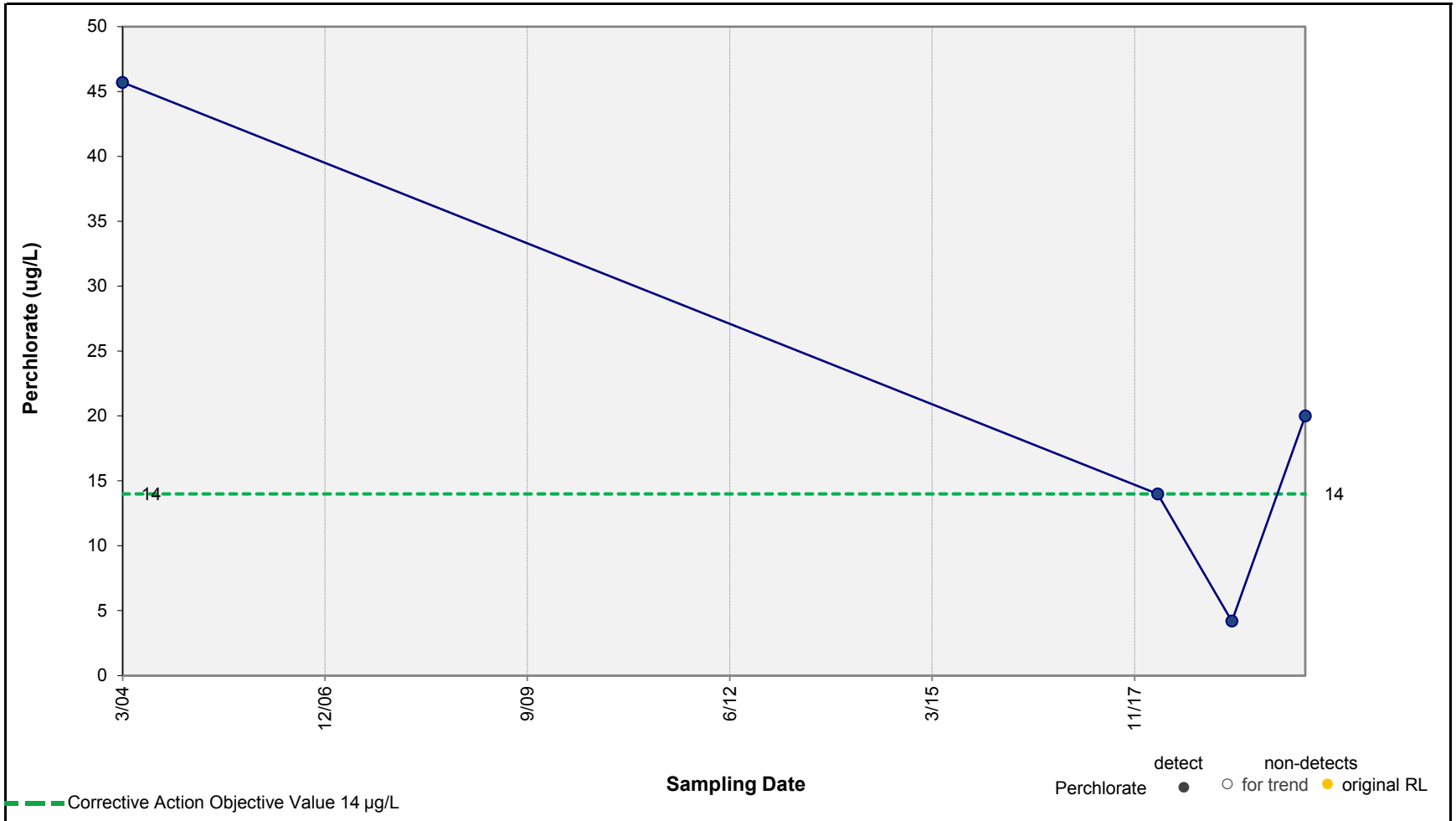
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-9M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-9



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

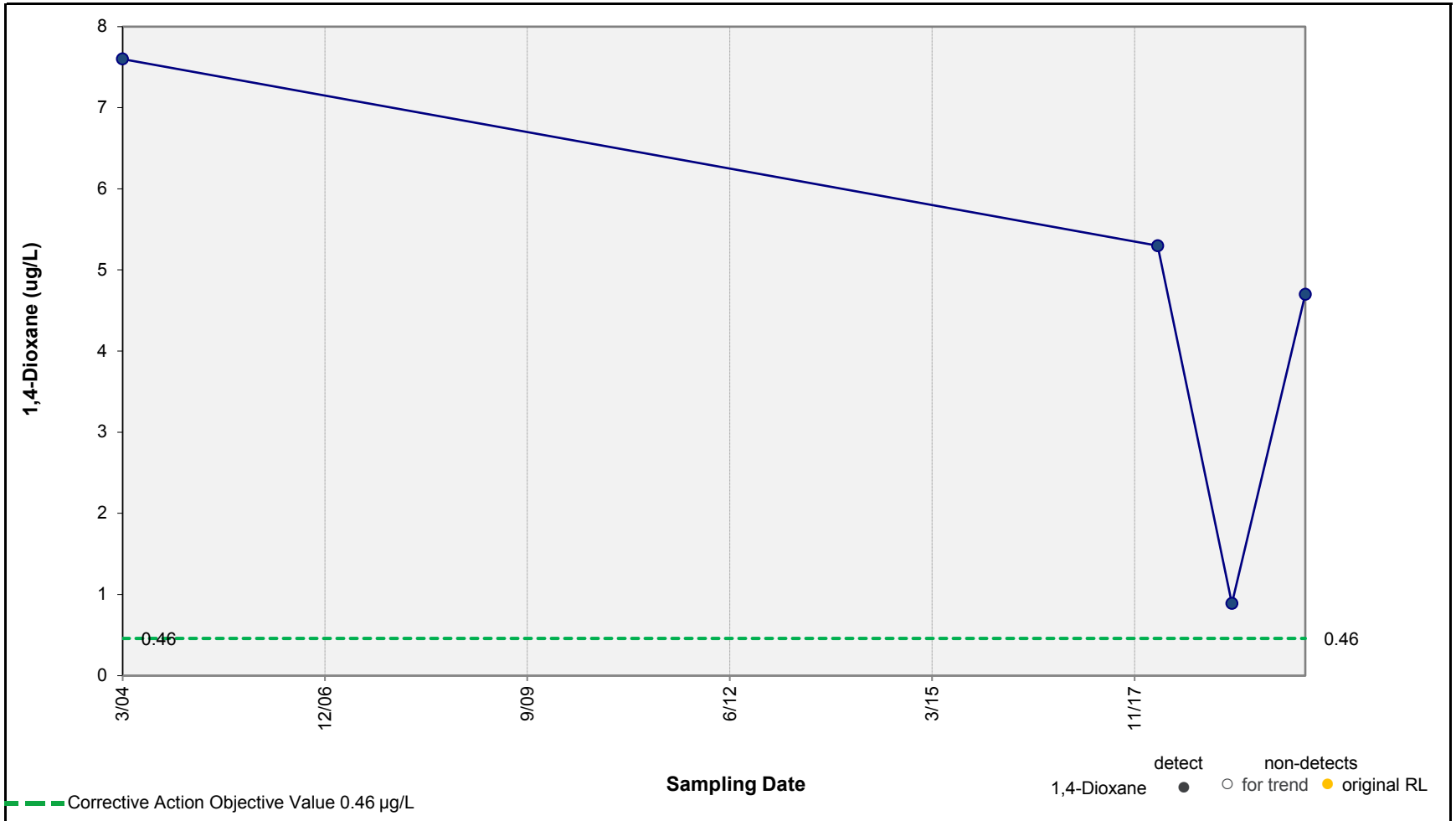
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-10S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-10



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.167 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

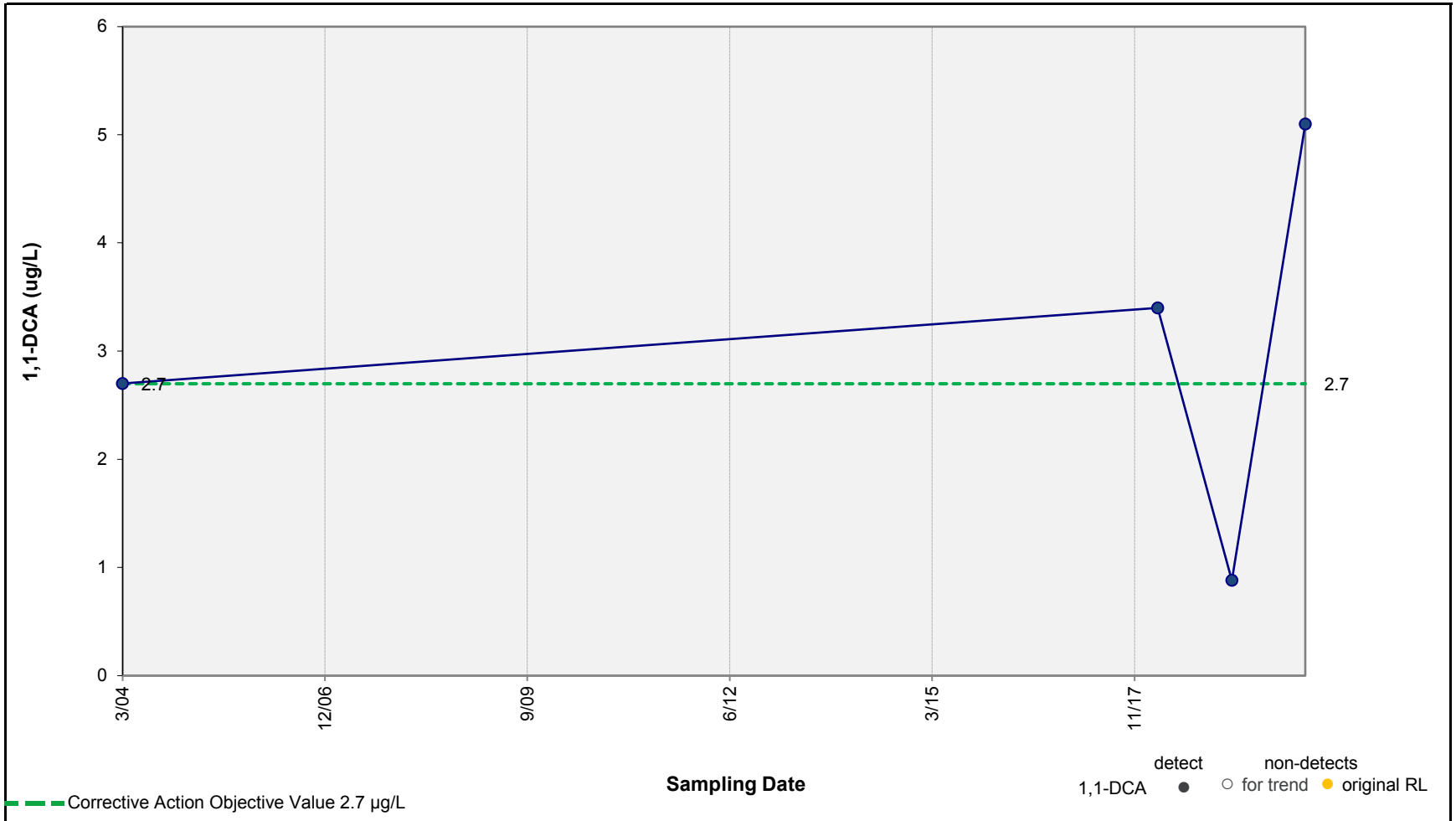
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-10S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-11



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

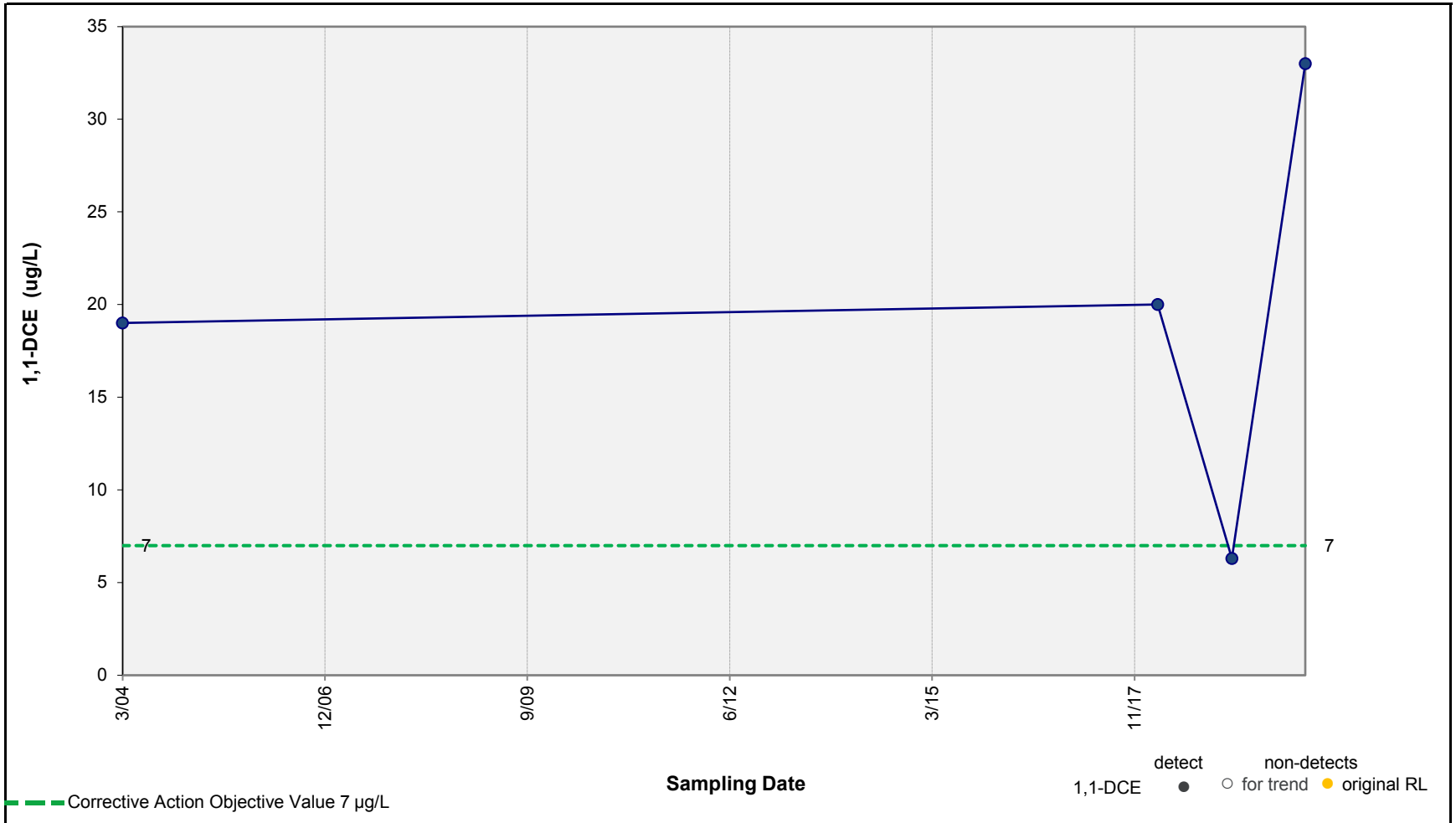
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-10S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-12



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

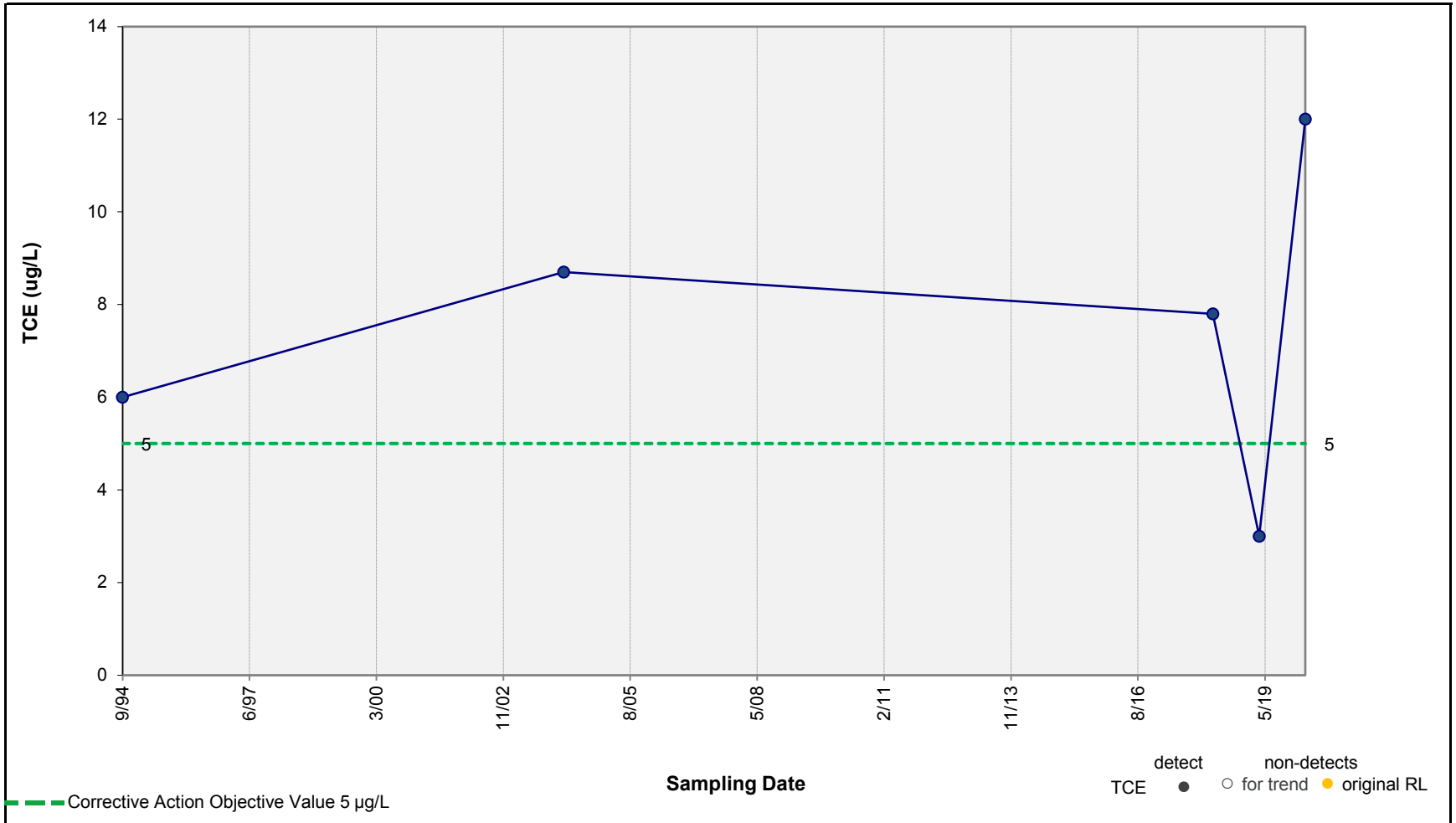
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-10S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-13



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.408 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

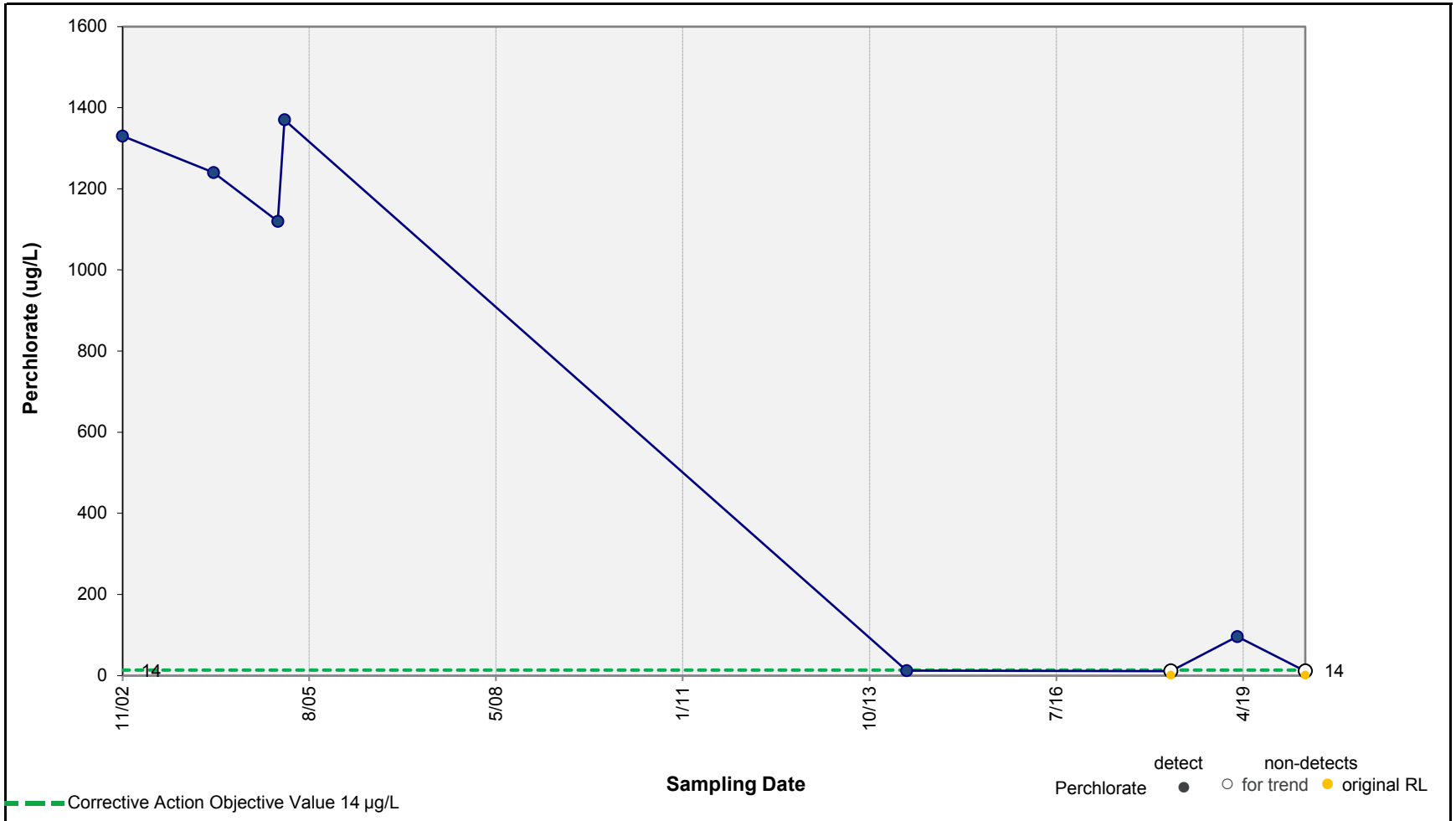
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-10S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-14



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.024 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.1E-01 ug/L Per Day

95% Confidence Interval = -2.8E-01 to -3.0E-04 ug/L Per Day

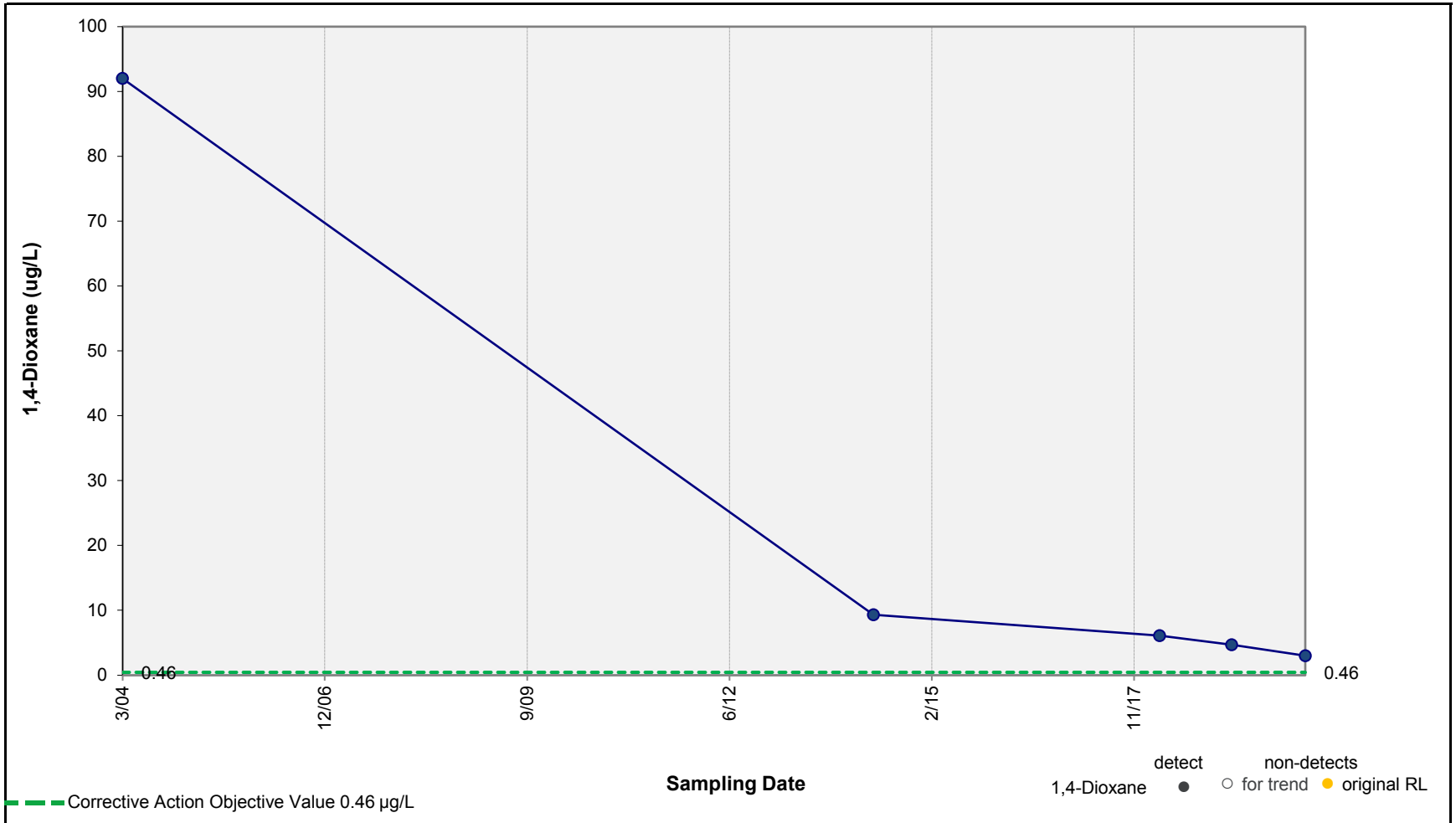
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-15



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

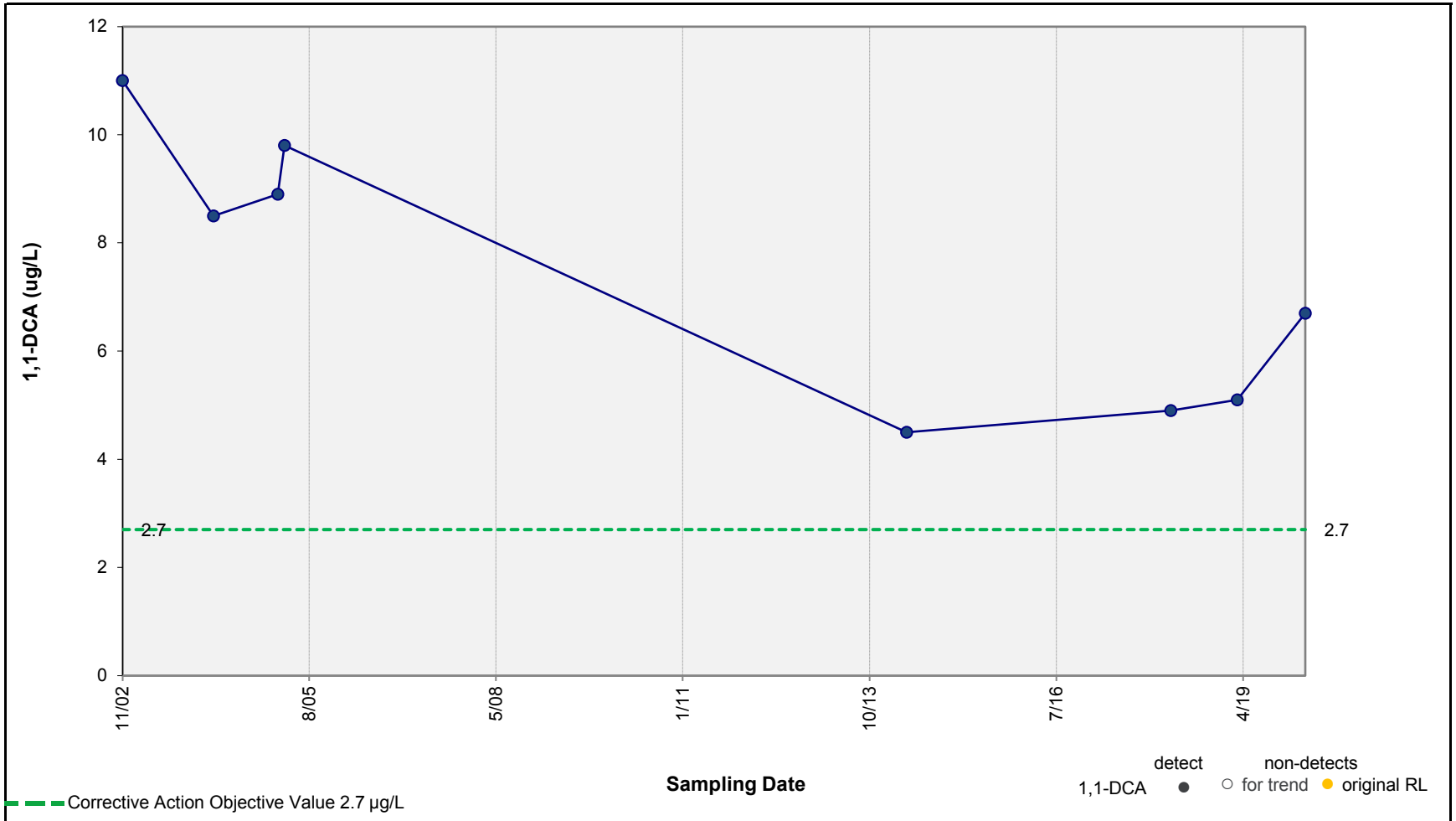
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-16



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.138 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -6.9E-04 ug/L Per Day

95% Confidence Interval = -1.3E-03 to 5.4E-04 ug/L Per Day

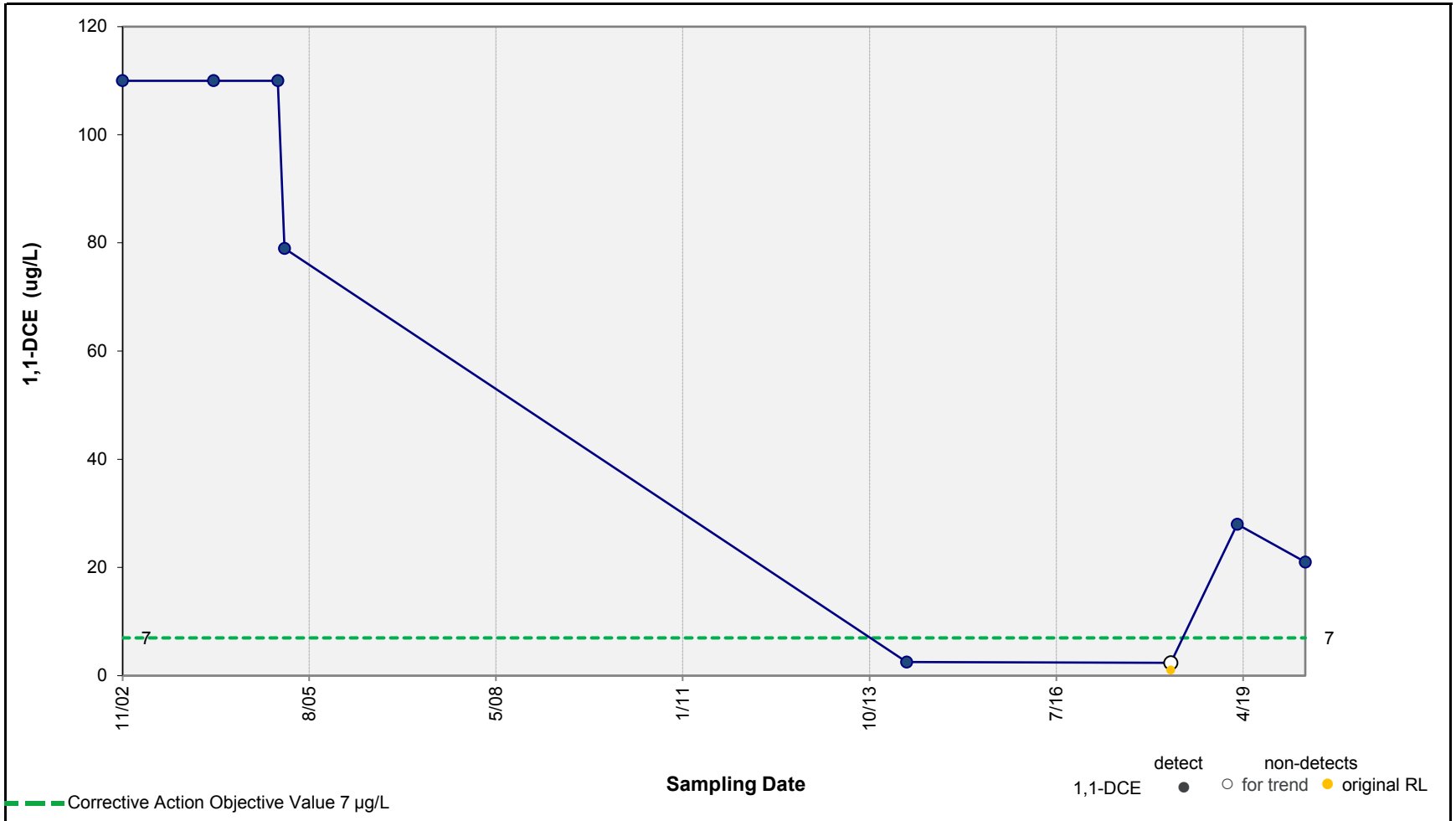
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-17



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.024 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.6E-02 ug/L Per Day

95% Confidence Interval = -2.5E-02 to -2.7E-05 ug/L Per Day

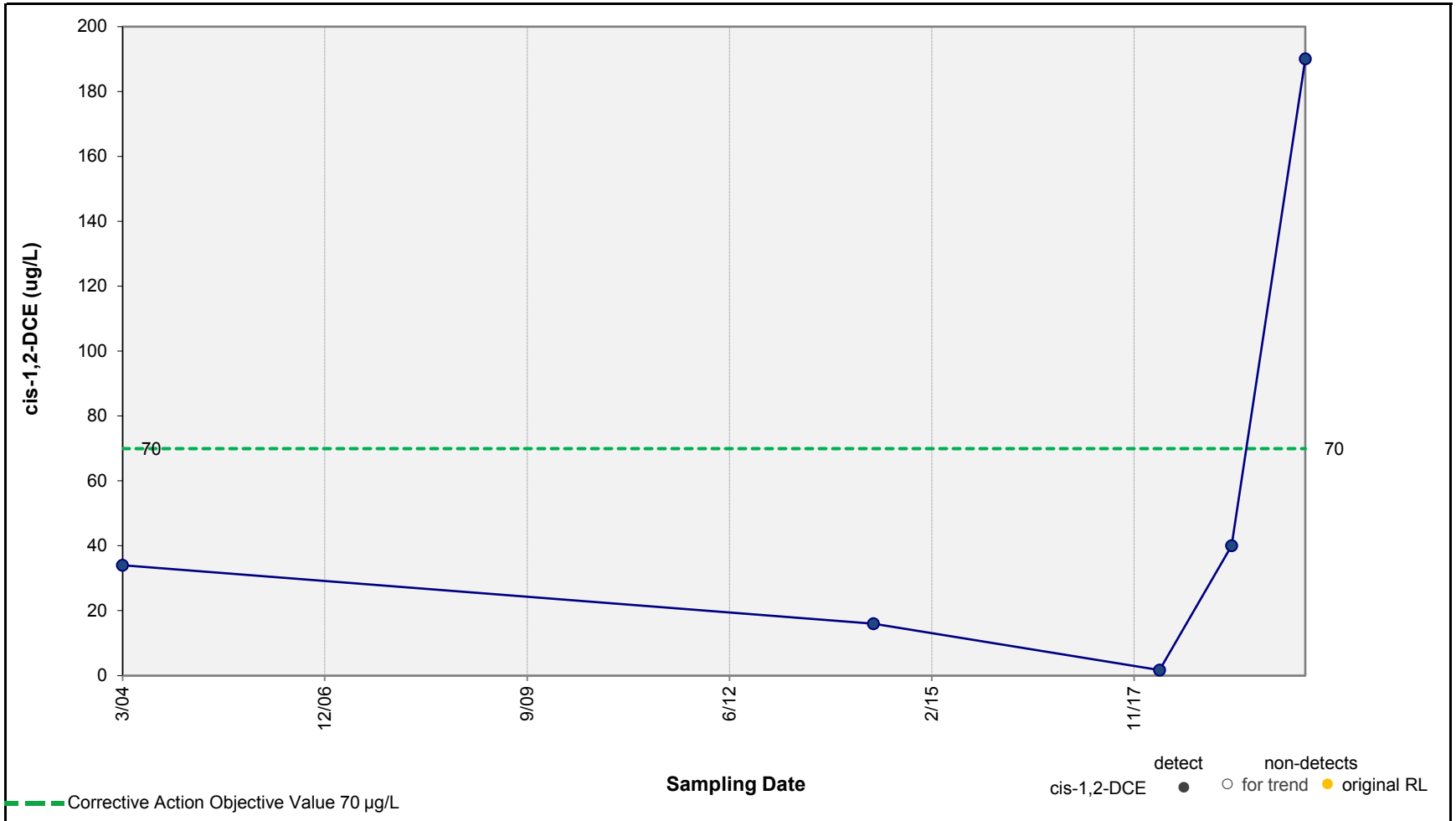
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-18



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.242 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

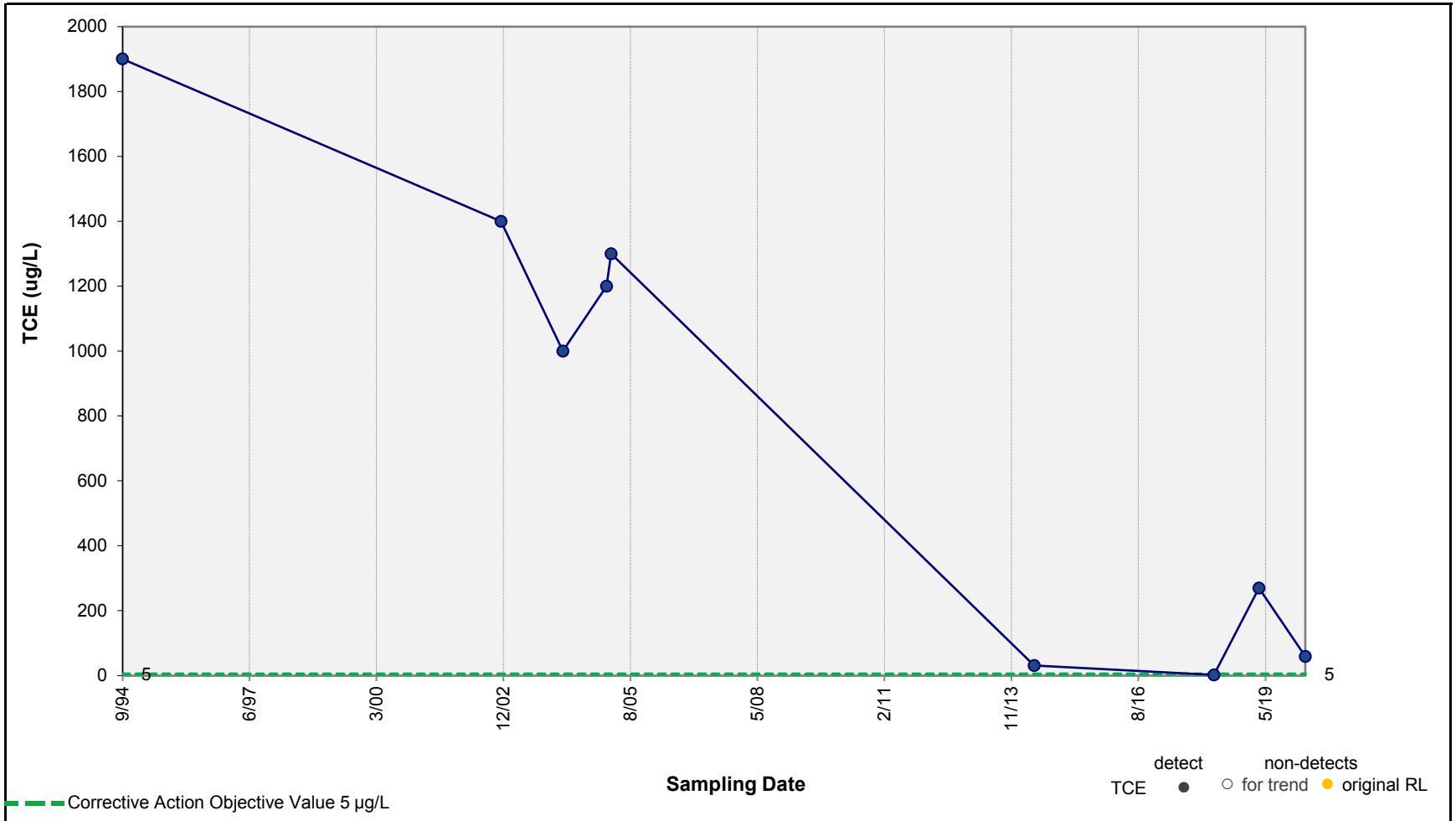
ARCADIS

Concentration vs. Time Plot – cis-1,2-DCE in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-19



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.012 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.0E-01 ug/L Per Day

95% Confidence Interval = -2.6E-01 to -1.3E-01 ug/L Per Day

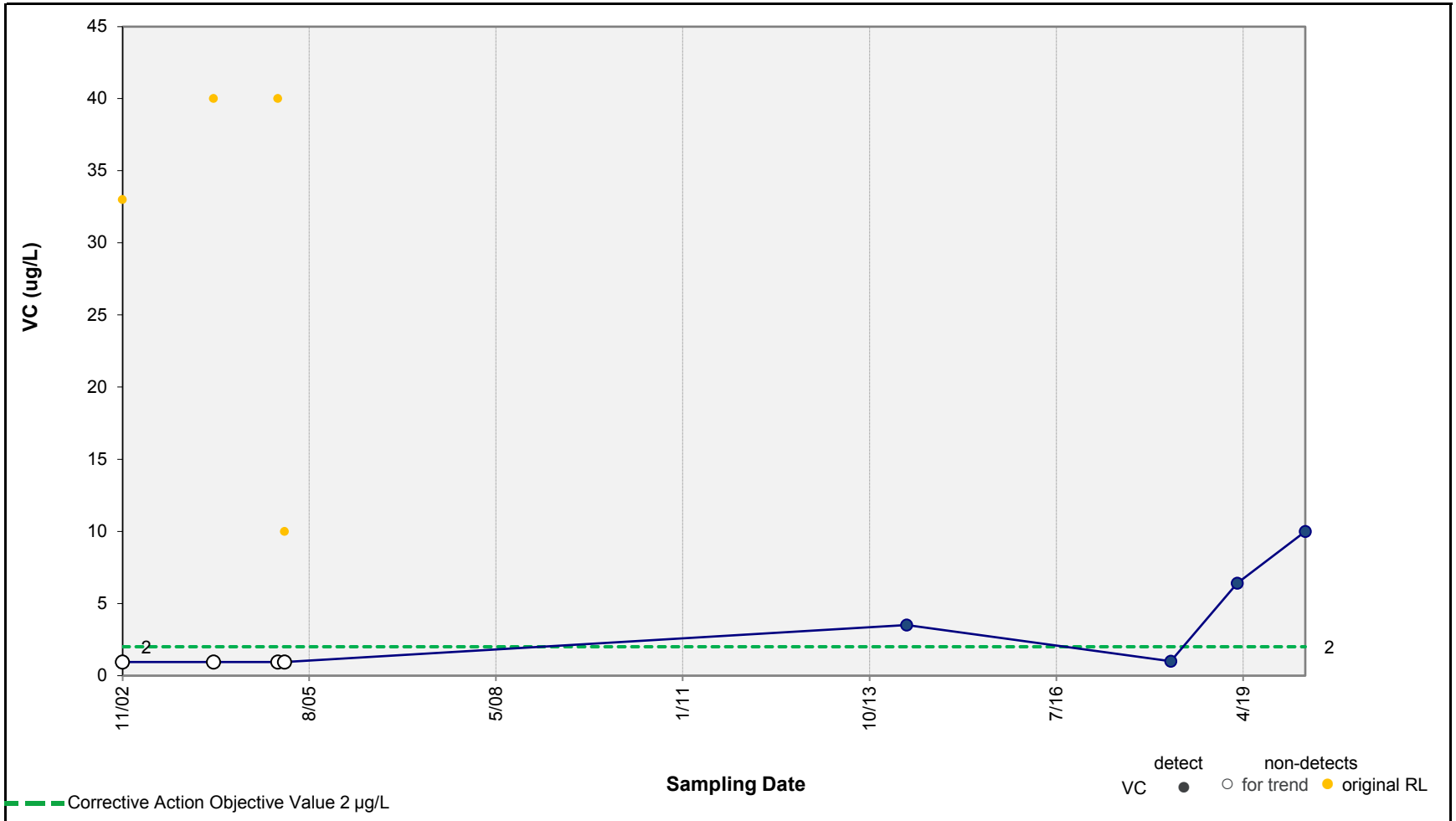
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-20



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.007 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = 7.6E-04 ug/L Per Day

95% Confidence Interval = 0.0E+00 to 1.6E-03 ug/L Per Day

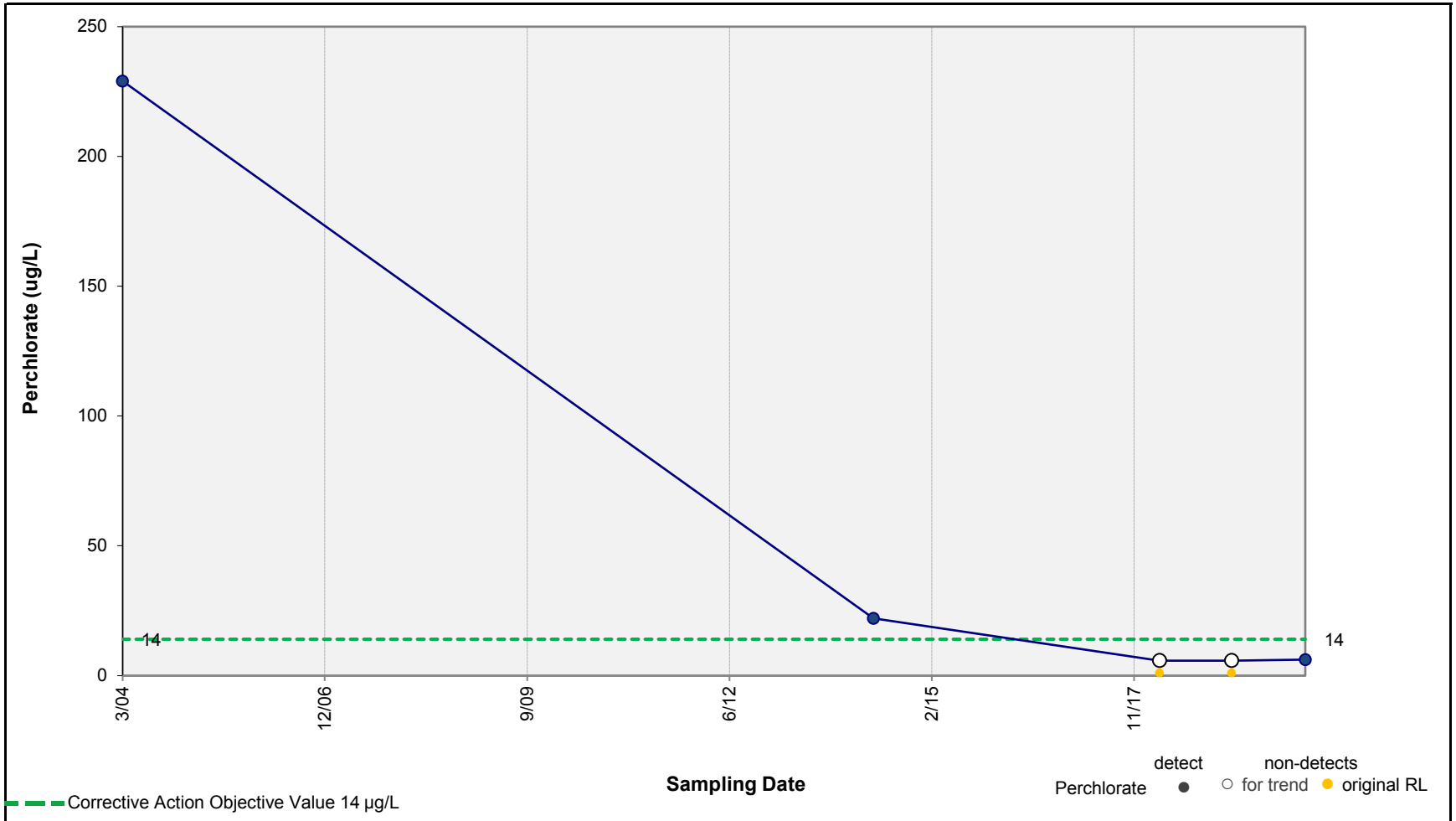
ARCADIS

Concentration vs. Time Plot – VC in Well GM-14M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-21



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.180 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.0E-02 ug/L Per Day

95% Confidence Interval = -5.4E-02 to 3.7E-04 ug/L Per Day

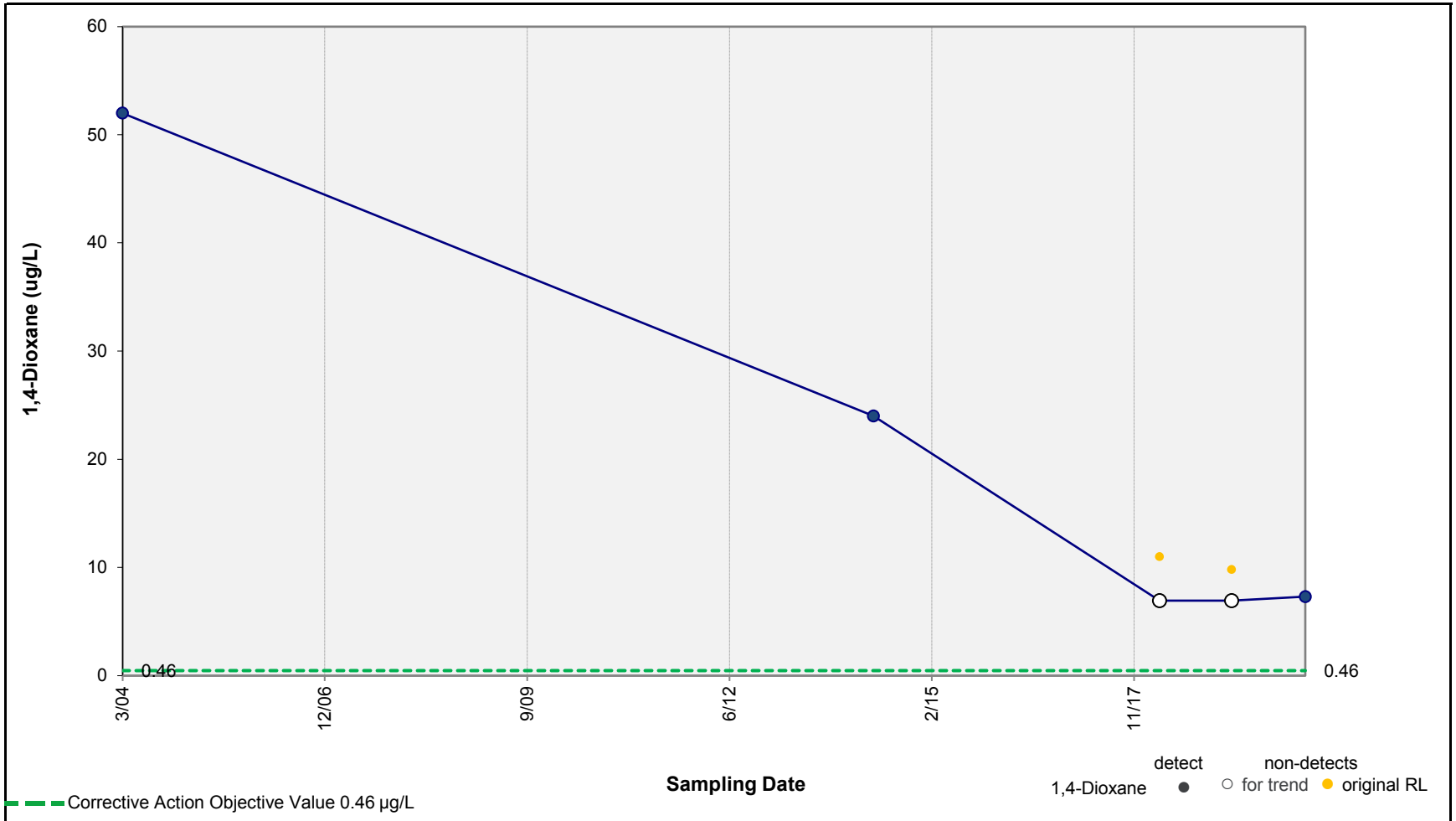
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-22



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.180 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -7.7E-03 ug/L Per Day

95% Confidence Interval = -1.2E-02 to 4.5E-04 ug/L Per Day

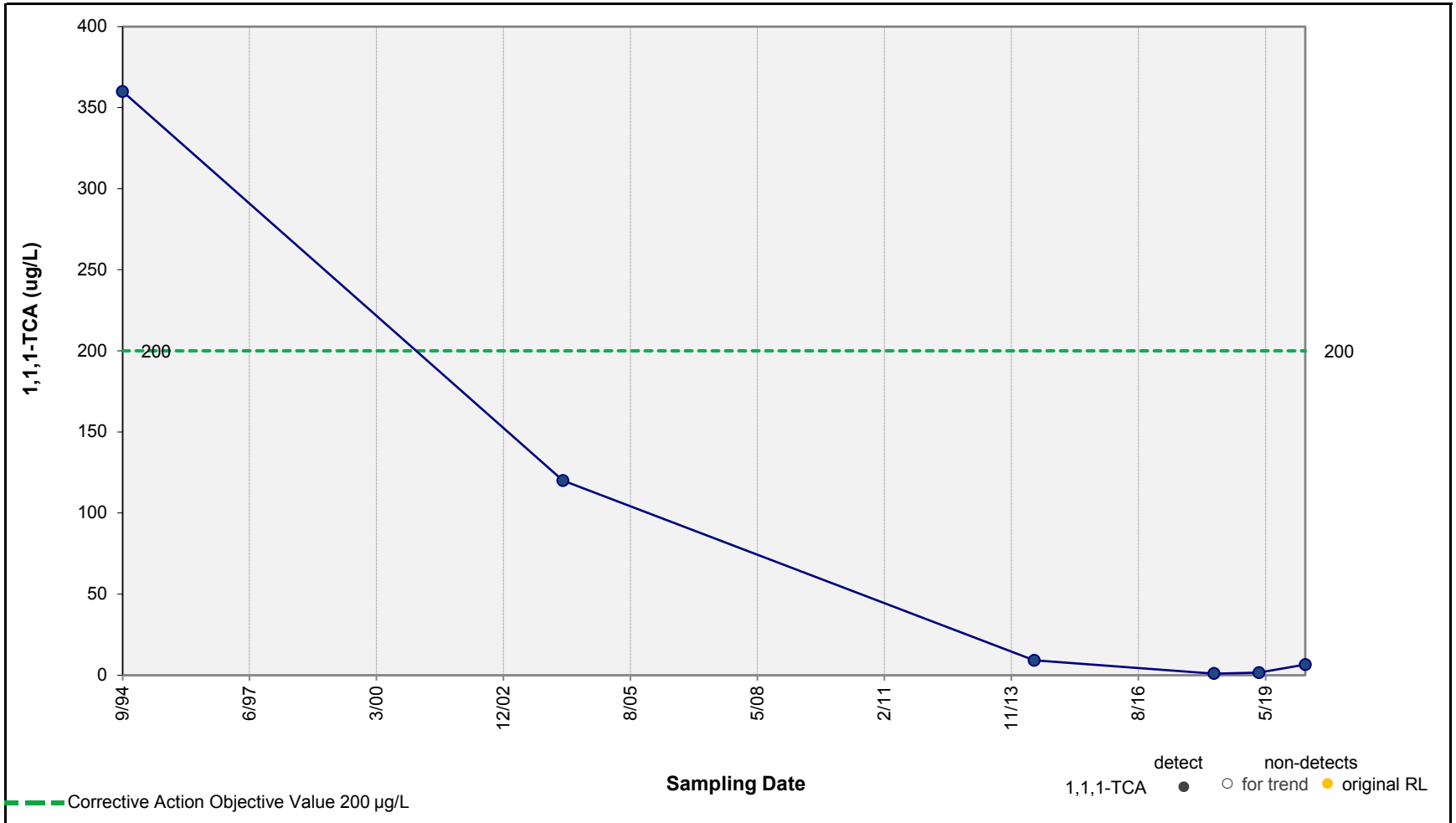
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-23



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.068 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.2E-02 ug/L Per Day

95% Confidence Interval = -4.7E-02 to 8.8E-04 ug/L Per Day

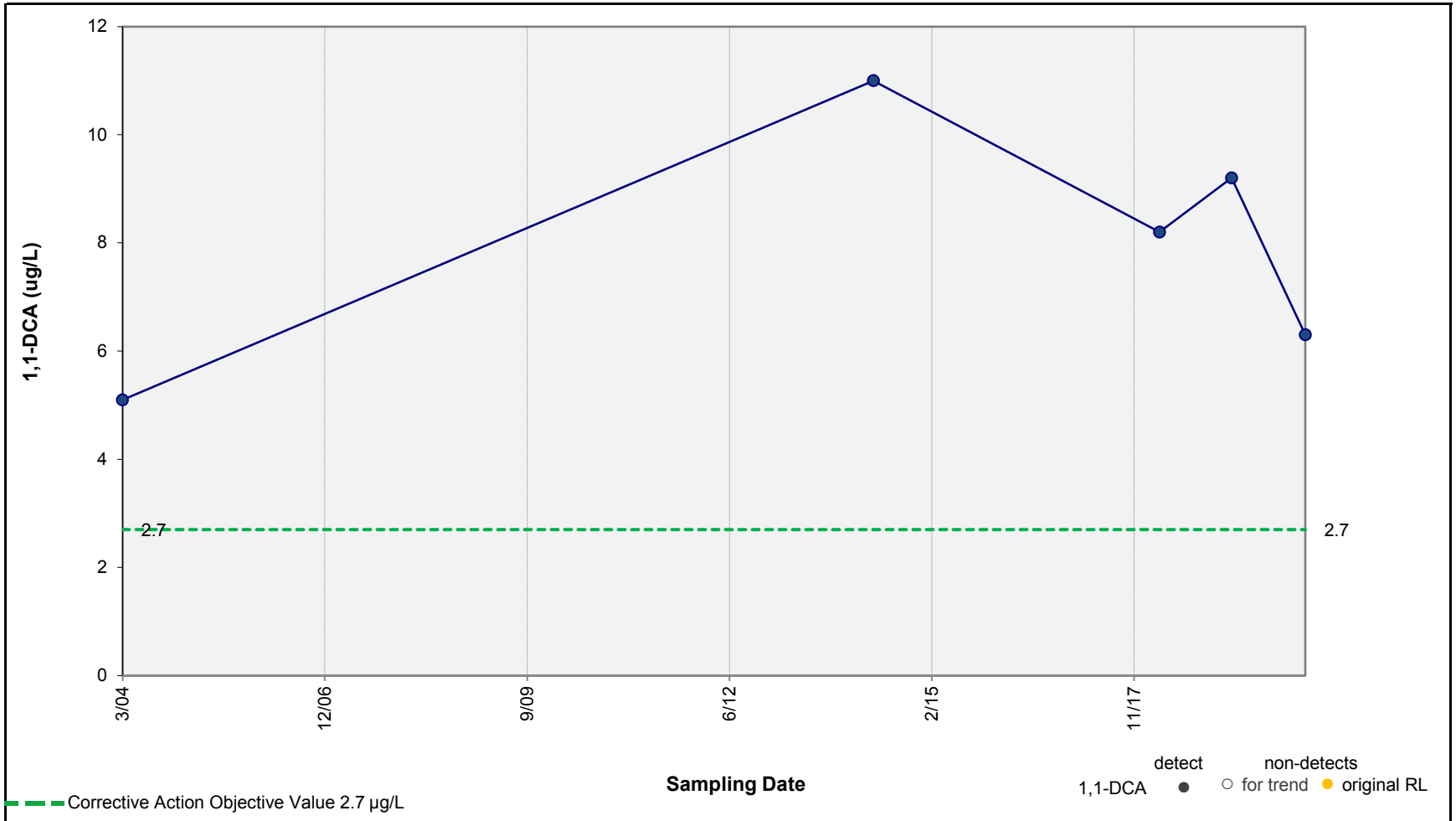
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-24



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.592 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

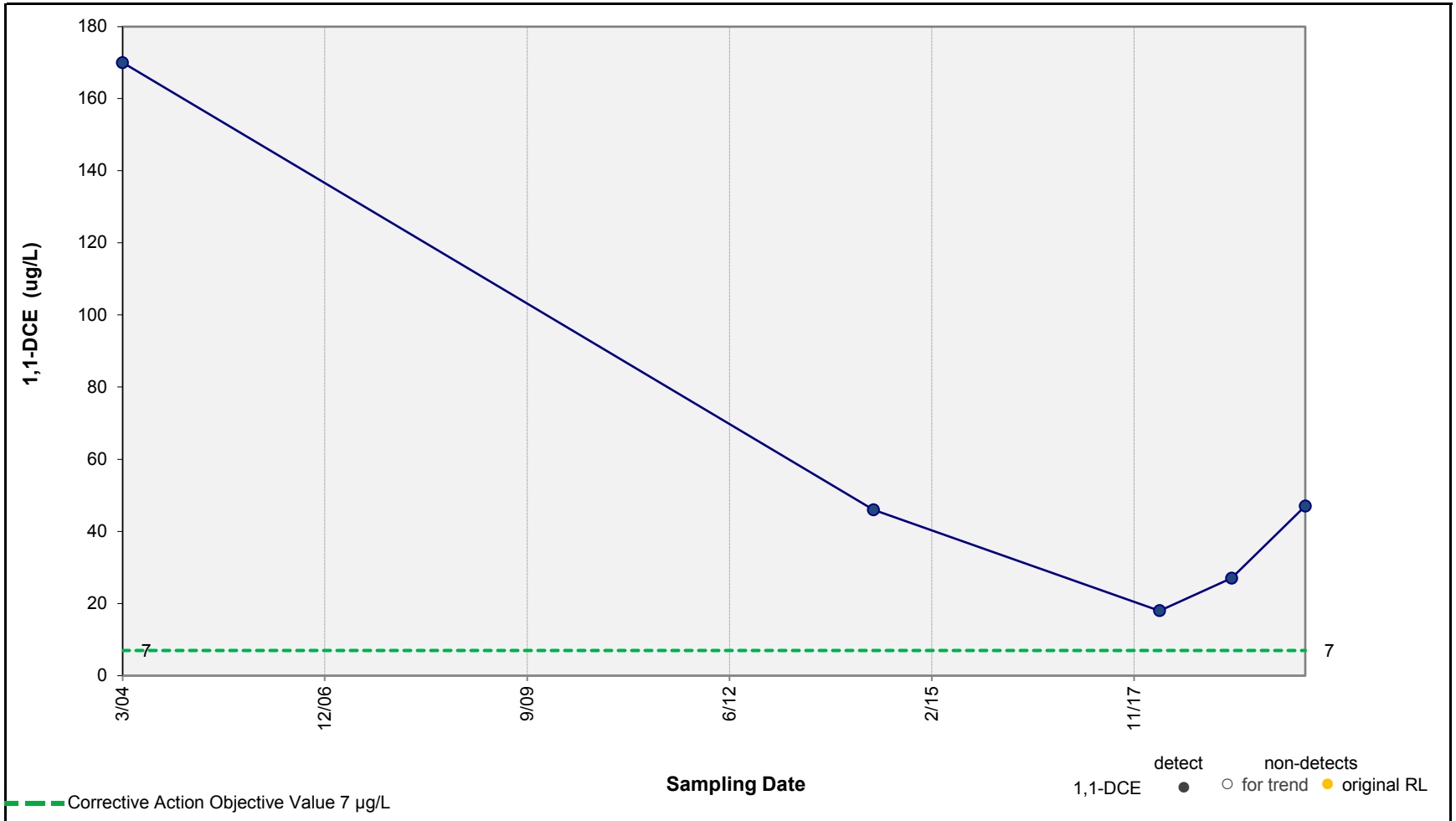
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-25



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.408 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

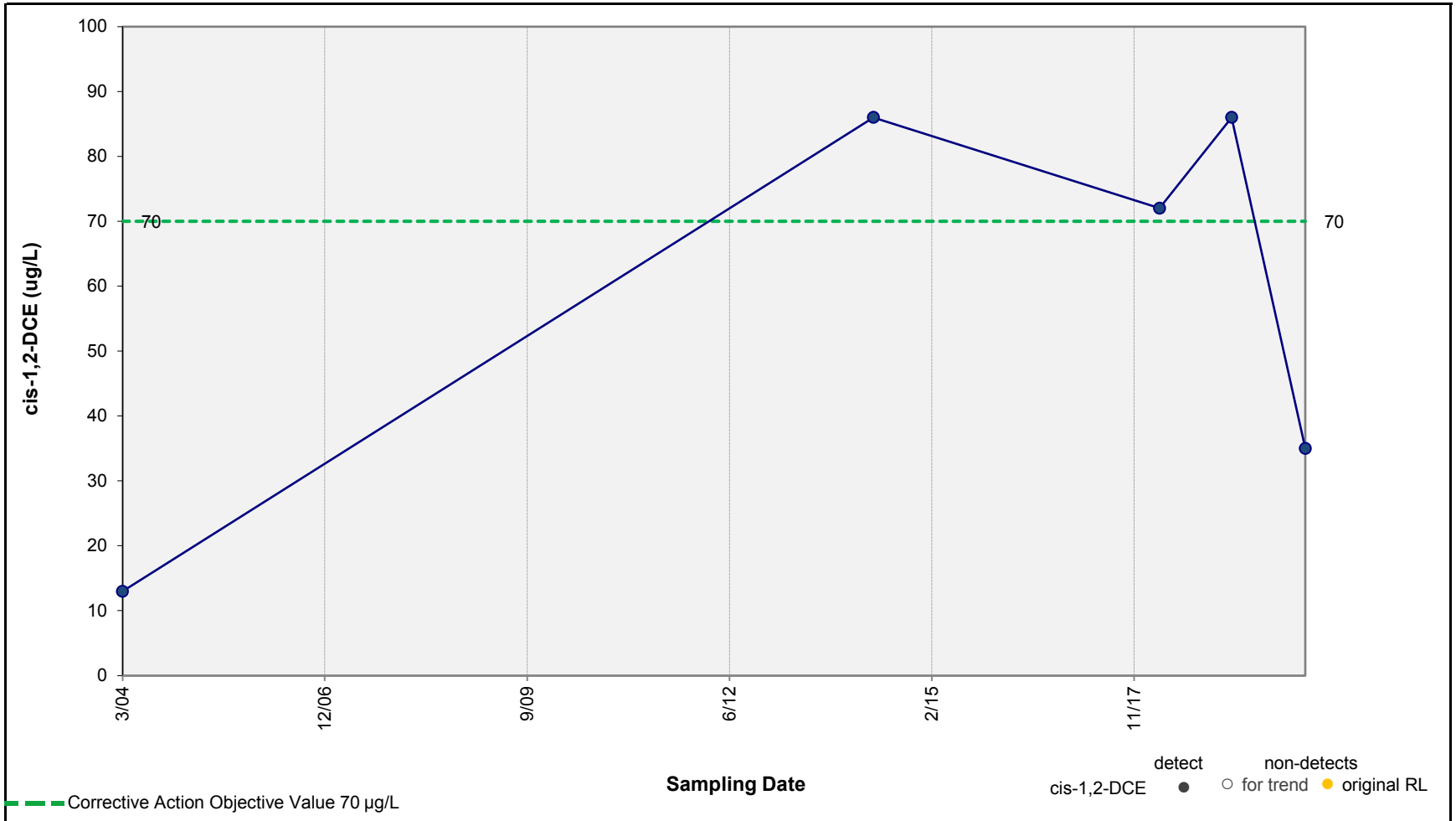
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-26



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.9E-03 ug/L Per Day

95% Confidence Interval = -1.3E-01 to 1.9E-02 ug/L Per Day

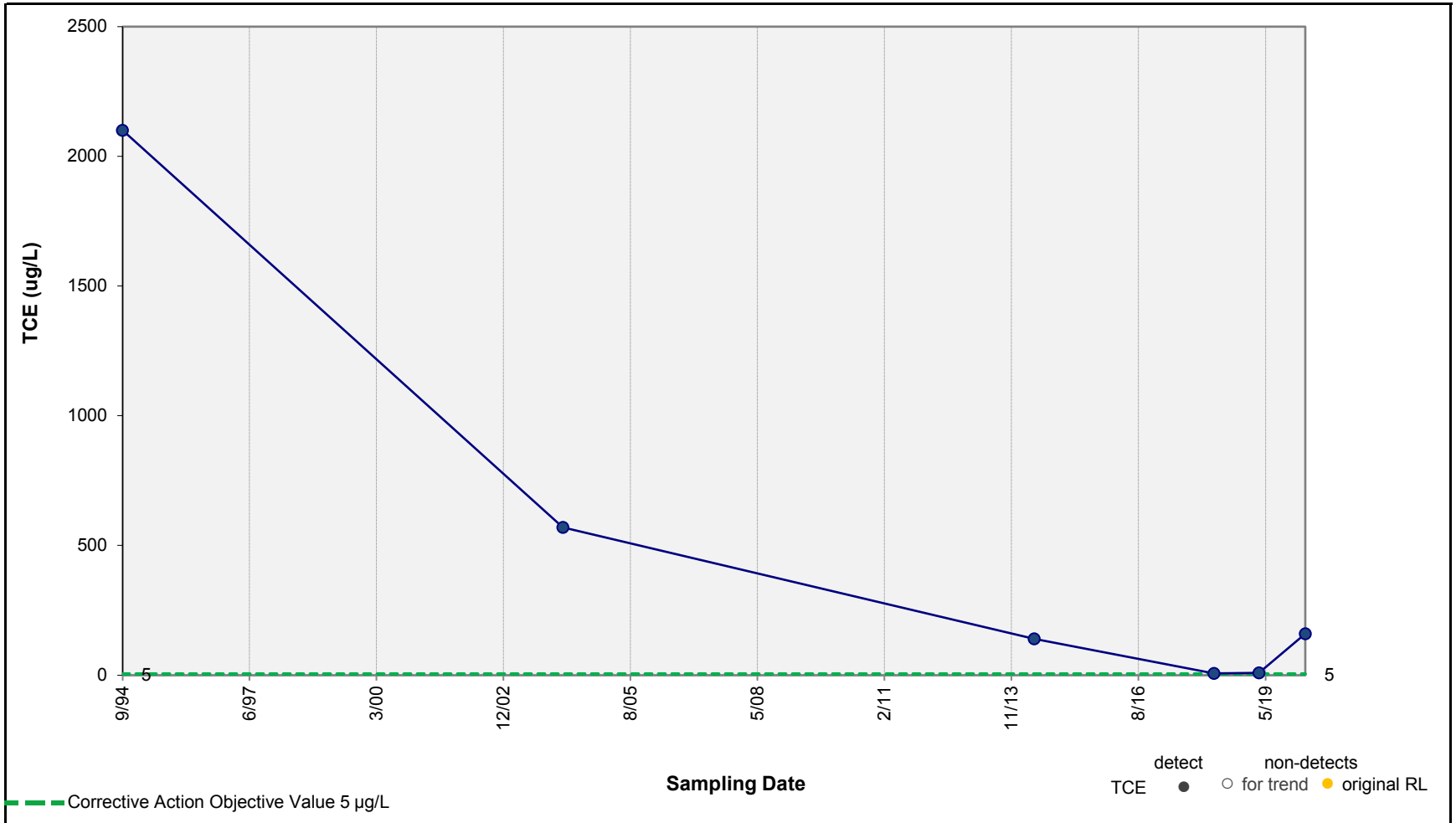
ARCADIS

Concentration vs. Time Plot – cis-1,2-DCE in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-27



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.136 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.0E-01 ug/L Per Day

95% Confidence Interval = -2.6E-01 to 7.7E-03 ug/L Per Day

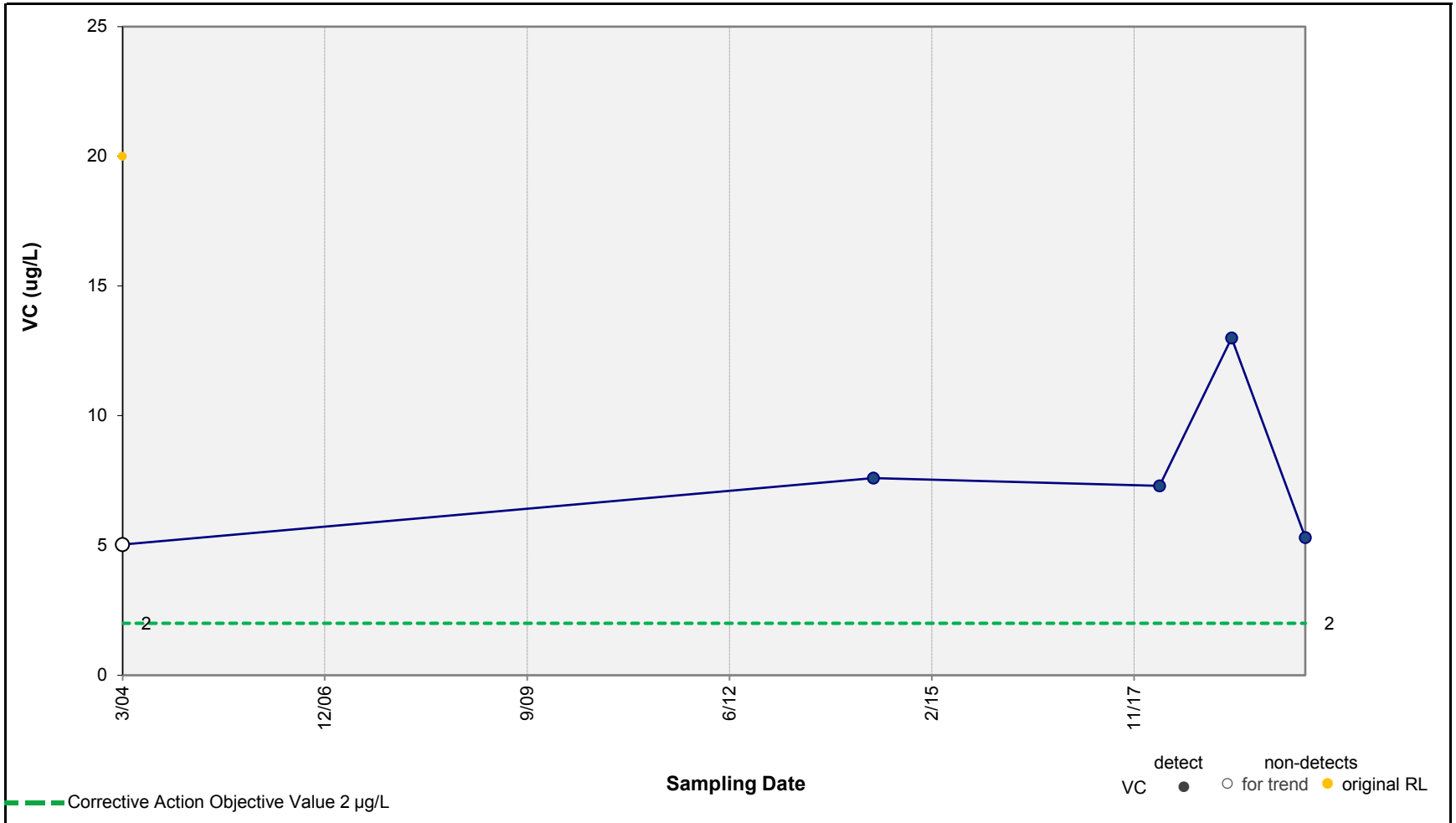
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-28



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.408 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

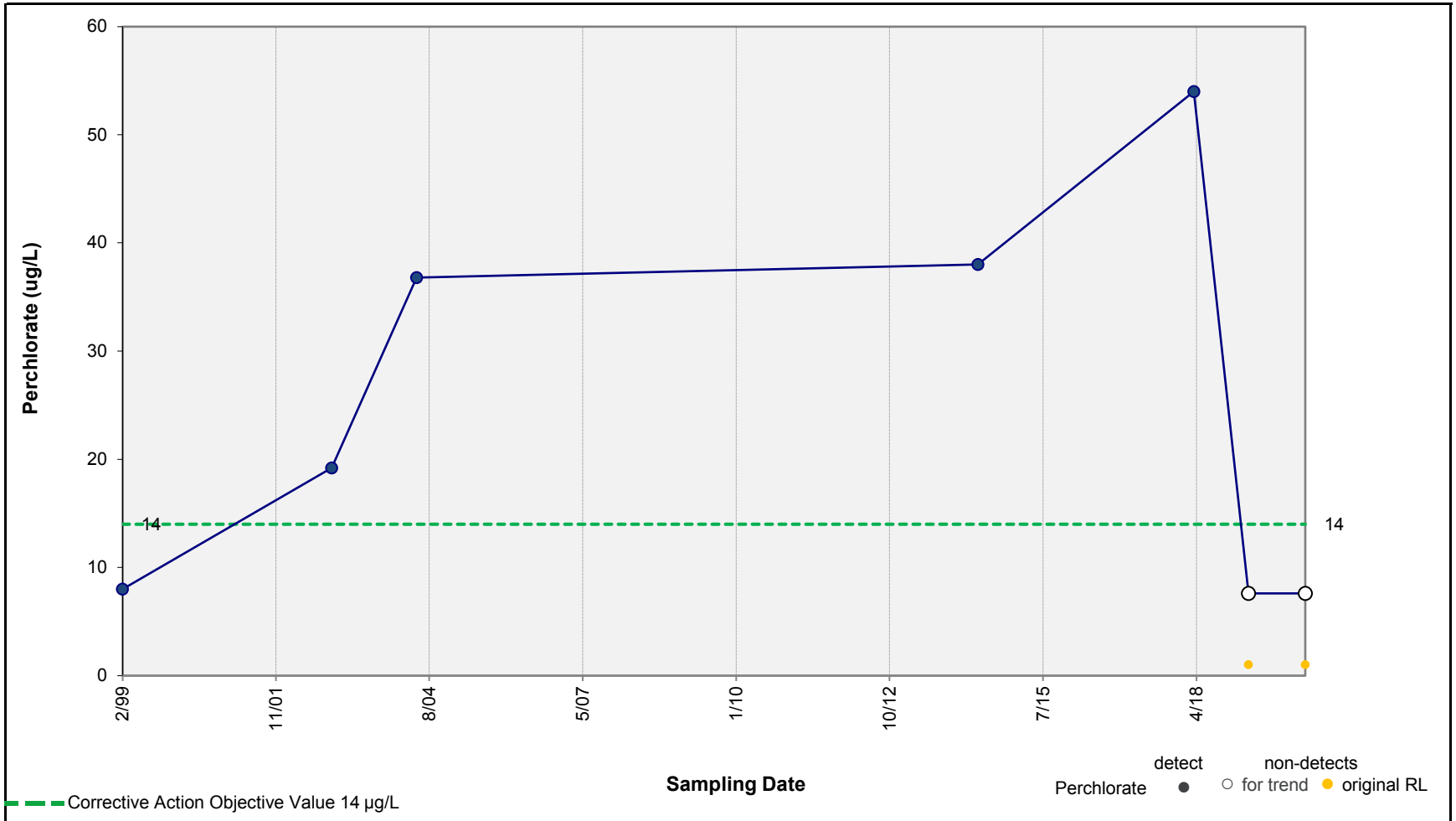
ARCADIS

Concentration vs. Time Plot – VC in Well GM-14S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-29



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.563 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 0.0E+00 ug/L Per Day

95% Confidence Interval = -1.4E-02 to 6.6E-03 ug/L Per Day

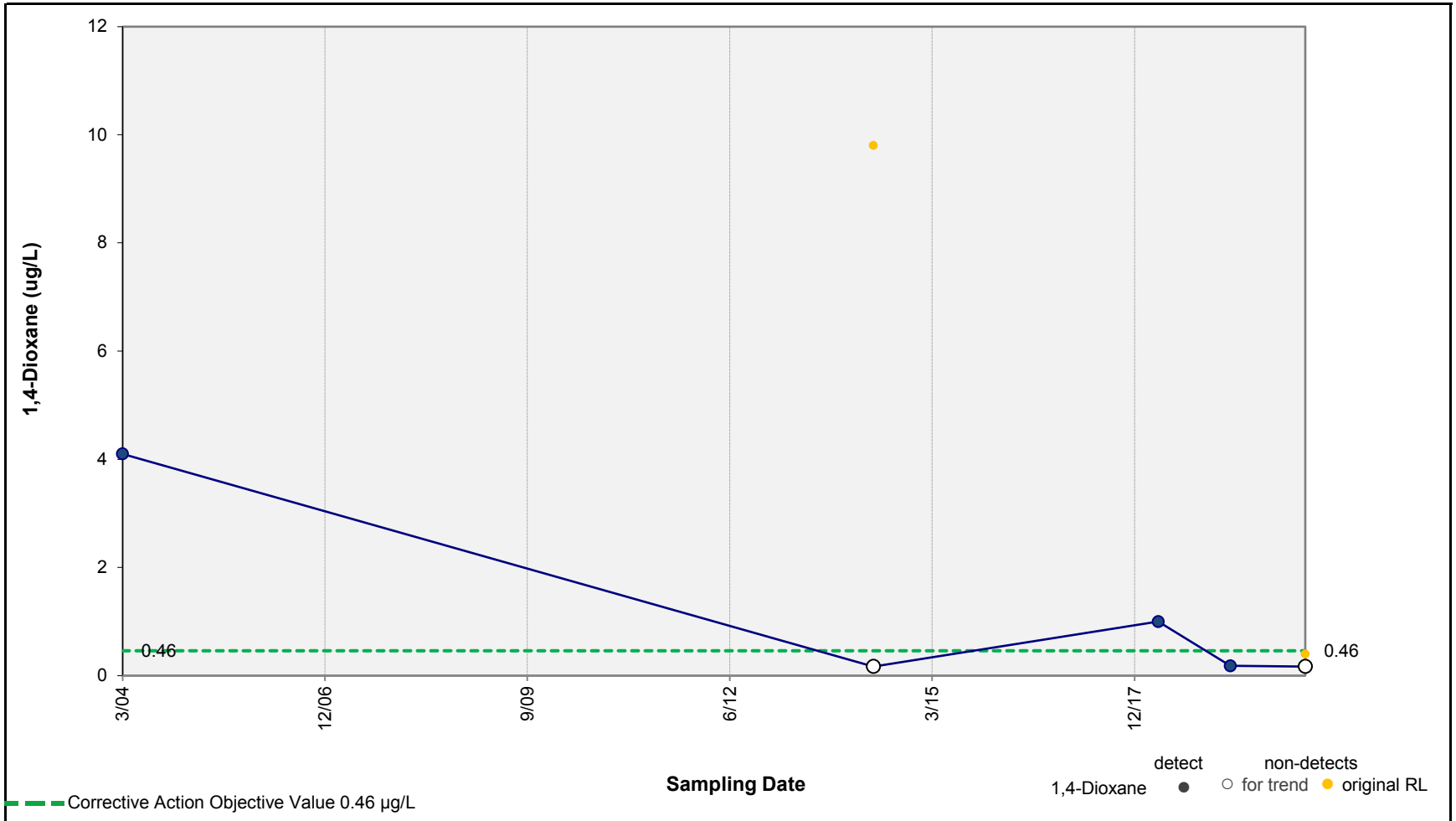
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-16M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-30



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.180 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -6.4E-04 ug/L Per Day

95% Confidence Interval = -2.2E-03 to 4.5E-06 ug/L Per Day

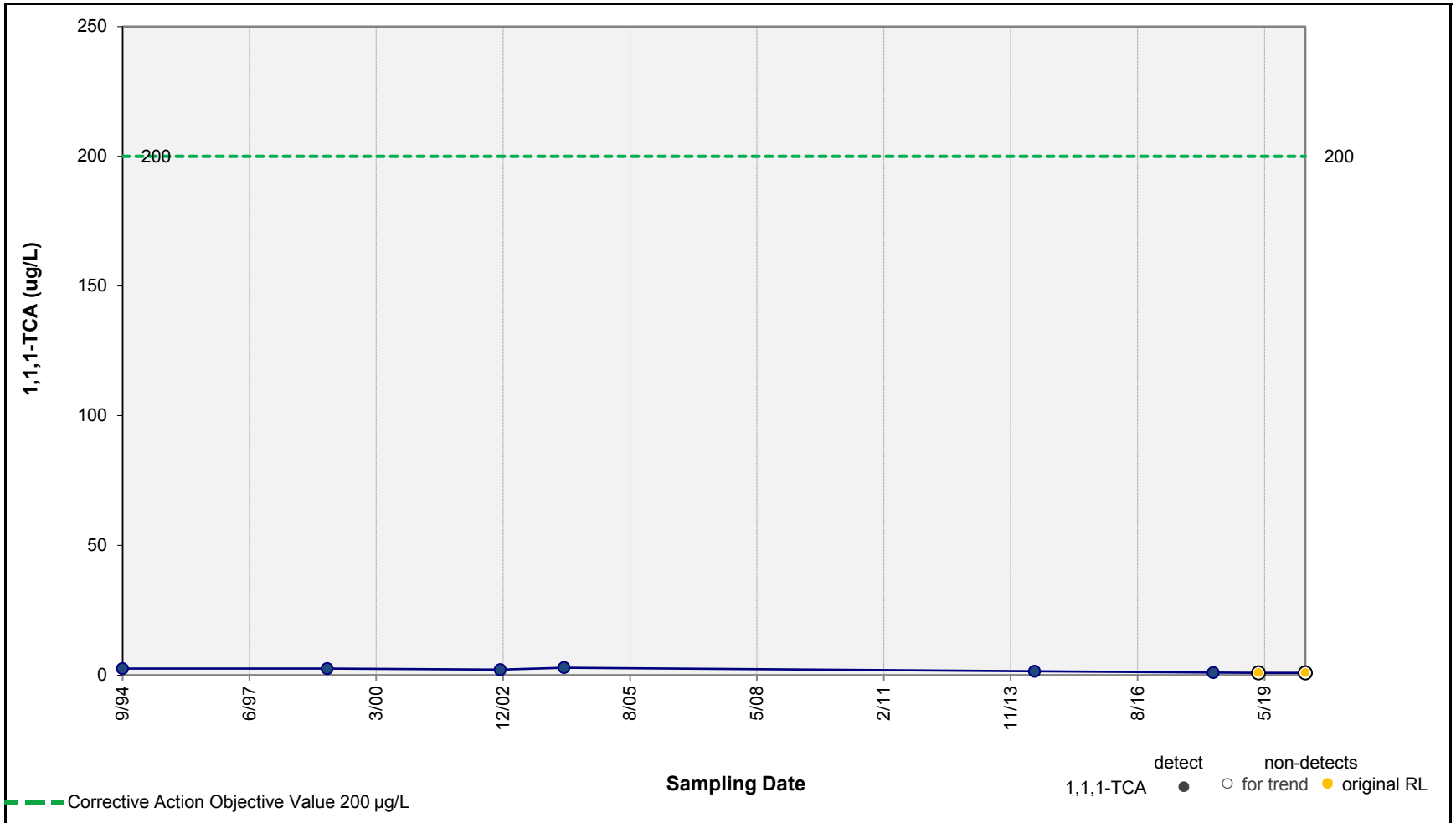
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-16M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-31



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.007 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.8E-04 ug/L Per Day

95% Confidence Interval = -3.2E-04 to -1.3E-04 ug/L Per Day

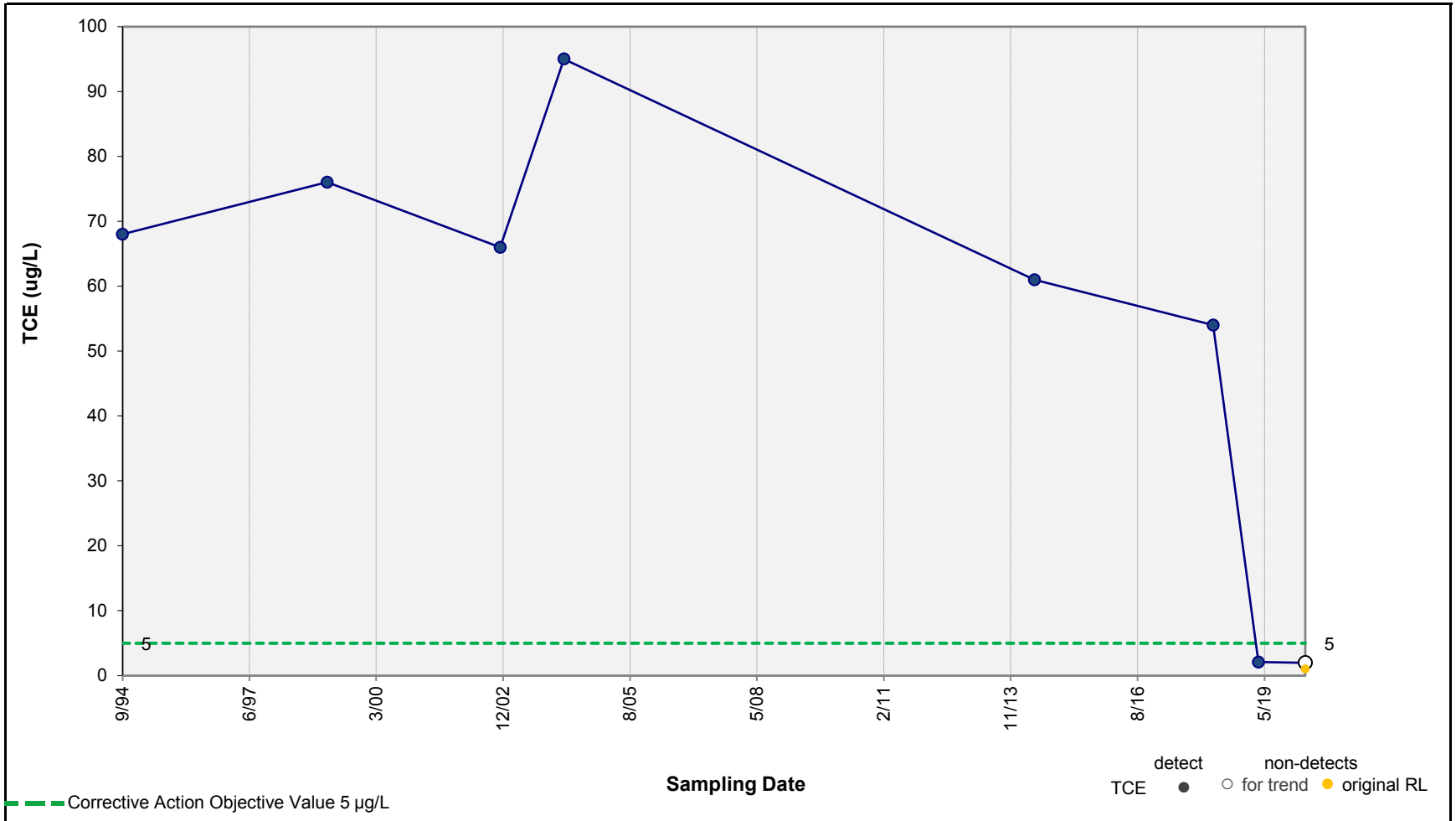
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-16M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-32



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.007 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -7.2E-03 ug/L Per Day

95% Confidence Interval = -1.6E-02 to -9.9E-04 ug/L Per Day

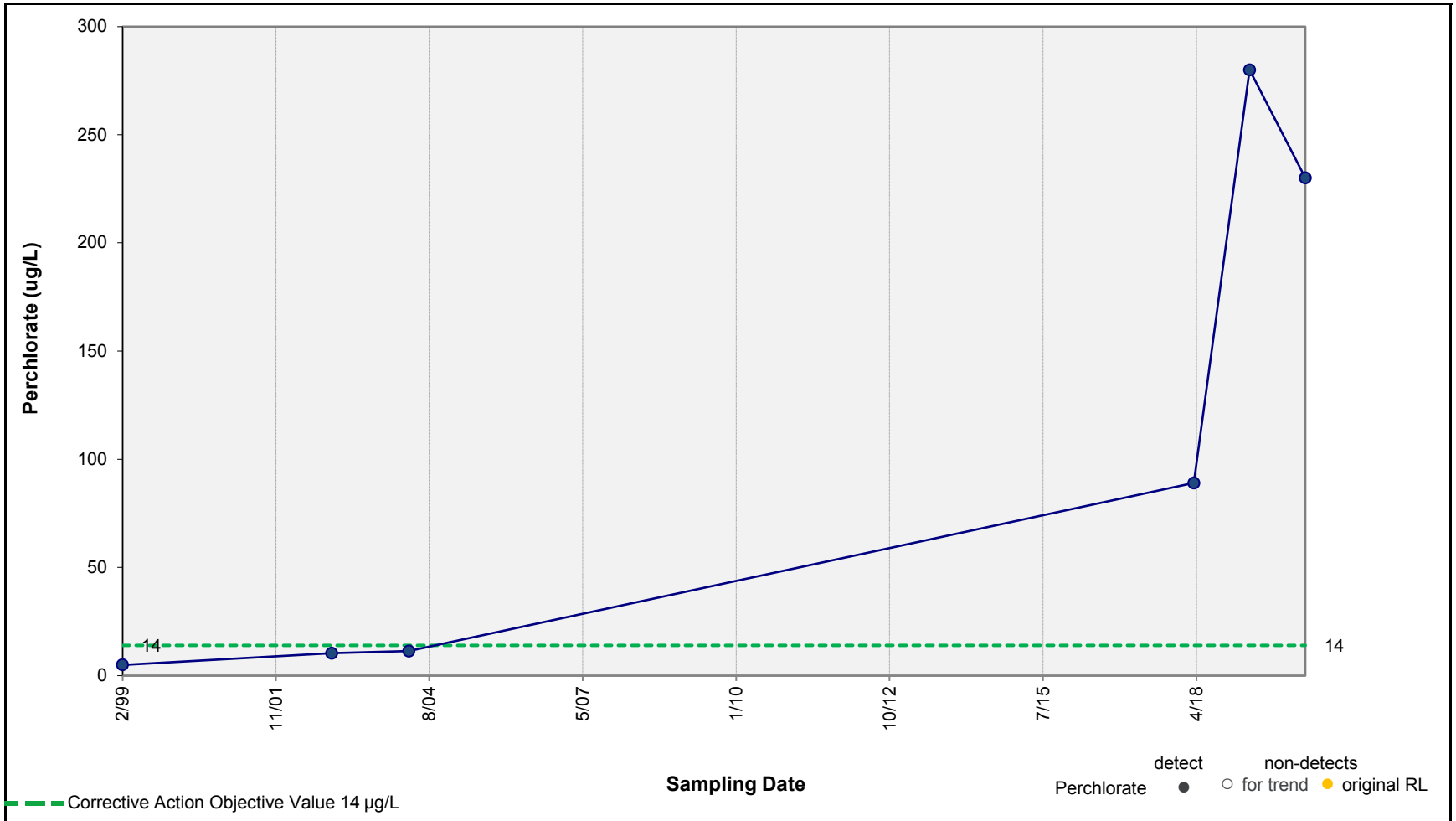
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-16M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-33



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 2.9E-02 ug/L Per Day

95% Confidence Interval = 2.2E-03 to 4.8E-02 ug/L Per Day

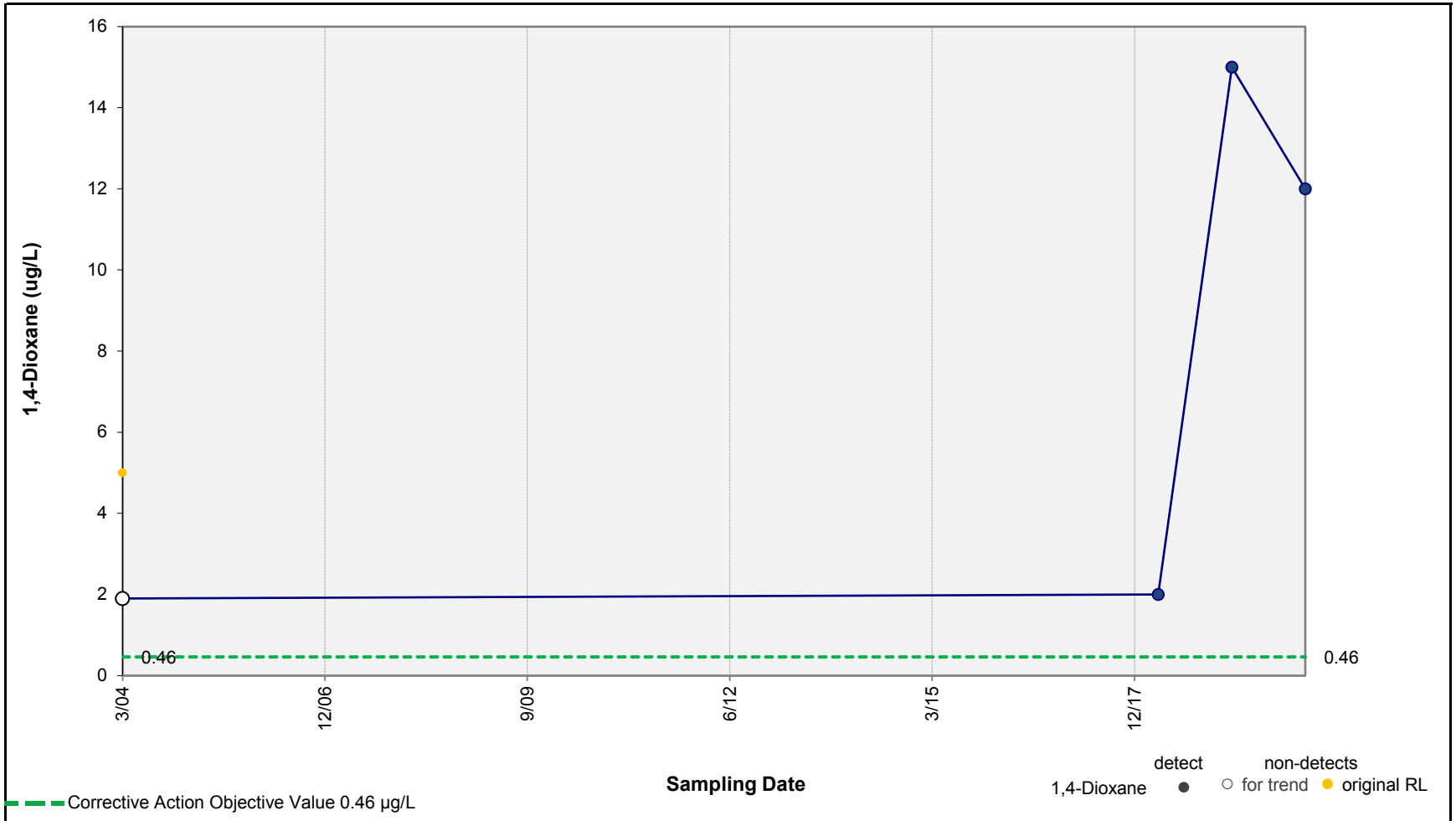
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-34



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.167 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

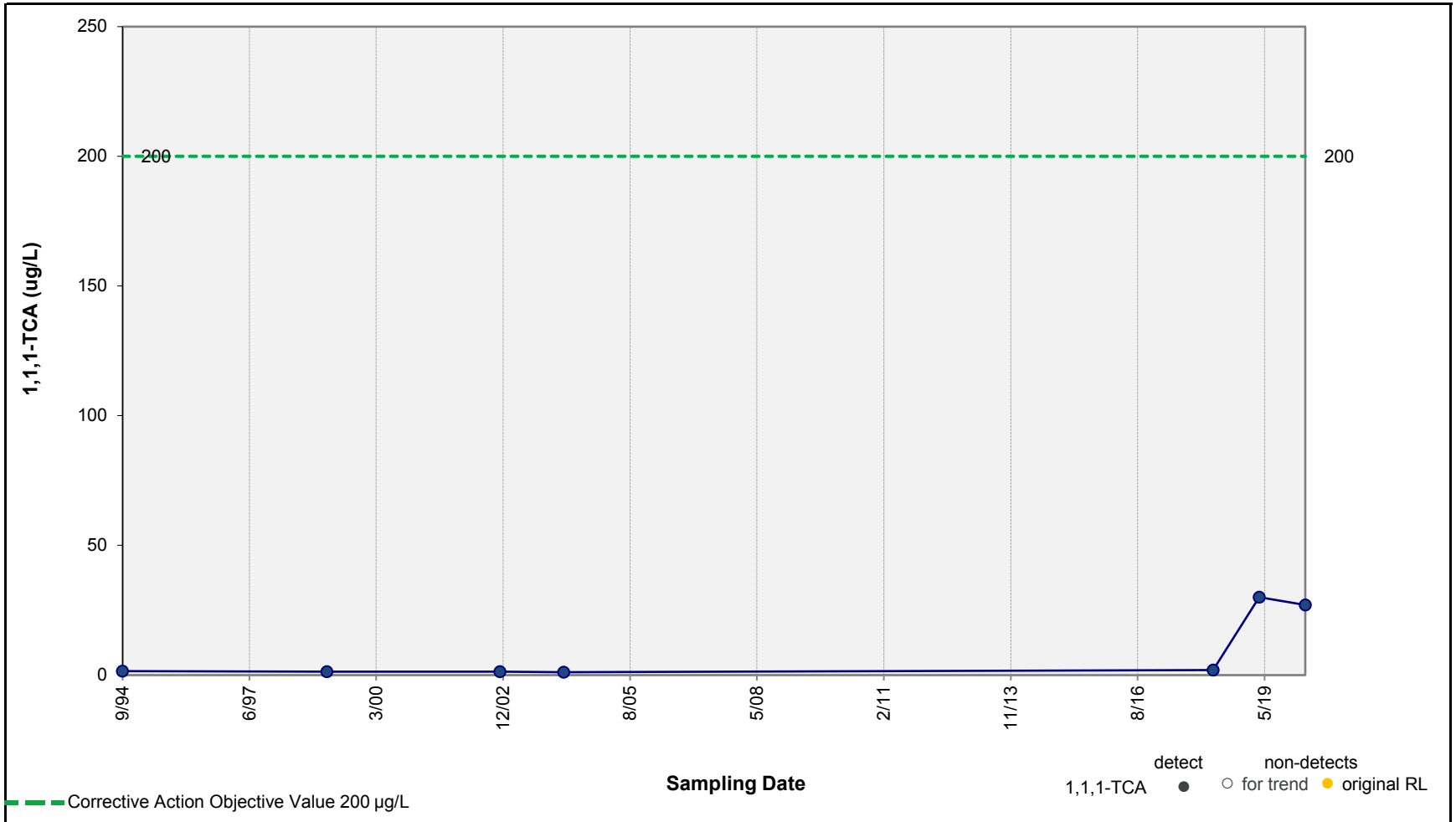
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-35



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.155 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.6E-04 ug/L Per Day

95% Confidence Interval = -1.1E-04 to 4.4E-03 ug/L Per Day

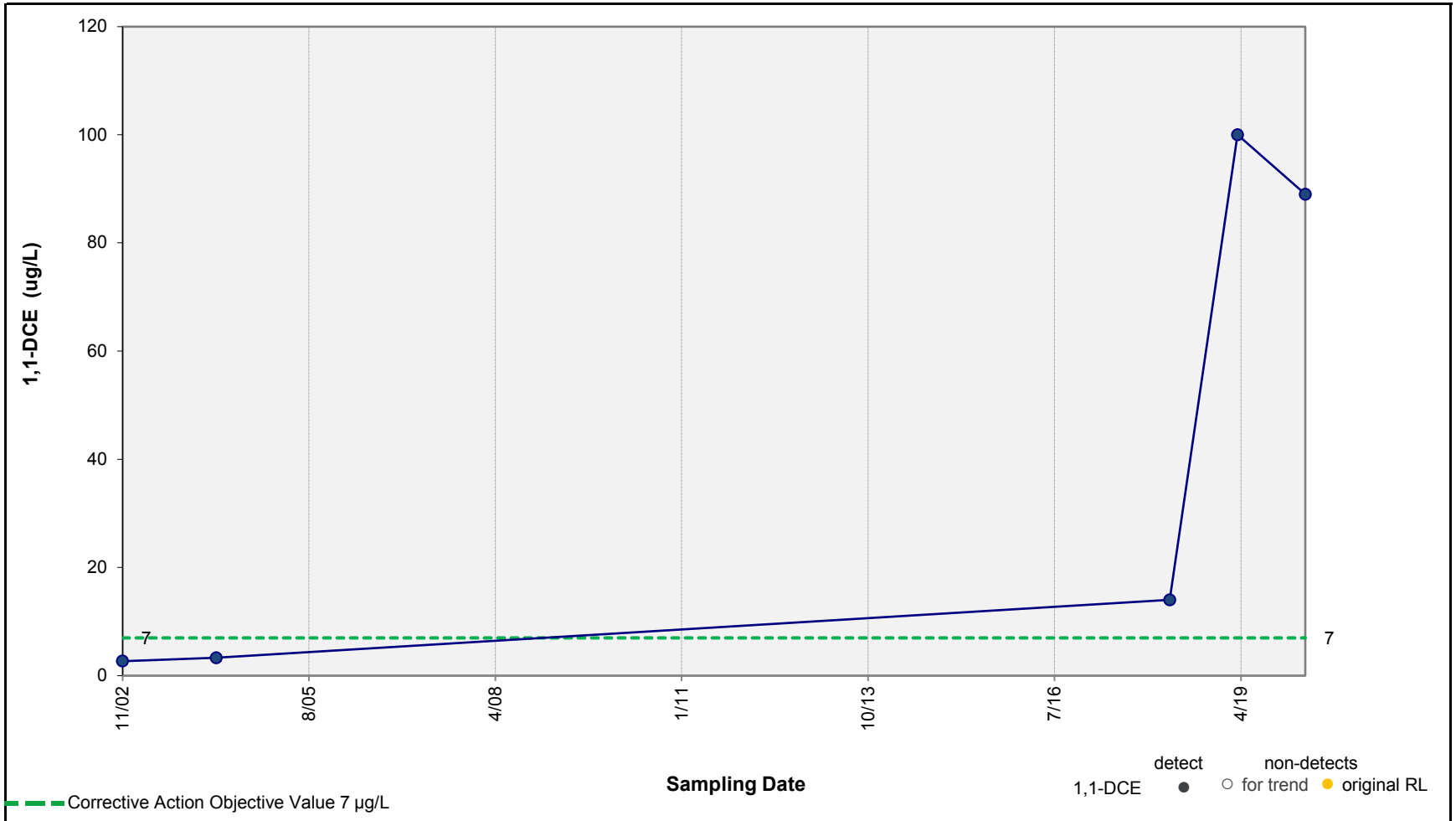
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-36



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

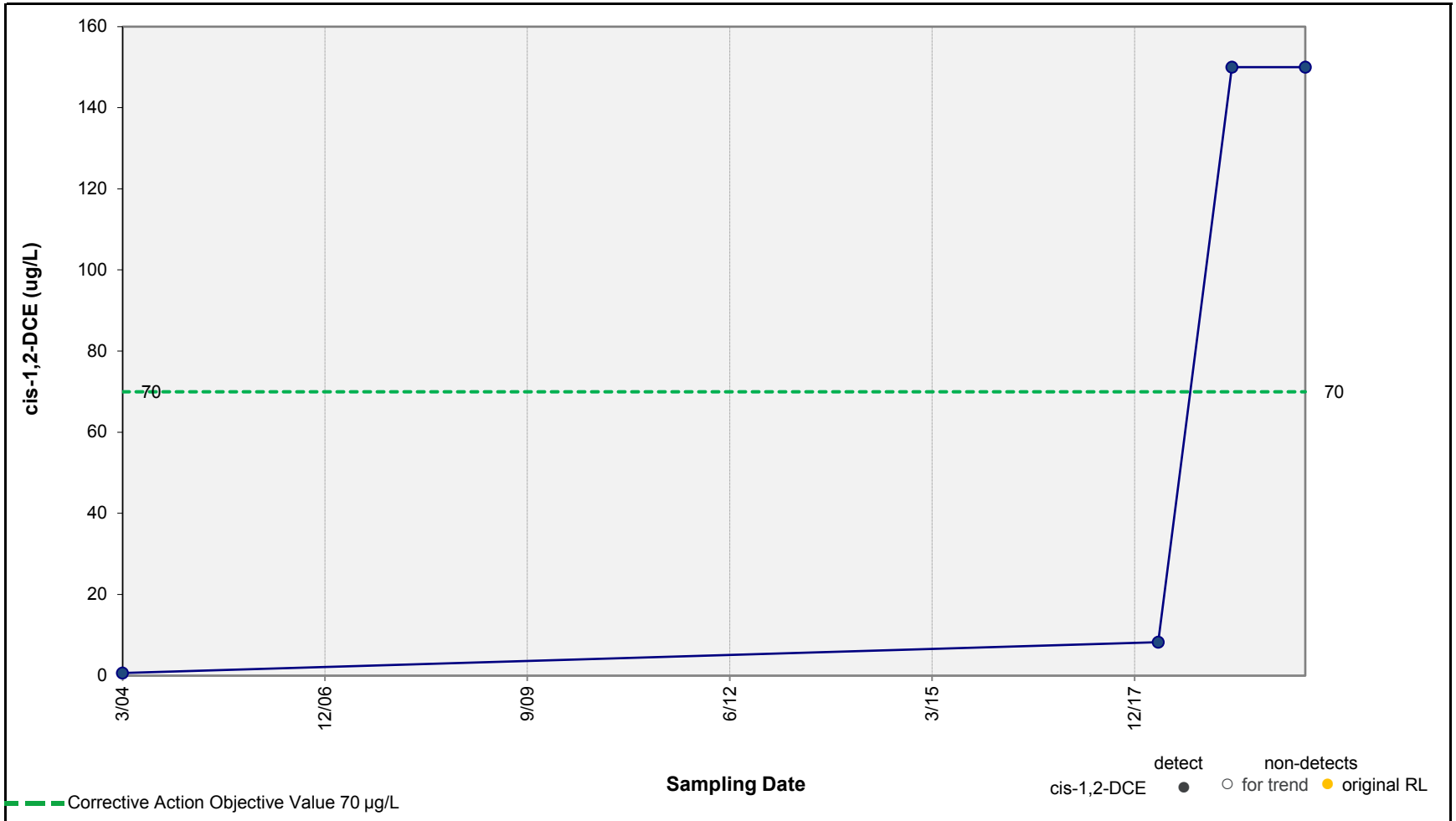
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-37



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.105 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

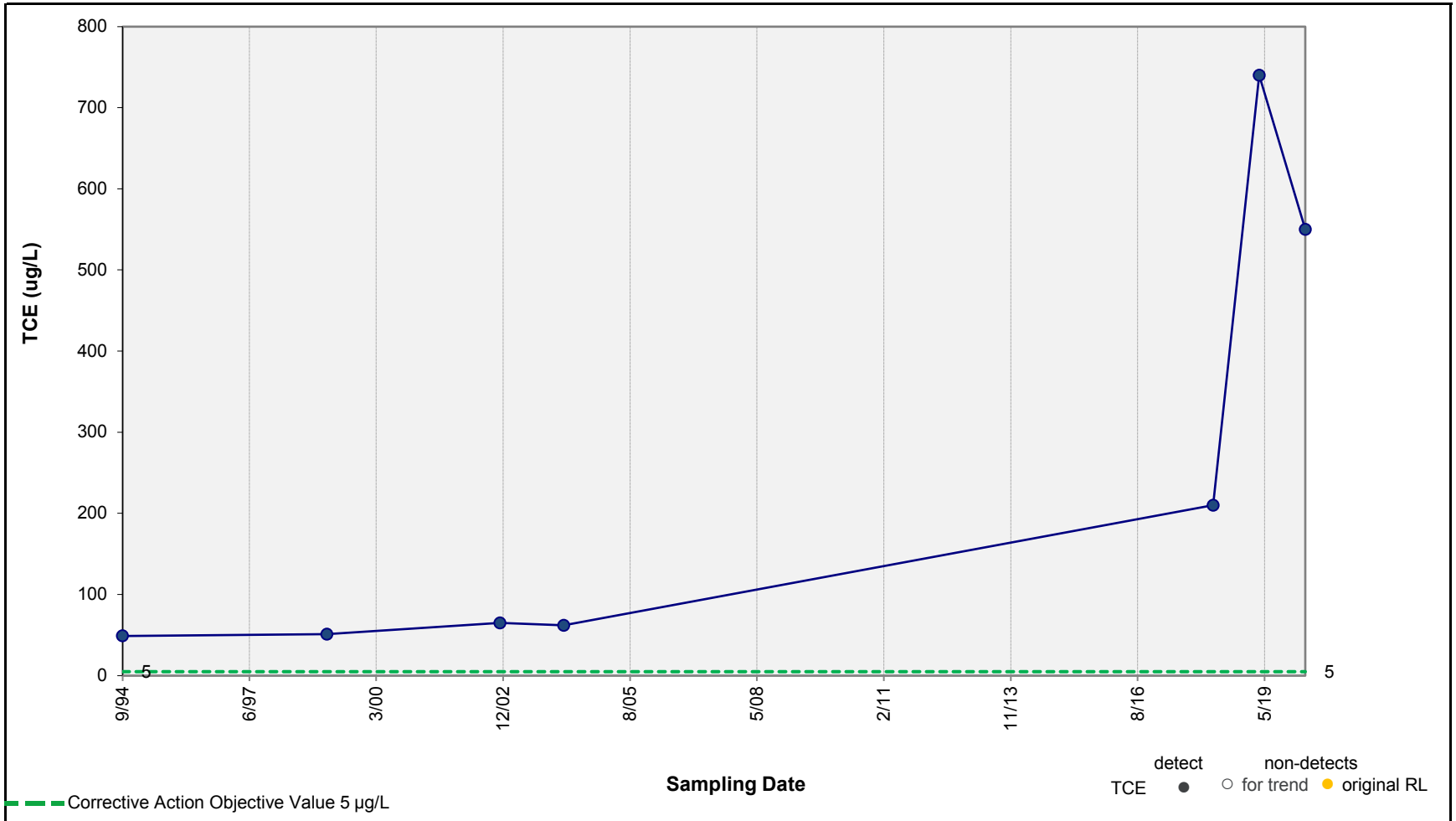
ARCADIS

Concentration vs. Time Plot – cis-1,2-DCE in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-38



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 2.9E-02 ug/L Per Day

95% Confidence Interval = 3.7E-03 to 9.4E-02 ug/L Per Day

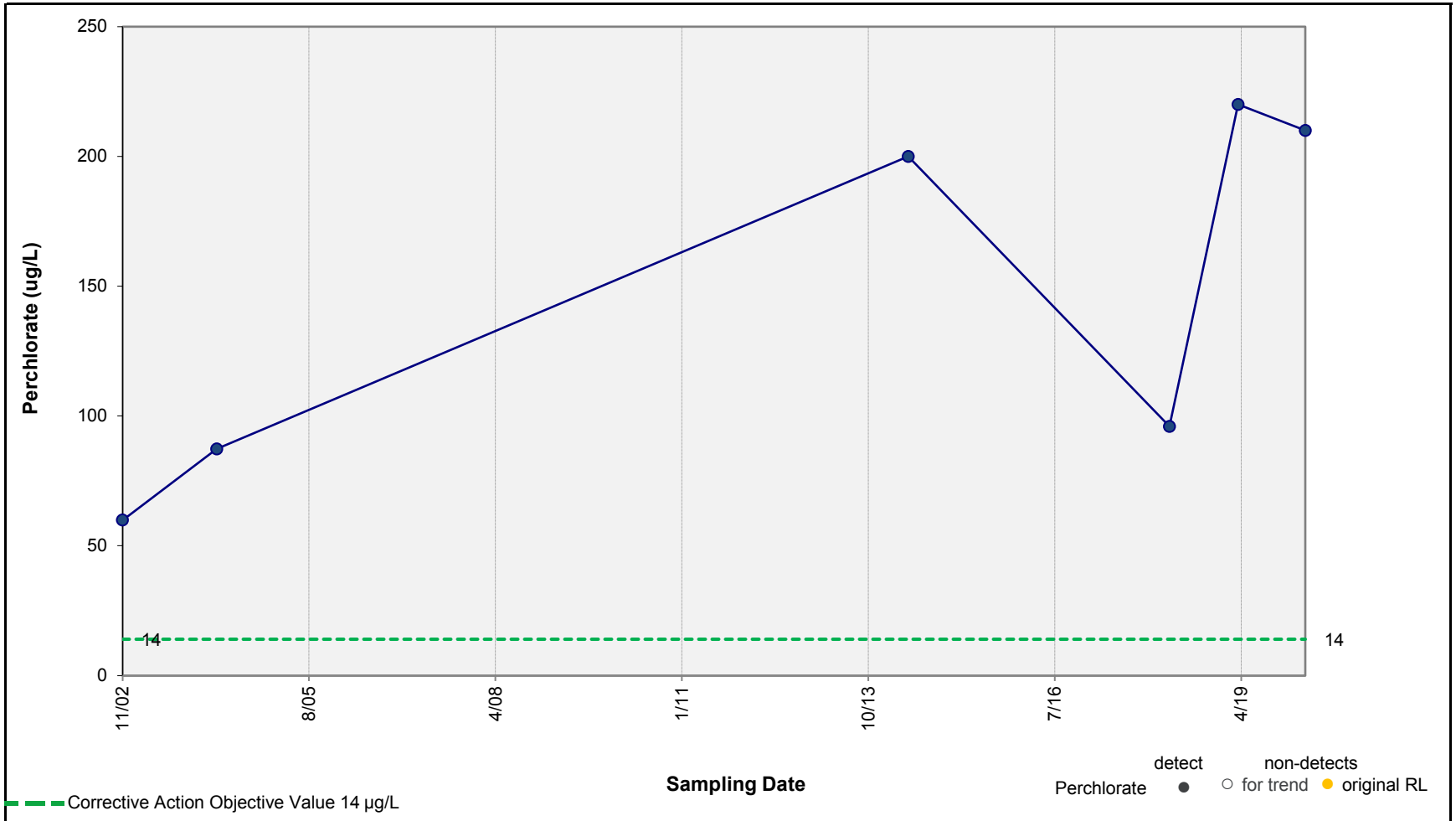
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-16S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-39



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 2.4E-02 ug/L Per Day

95% Confidence Interval = -1.9E-02 to 4.8E-02 ug/L Per Day

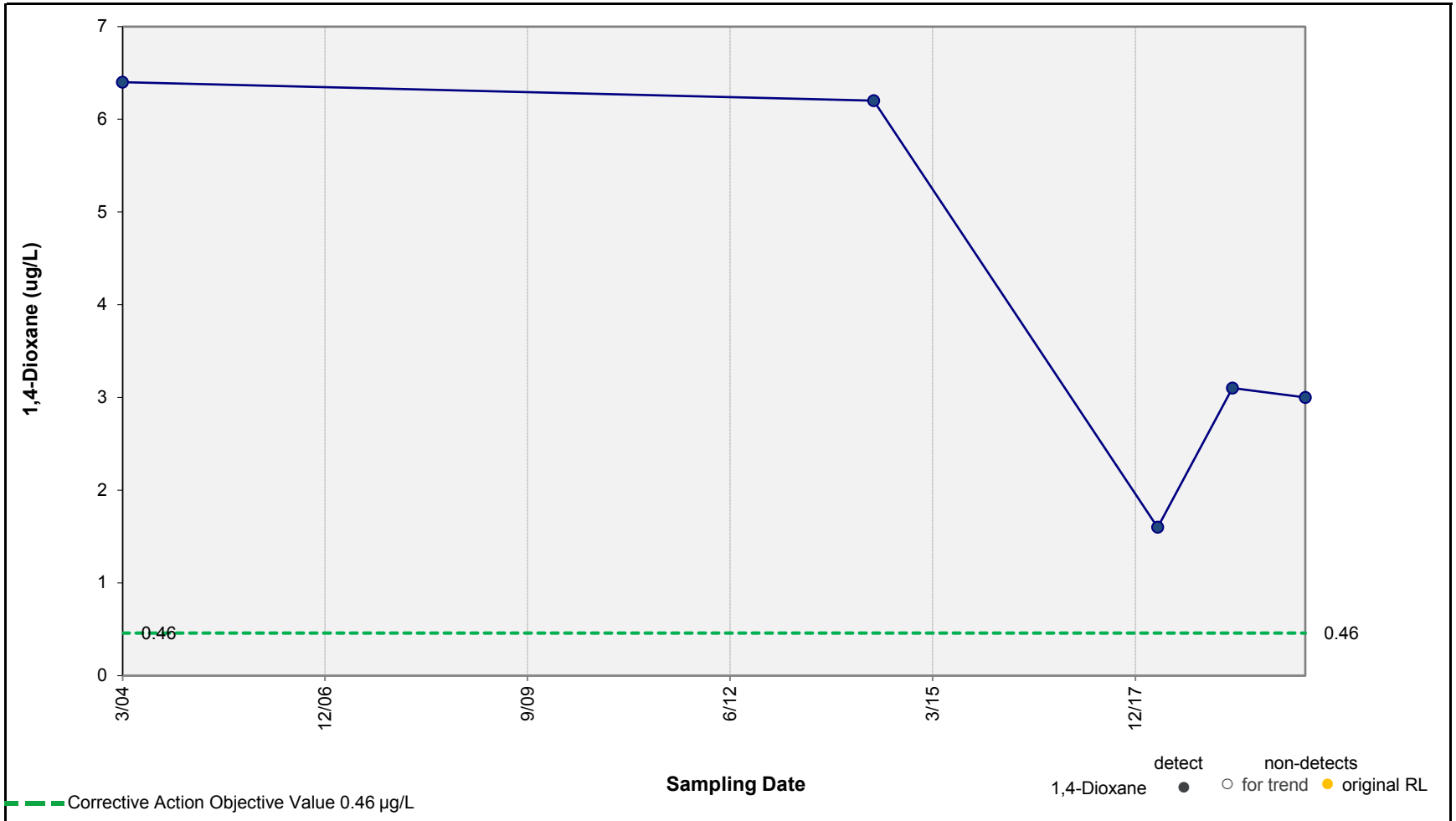
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-21M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-40



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.117 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

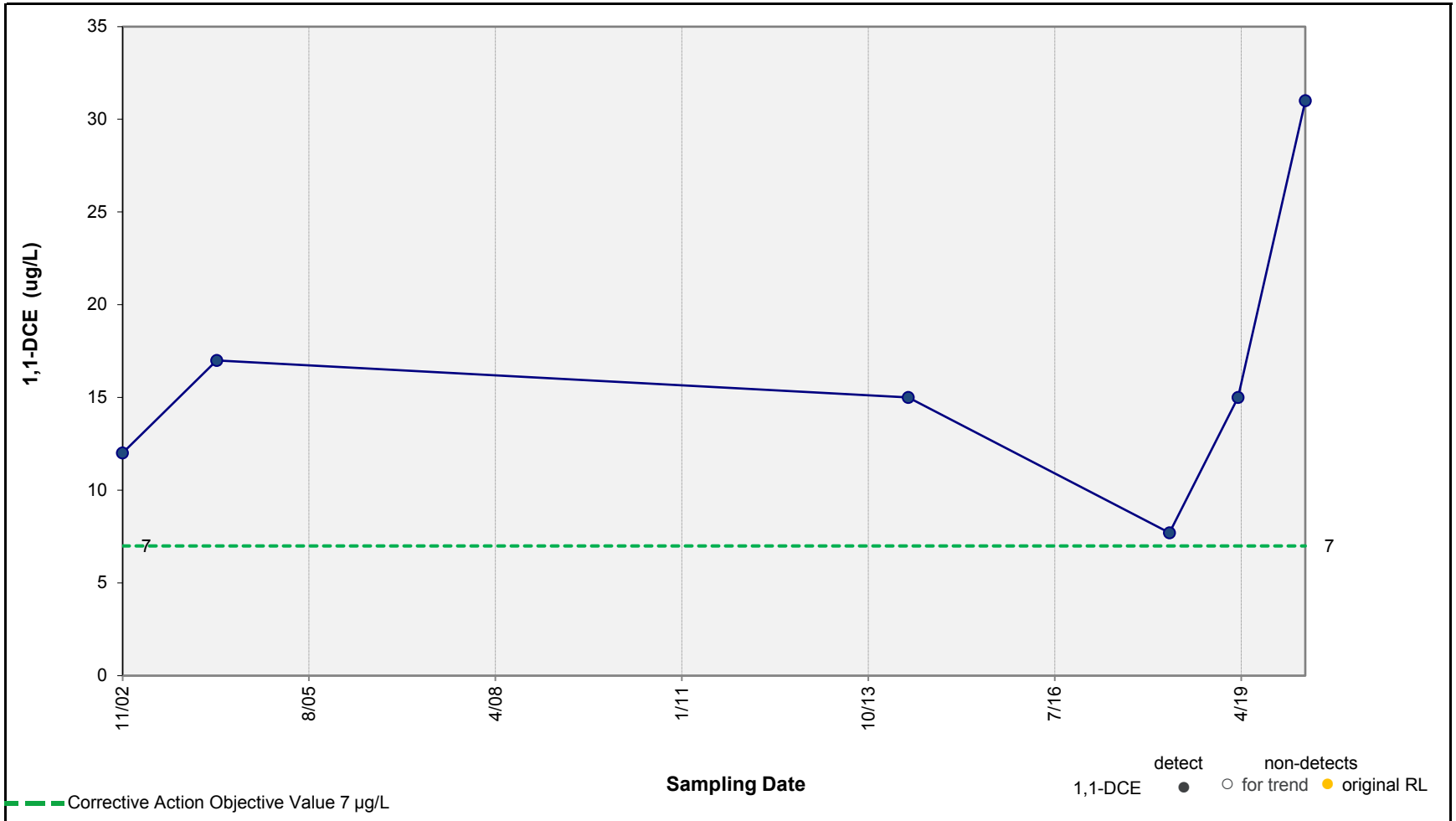
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-21M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-41



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.298 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 7.1E-04 ug/L Per Day

95% Confidence Interval = -1.4E-03 to 1.6E-02 ug/L Per Day

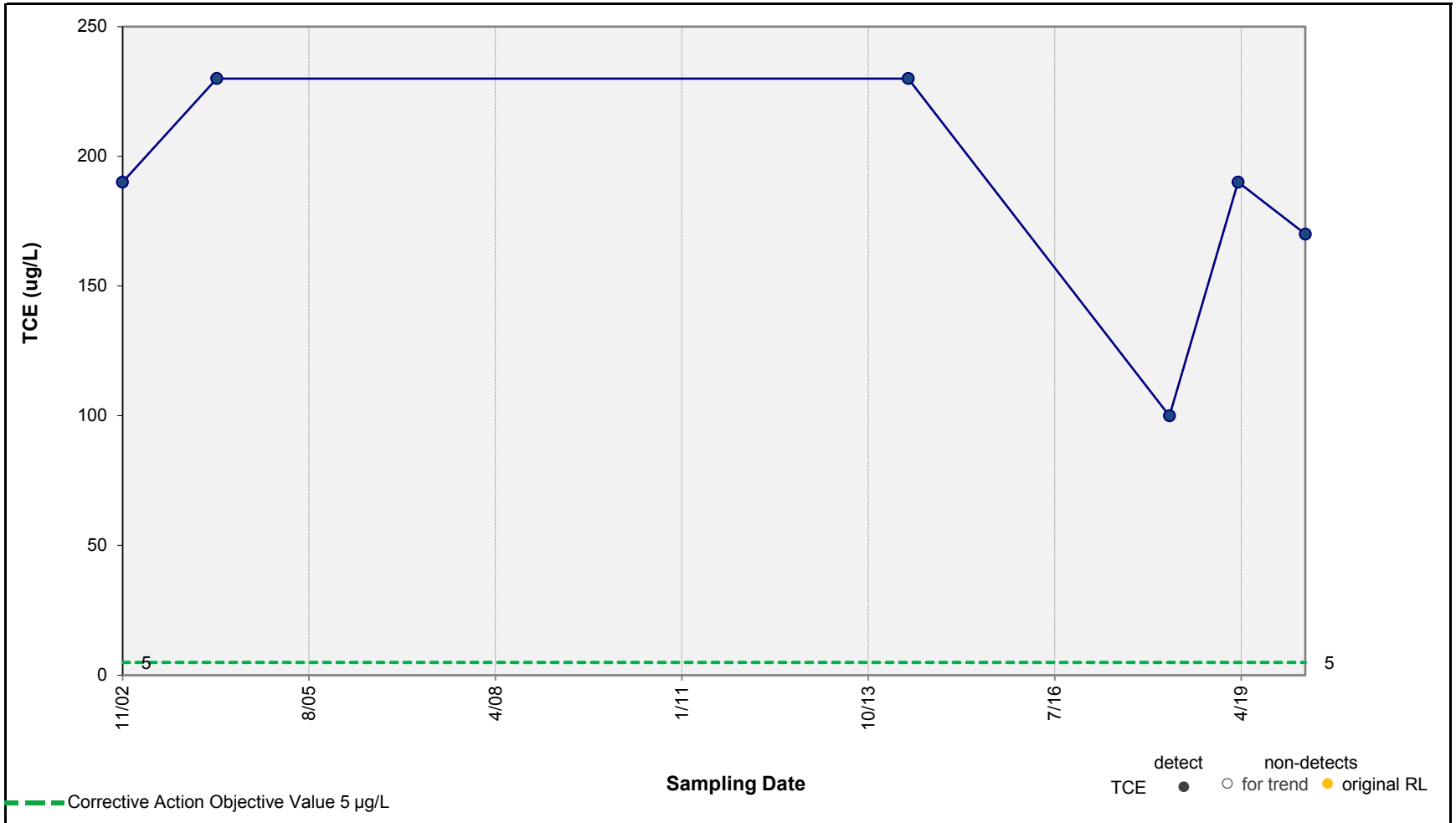
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-21M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-42



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.235 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -7.3E-03 ug/L Per Day

95% Confidence Interval = -4.3E-02 to 4.6E-02 ug/L Per Day

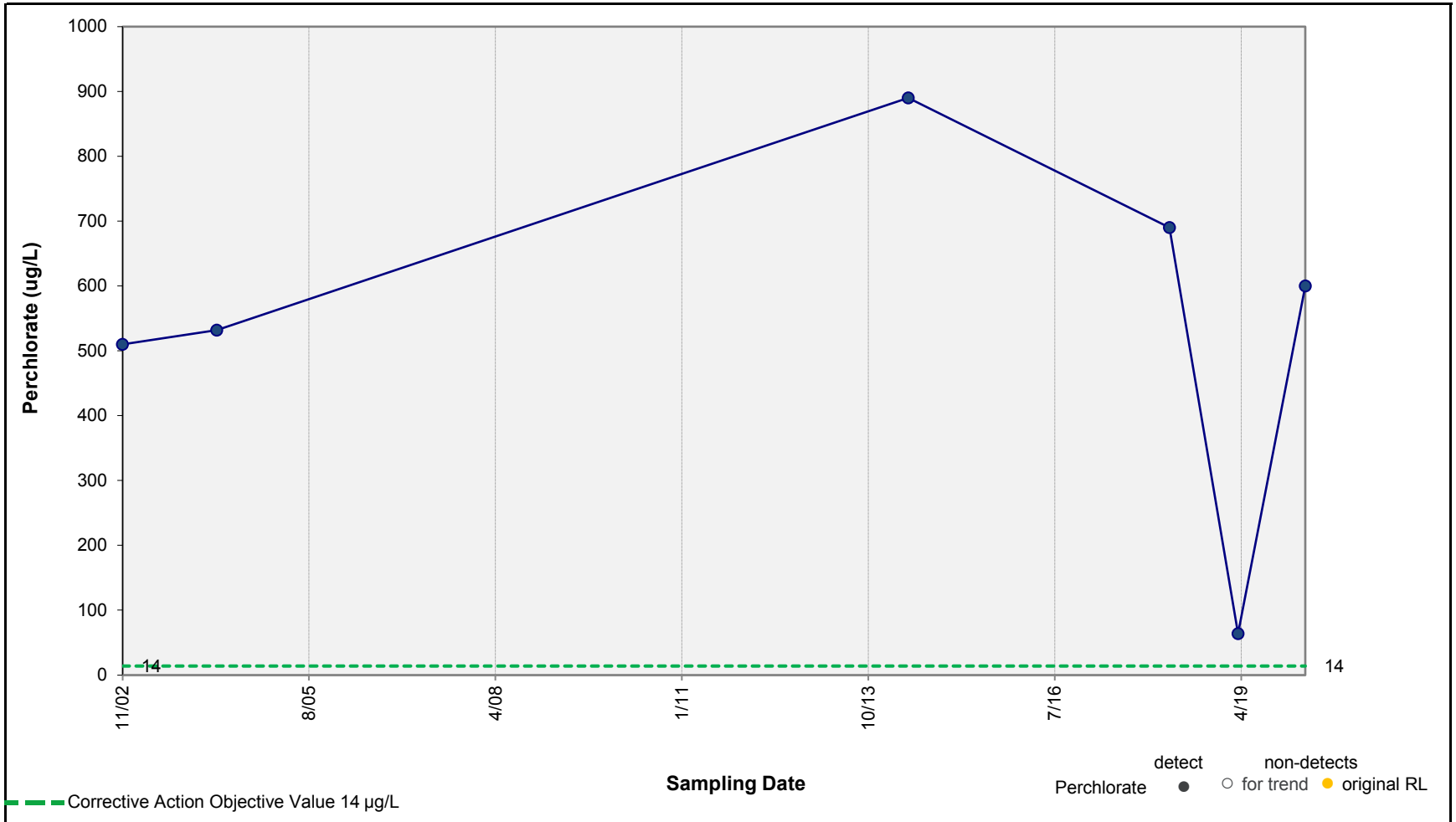
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-21M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-43



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.2E-02 ug/L Per Day

95% Confidence Interval = -3.7E-01 to 7.7E-02 ug/L Per Day

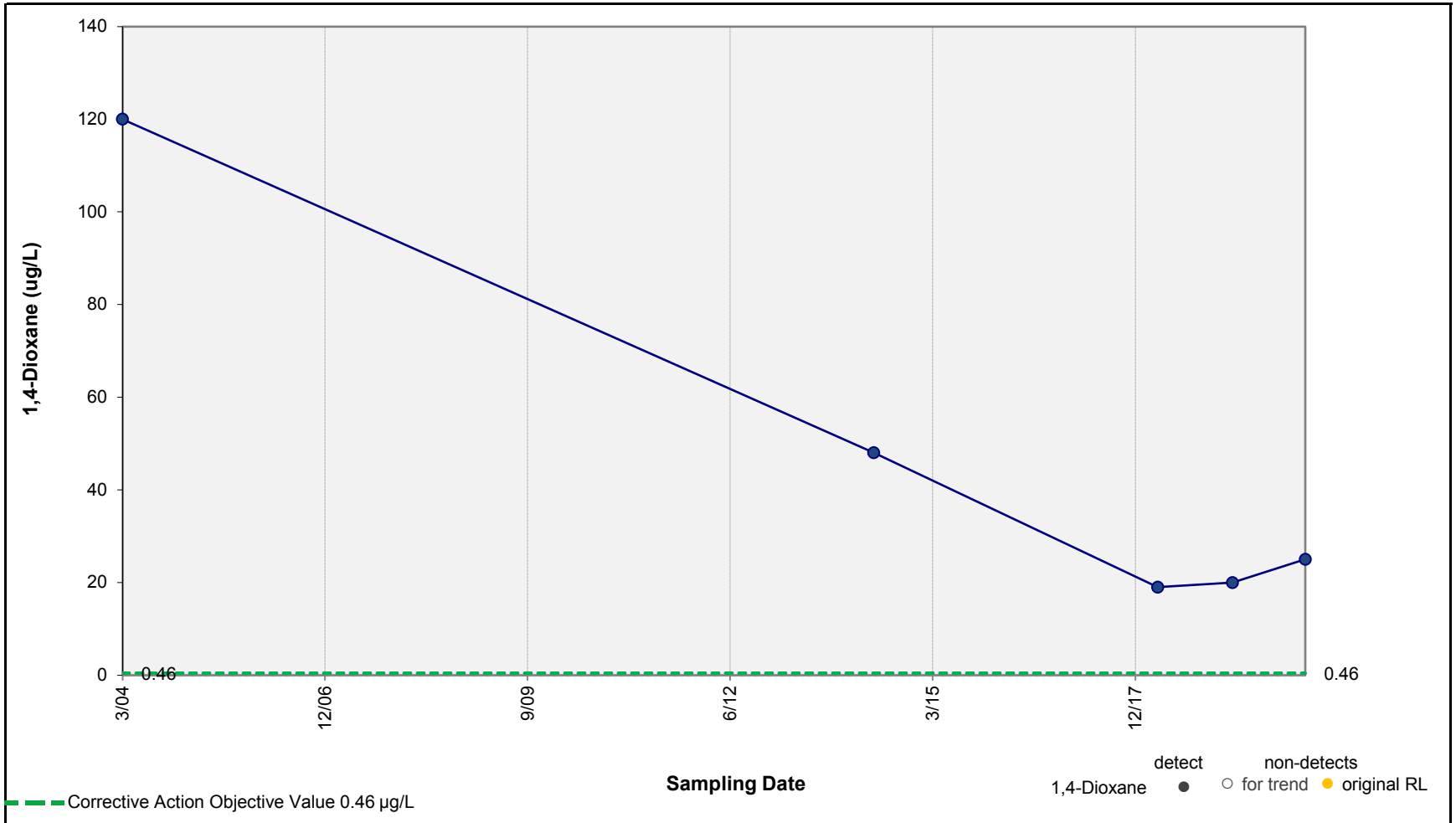
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-44



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.242 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

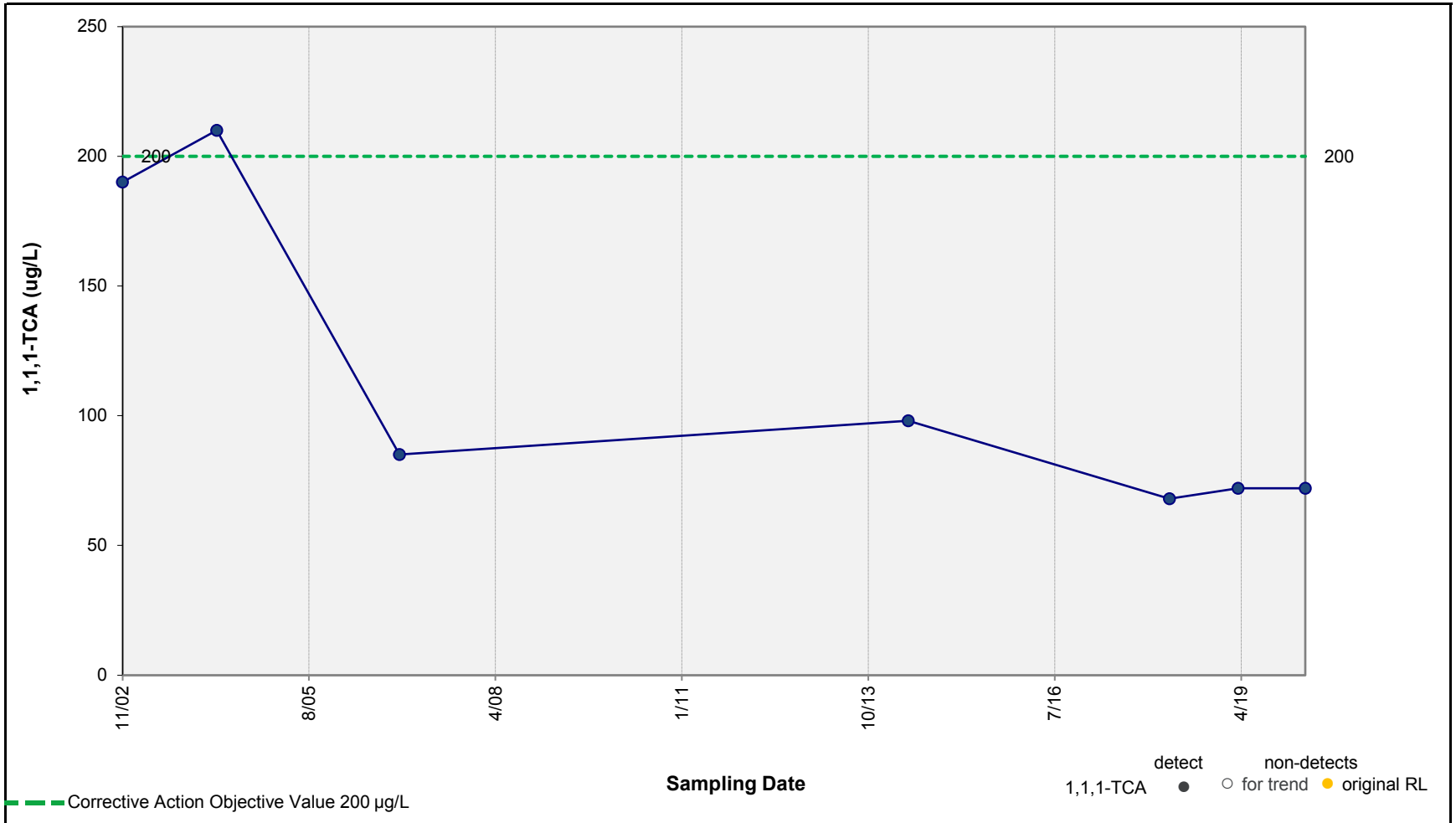
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-45



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.052 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.9E-02 ug/L Per Day

95% Confidence Interval = -2.8E-02 to -1.3E-04 ug/L Per Day

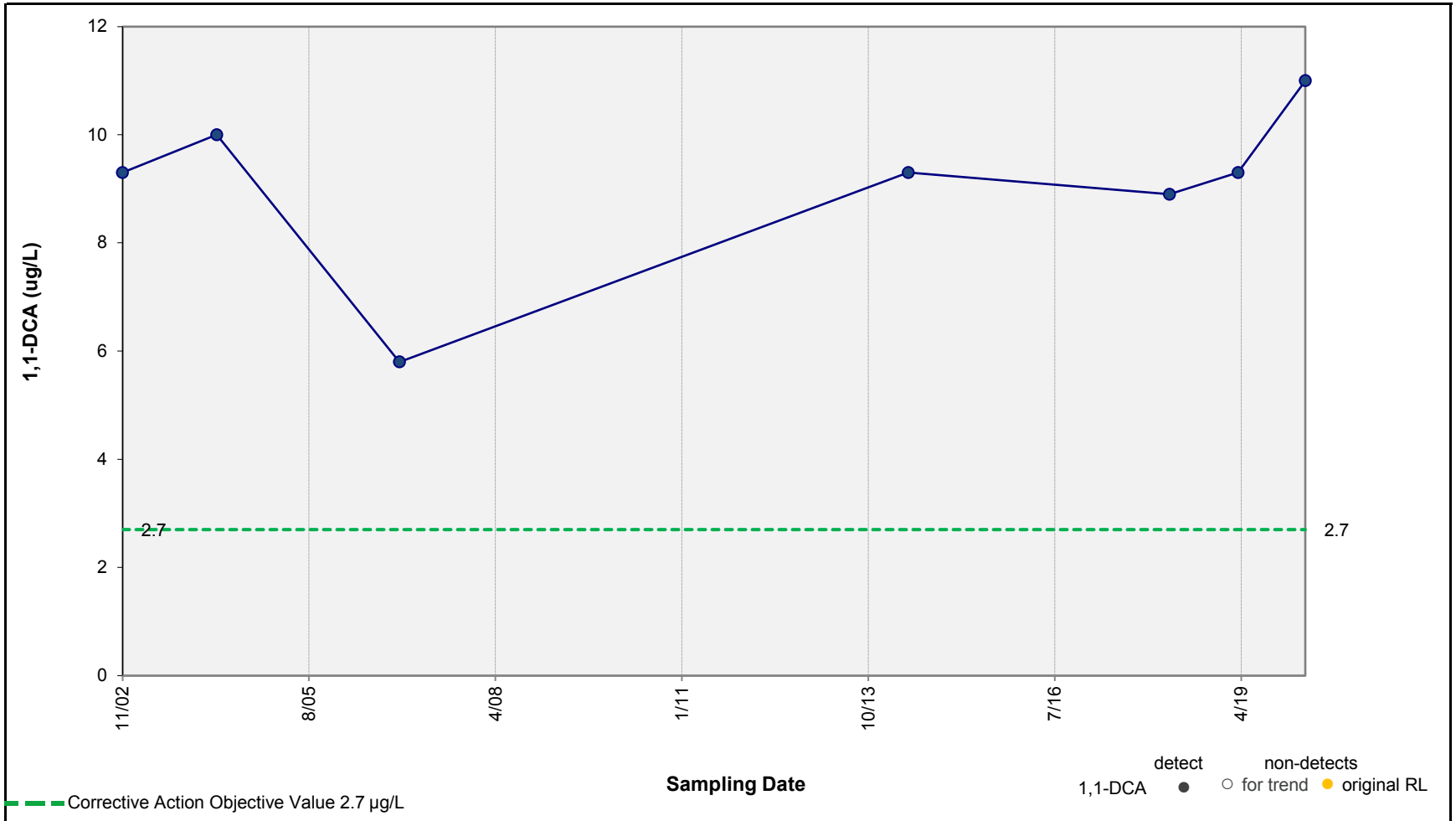
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-46



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.334 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.7E-04 ug/L Per Day

95% Confidence Interval = -2.1E-04 to 1.1E-03 ug/L Per Day

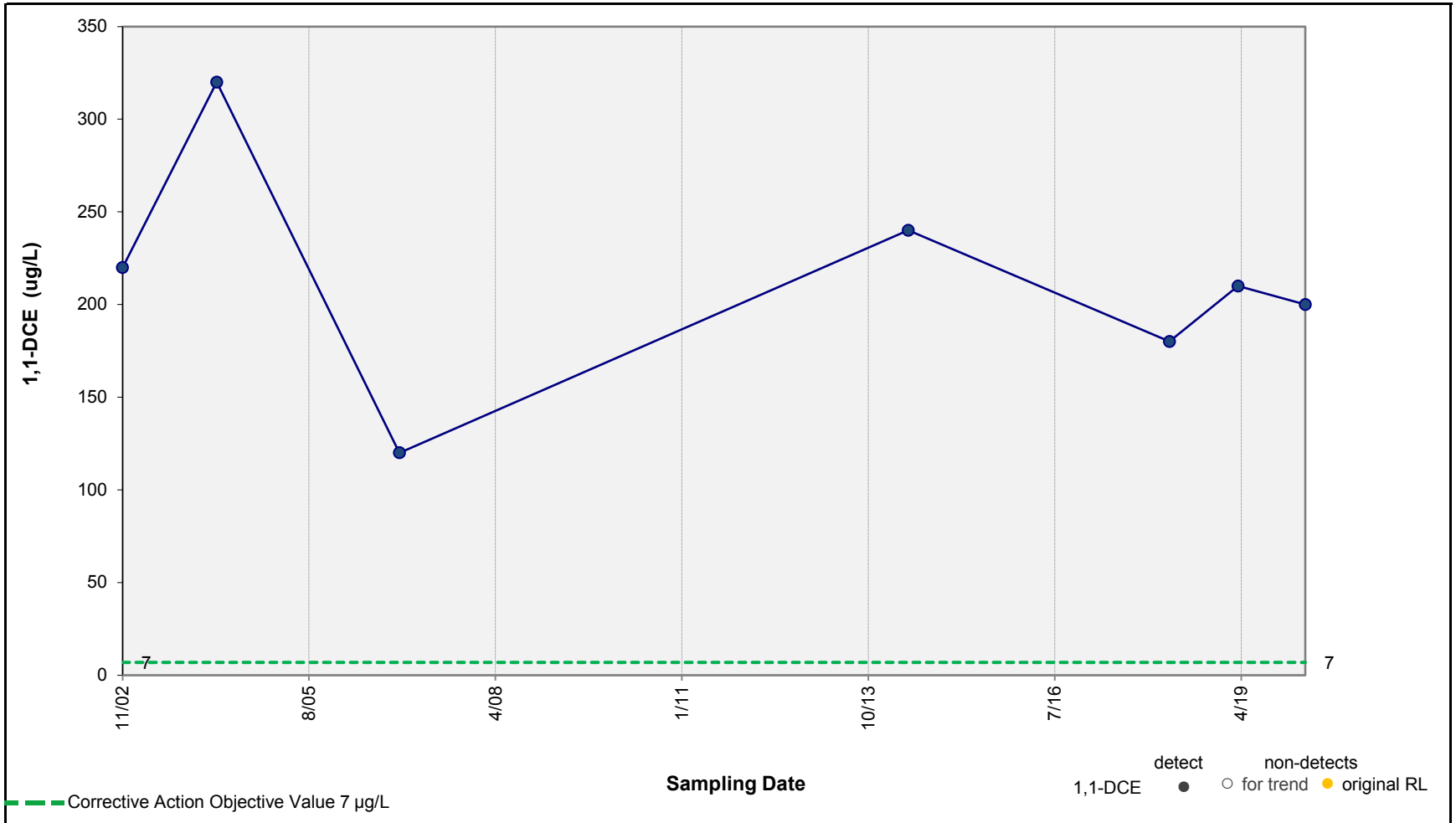
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-47



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.281 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -7.1E-03 ug/L Per Day

95% Confidence Interval = -2.8E-02 to 2.0E-02 ug/L Per Day

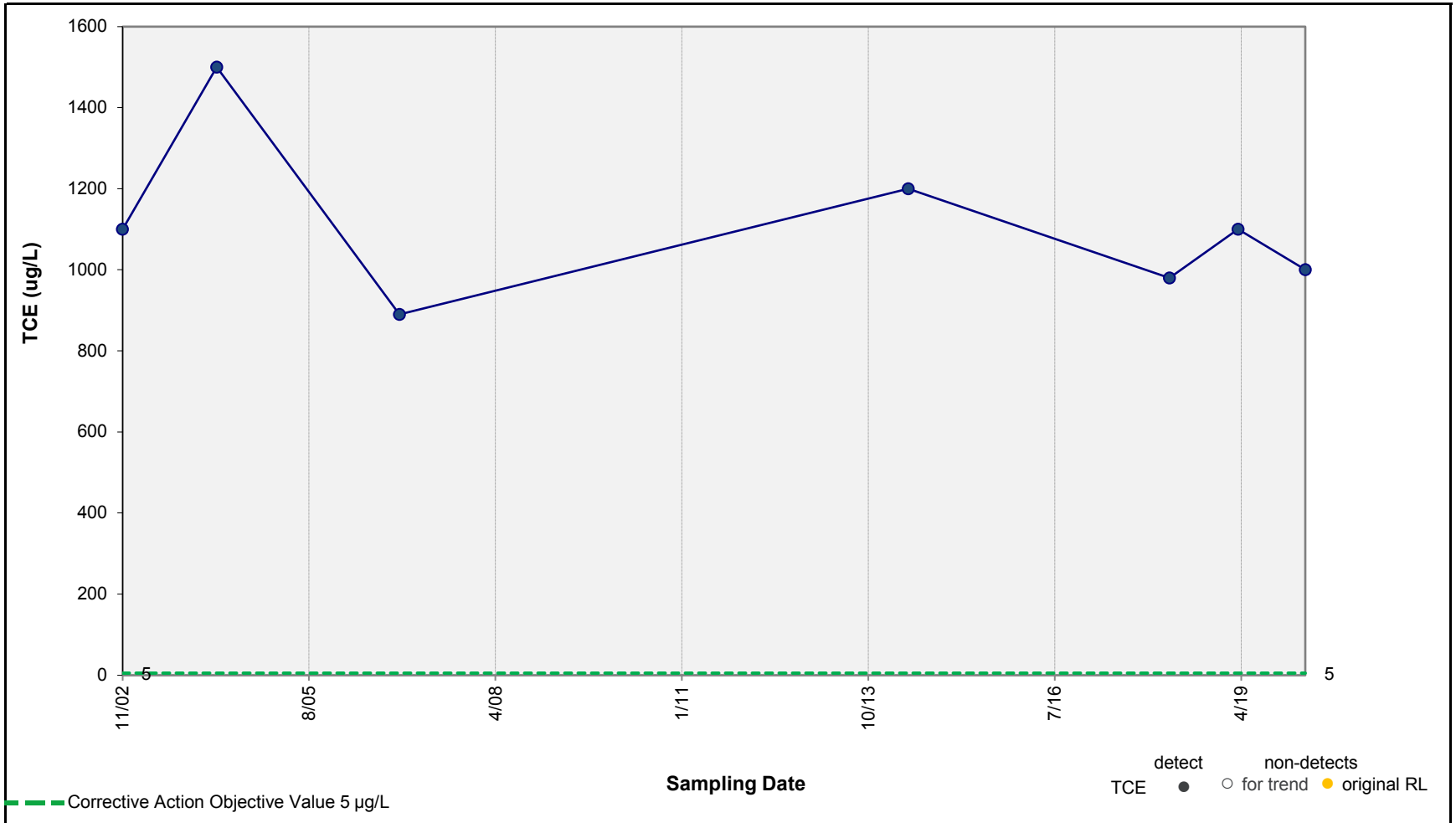
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-48



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.334 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.1E-02 ug/L Per Day

95% Confidence Interval = -1.4E-01 to 2.7E-02 ug/L Per Day

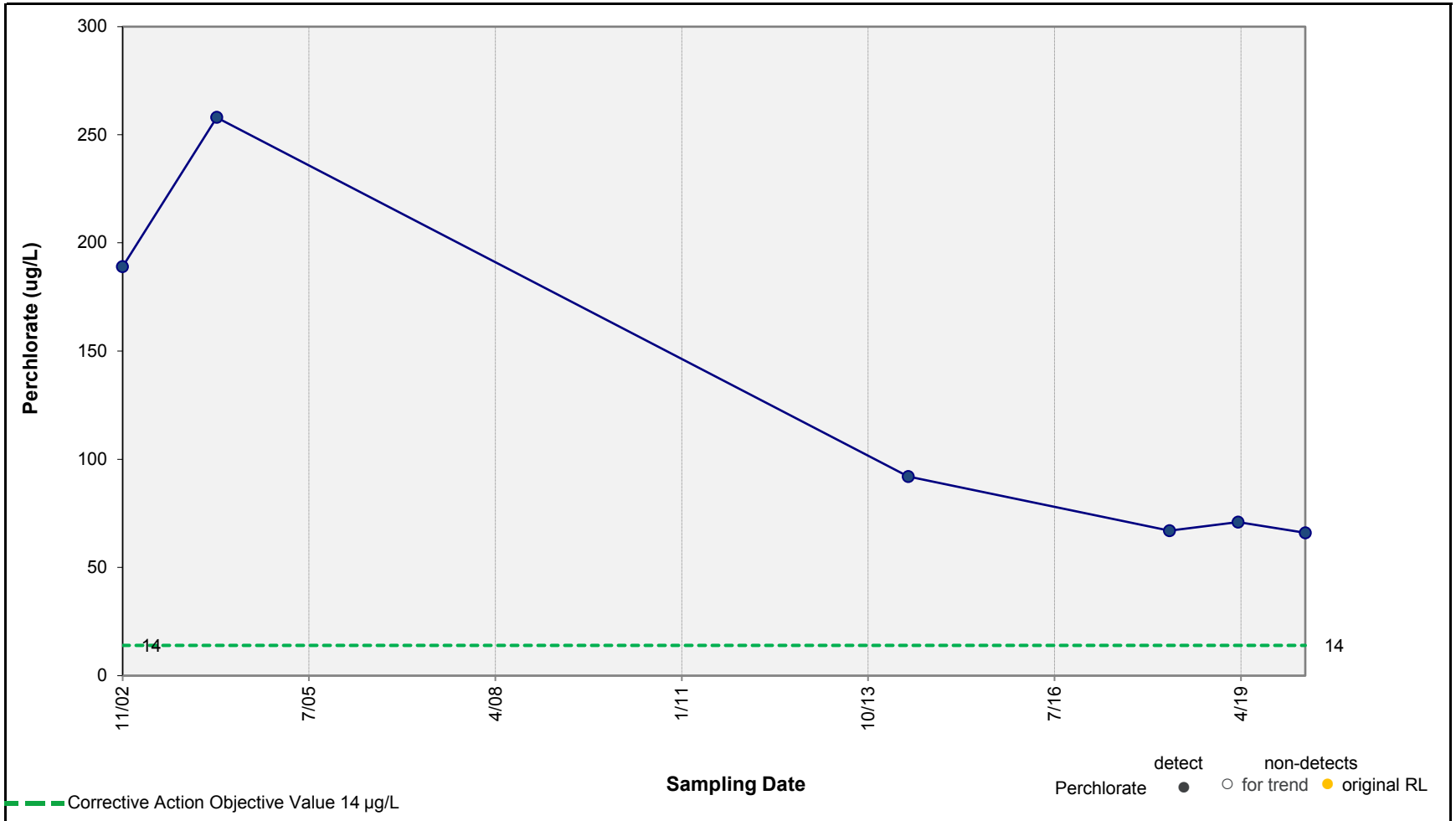
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-21S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-49



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.9E-02 ug/L Per Day

95% Confidence Interval = -3.6E-02 to -4.3E-03 ug/L Per Day

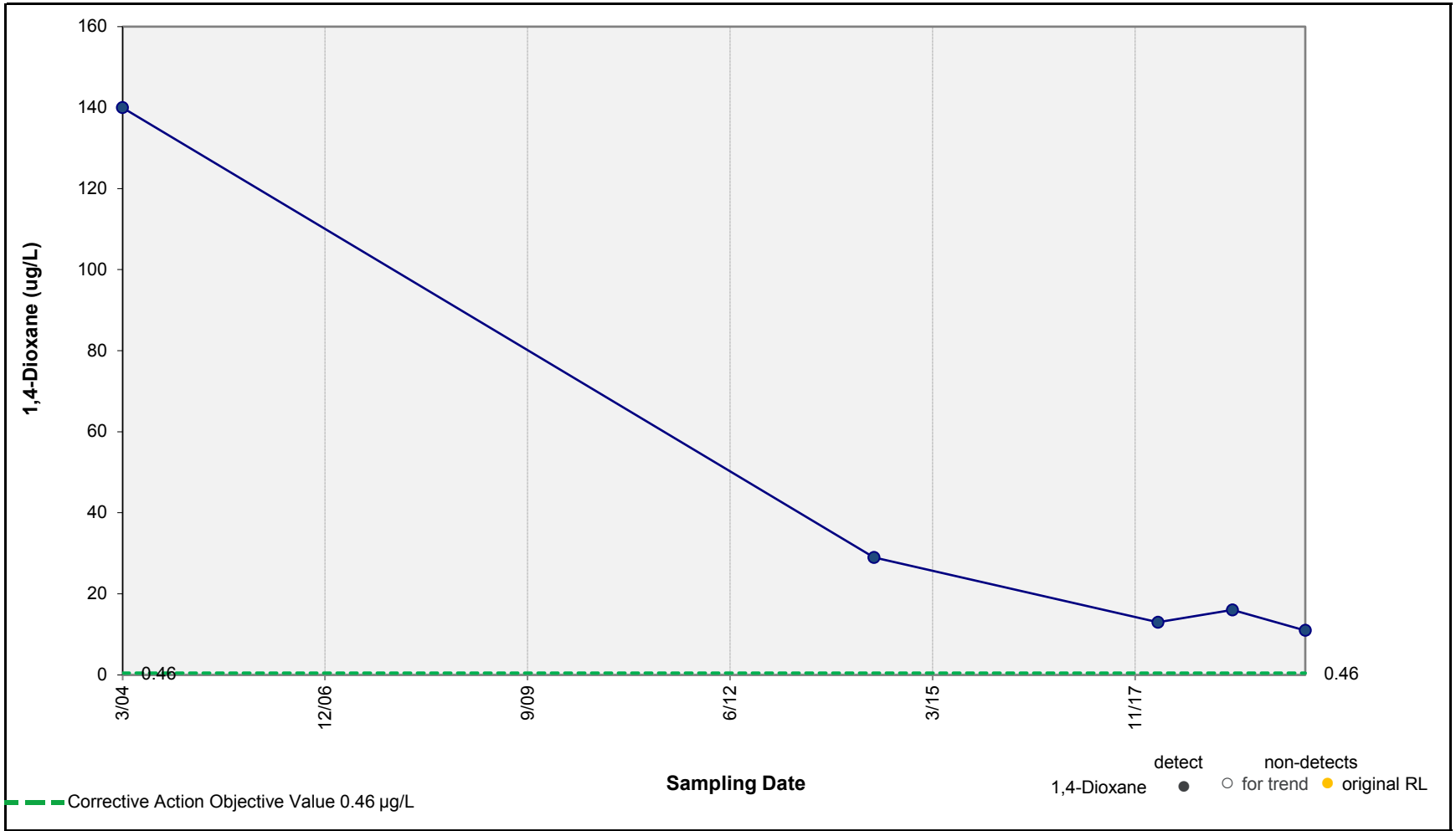
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-50



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

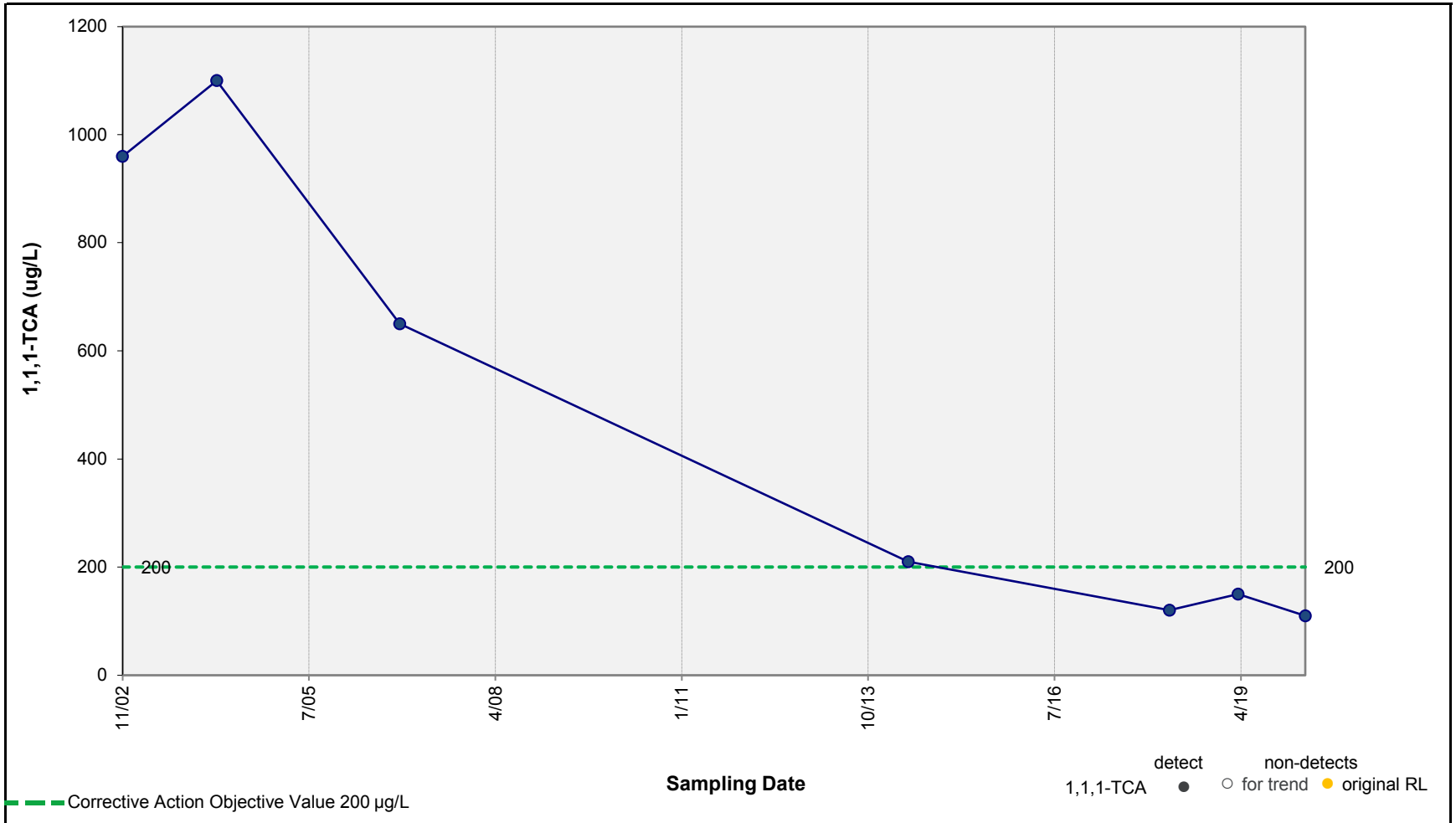
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-51



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.3E-01 ug/L Per Day

95% Confidence Interval = -1.9E-01 to -4.7E-02 ug/L Per Day

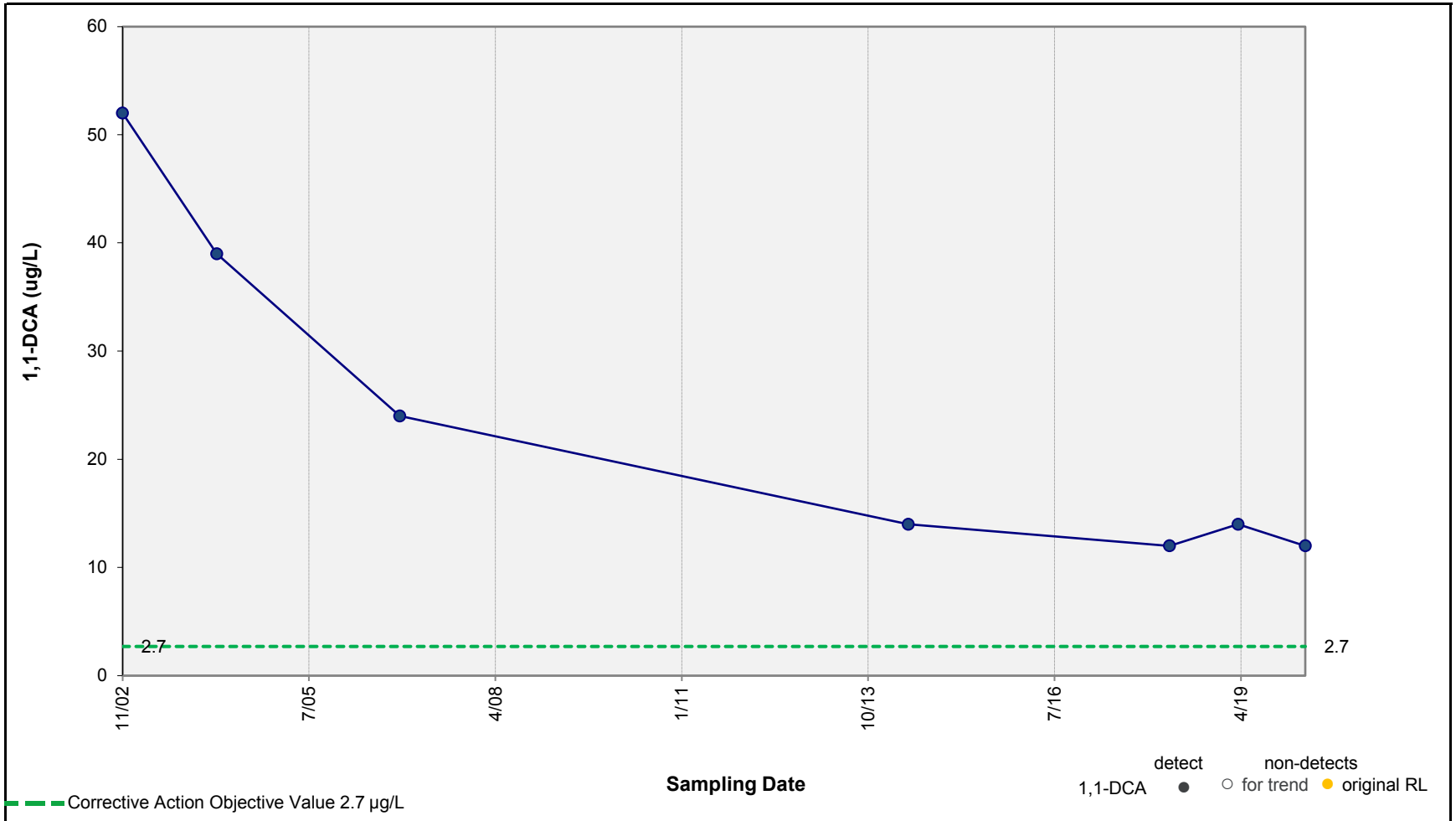
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-52



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -4.6E-03 ug/L Per Day

95% Confidence Interval = -8.8E-03 to -1.5E-03 ug/L Per Day

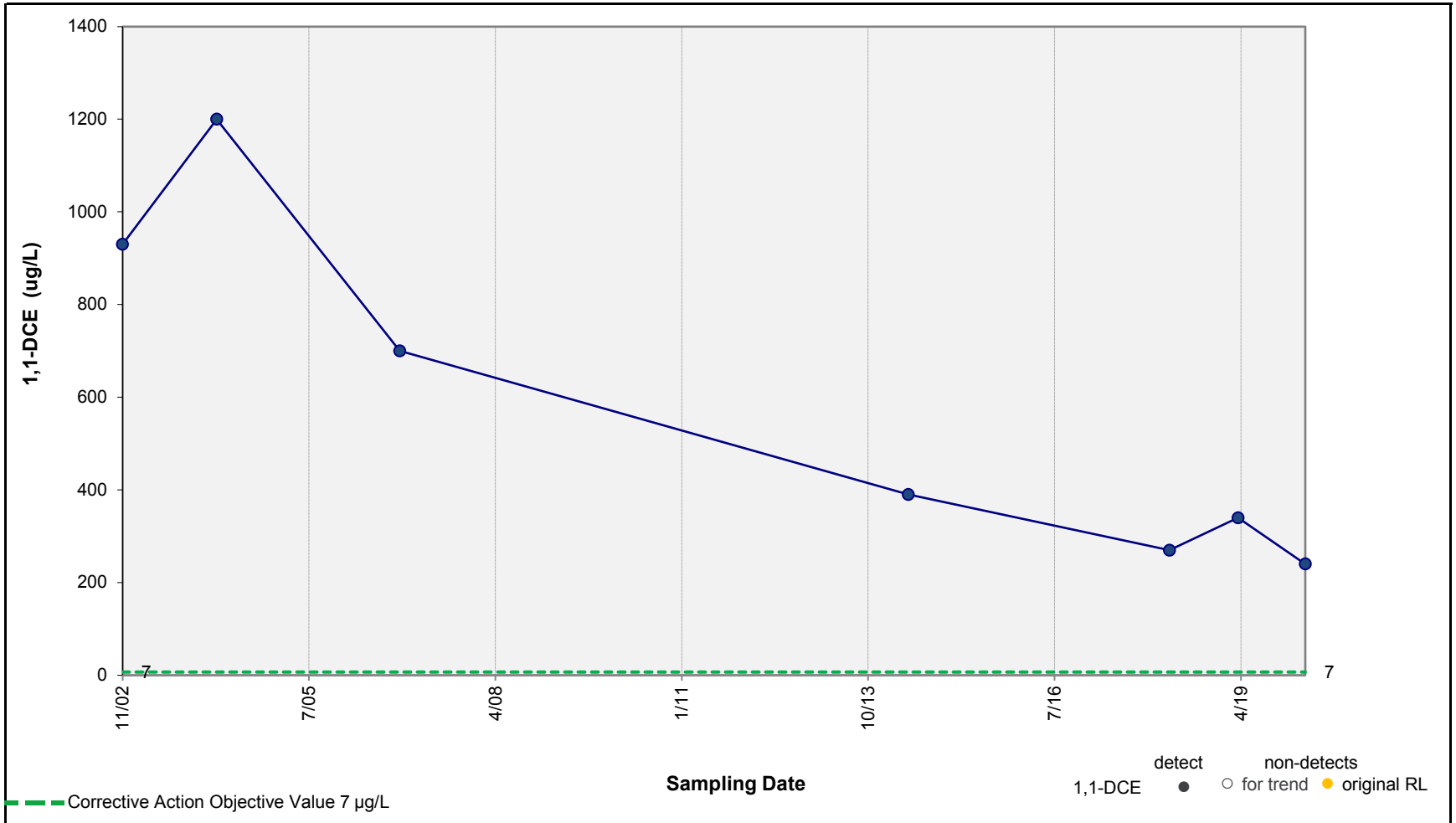
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-53



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.1E-01 ug/L Per Day

95% Confidence Interval = -1.8E-01 to -7.0E-02 ug/L Per Day

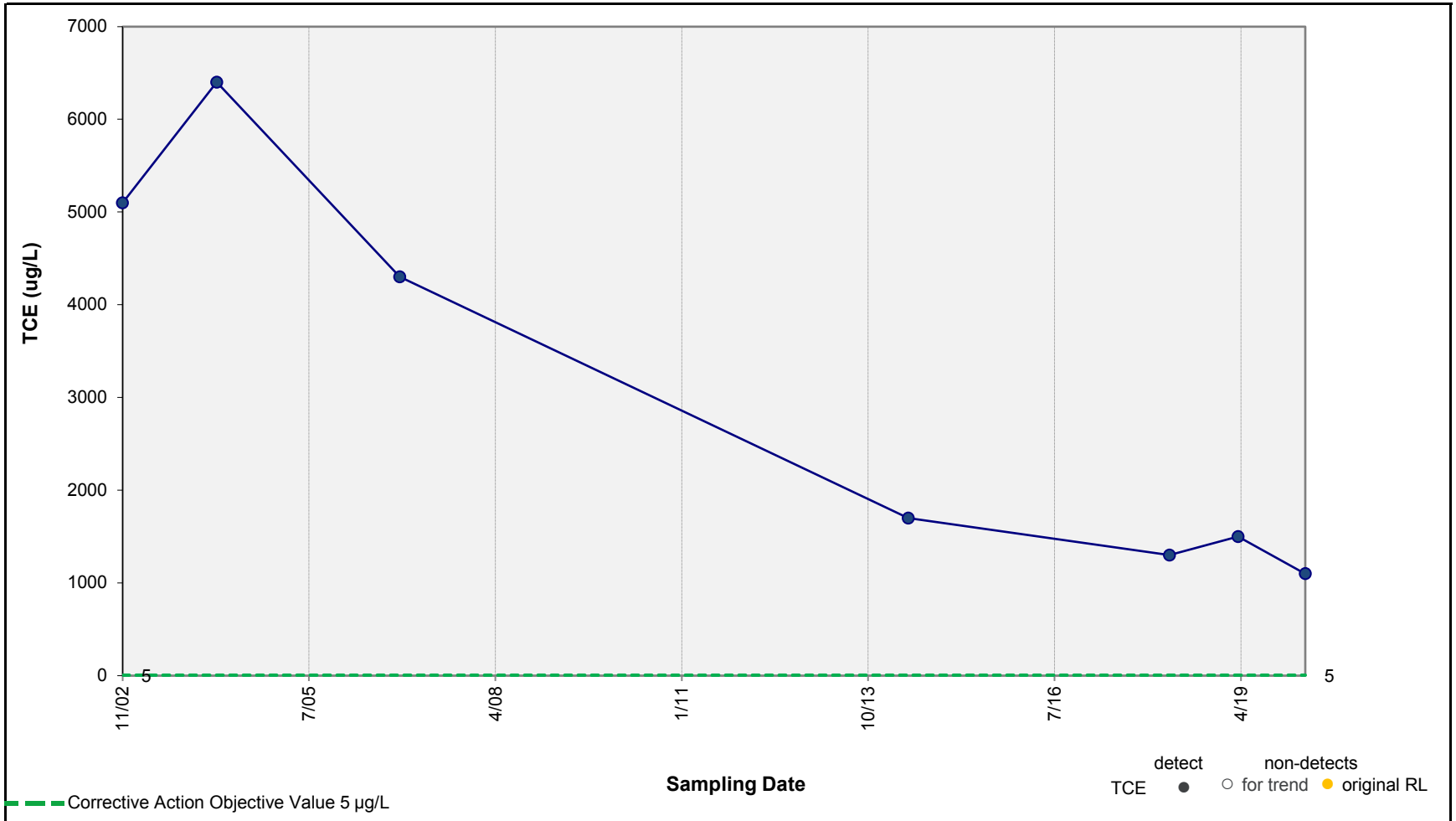
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-54



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -6.6E-01 ug/L Per Day

95% Confidence Interval = -1.0E+00 to -2.8E-01 ug/L Per Day

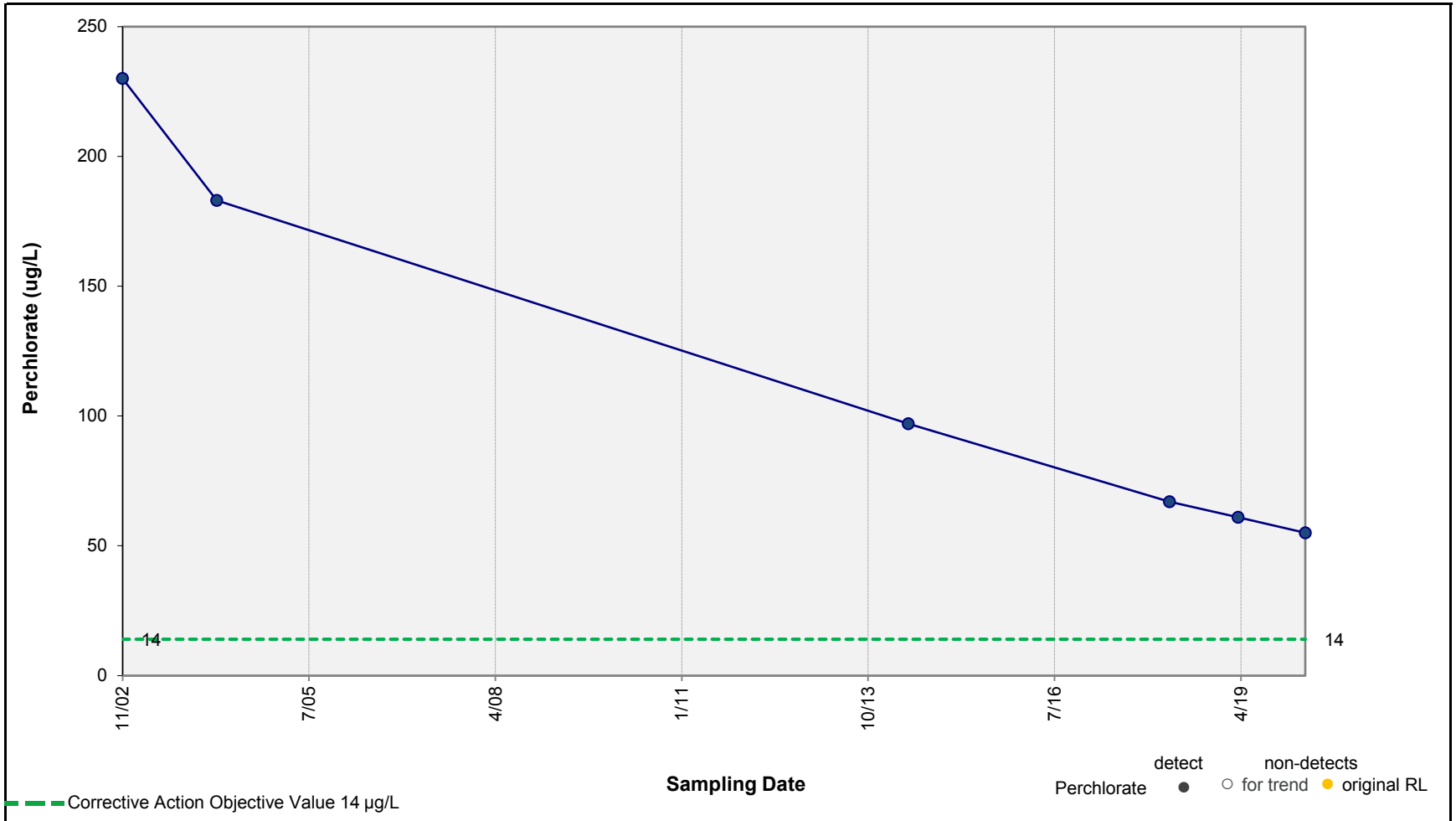
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-22M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-55



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.2E-02 ug/L Per Day

95% Confidence Interval = -3.1E-02 to -1.8E-02 ug/L Per Day

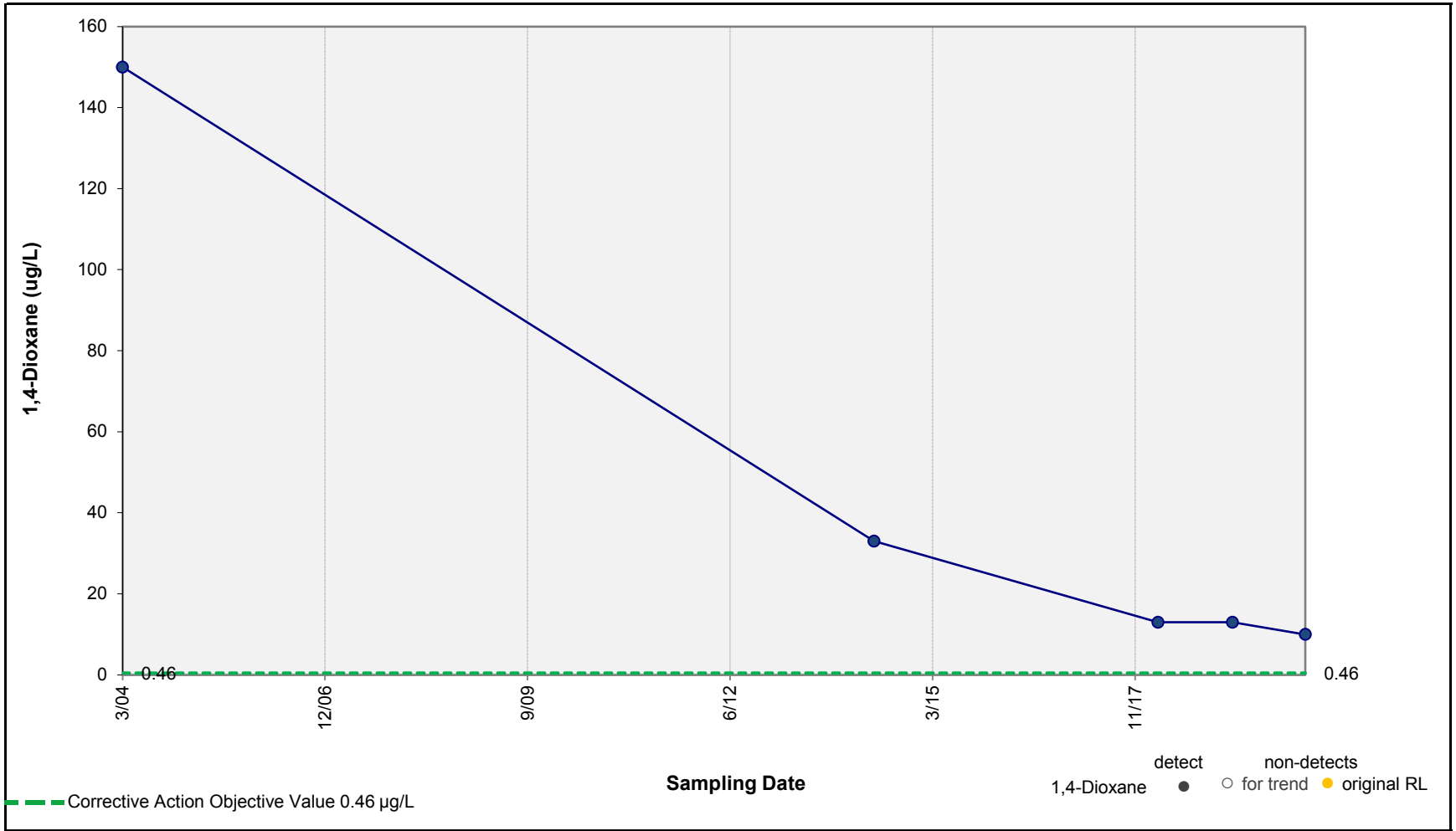
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-56



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.025 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.3E-02 ug/L Per Day

95% Confidence Interval = -3.1E-02 to -4.6E-03 ug/L Per Day

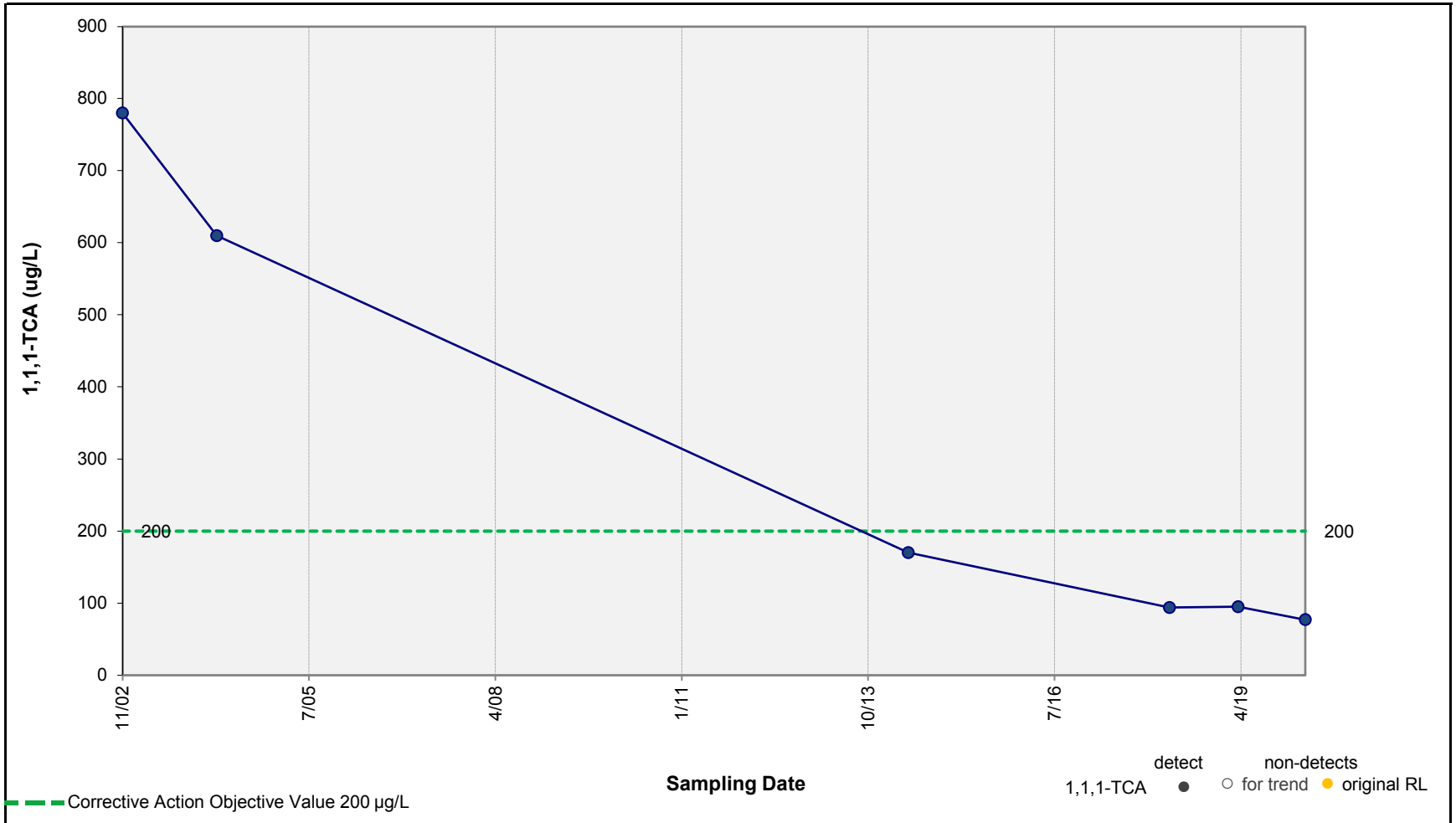
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-57



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -9.4E-02 ug/L Per Day

95% Confidence Interval = -1.4E-01 to -4.3E-02 ug/L Per Day

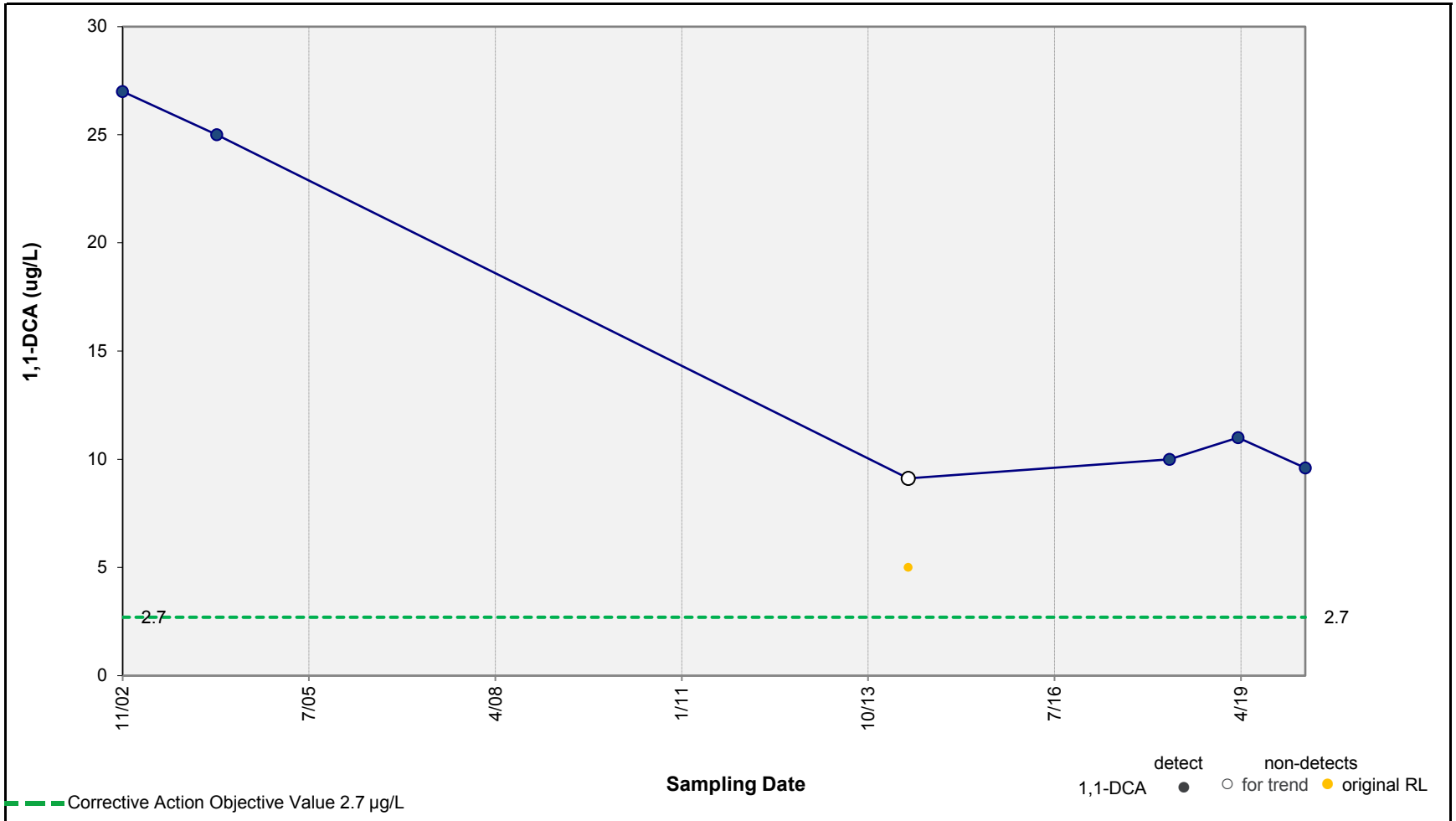
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-58



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.136 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.7E-03 ug/L Per Day

95% Confidence Interval = -4.2E-03 to 5.1E-04 ug/L Per Day

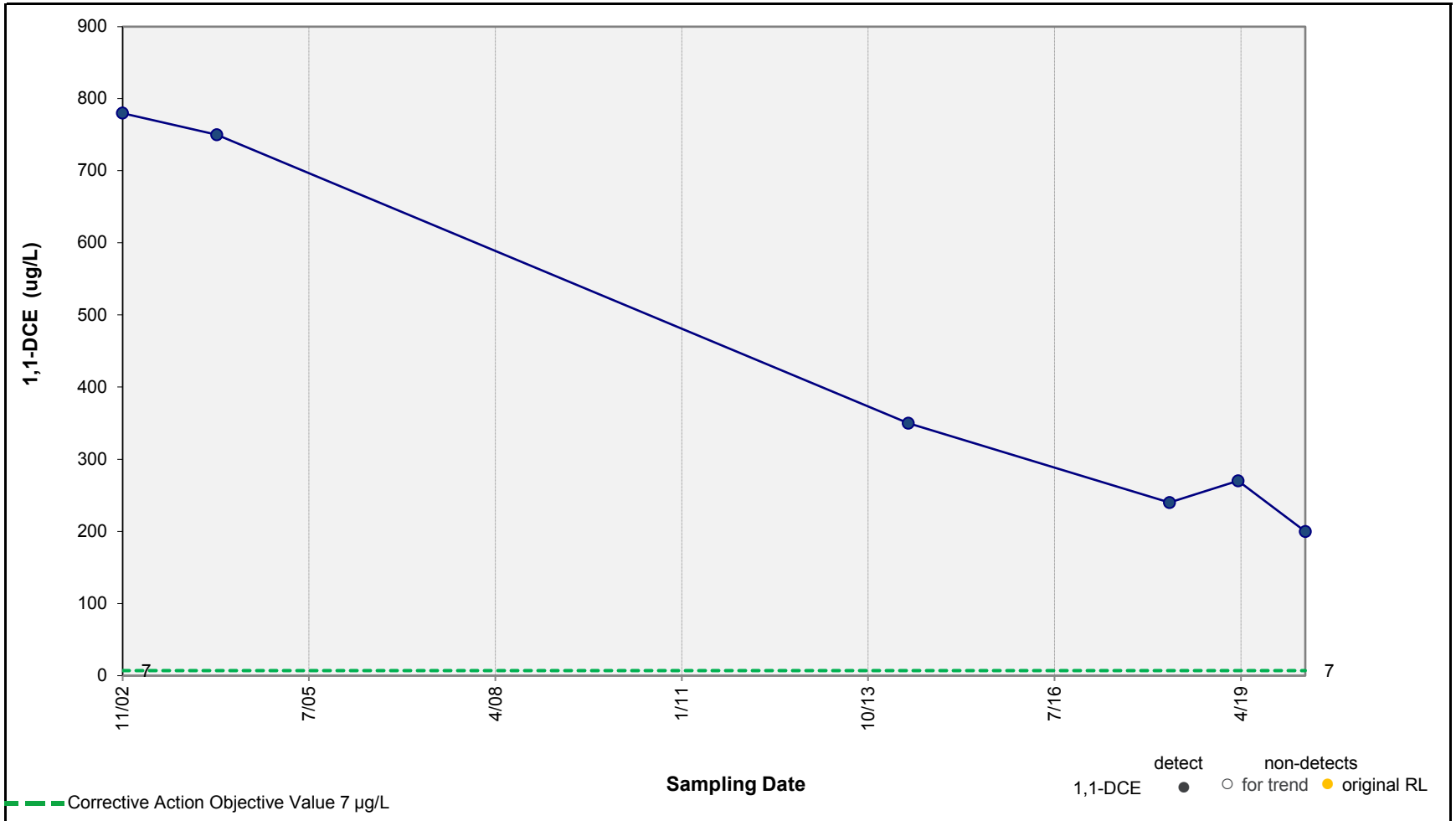
ARCADIS

Concentration vs. Time Plot – 1,1-DCA in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-59



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -8.8E-02 ug/L Per Day

95% Confidence Interval = -1.1E-01 to -5.6E-02 ug/L Per Day

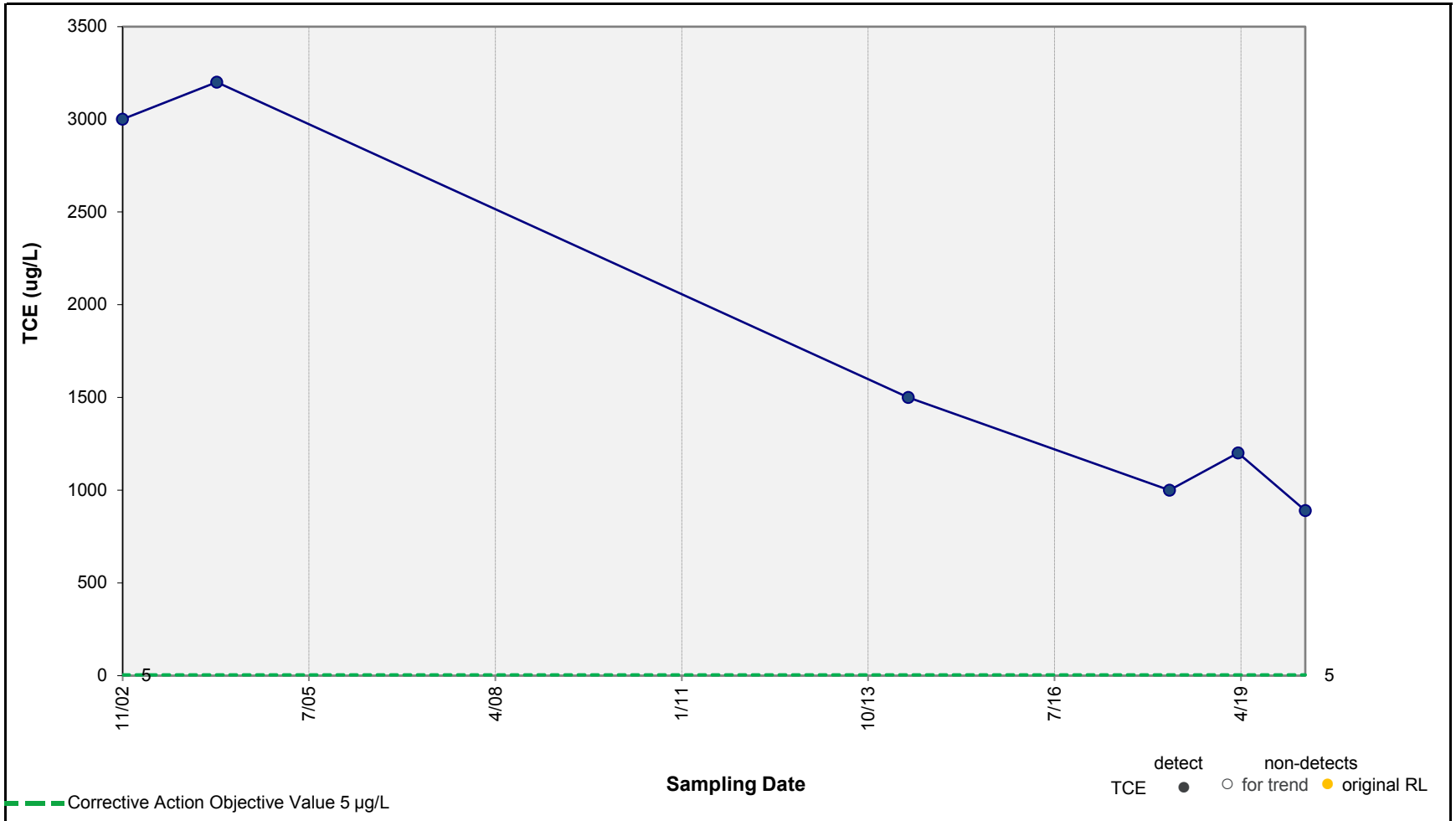
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-60



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -3.6E-01 ug/L Per Day

95% Confidence Interval = -4.5E-01 to -1.6E-01 ug/L Per Day

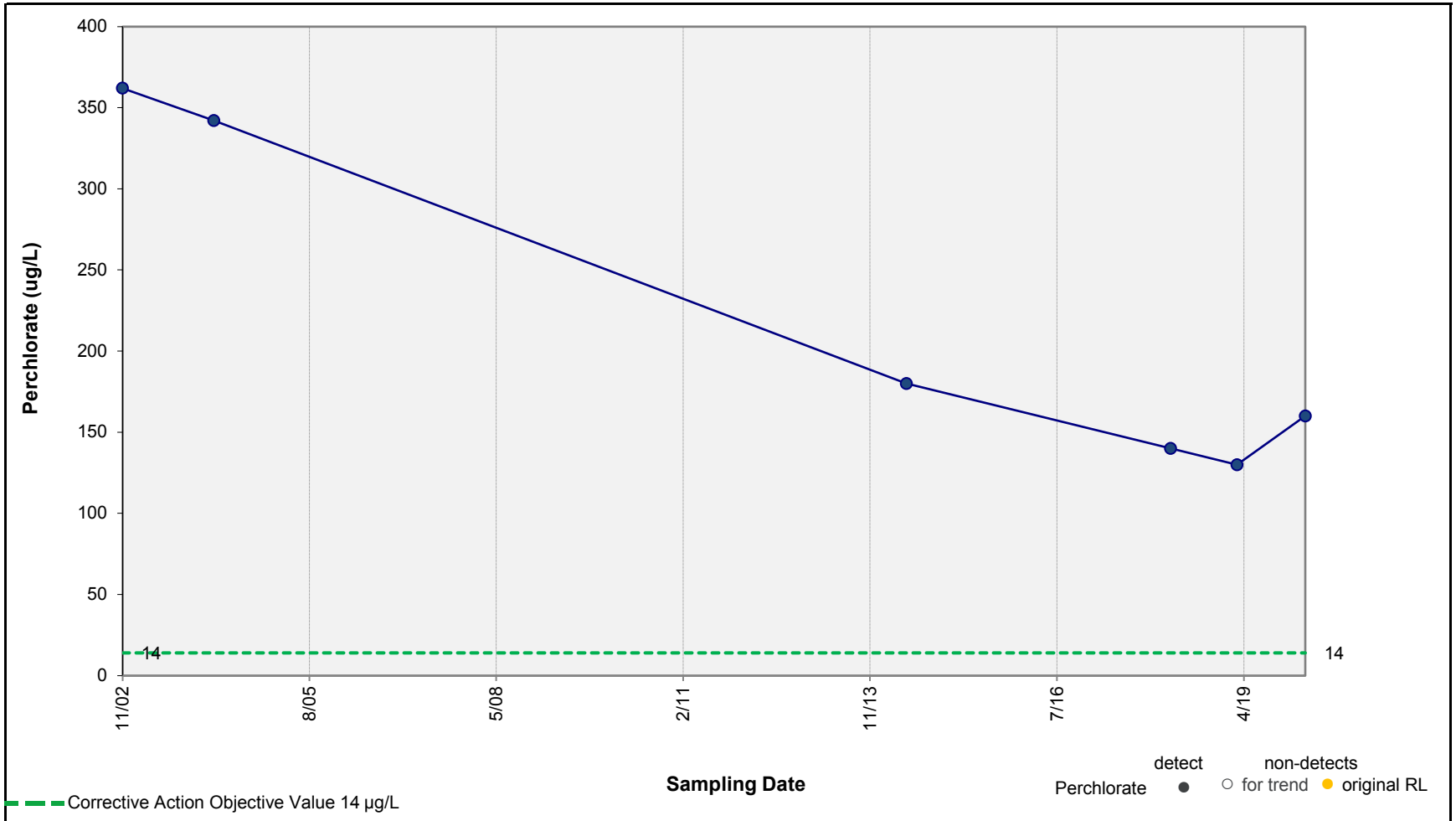
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-22S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-61



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -3.2E-02 ug/L Per Day

95% Confidence Interval = -4.3E-02 to -1.5E-02 ug/L Per Day

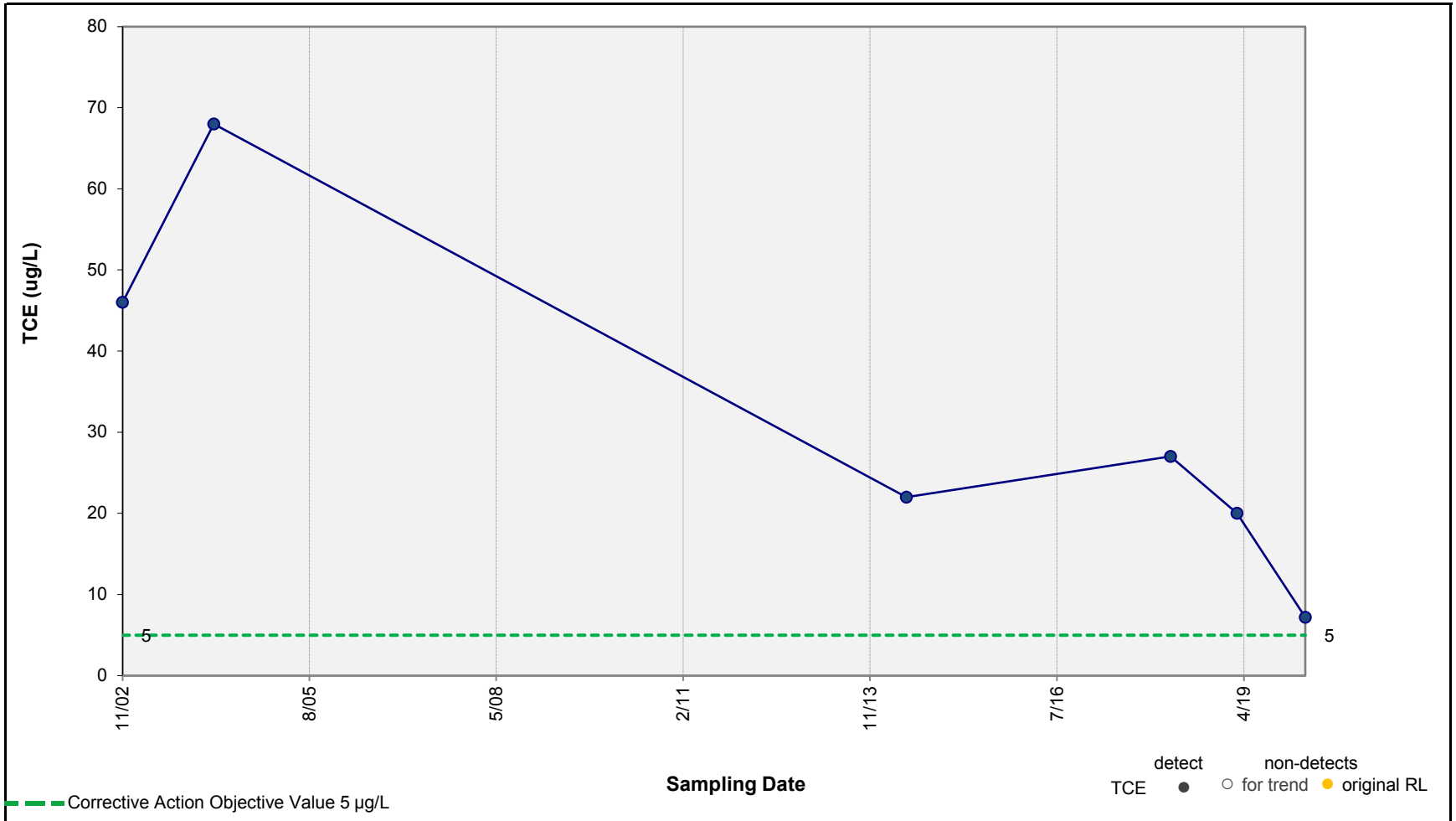
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-24

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-62



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -6.9E-03 ug/L Per Day

95% Confidence Interval = -2.5E-02 to -1.8E-03 ug/L Per Day

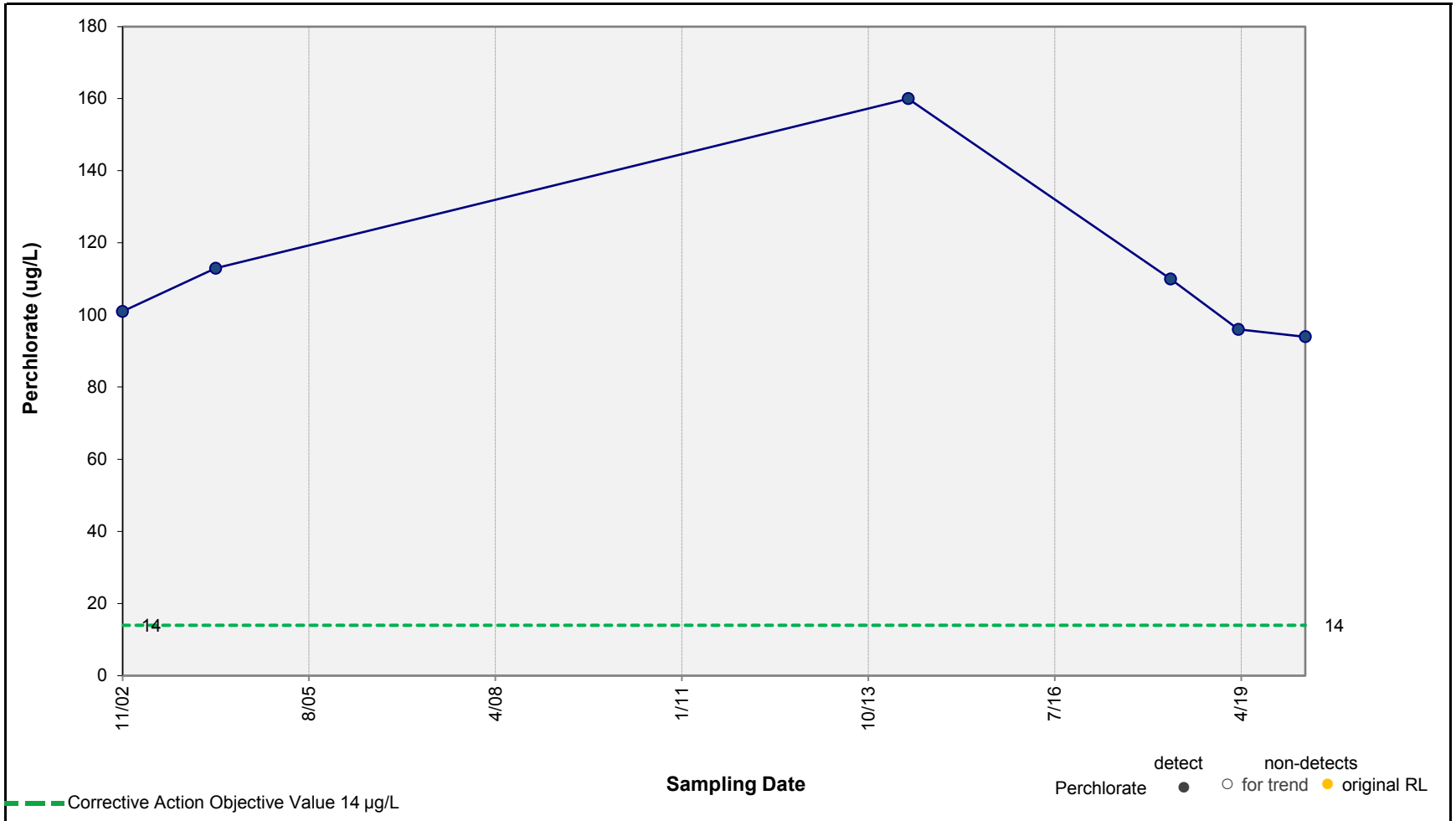
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-24

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-63



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.136 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.1E-03 ug/L Per Day

95% Confidence Interval = -3.6E-02 to 9.5E-03 ug/L Per Day

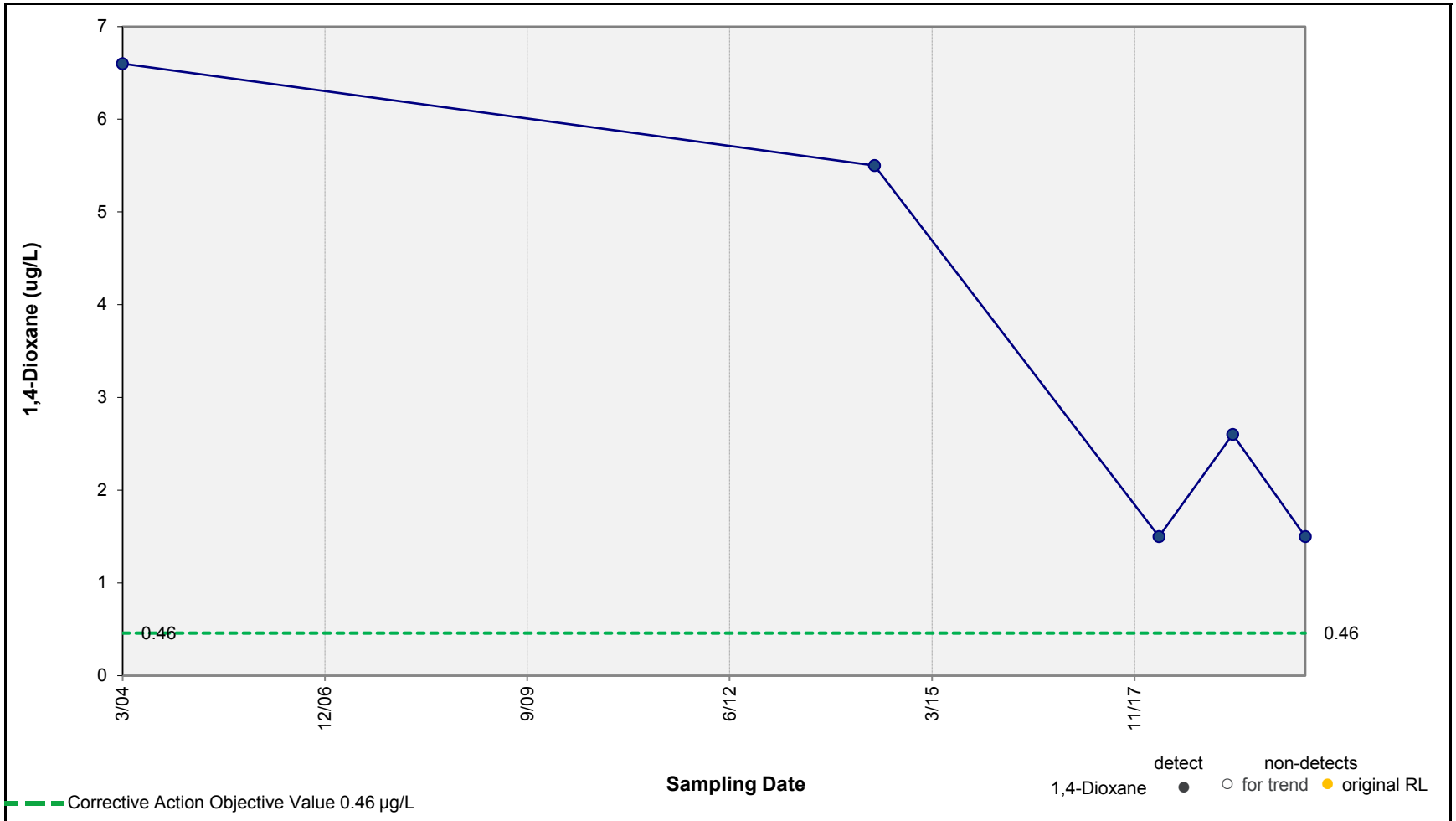
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-26M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-64



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.080 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -9.3E-04 ug/L Per Day

95% Confidence Interval = -3.0E-03 to -3.6E-05 ug/L Per Day

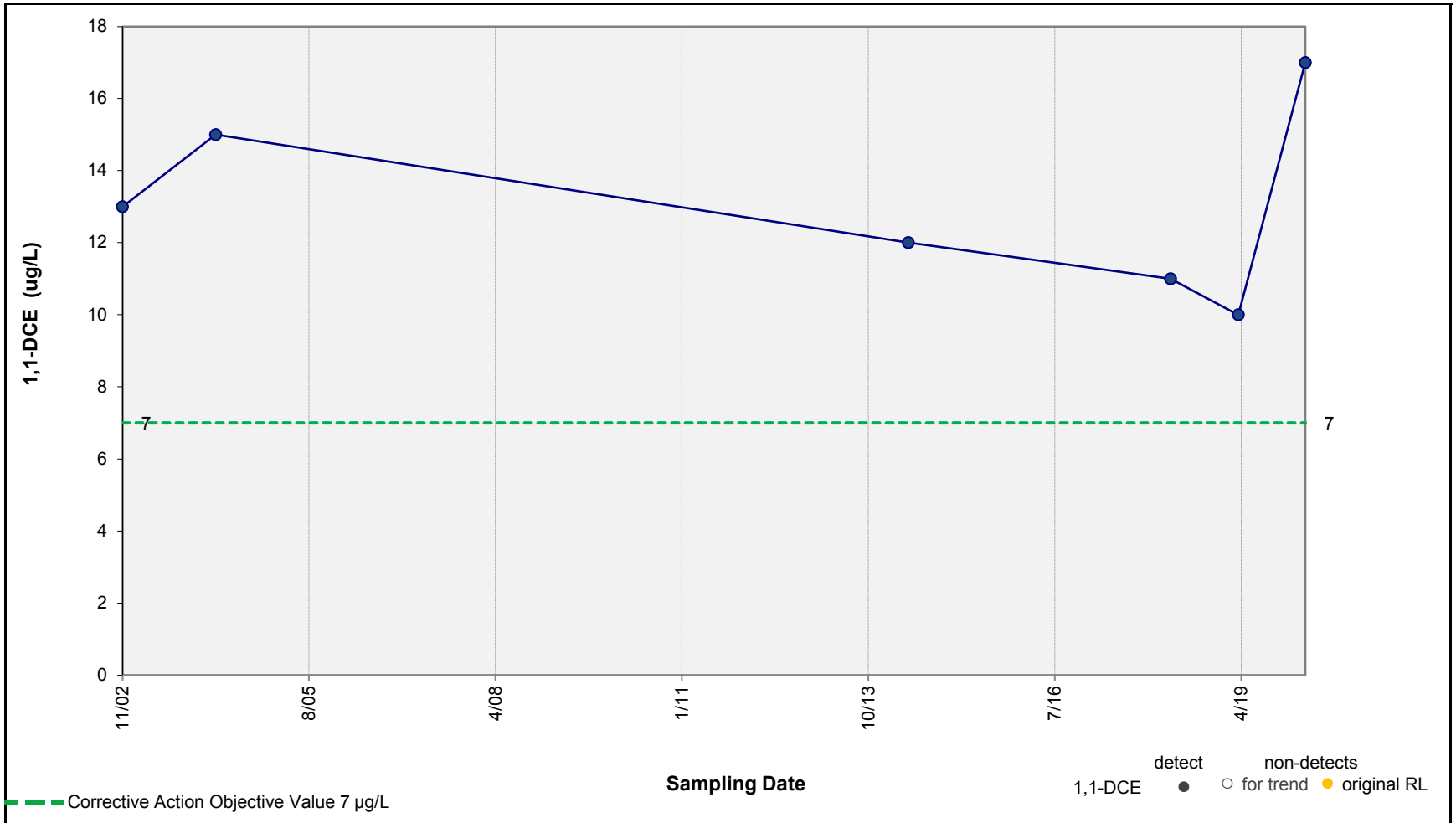
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-26M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-65



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.360 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.6E-04 ug/L Per Day

95% Confidence Interval = -1.1E-03 to 3.5E-03 ug/L Per Day

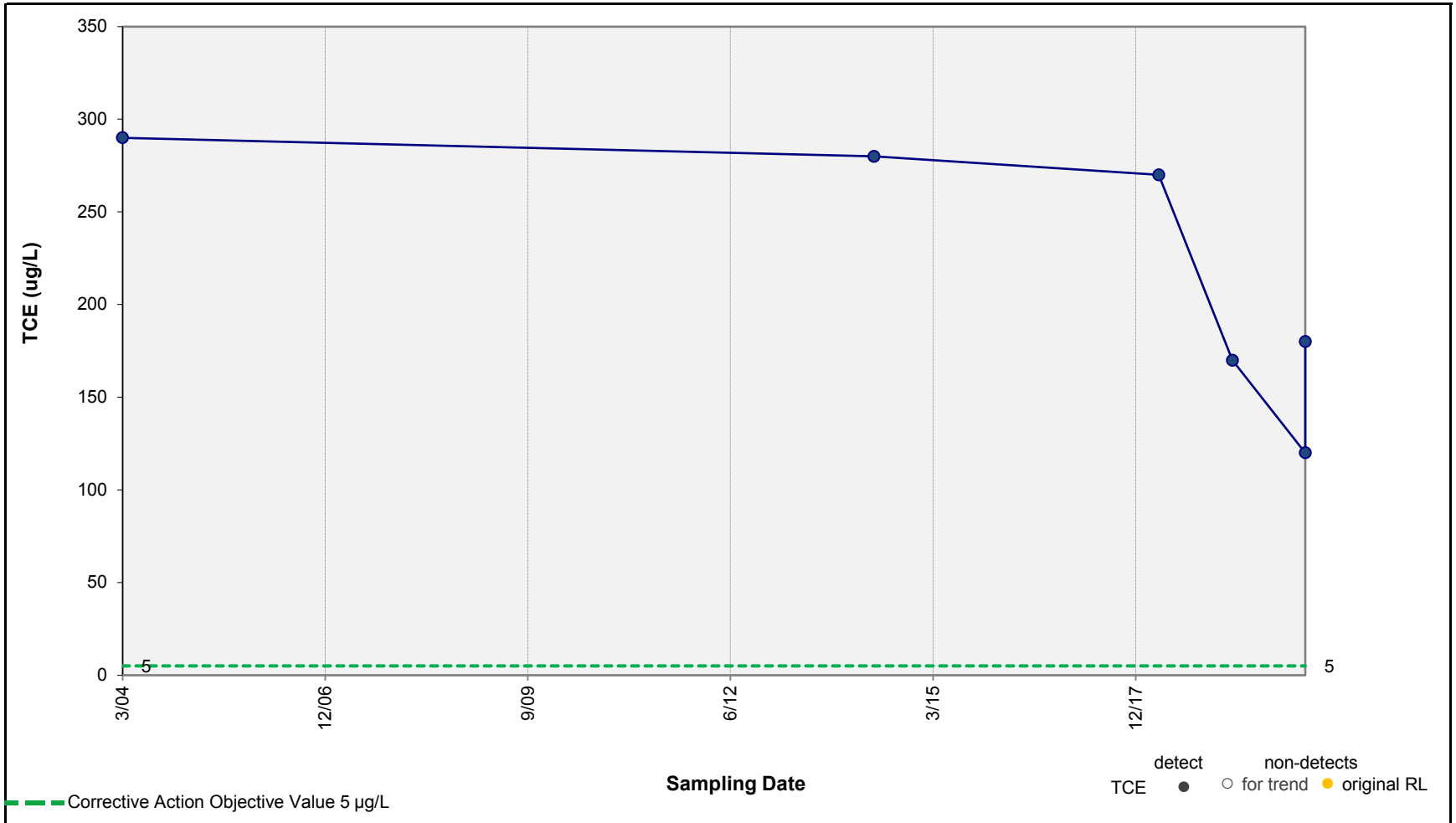
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-26M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-66



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

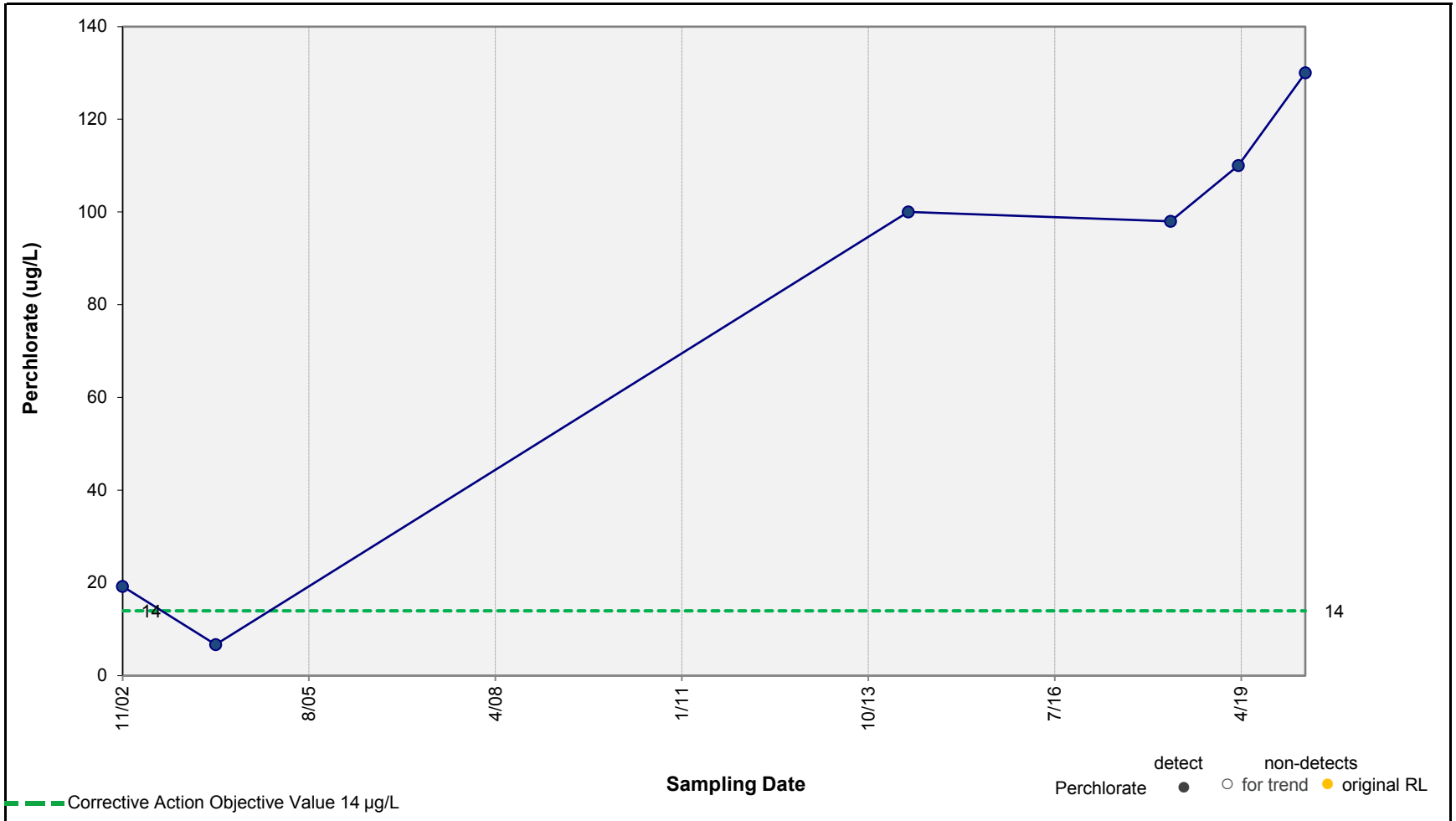
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-26M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-67



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 1.8E-02 ug/L Per Day

95% Confidence Interval = 5.8E-04 to 3.1E-02 ug/L Per Day

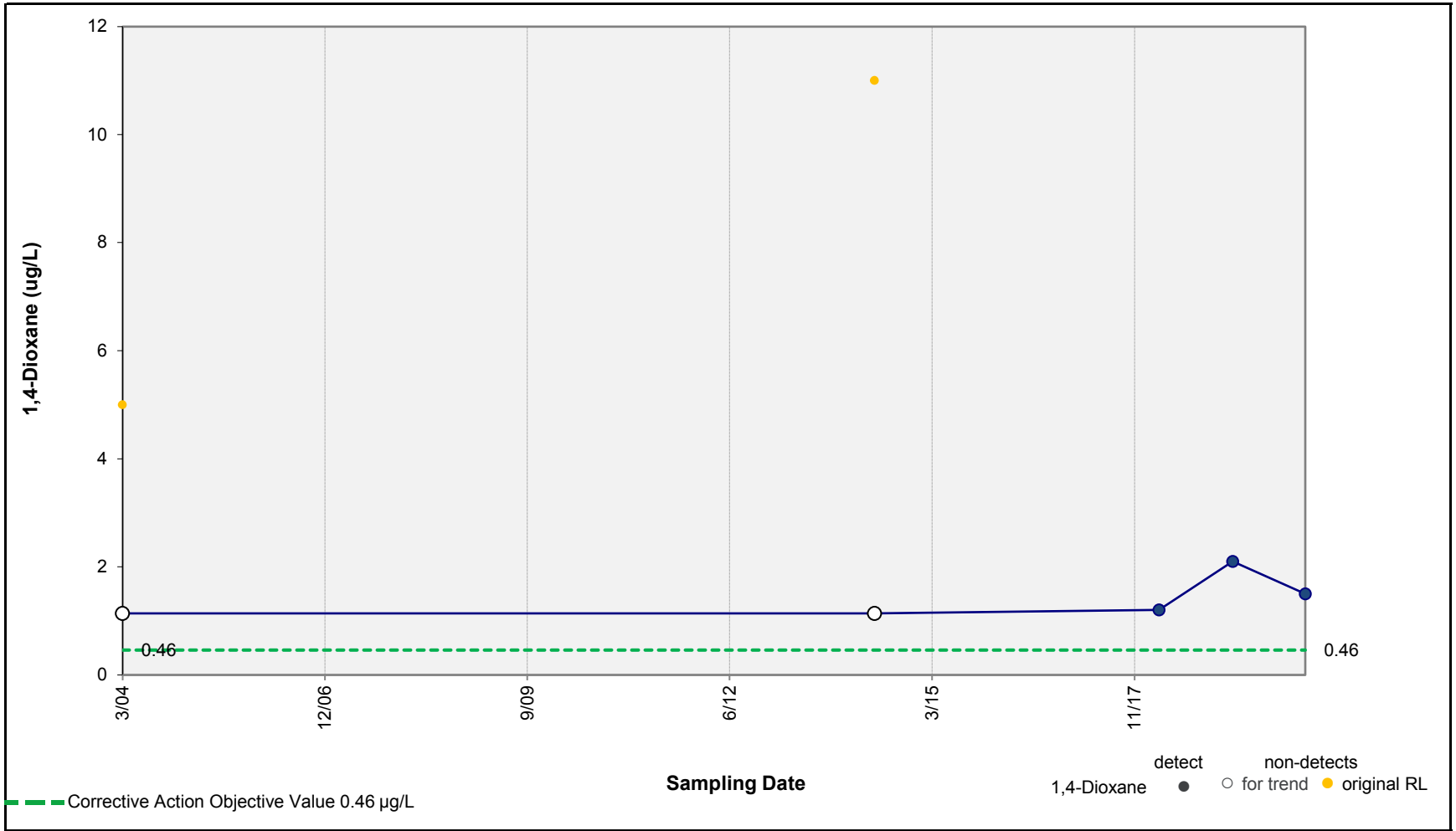
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-26S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-68



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.080 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.2E-04 ug/L Per Day

95% Confidence Interval = -1.5E-03 to 5.3E-04 ug/L Per Day

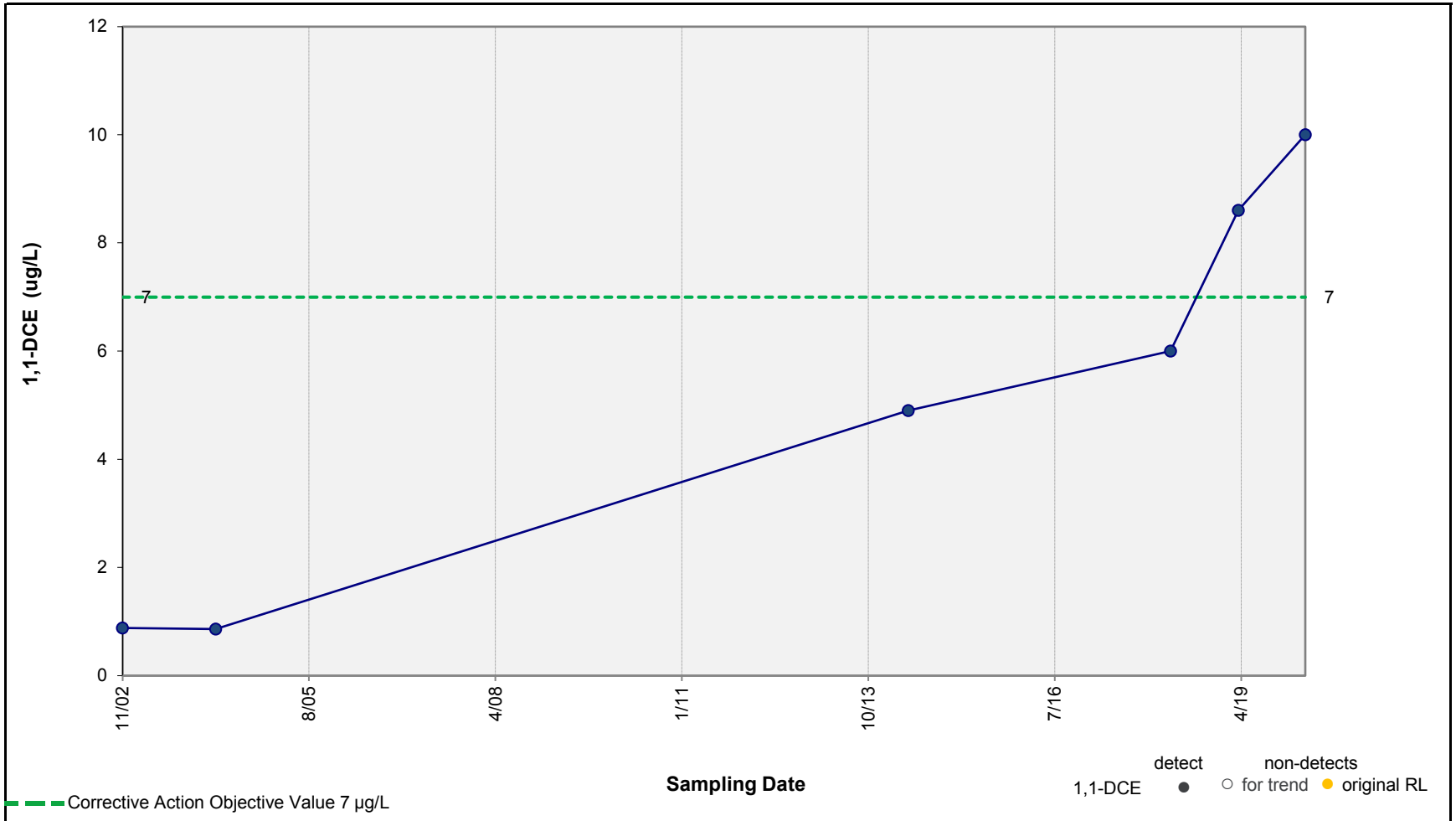
ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well GM-26S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-69



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 1.4E-03 ug/L Per Day

95% Confidence Interval = 8.2E-04 to 3.5E-03 ug/L Per Day

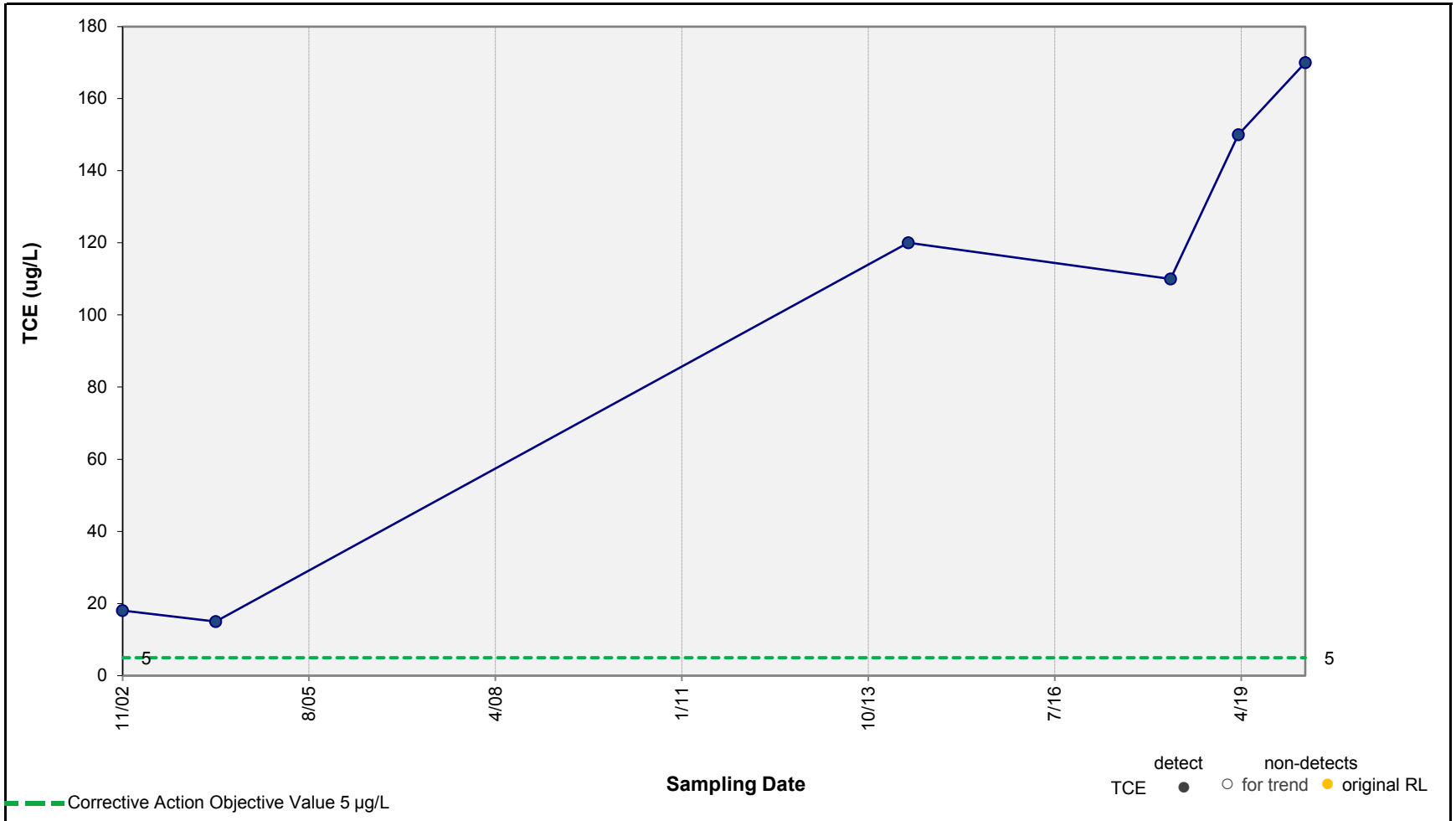
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well GM-26S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-70



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.028 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 2.4E-02 ug/L Per Day

95% Confidence Interval = 3.4E-04 to 4.8E-02 ug/L Per Day

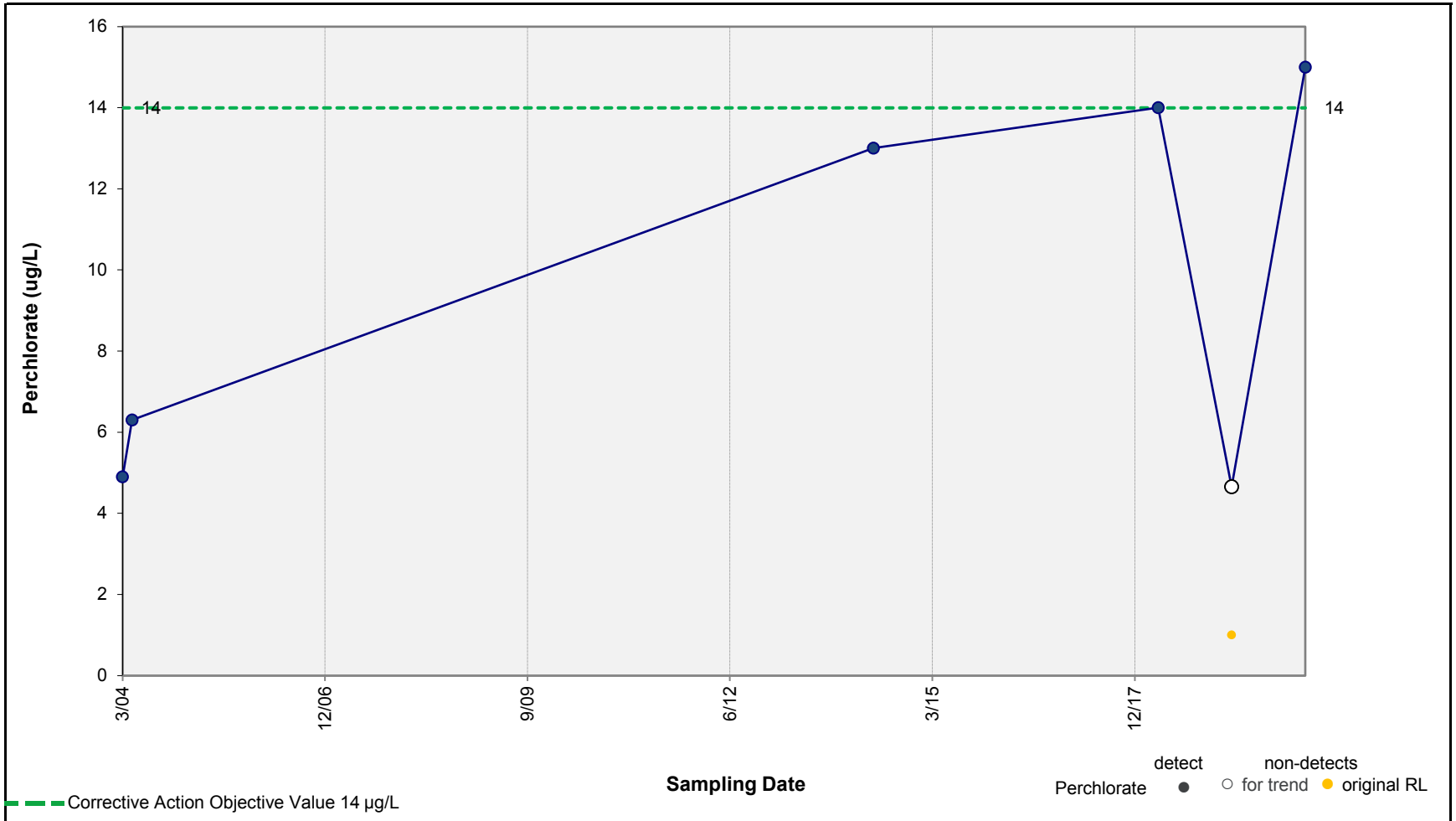
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-26S

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-71



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.136 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 1.5E-03 ug/L Per Day

95% Confidence Interval = -3.5E-03 to 2.1E-03 ug/L Per Day

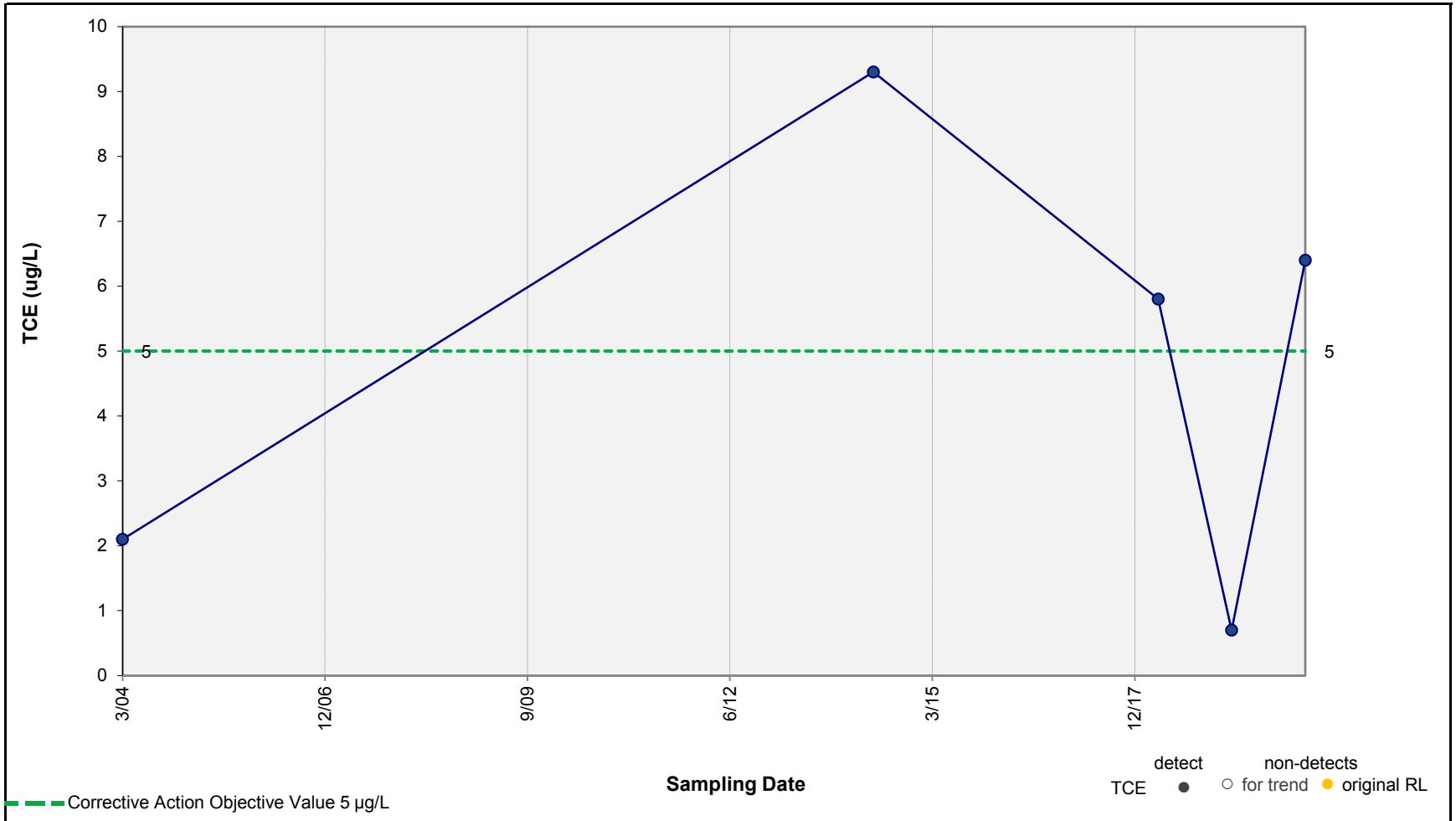
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-30M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-72



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.592 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

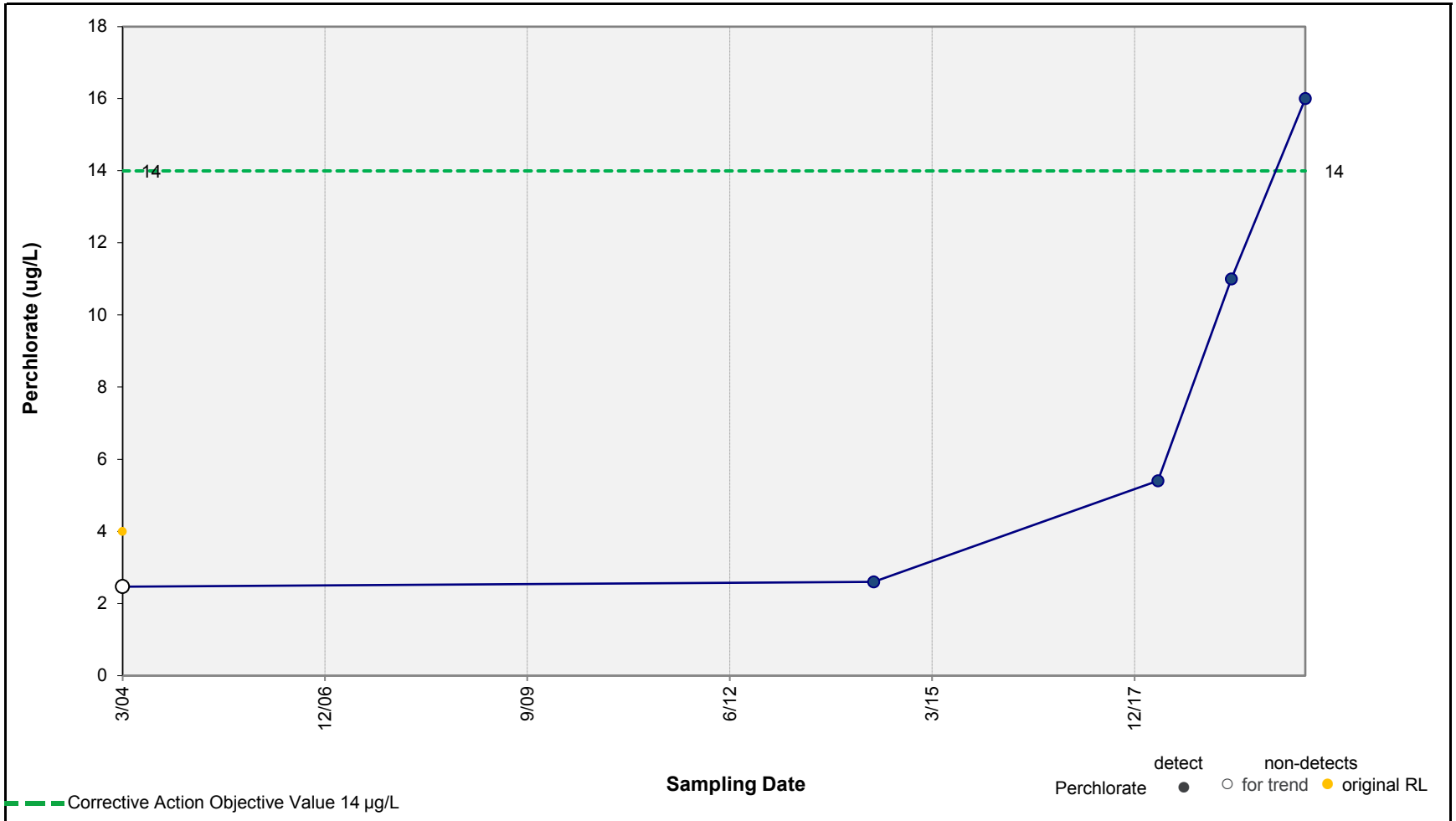
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-30M

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-73



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

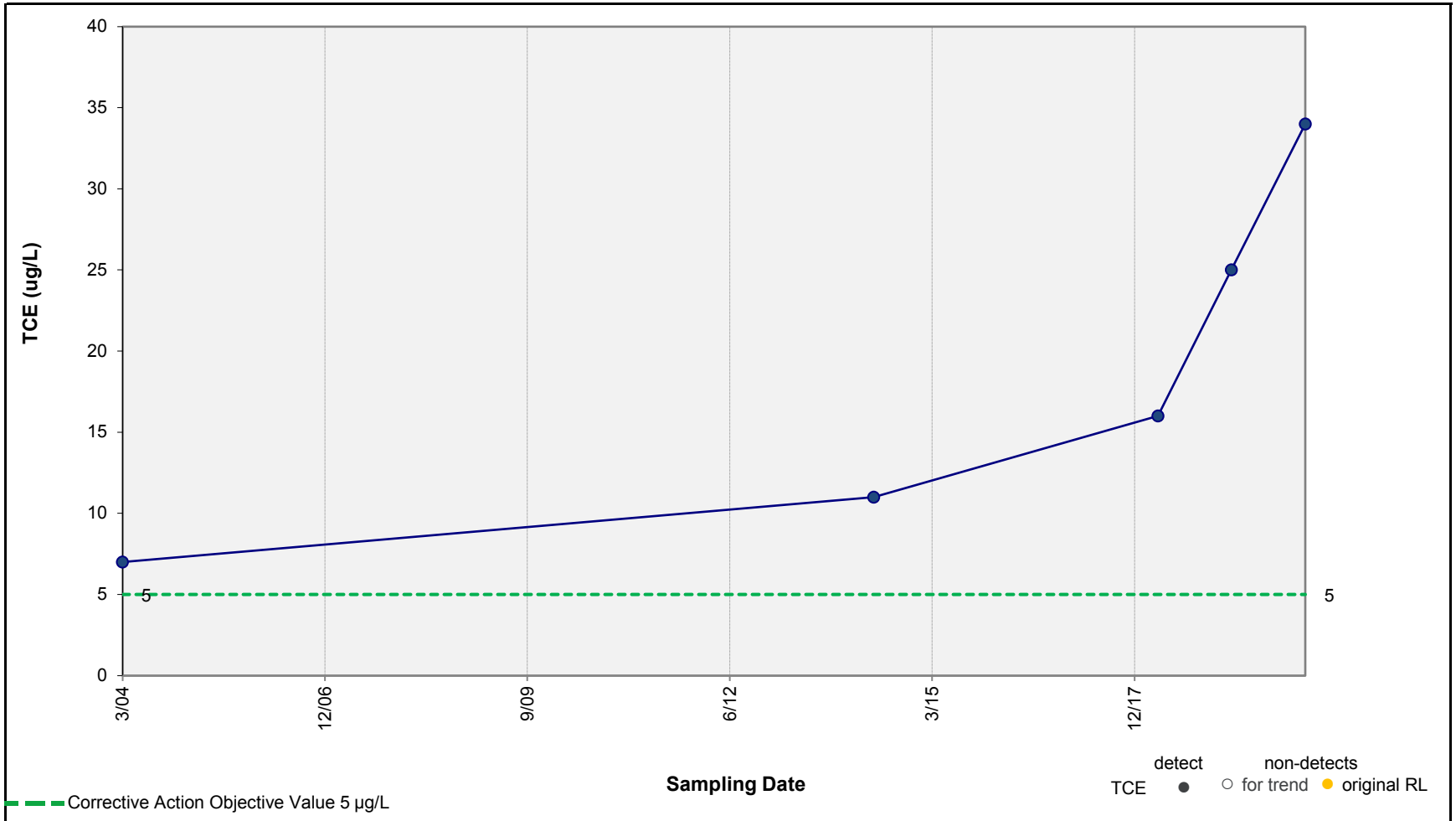
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well GM-32

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-74



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

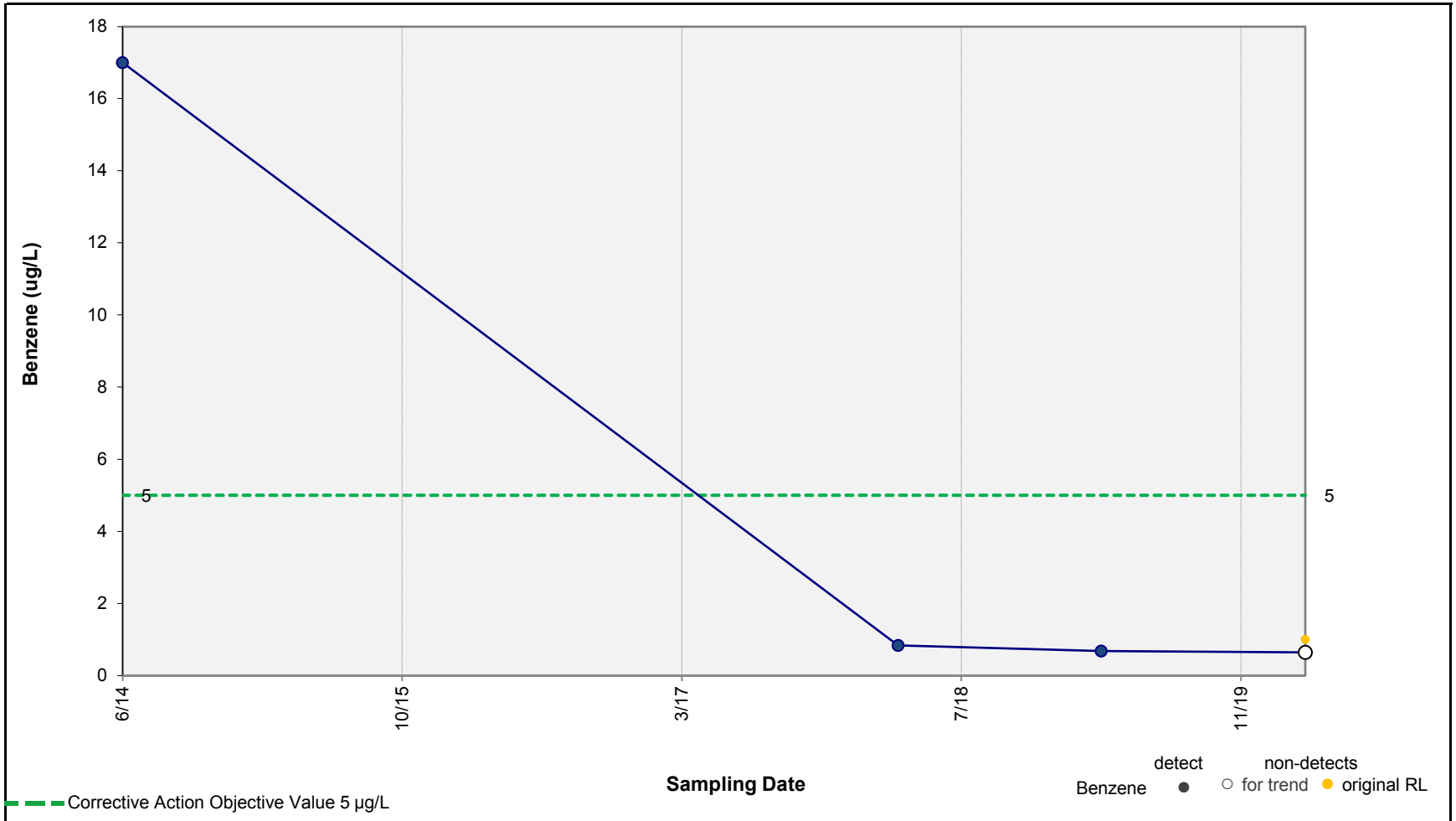
ARCADIS

Concentration vs. Time Plot – TCE in Well GM-32

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-75



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.042 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

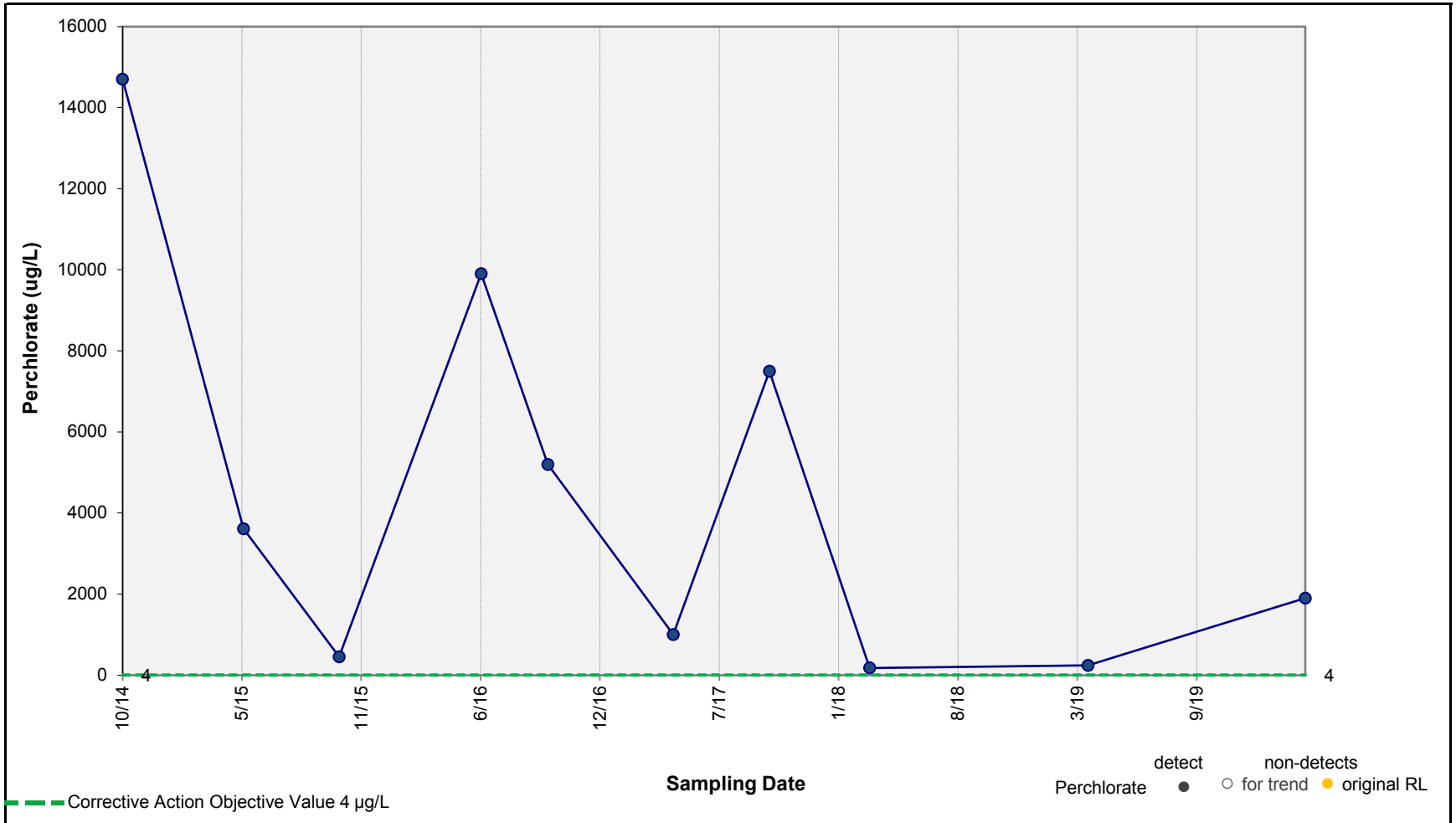
ARCADIS

Concentration vs. Time Plot – Benzene in Well GM-32D

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-76



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.078 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.6E+00 ug/L Per Day

95% Confidence Interval = -1.2E+01 to 8.7E-01 ug/L Per Day

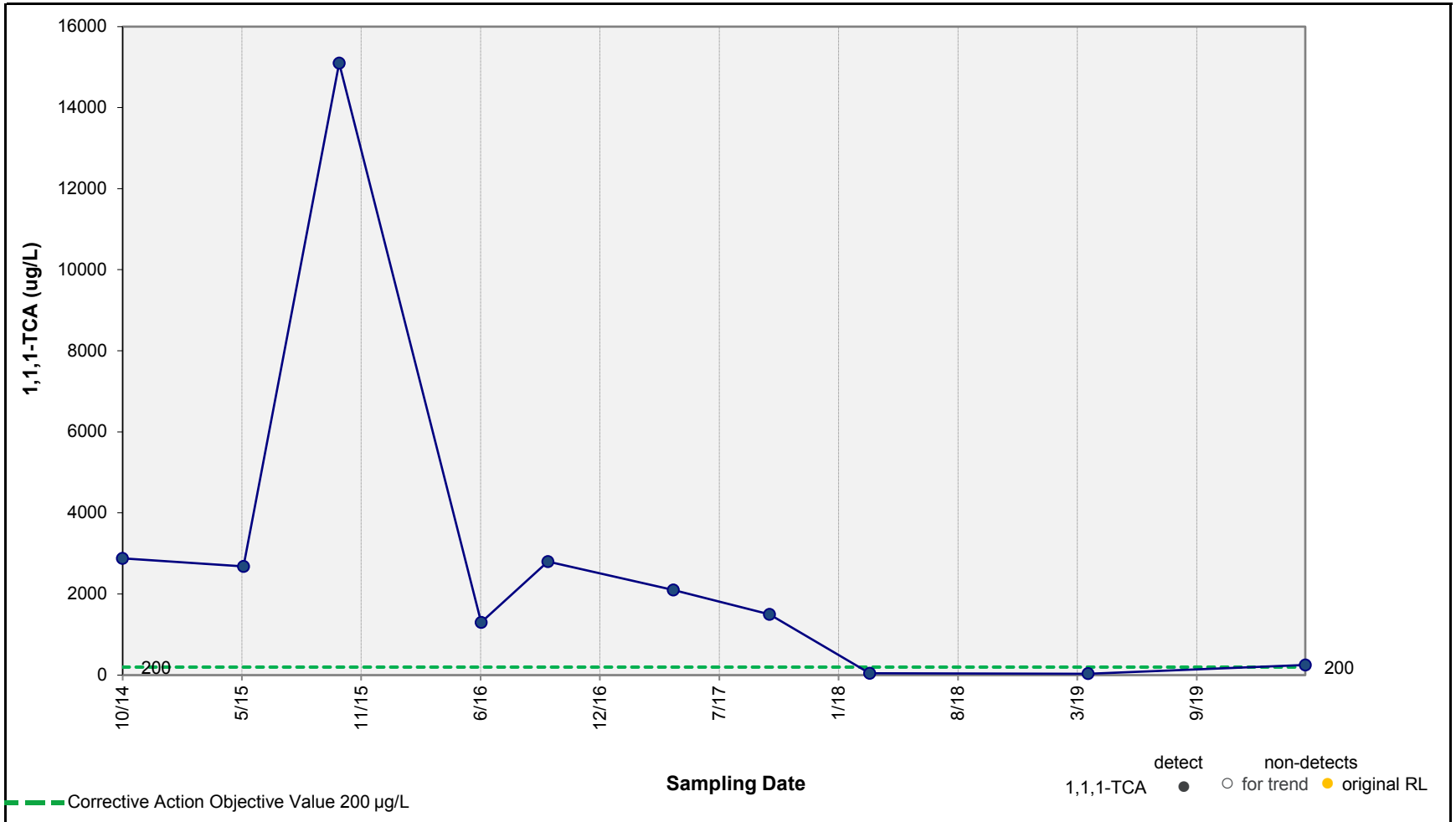
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-01

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-77



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.9E+00 ug/L Per Day

95% Confidence Interval = -3.6E+00 to -8.3E-01 ug/L Per Day

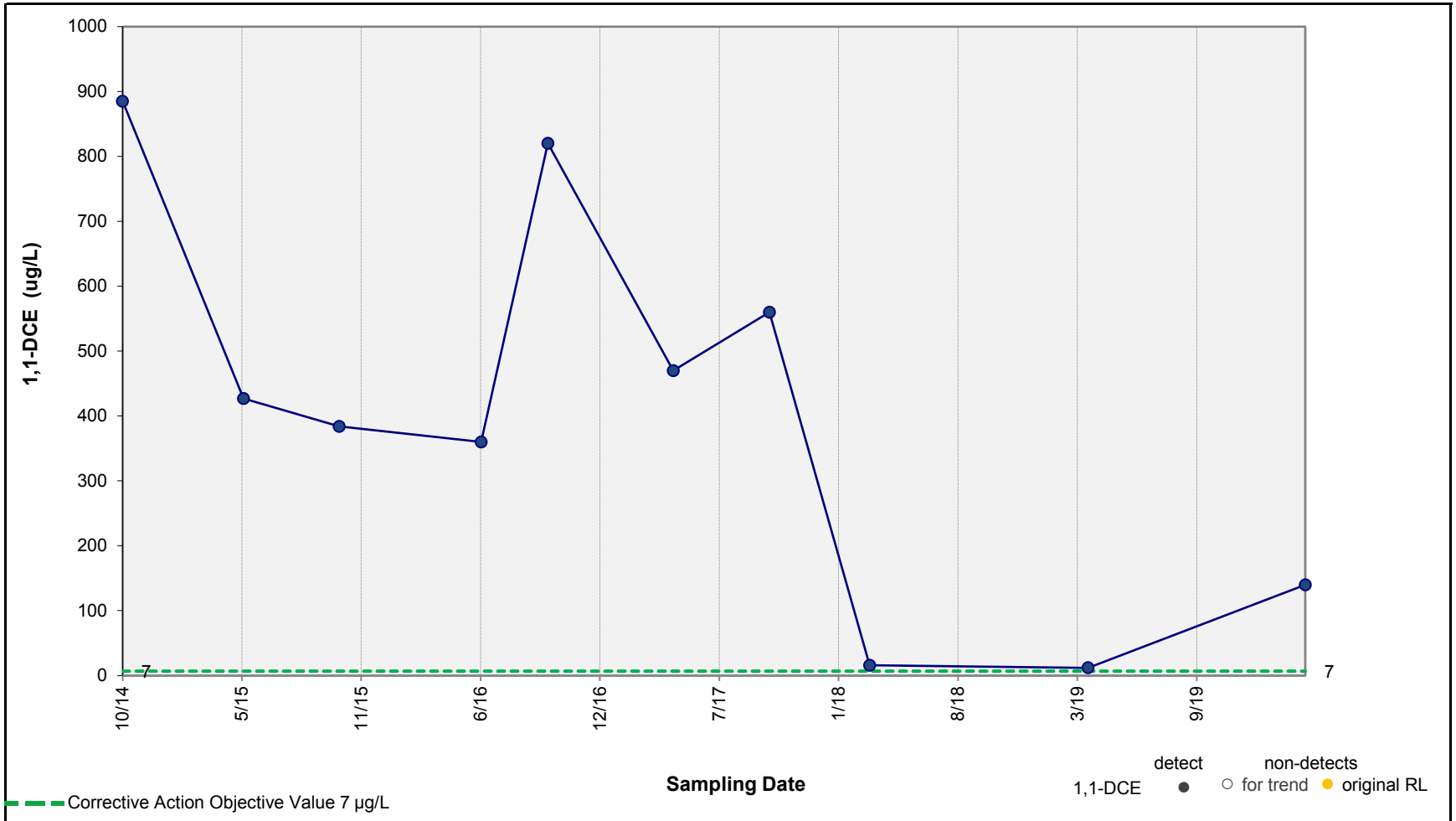
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well MW-01

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-78



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.036 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.0E-01 ug/L Per Day

95% Confidence Interval = -6.8E-01 to 2.1E-02 ug/L Per Day

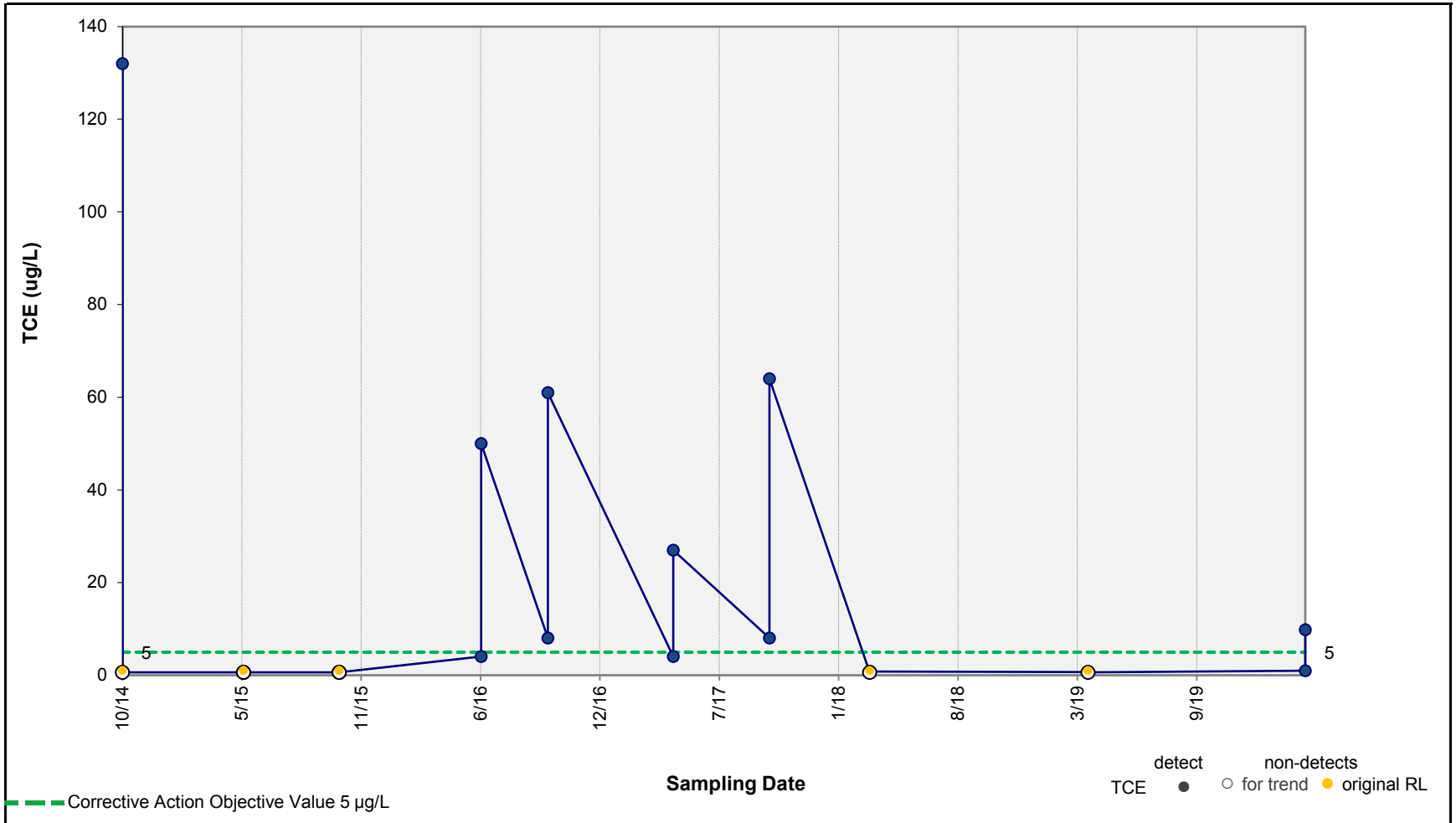
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-01

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-79



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.297 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

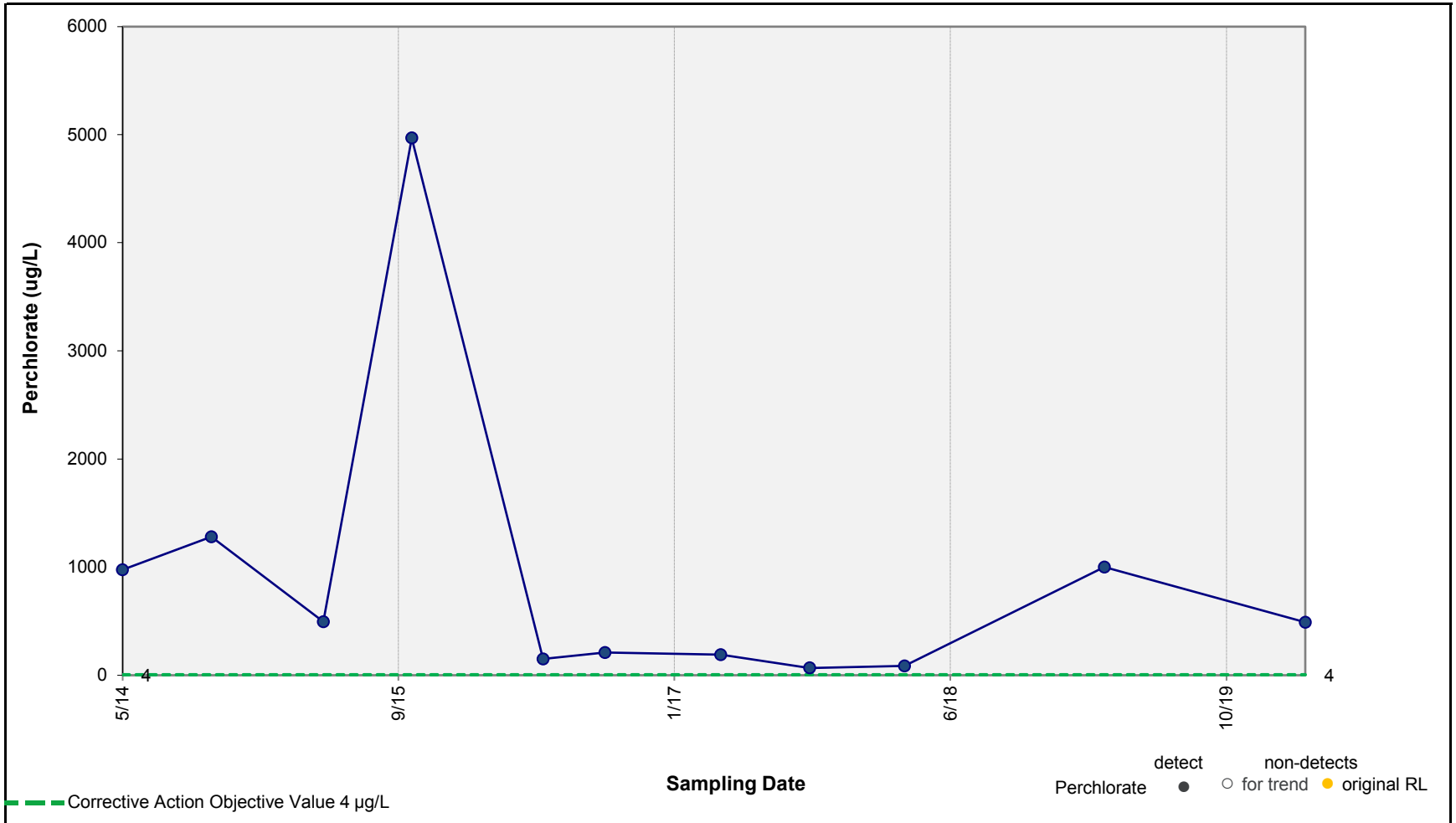
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-01

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-80



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.106 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.8E-01 ug/L Per Day

95% Confidence Interval = -1.1E+00 to 2.2E-01 ug/L Per Day

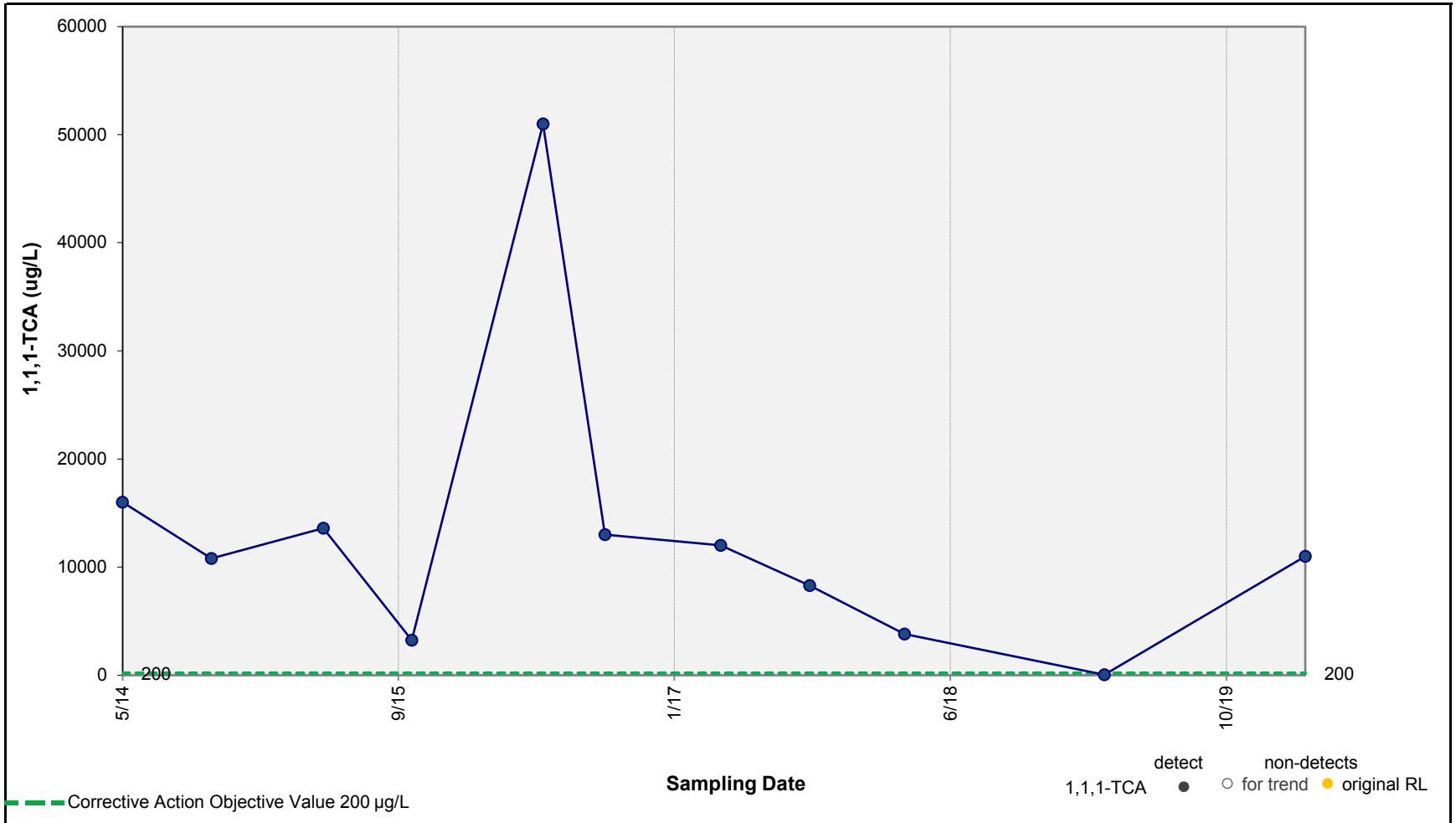
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-02

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-81



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.043 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -5.6E+00 ug/L Per Day

95% Confidence Interval = -1.7E+01 to 1.5E-01 ug/L Per Day

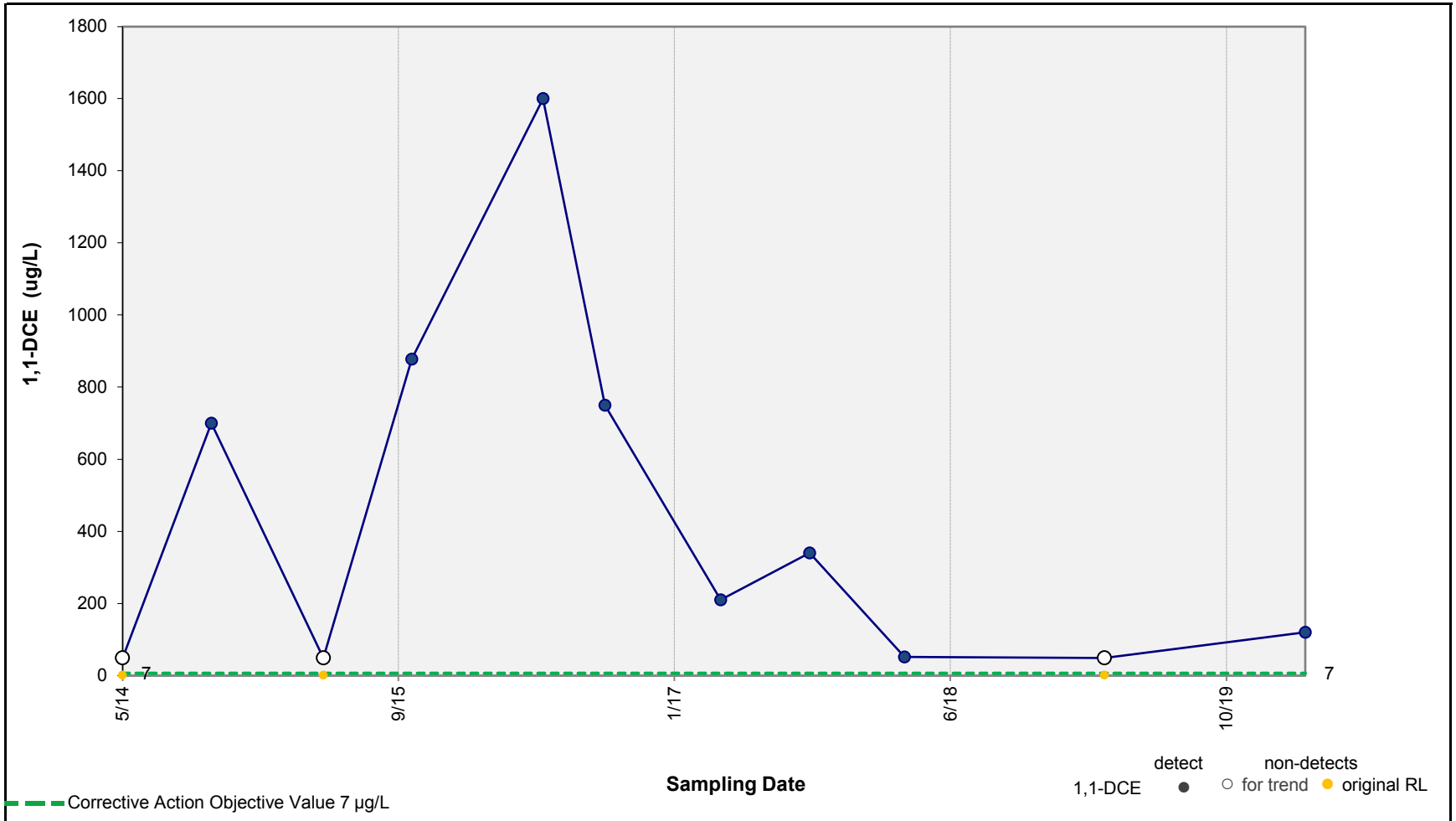
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well MW-02

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-82



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.291 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.3E-01 ug/L Per Day

95% Confidence Interval = -7.4E-01 to 1.5E-01 ug/L Per Day

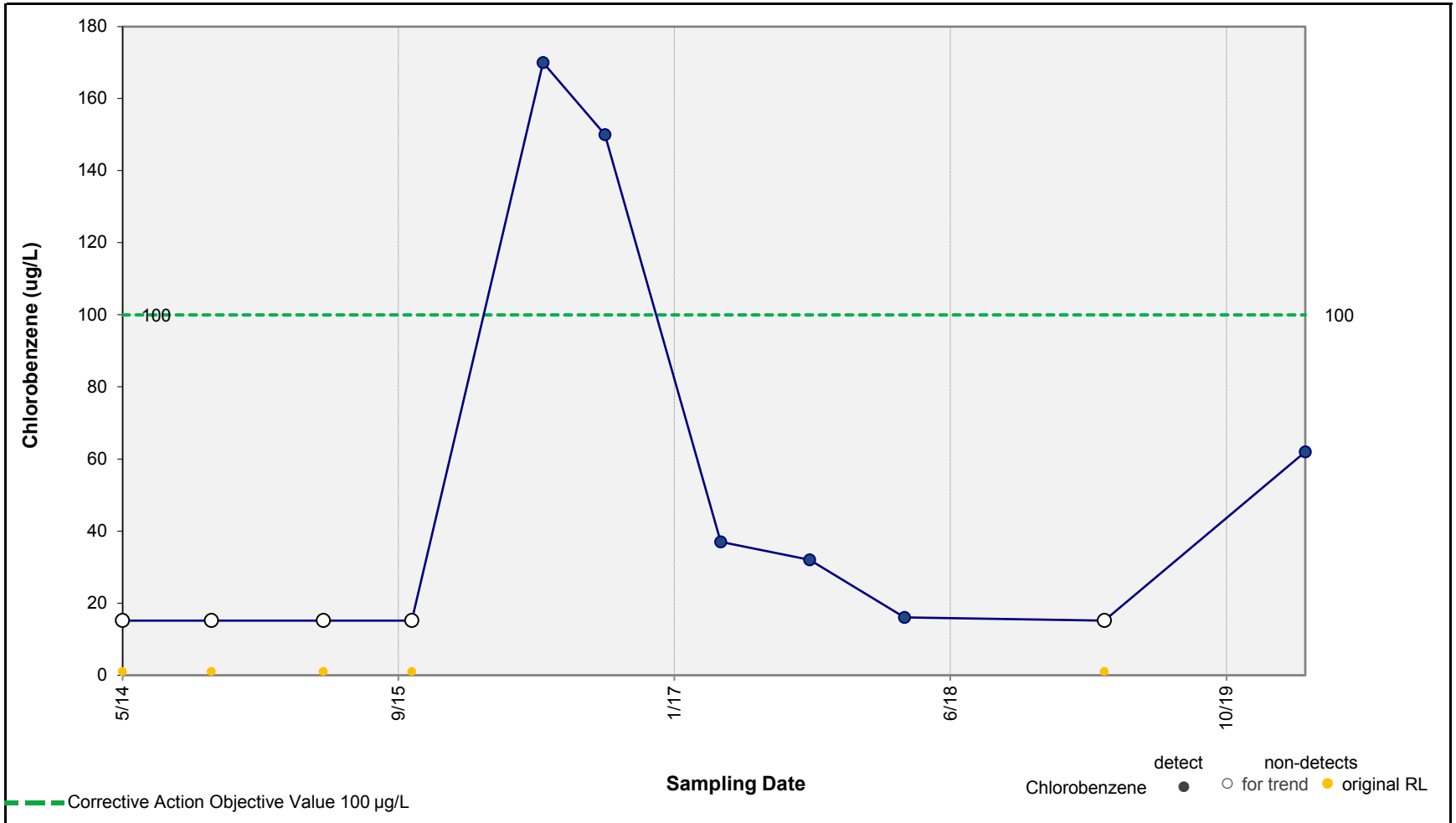
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-02

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-83



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.206 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 5.6E-04 ug/L Per Day

95% Confidence Interval = -3.1E-02 to 2.4E-02 ug/L Per Day

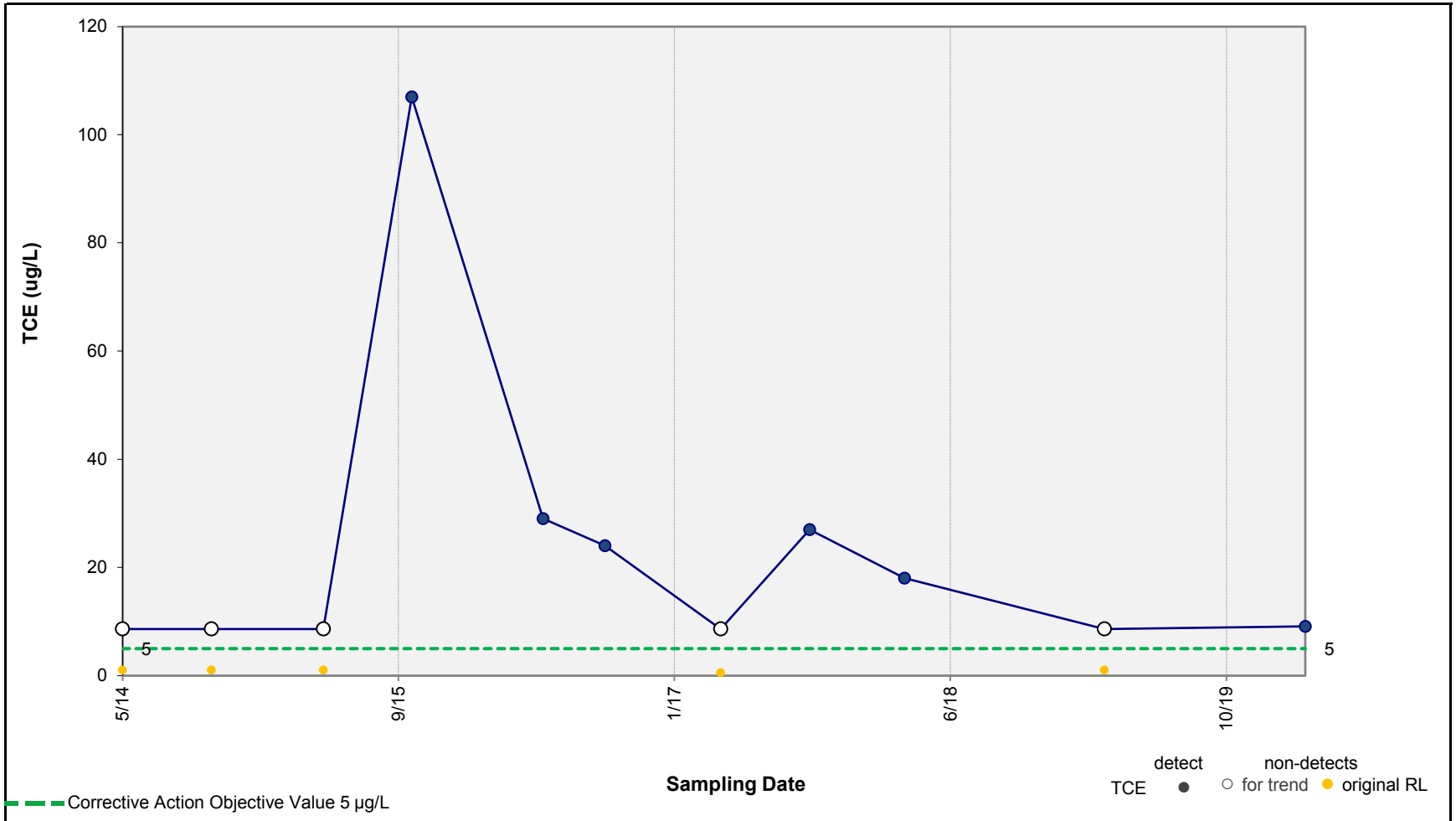
ARCADIS

Concentration vs. Time Plot – Chlorobenzene in Well MW-02

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-84



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 0.0E+00 ug/L Per Day

95% Confidence Interval = -1.8E-02 to 7.7E-03 ug/L Per Day

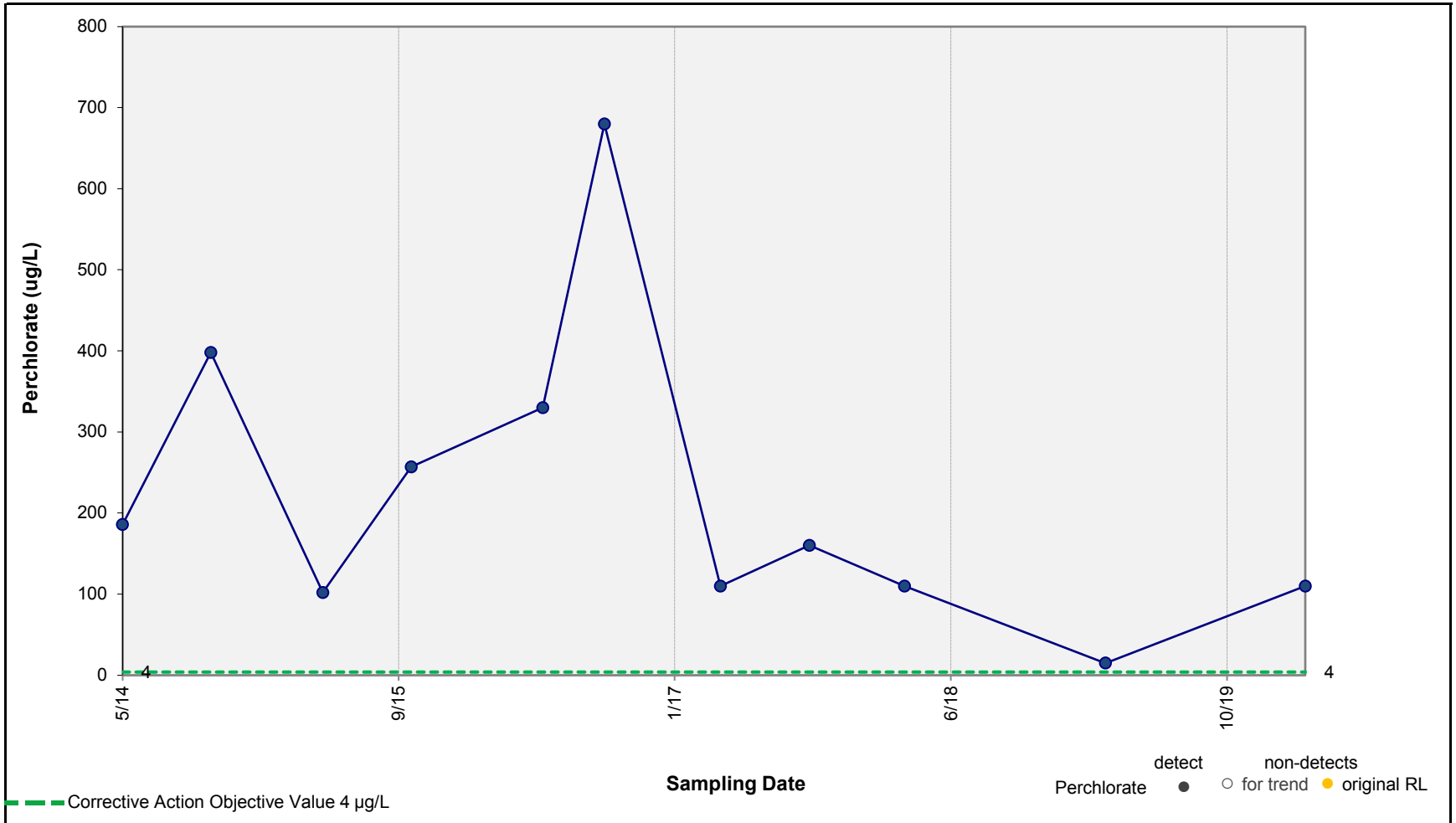
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-02

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-85



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.090 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -9.6E-02 ug/L Per Day

95% Confidence Interval = -2.6E-01 to 7.4E-03 ug/L Per Day

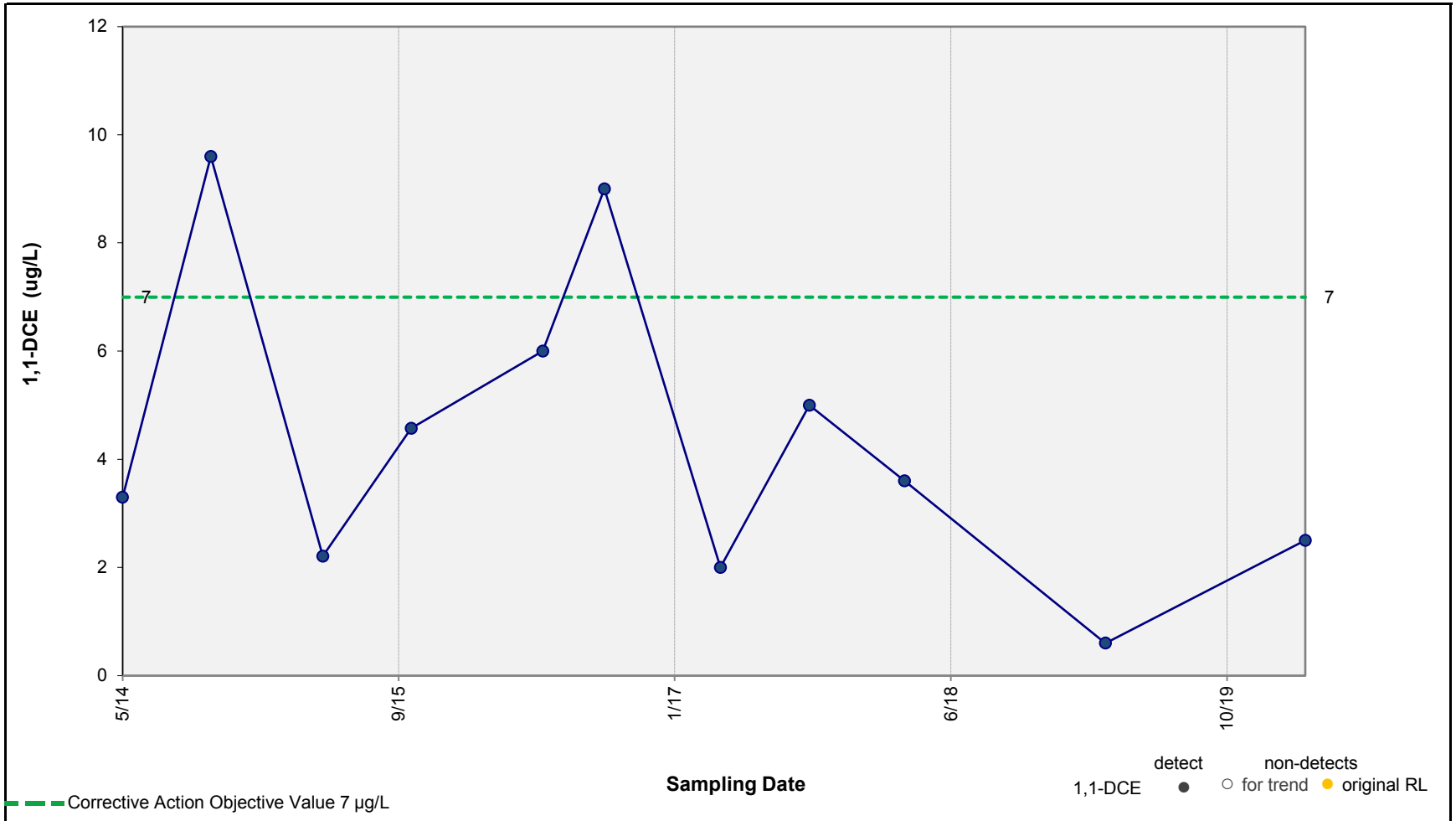
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-05

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-86



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.138 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.5E-03 ug/L Per Day

95% Confidence Interval = -5.1E-03 to 1.3E-03 ug/L Per Day

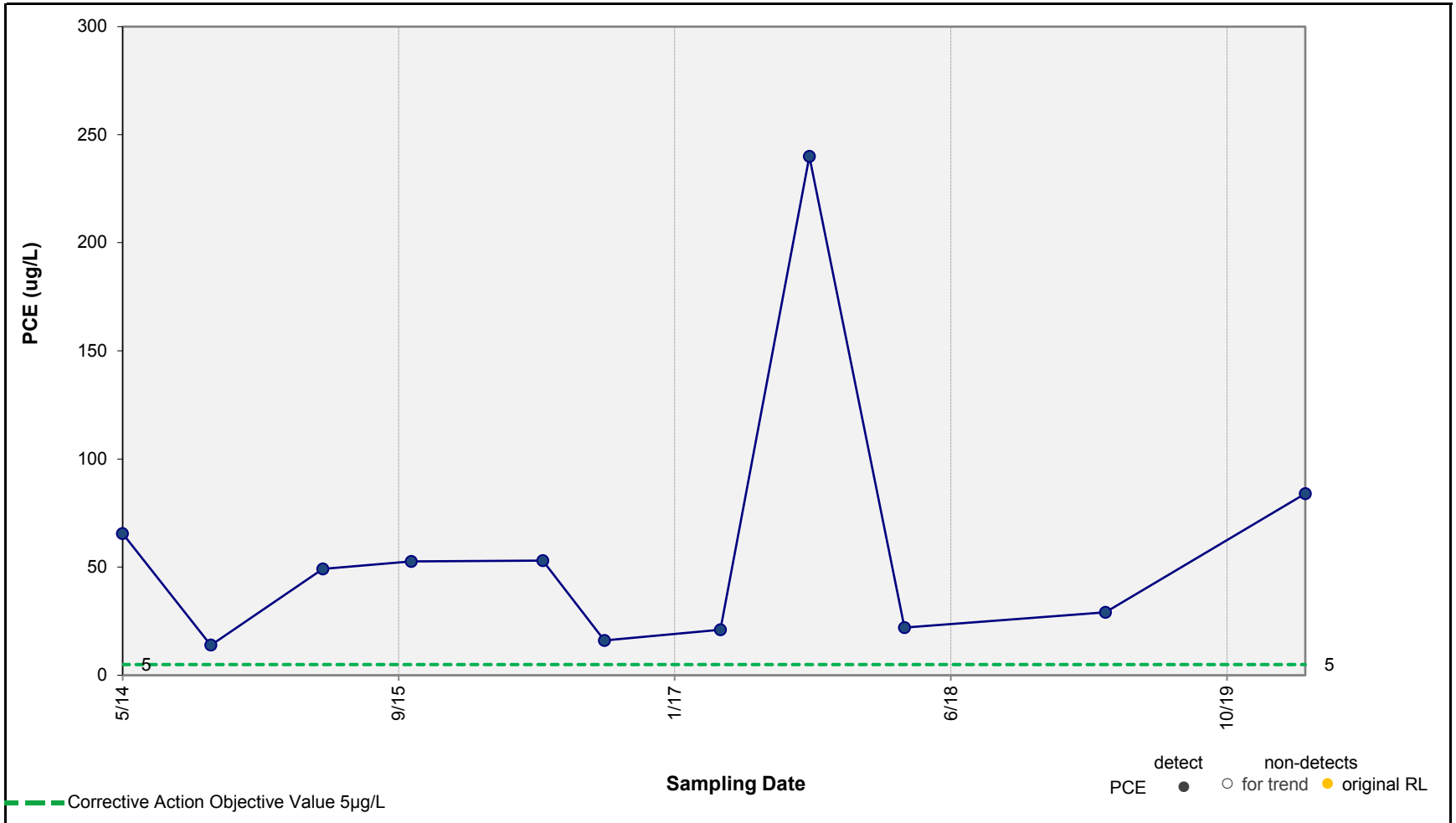
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-05

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-87



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.267 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 7.7E-03 ug/L Per Day

95% Confidence Interval = -3.5E-02 to 2.5E-02 ug/L Per Day

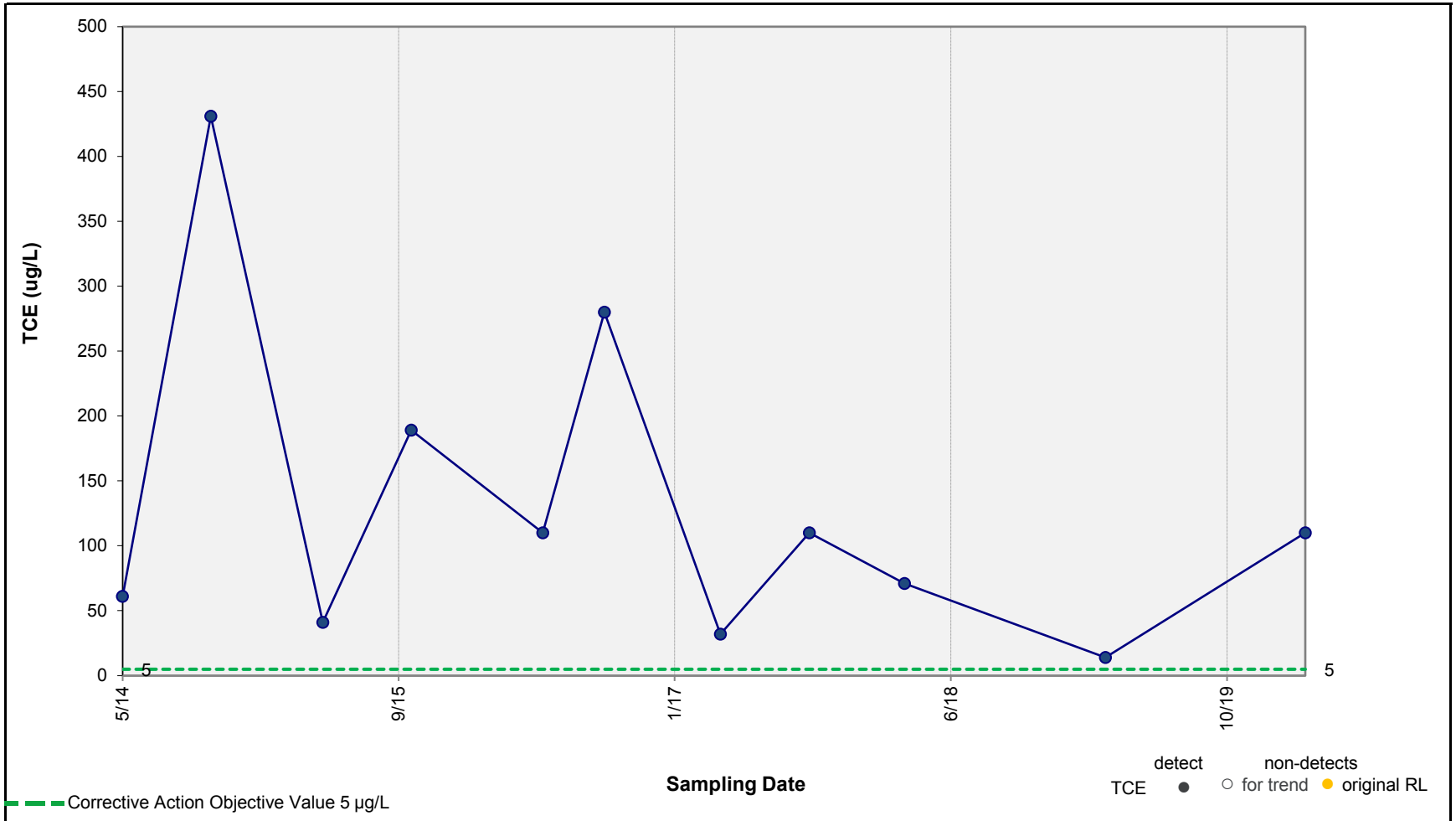
ARCADIS

Concentration vs. Time Plot – PCE in Well MW-05

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-88



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.193 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.7E-02 ug/L Per Day

95% Confidence Interval = -2.3E-01 to 3.9E-02 ug/L Per Day

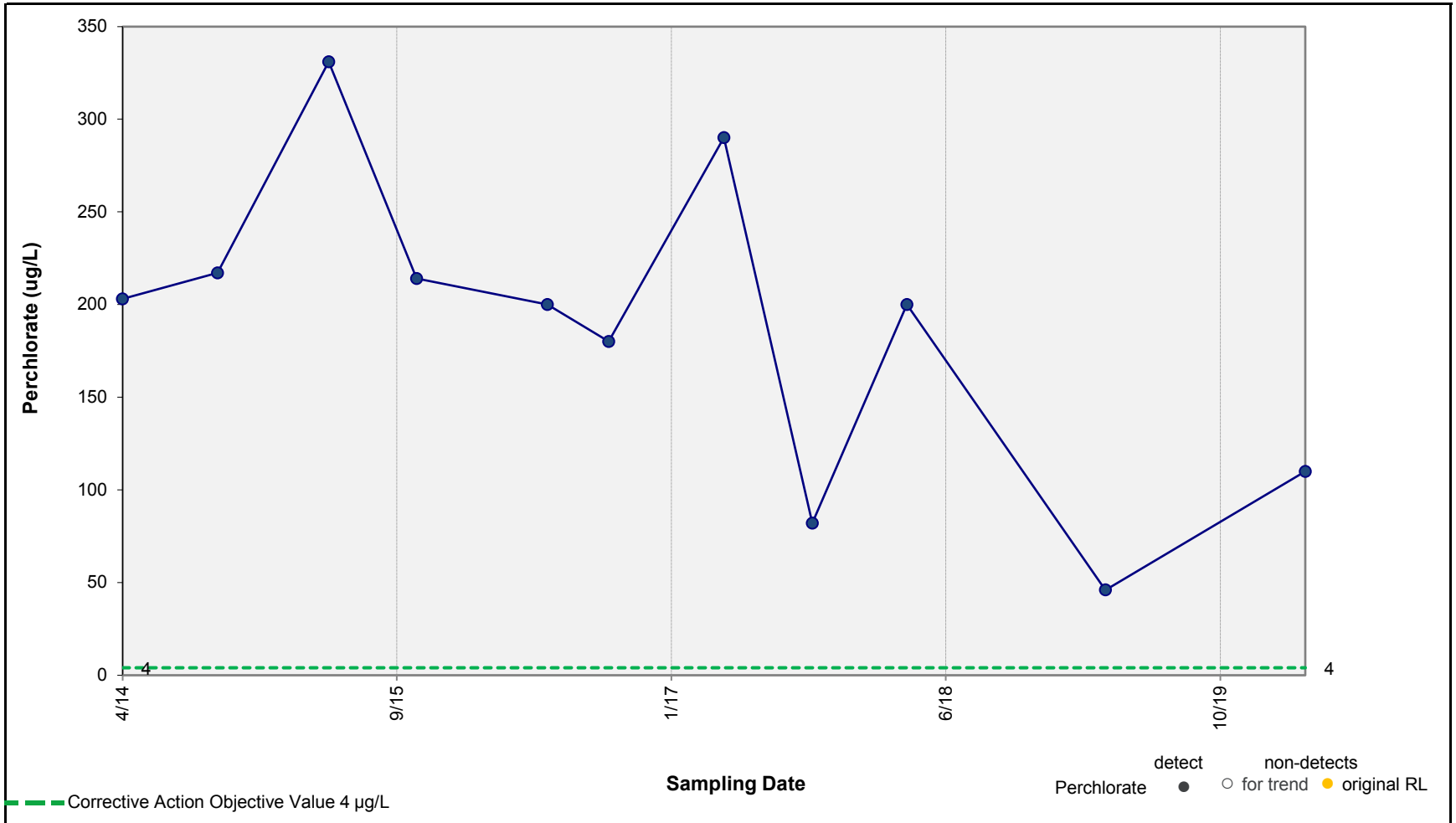
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-05

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-89



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.018 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -6.4E-02 ug/L Per Day

95% Confidence Interval = -1.5E-01 to -3.8E-03 ug/L Per Day

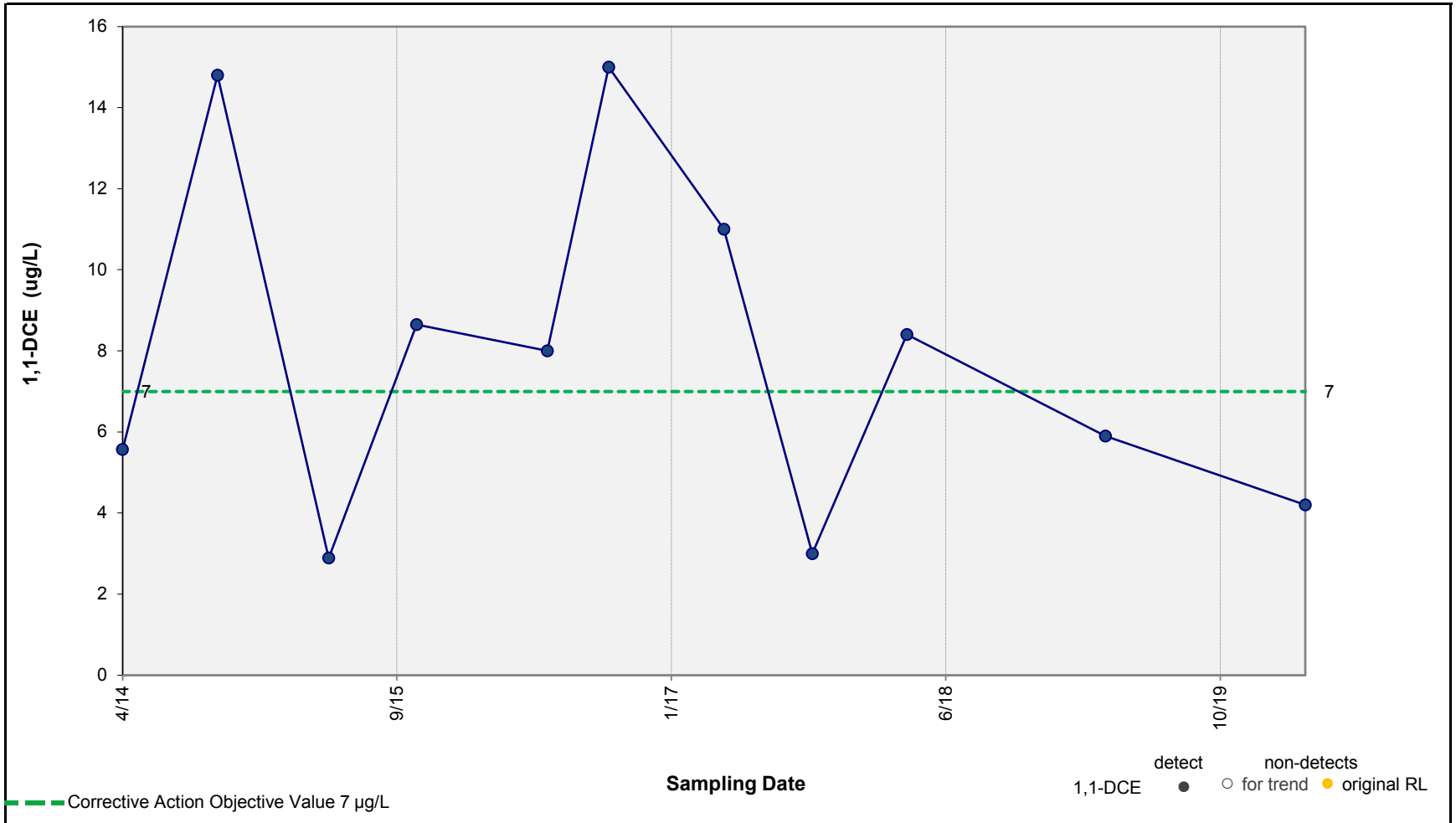
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-10

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-90



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.320 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.1E-03 ug/L Per Day

95% Confidence Interval = -7.1E-03 to 3.2E-03 ug/L Per Day

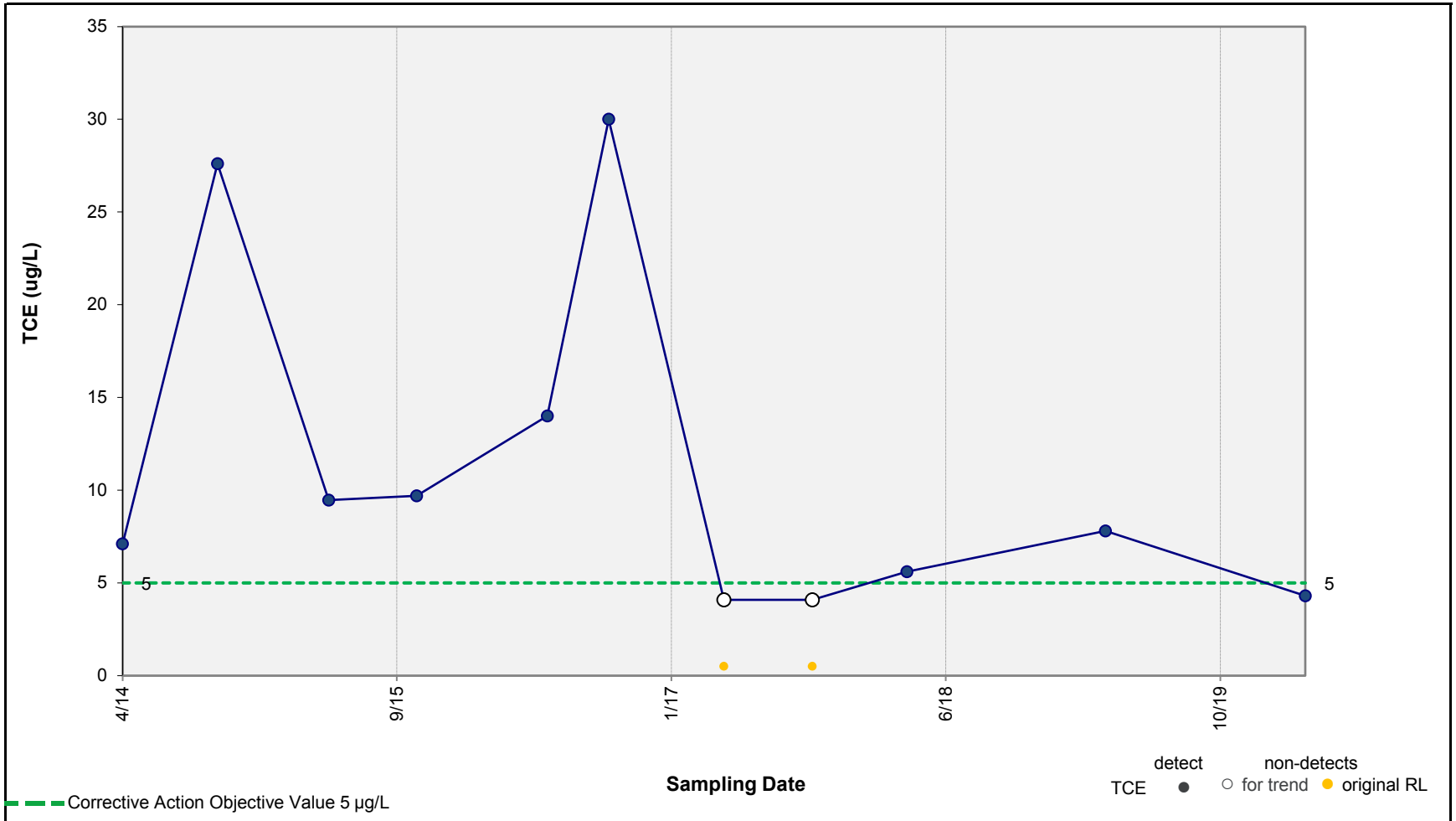
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-10

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-91



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.155 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.8E-03 ug/L Per Day

95% Confidence Interval = -1.2E-02 to 3.4E-03 ug/L Per Day

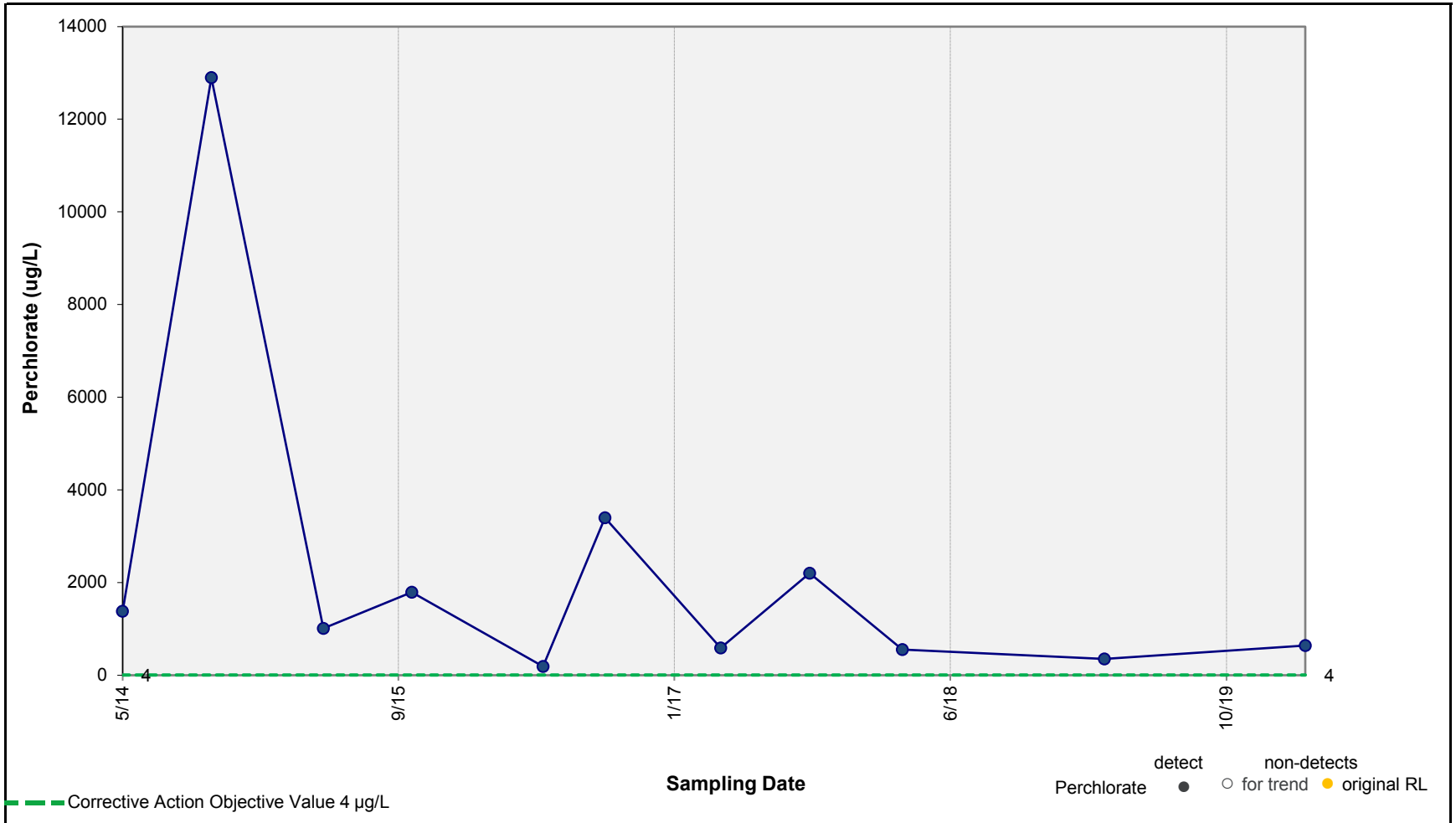
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-10

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-92



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.106 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -5.8E-01 ug/L Per Day

95% Confidence Interval = -3.4E+00 to 3.5E-01 ug/L Per Day

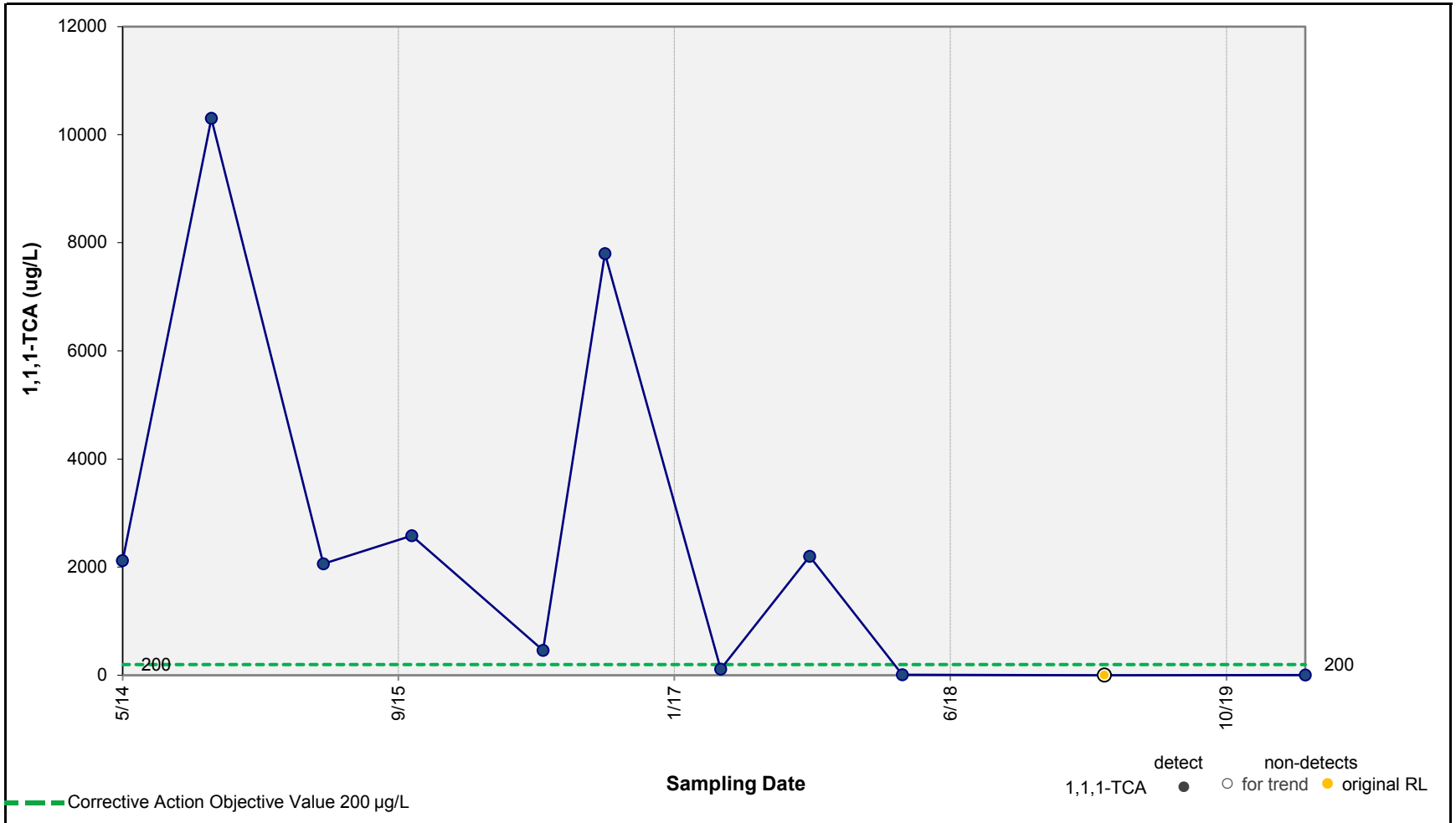
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-12

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-93



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.010 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.5E+00 ug/L Per Day

95% Confidence Interval = -5.3E+00 to -1.5E-01 ug/L Per Day

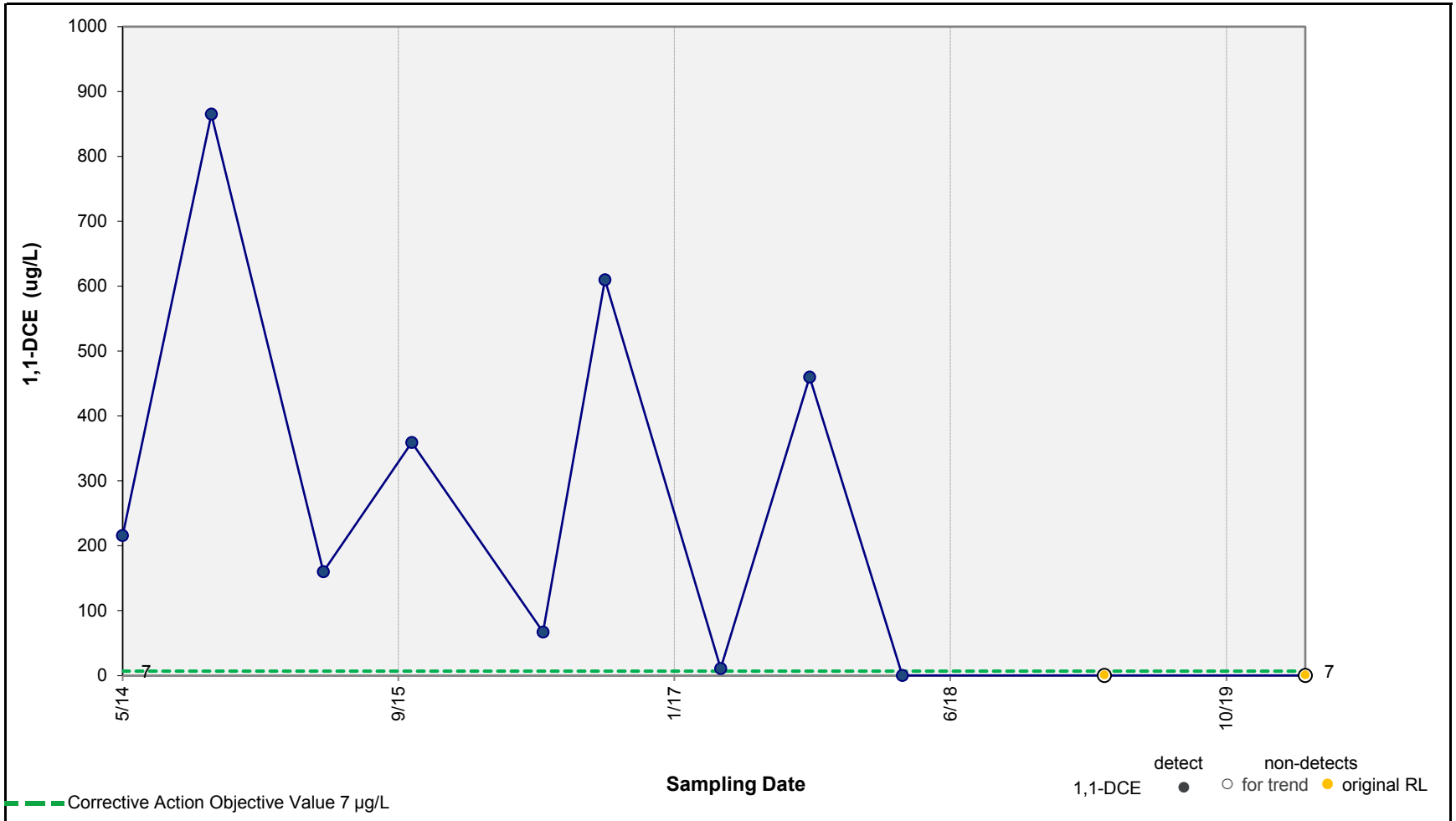
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well MW-12

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-94



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.012 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -1.5E-01 ug/L Per Day

95% Confidence Interval = -4.8E-01 to -9.5E-03 ug/L Per Day

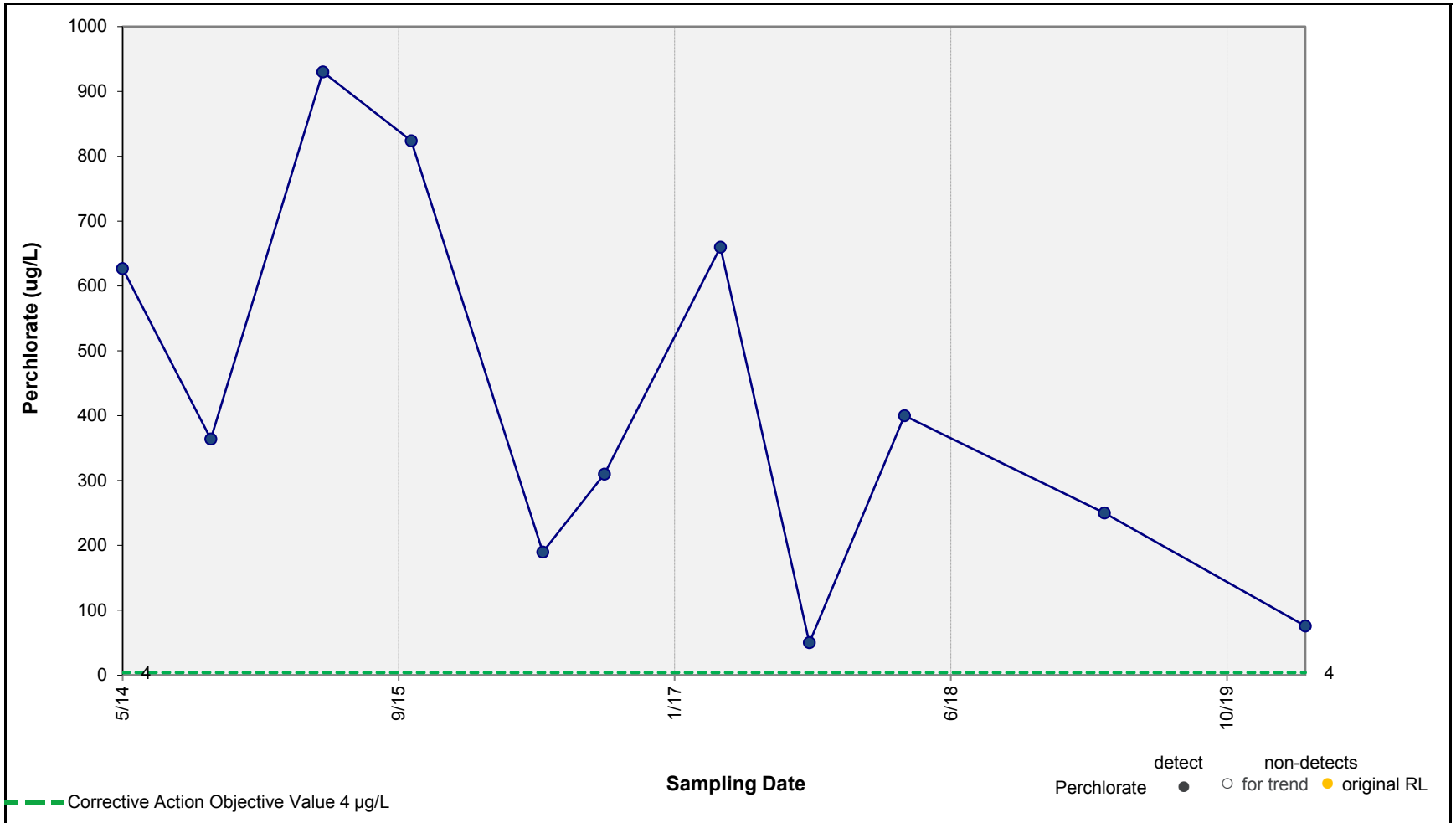
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-12

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-95



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.043 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.9E-01 ug/L Per Day

95% Confidence Interval = -5.1E-01 to 2.9E-02 ug/L Per Day

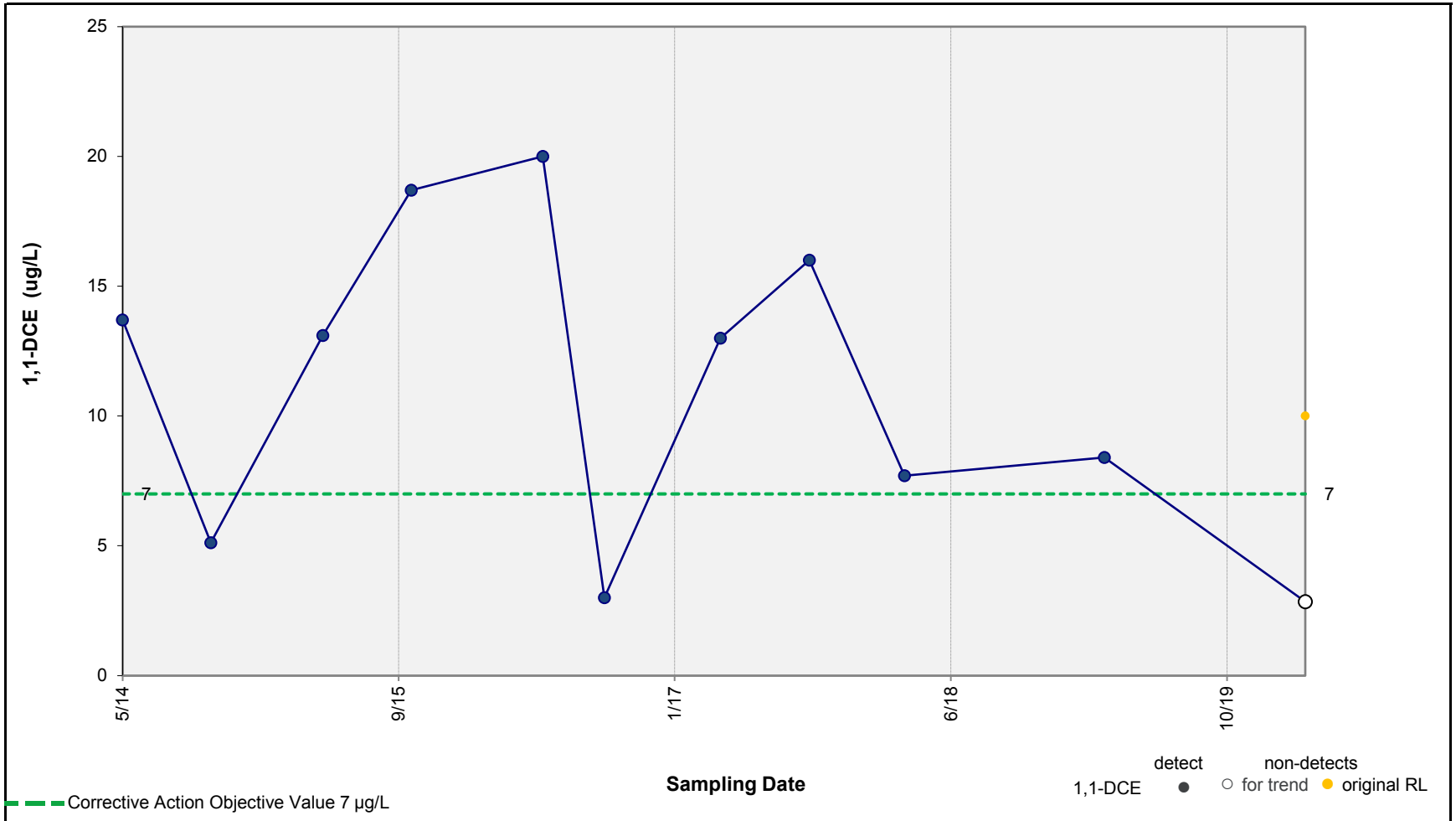
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-13

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-96



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.138 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.3E-03 ug/L Per Day

95% Confidence Interval = -1.1E-02 to 3.5E-03 ug/L Per Day

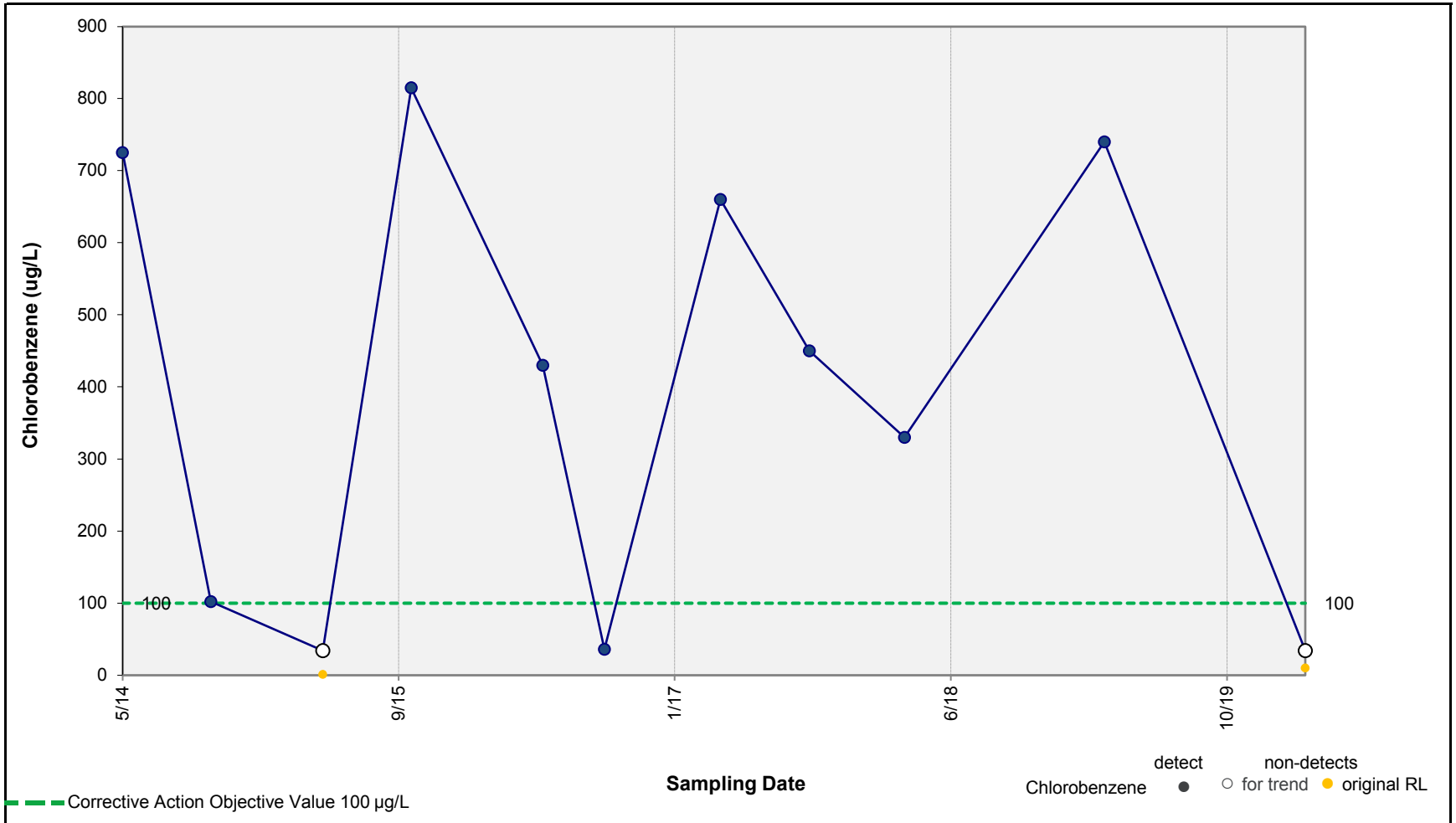
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-13

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-97



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.407 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.4E-02 ug/L Per Day

95% Confidence Interval = -4.6E-01 to 4.0E-01 ug/L Per Day

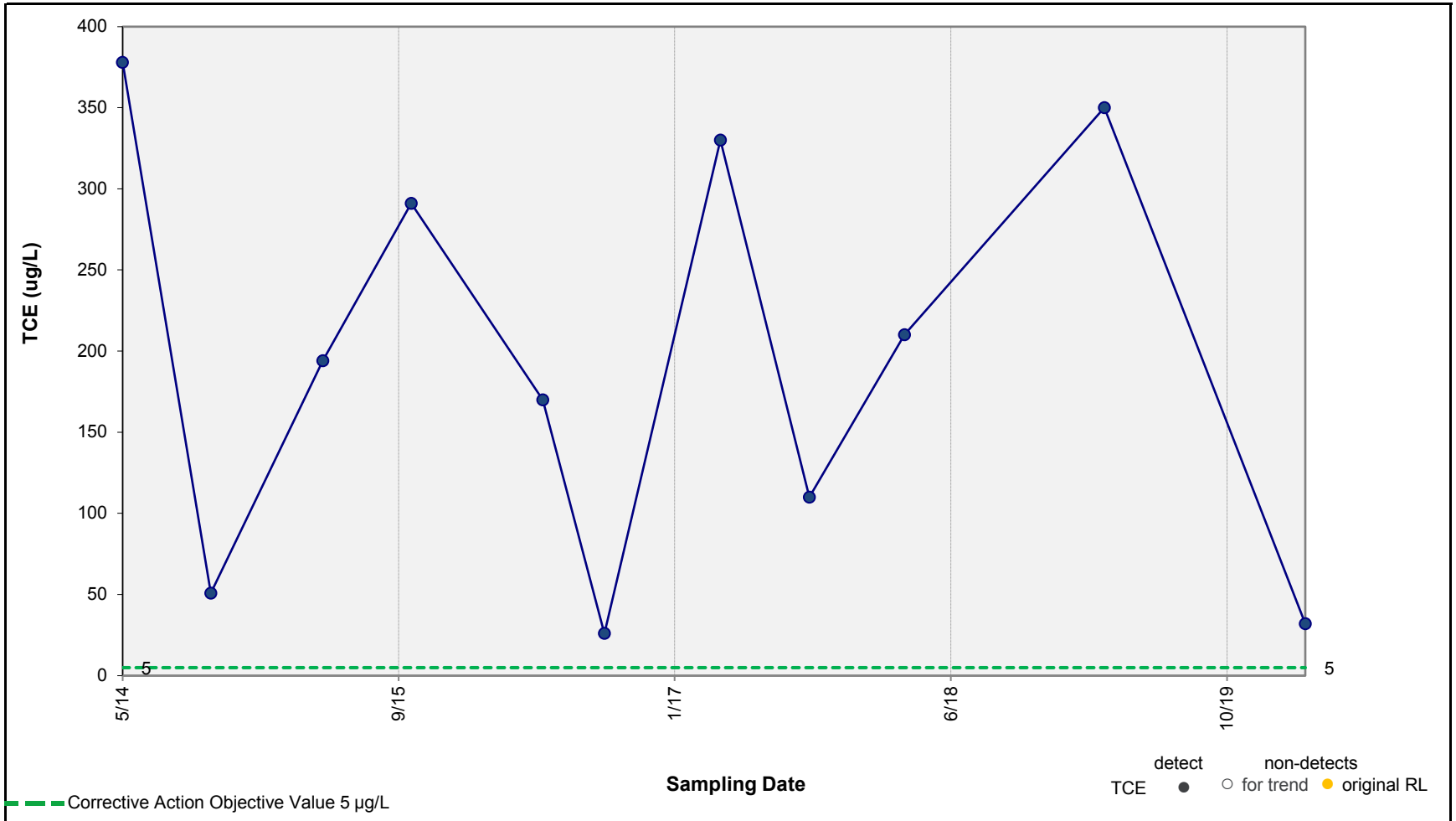
ARCADIS

Concentration vs. Time Plot – Chlorobenzene in Well MW-13

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-98



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.378 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -3.5E-02 ug/L Per Day

95% Confidence Interval = -2.2E-01 to 1.8E-01 ug/L Per Day

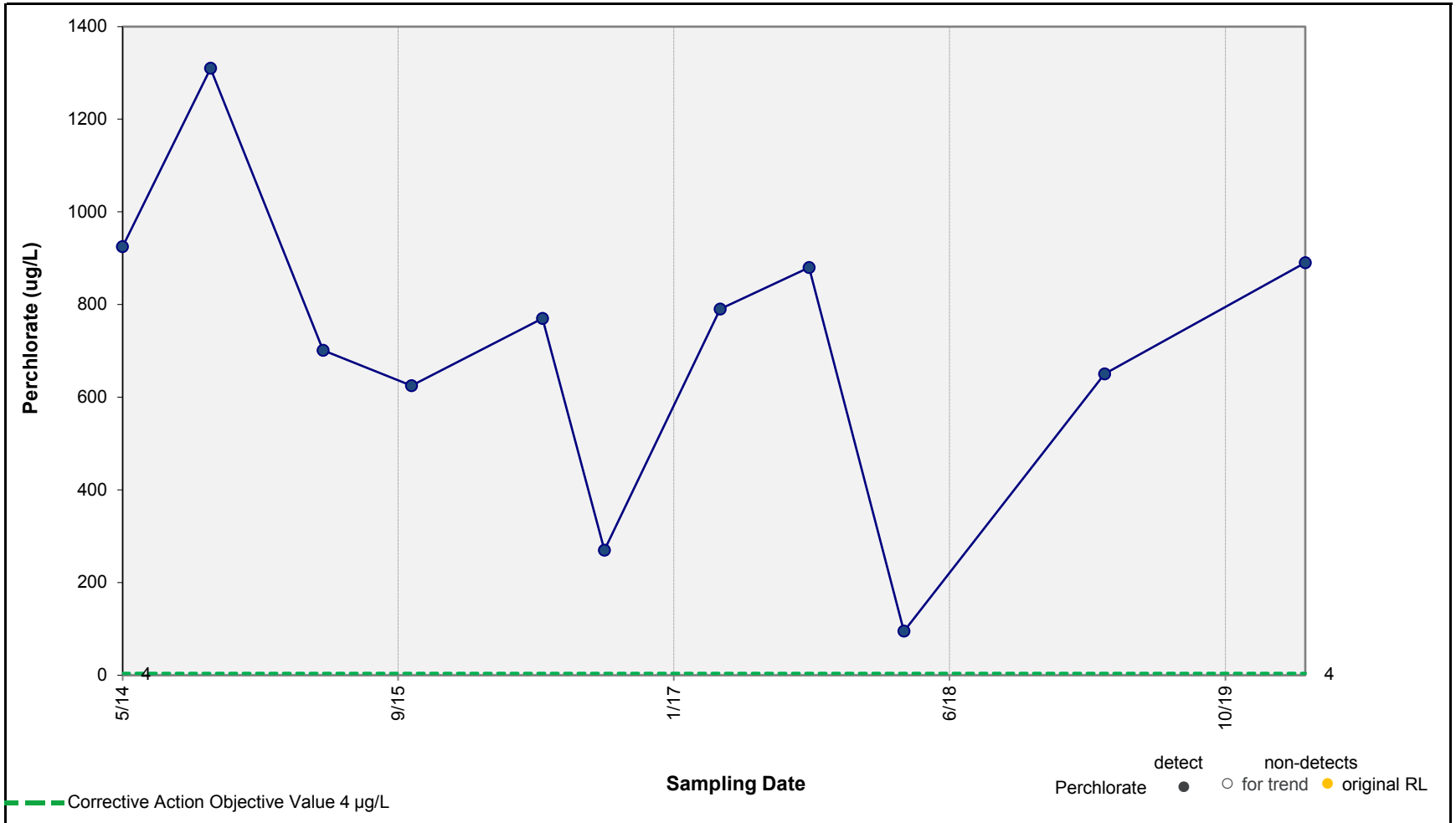
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-13

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-99



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.267 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.2E-01 ug/L Per Day

95% Confidence Interval = -5.9E-01 to 1.6E-01 ug/L Per Day

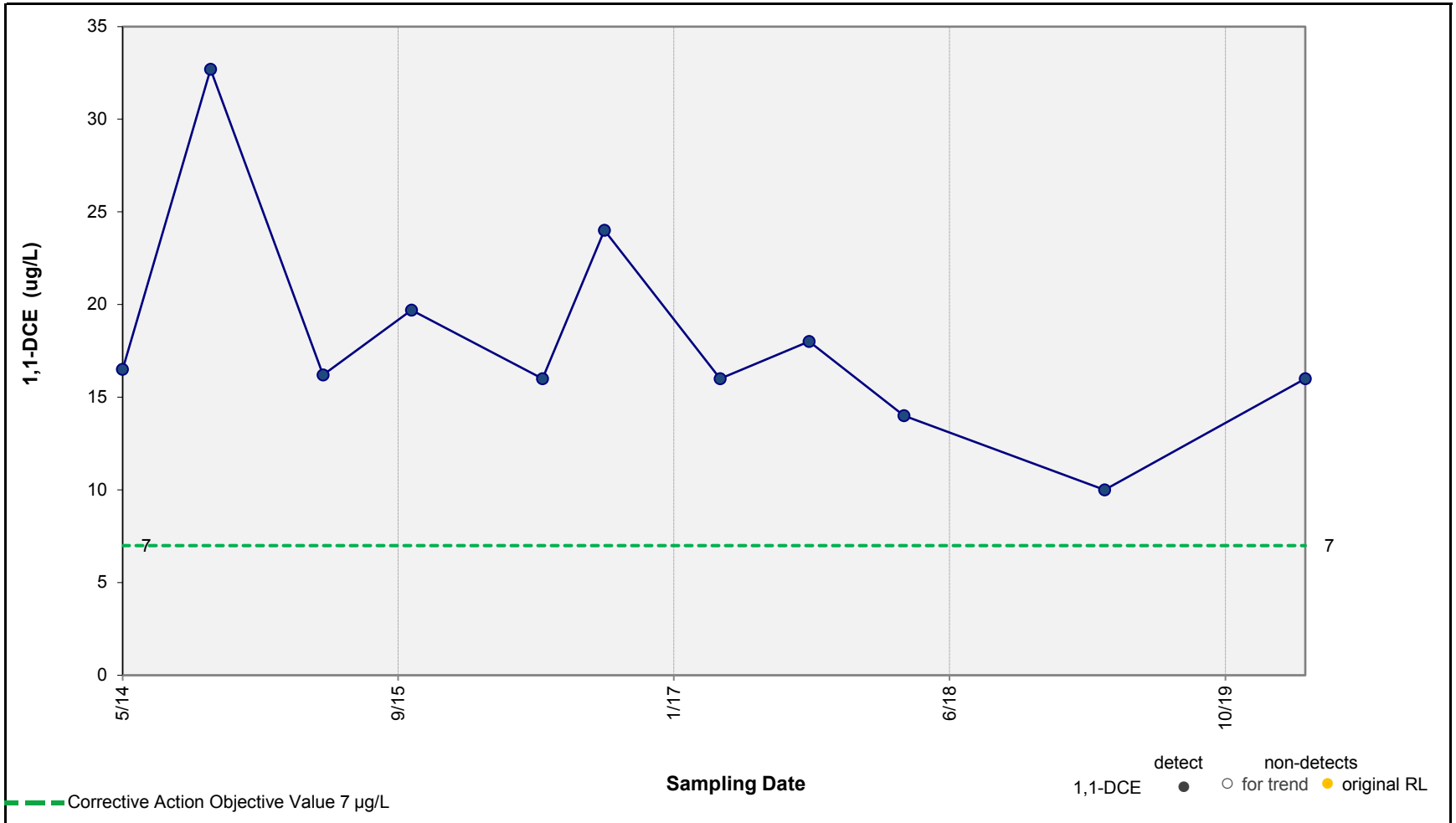
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-19

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-100



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.025 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.4E-03 ug/L Per Day

95% Confidence Interval = -1.2E-02 to -5.9E-06 ug/L Per Day

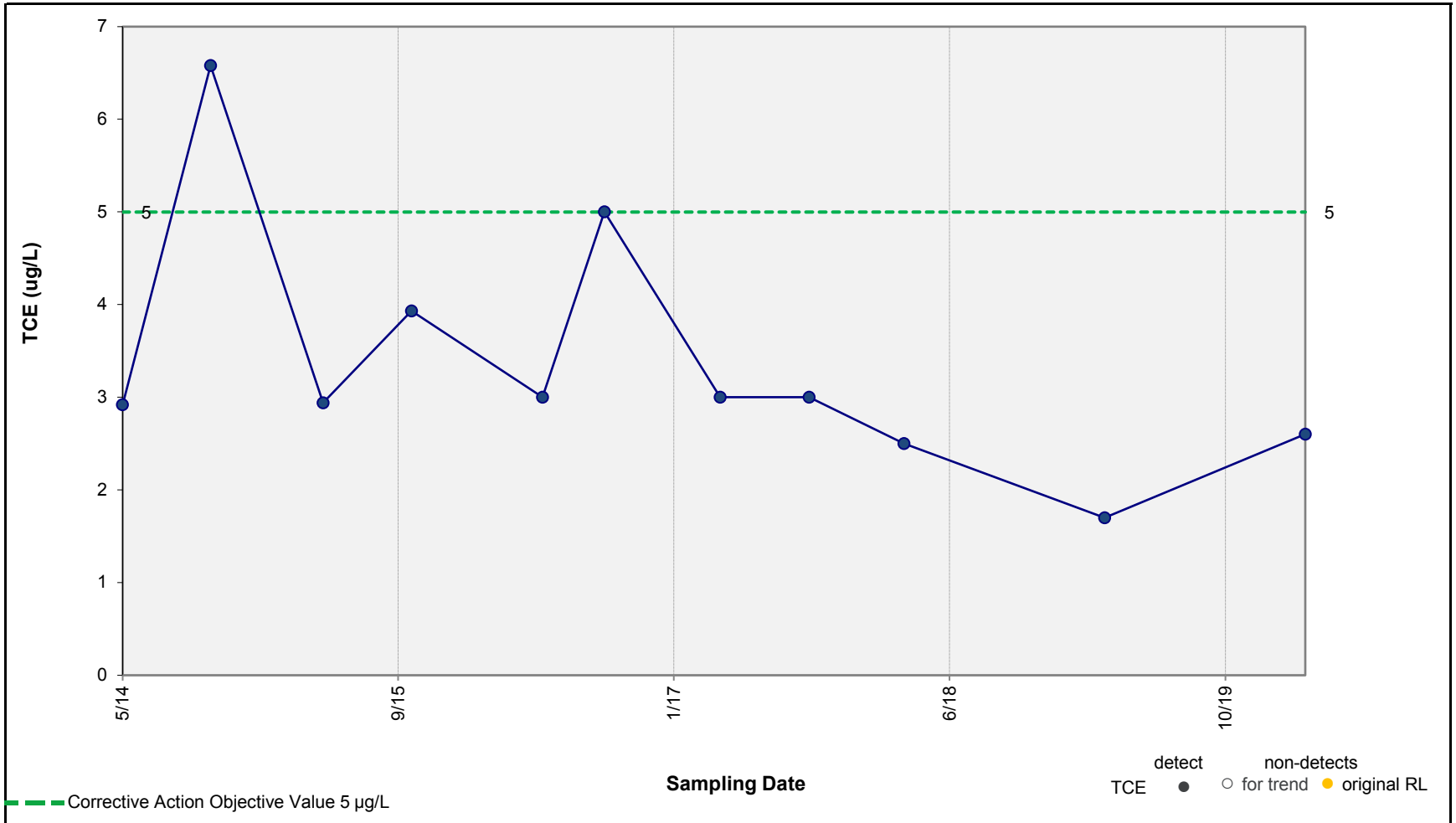
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-19

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-101



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.067 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -7.6E-04 ug/L Per Day

95% Confidence Interval = -2.2E-03 to 5.2E-05 ug/L Per Day

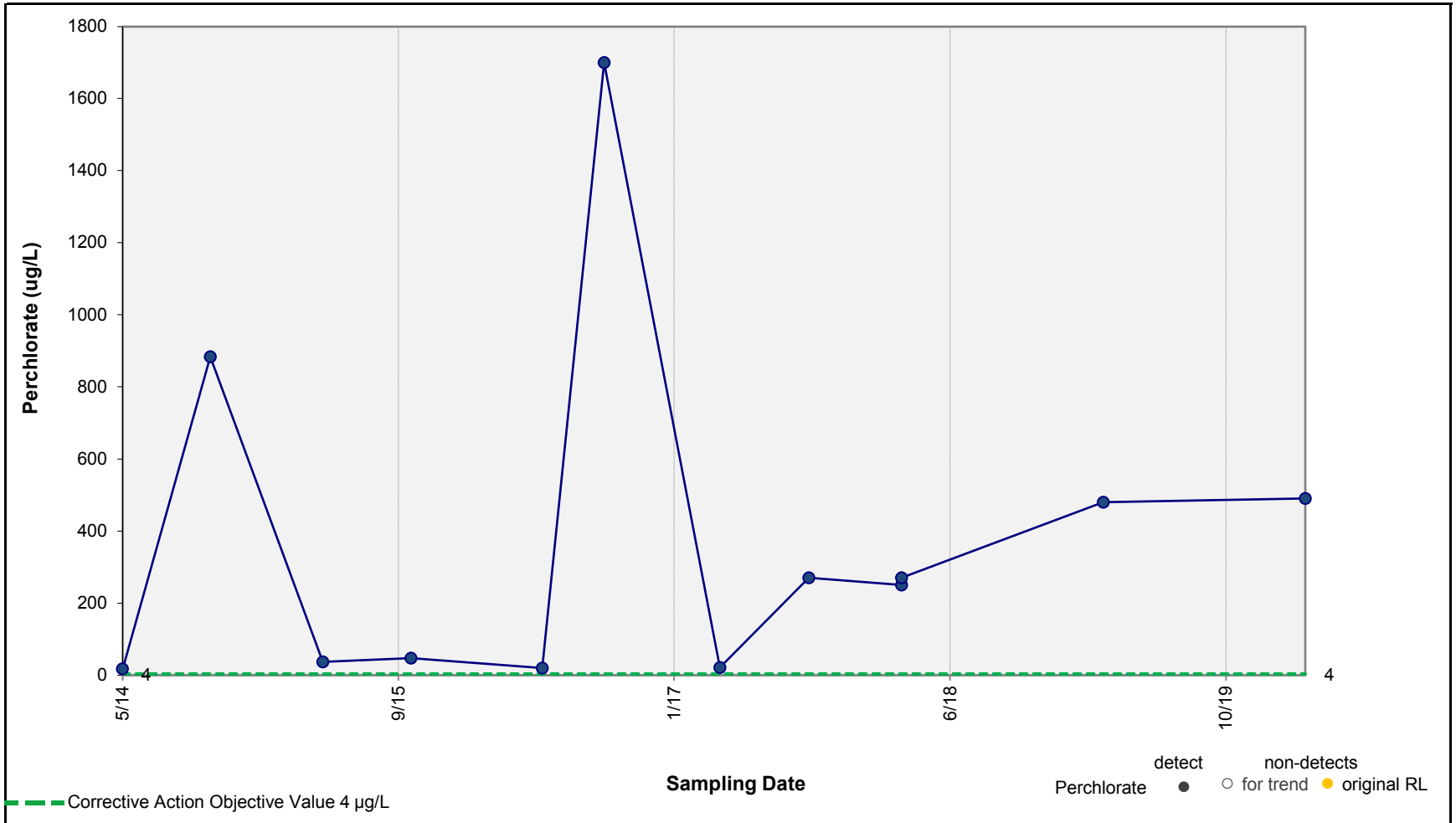
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-19

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-102



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.050 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

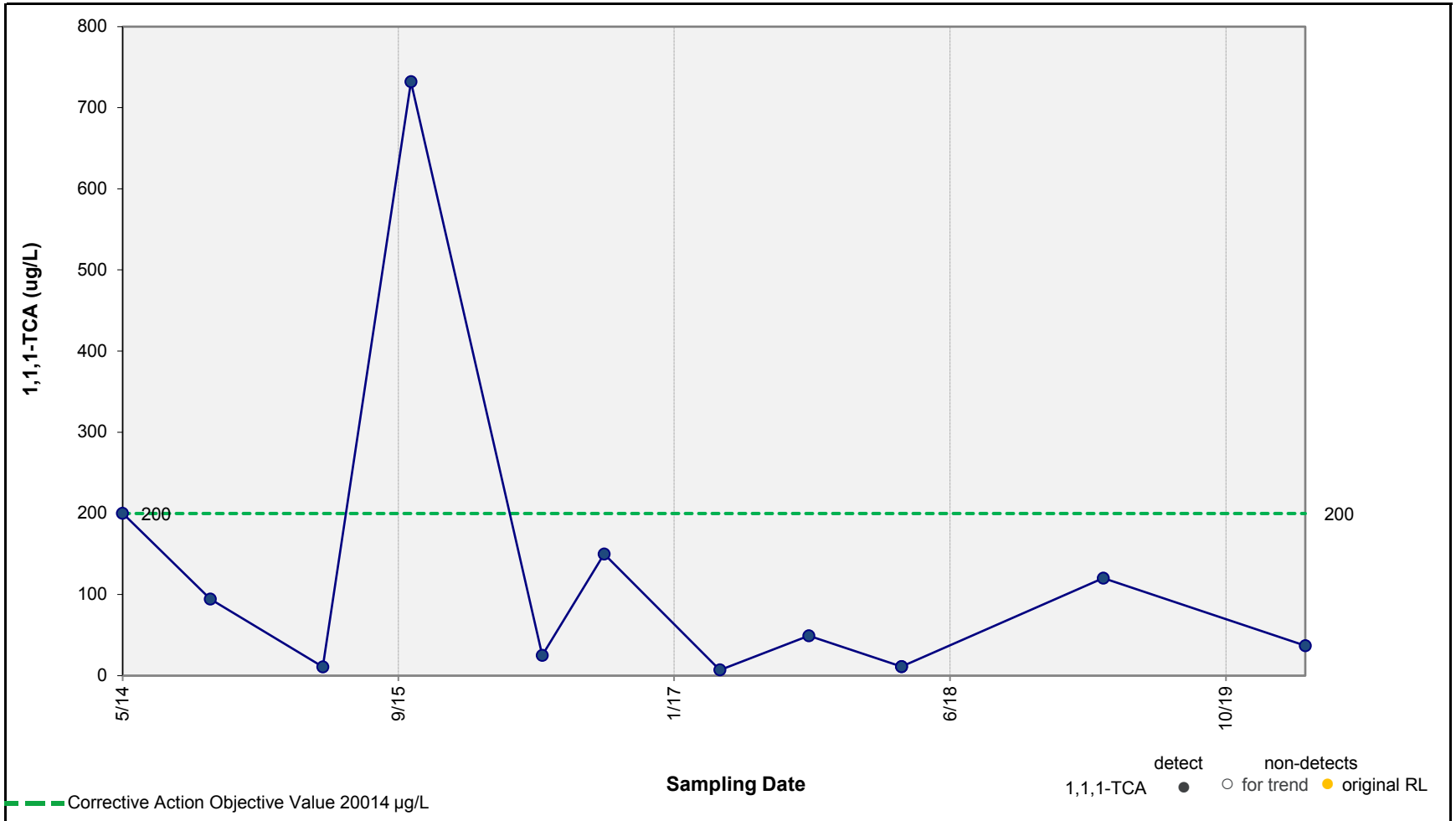
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-20

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-103



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.205 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

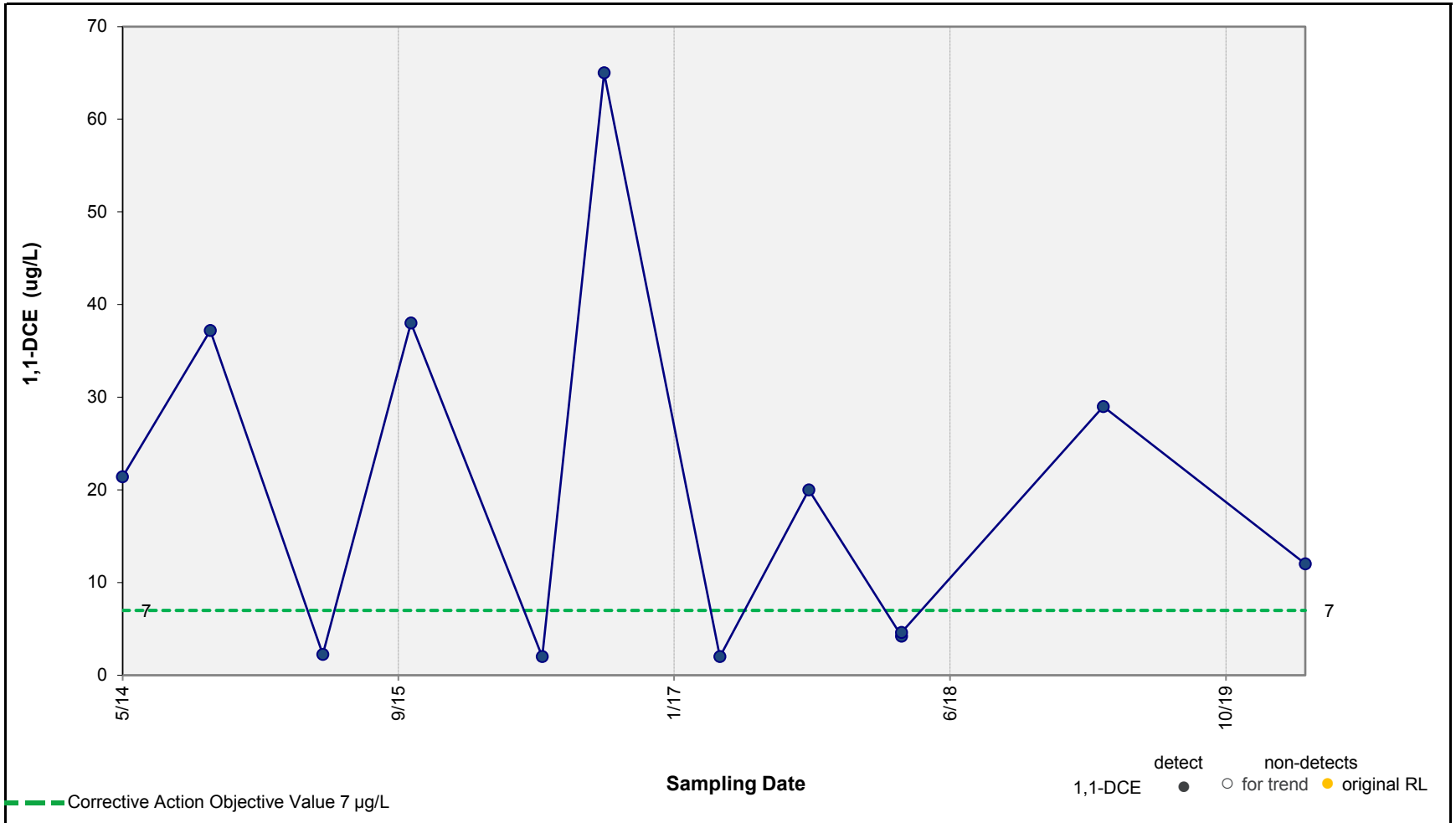
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well MW-20

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-104



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.445 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

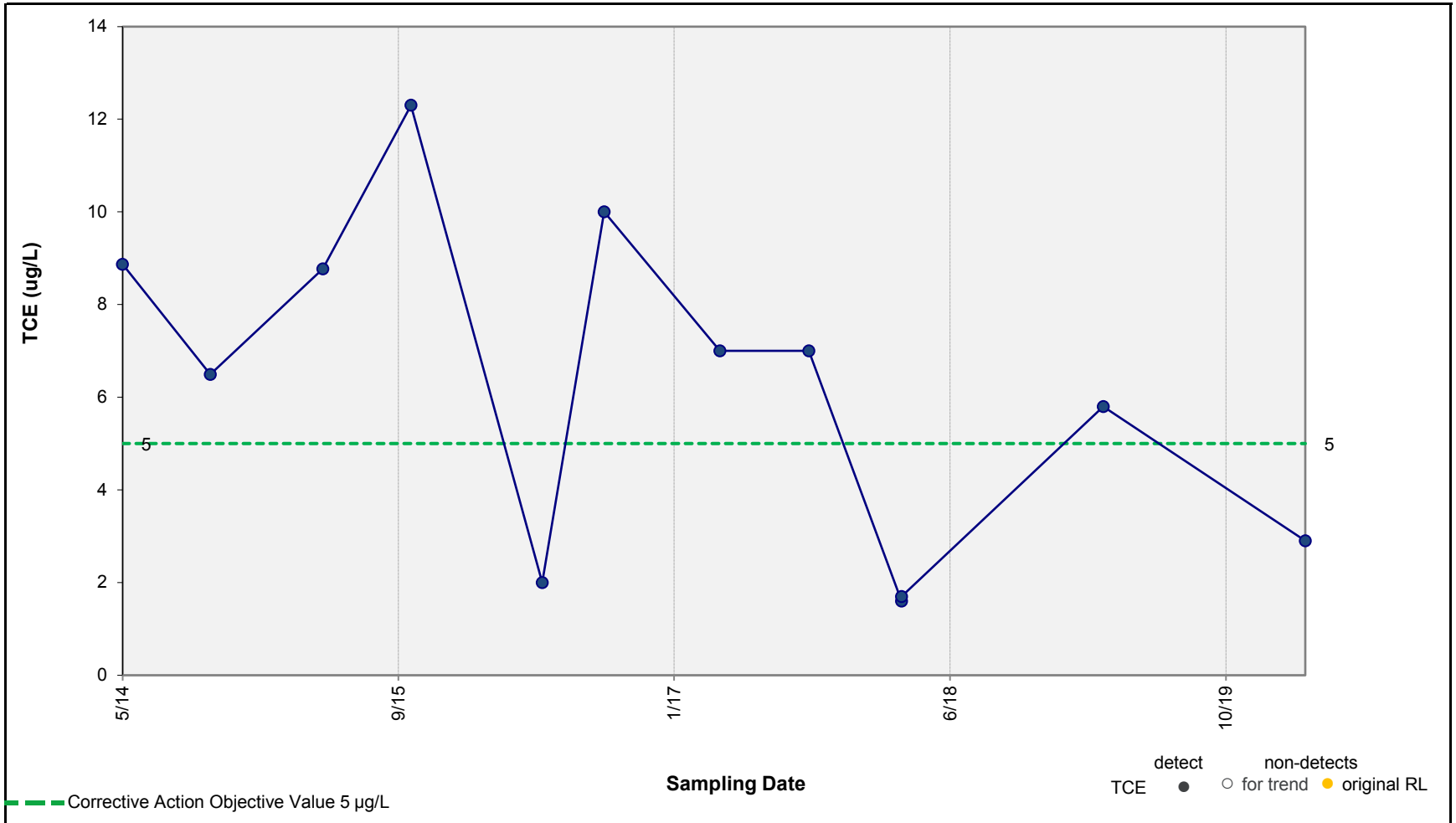
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-20

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-105



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.037 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

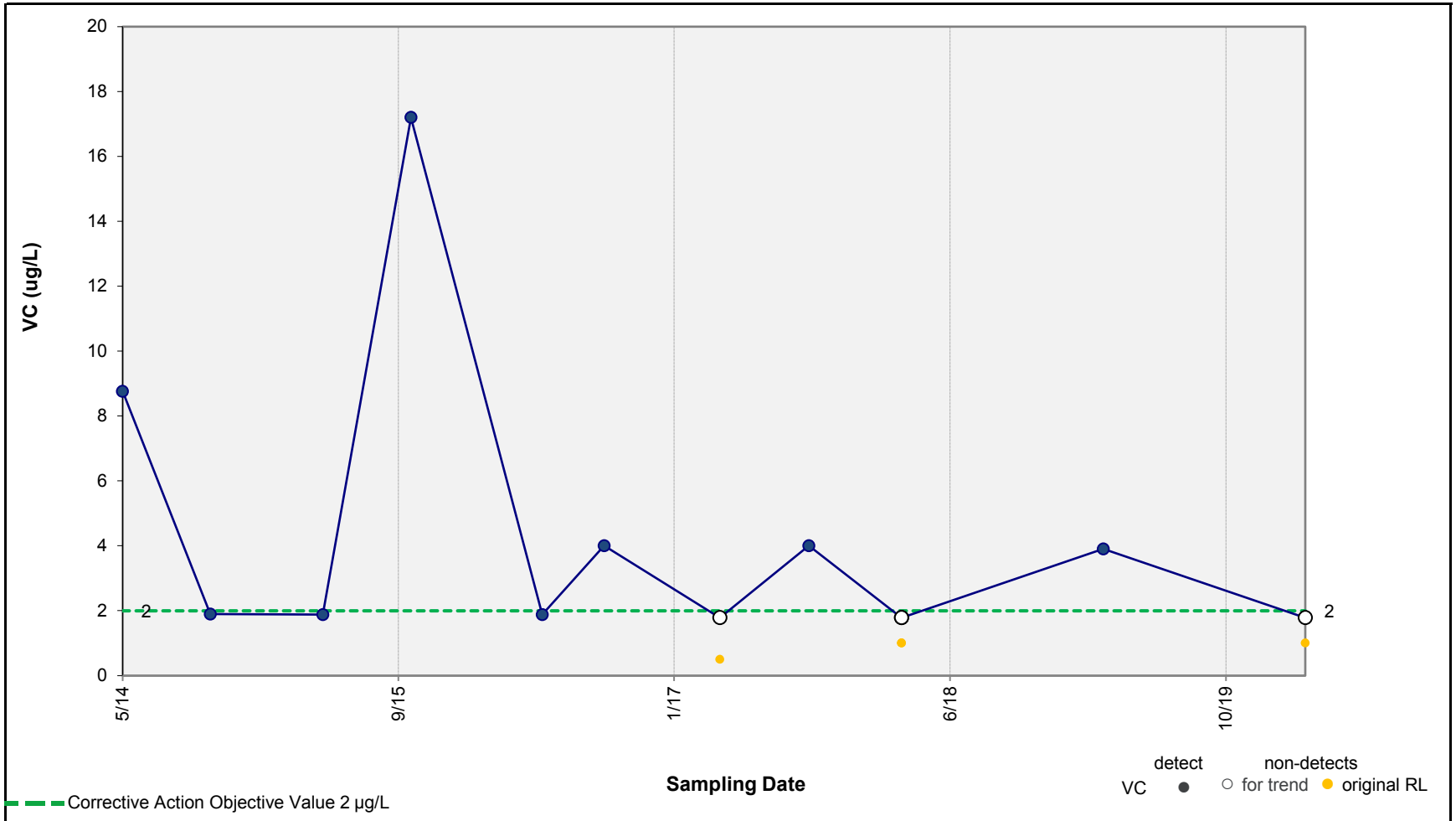
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-20

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-106



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.039 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

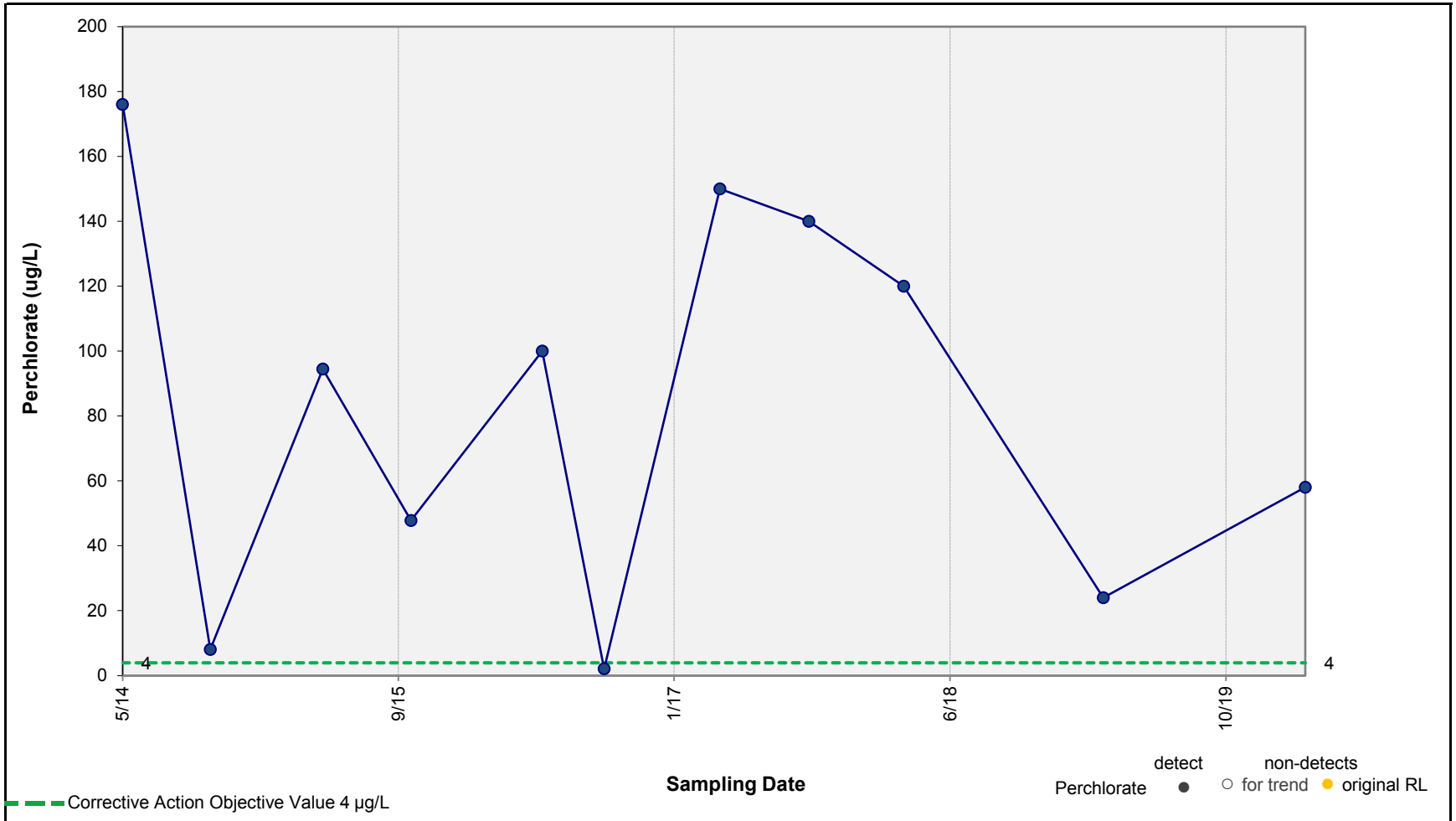
ARCADIS

Concentration vs. Time Plot – VC in Well MW-20

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-107



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.438 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.9E-02 ug/L Per Day

95% Confidence Interval = -9.0E-02 to 8.1E-02 ug/L Per Day

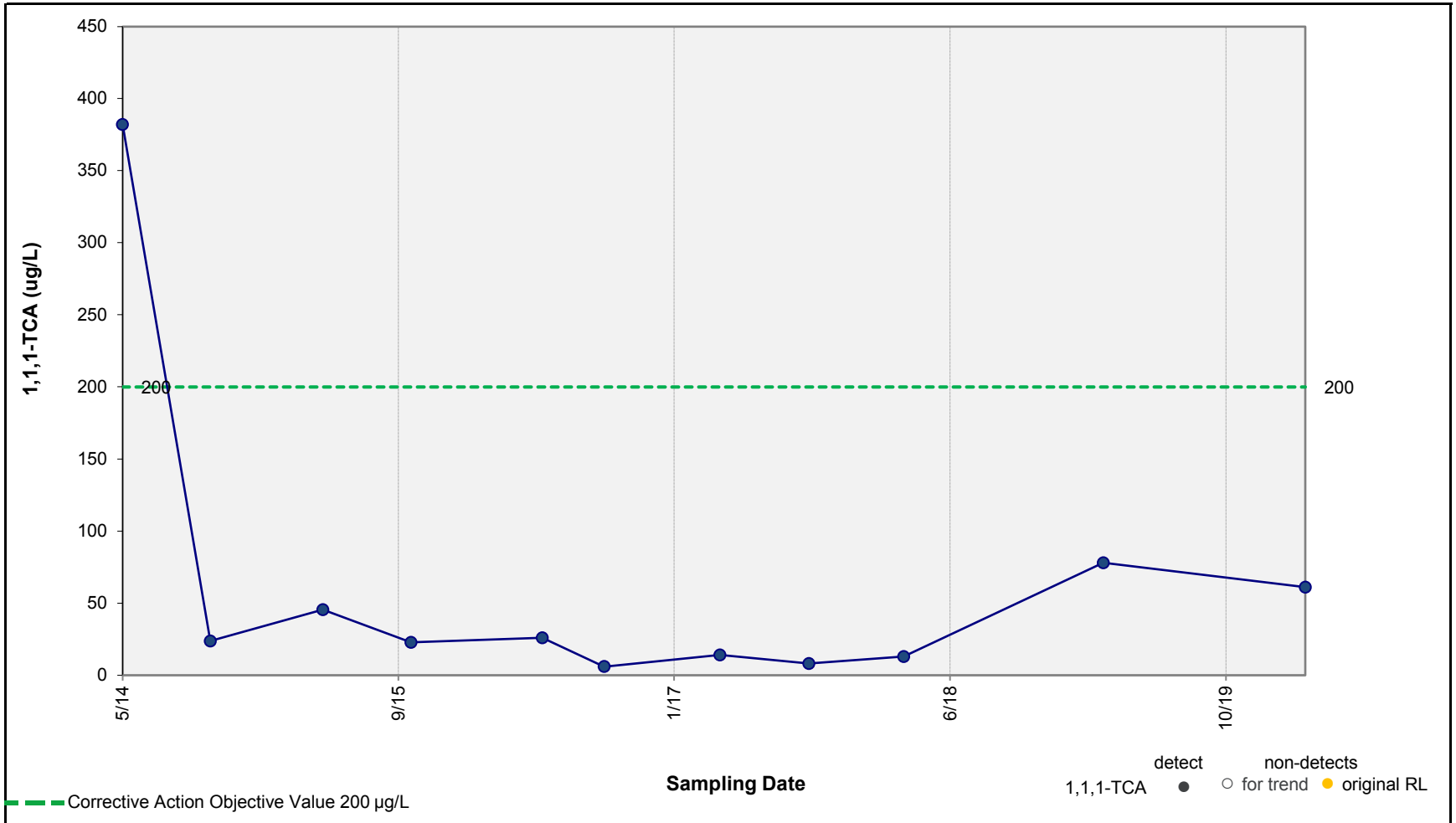
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-22

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-108



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.267 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.1E-02 ug/L Per Day

95% Confidence Interval = -4.8E-02 to 2.4E-02 ug/L Per Day

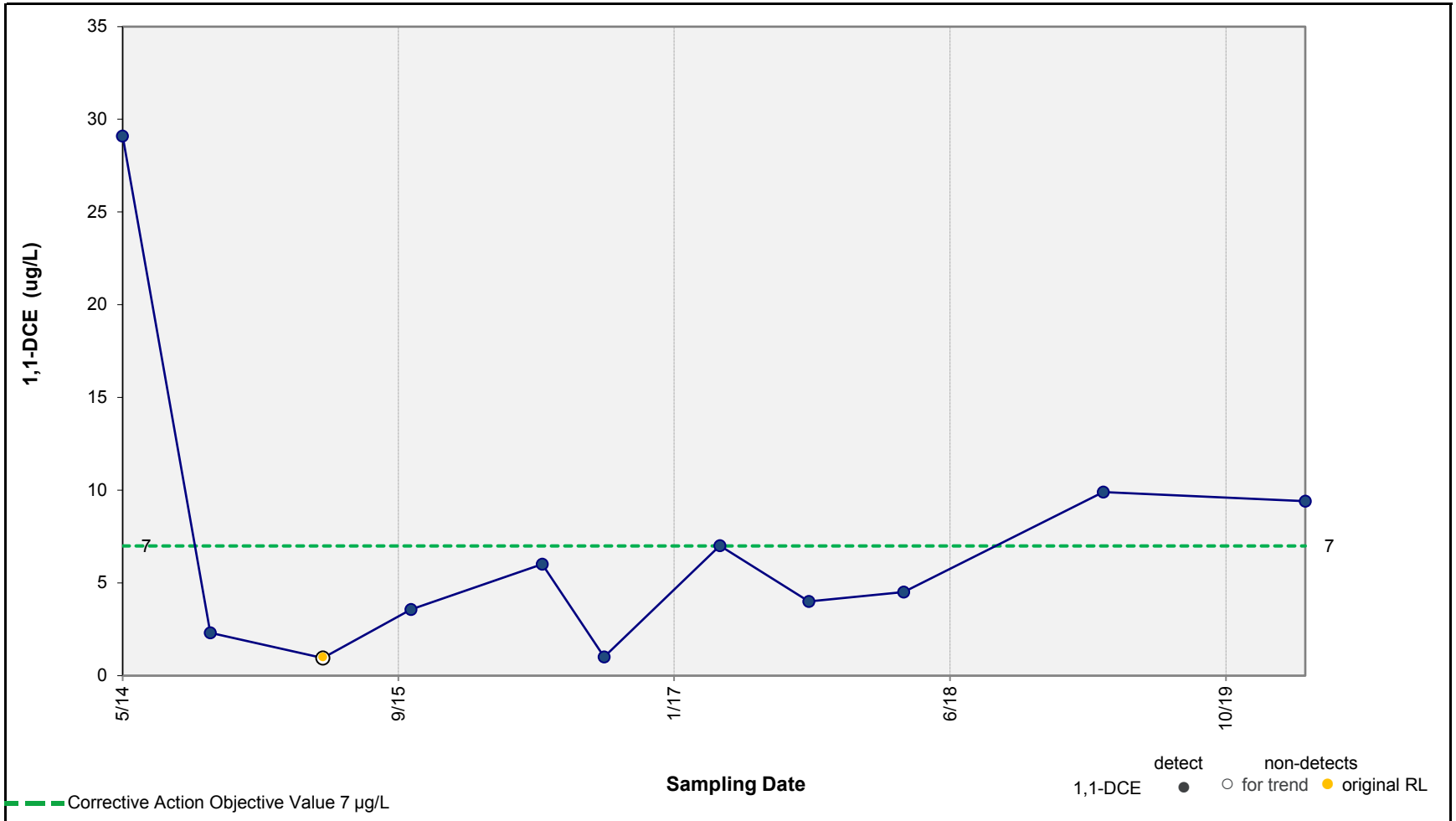
ARCADIS

Concentration vs. Time Plot – 1,1,1-TCA in Well MW-22

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-109



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.106 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 3.1E-03 ug/L Per Day

95% Confidence Interval = -6.7E-03 to 6.0E-03 ug/L Per Day

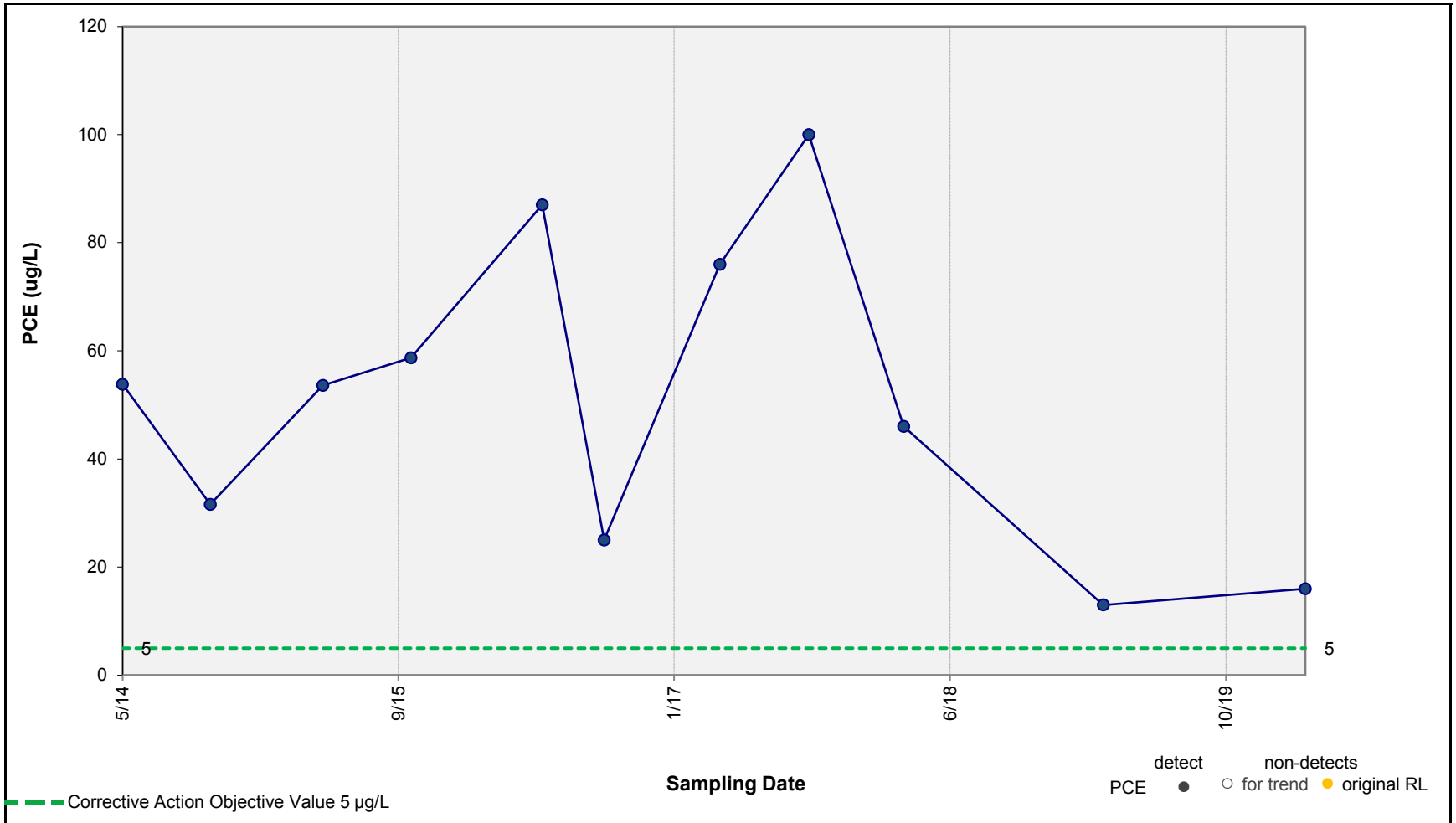
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-22

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-110



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.267 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -7.9E-03 ug/L Per Day

95% Confidence Interval = -4.2E-02 to 3.2E-02 ug/L Per Day

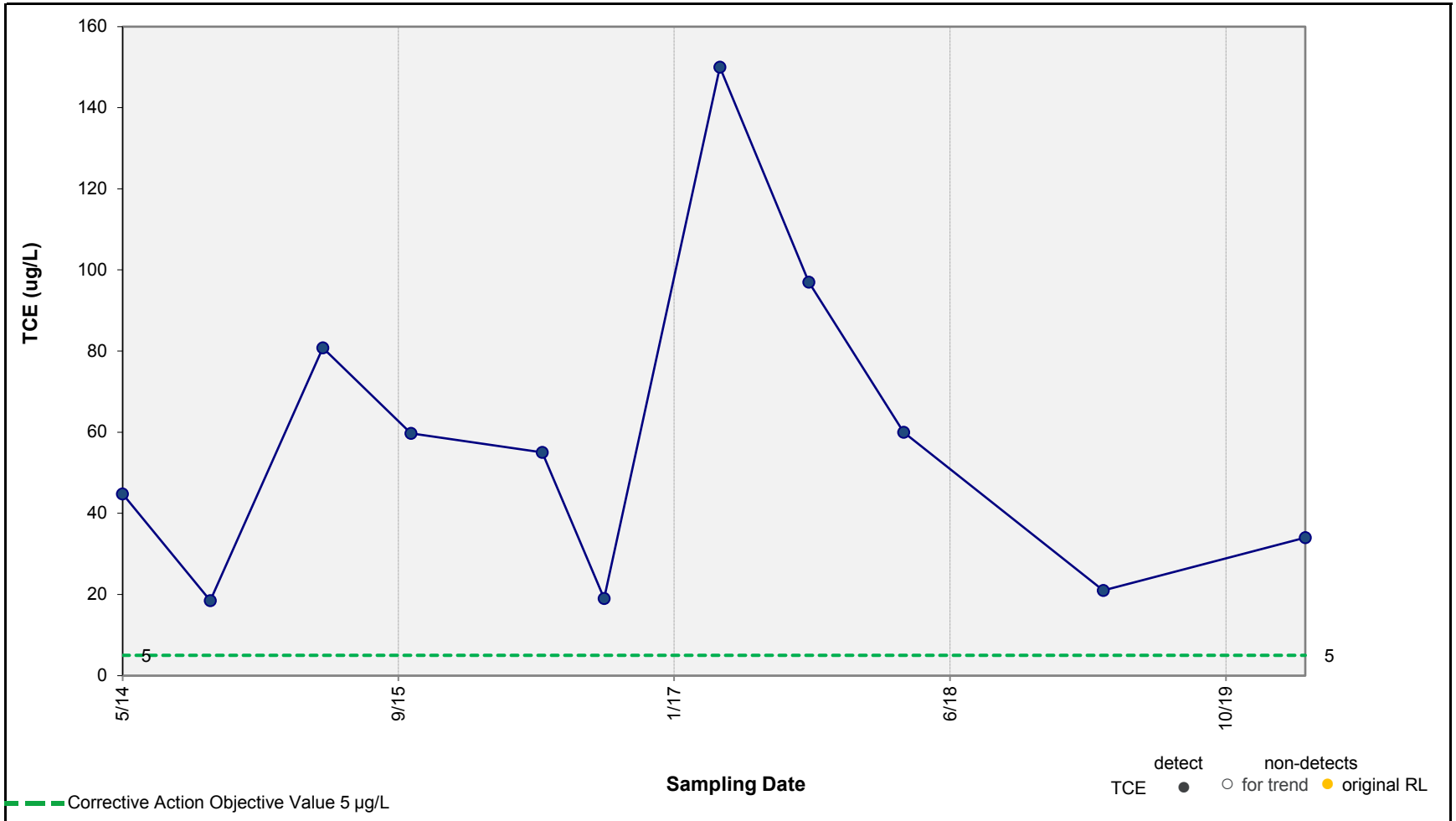
ARCADIS

Concentration vs. Time Plot – PCE in Well MW-22

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-111



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.438 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 7.0E-04 ug/L Per Day

95% Confidence Interval = -4.4E-02 to 4.3E-02 ug/L Per Day

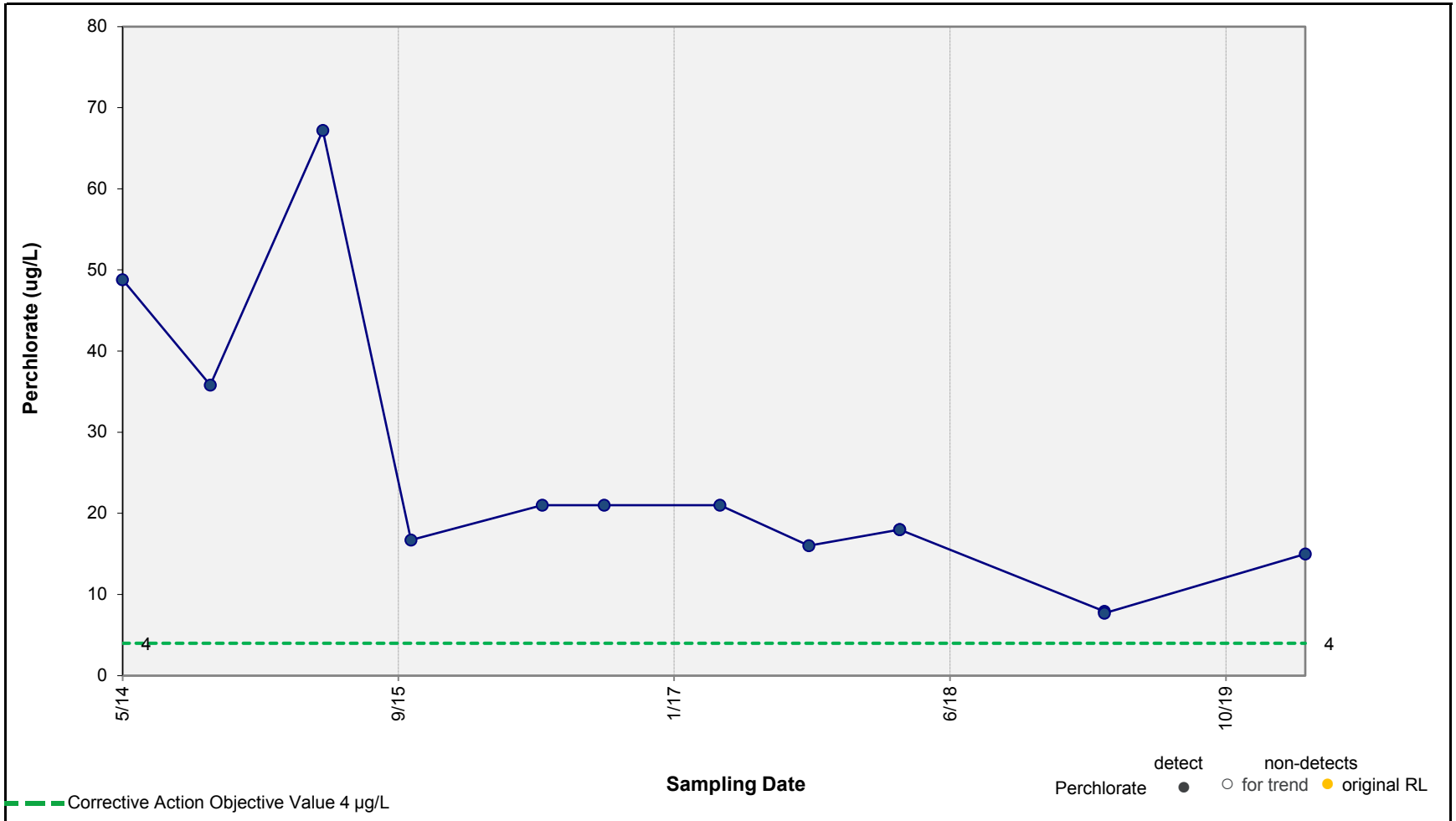
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-22

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-112



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

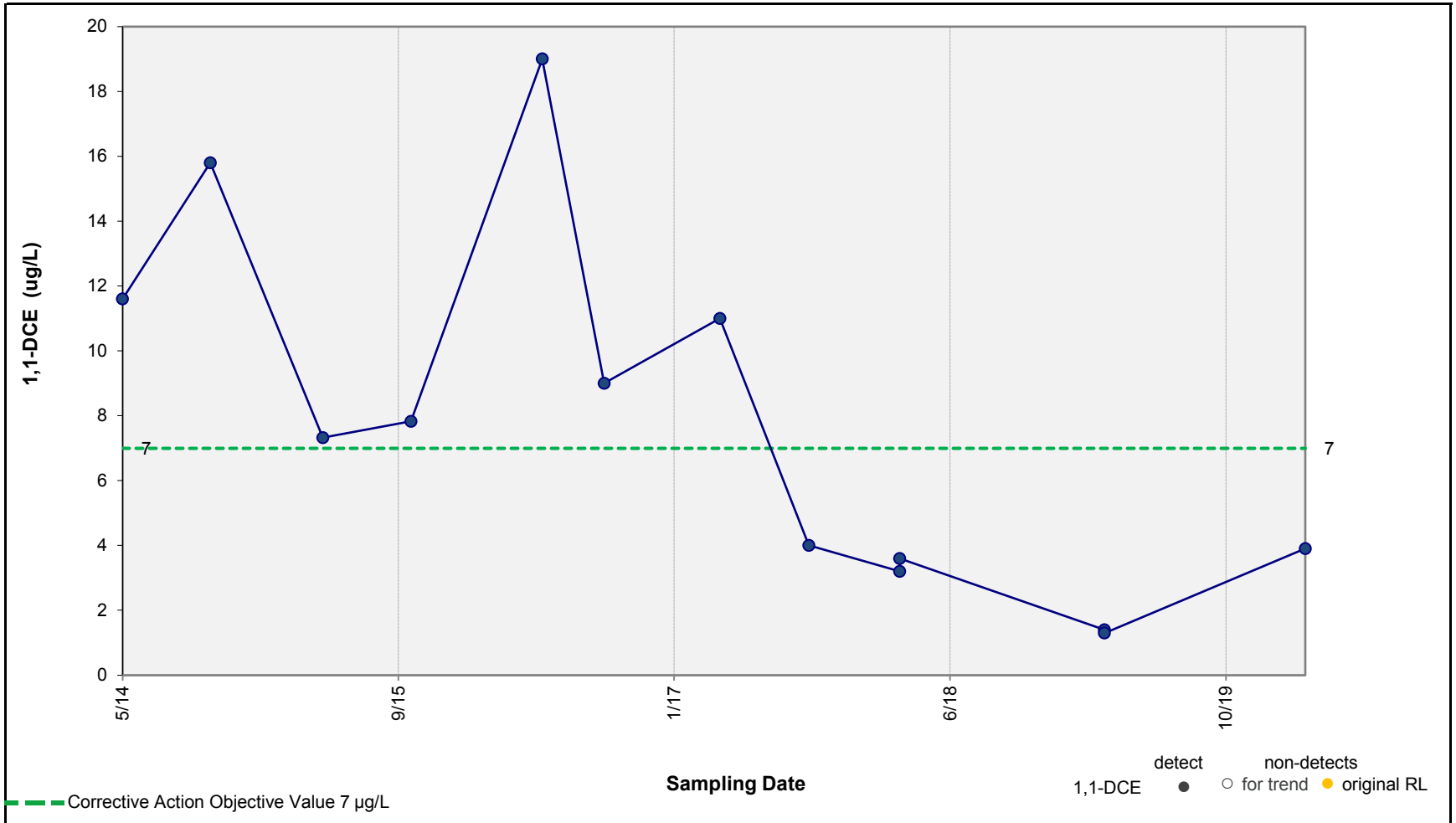
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-23

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-113



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.003 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

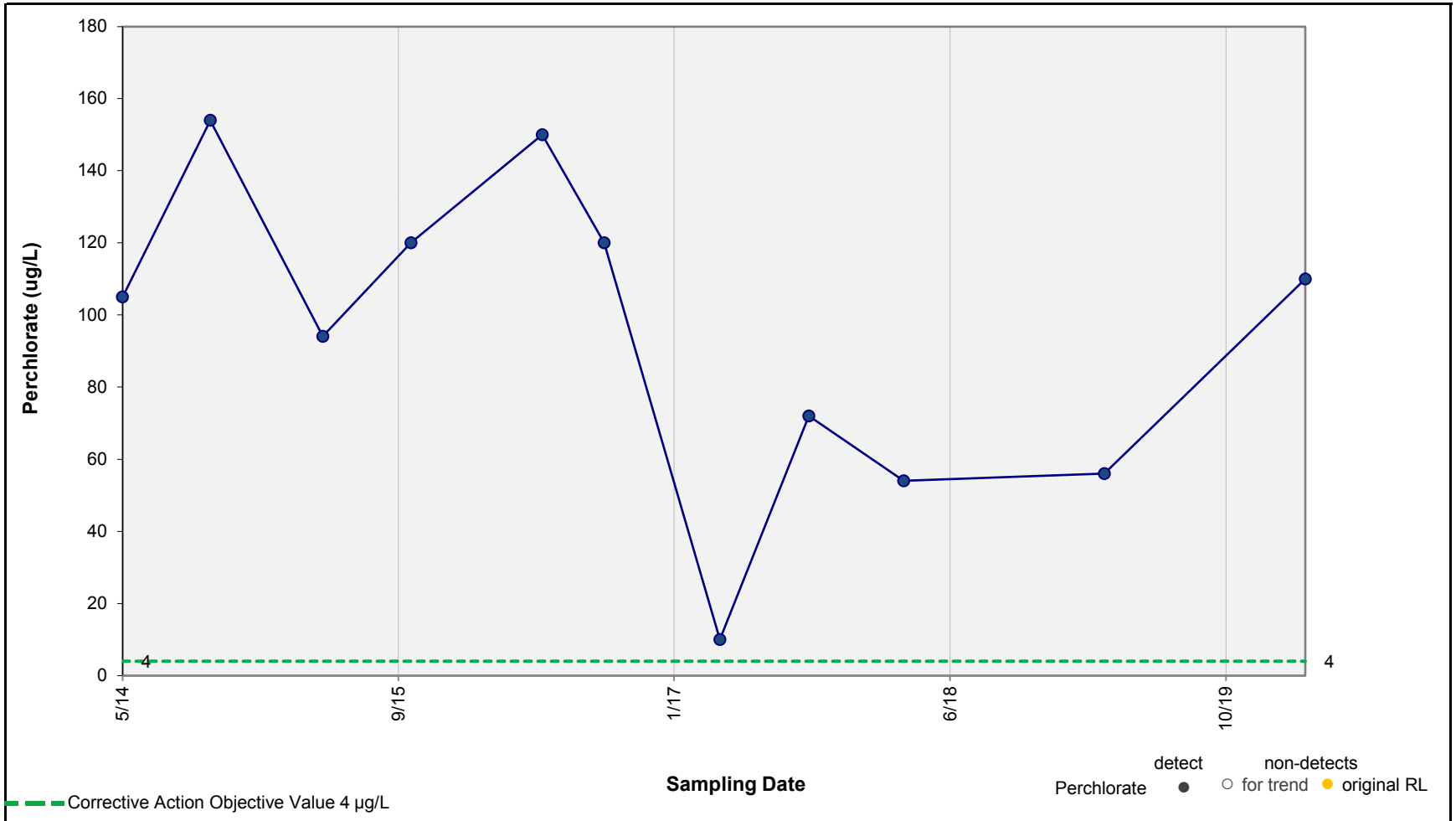
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-23

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-114



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.092 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -2.9E-02 ug/L Per Day

95% Confidence Interval = -8.8E-02 to 9.3E-03 ug/L Per Day

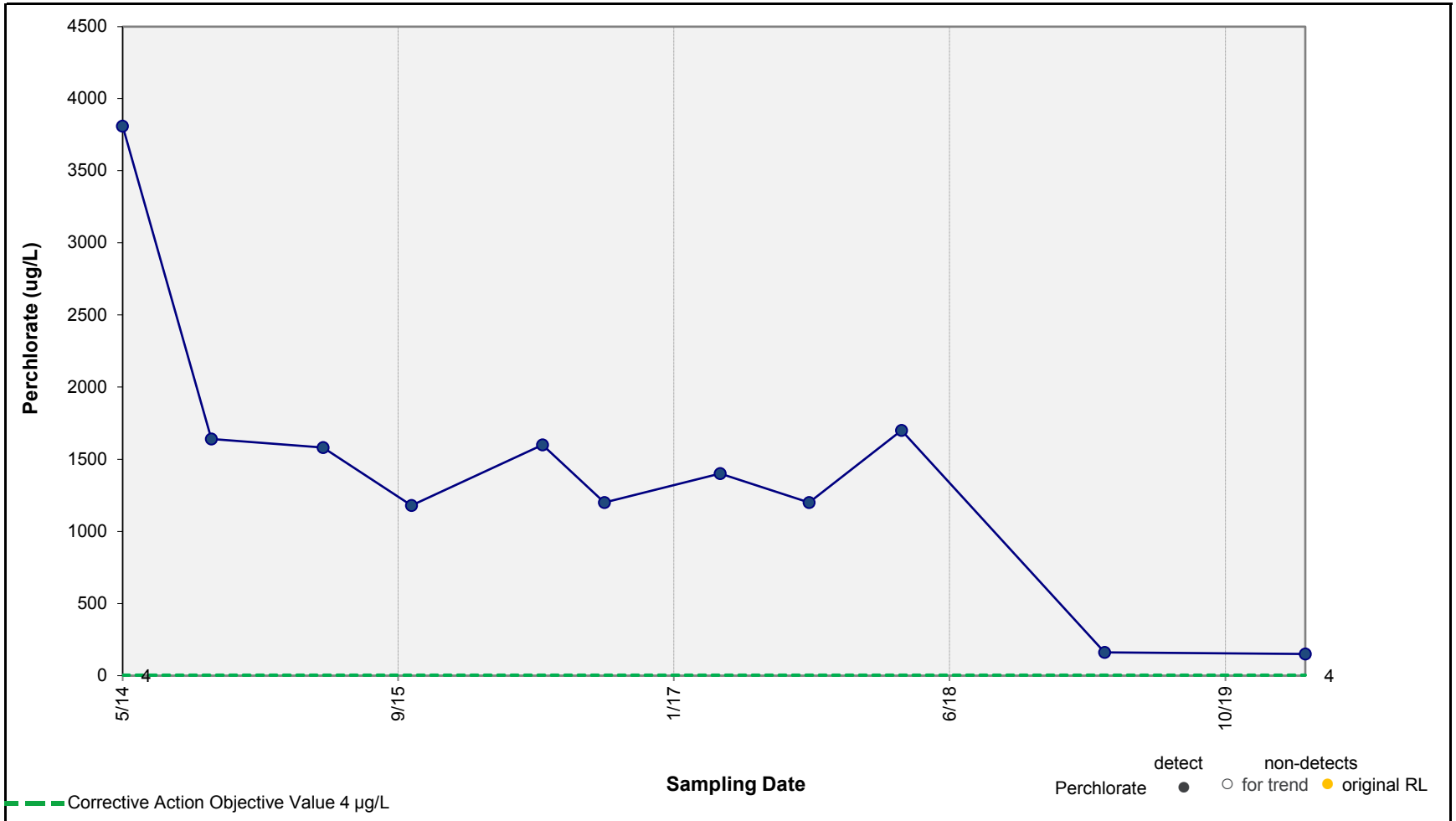
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-25

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-115



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.018 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -8.1E-01 ug/L Per Day

95% Confidence Interval = -1.7E+00 to -6.5E-02 ug/L Per Day

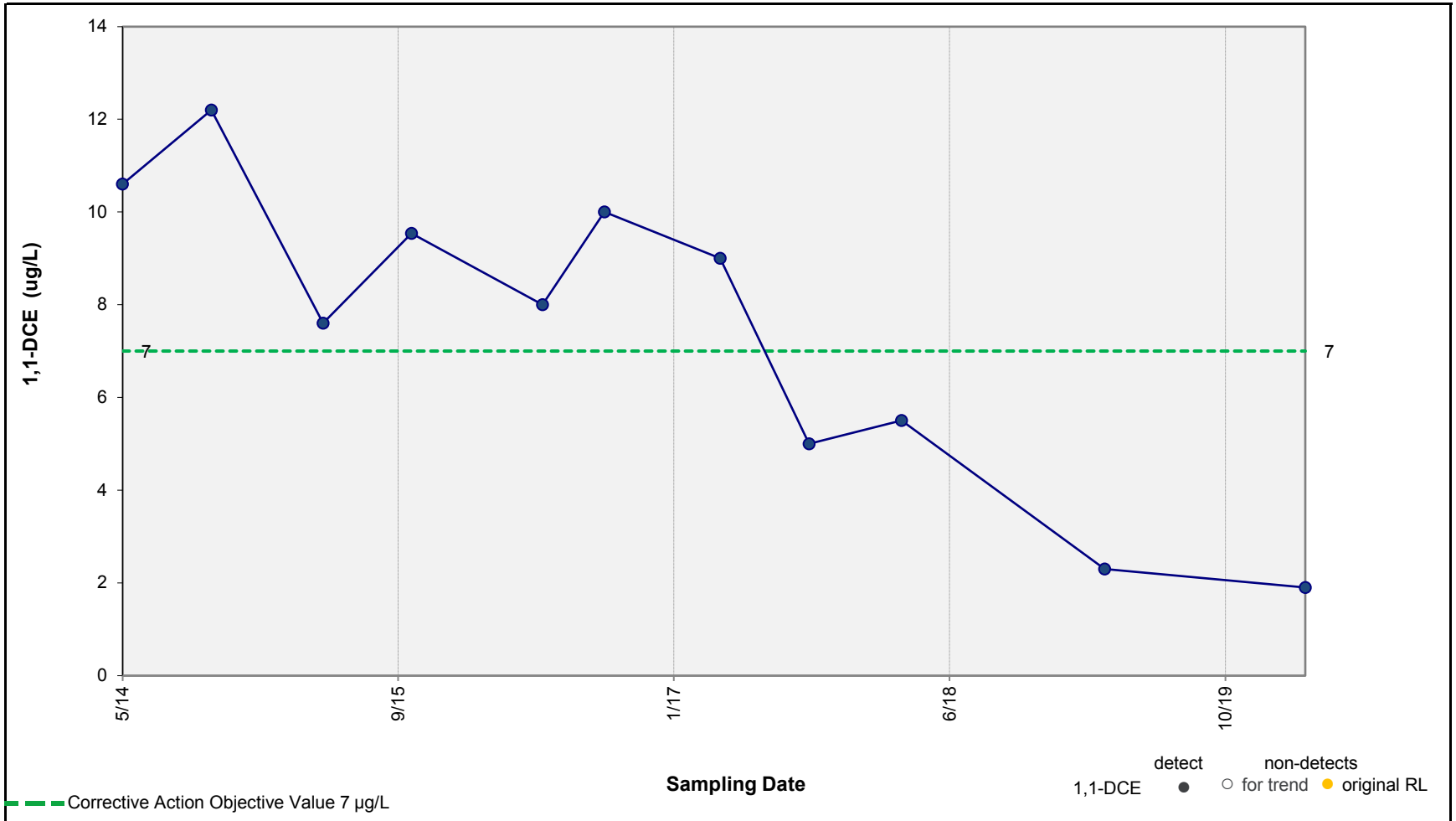
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-28

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-116



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.003 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -4.5E-03 ug/L Per Day

95% Confidence Interval = -6.4E-03 to -2.9E-03 ug/L Per Day

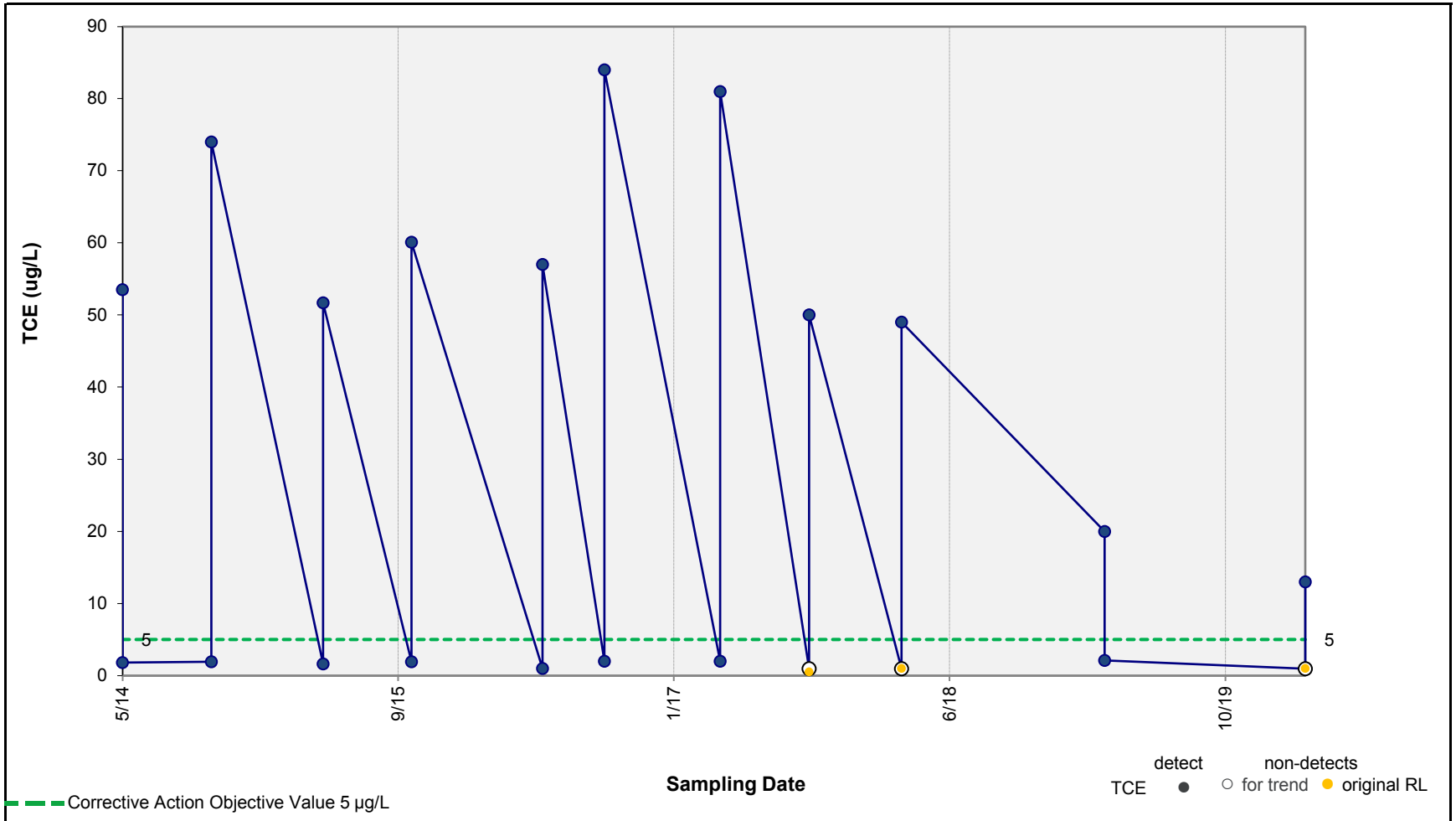
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-28

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-117



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.258 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

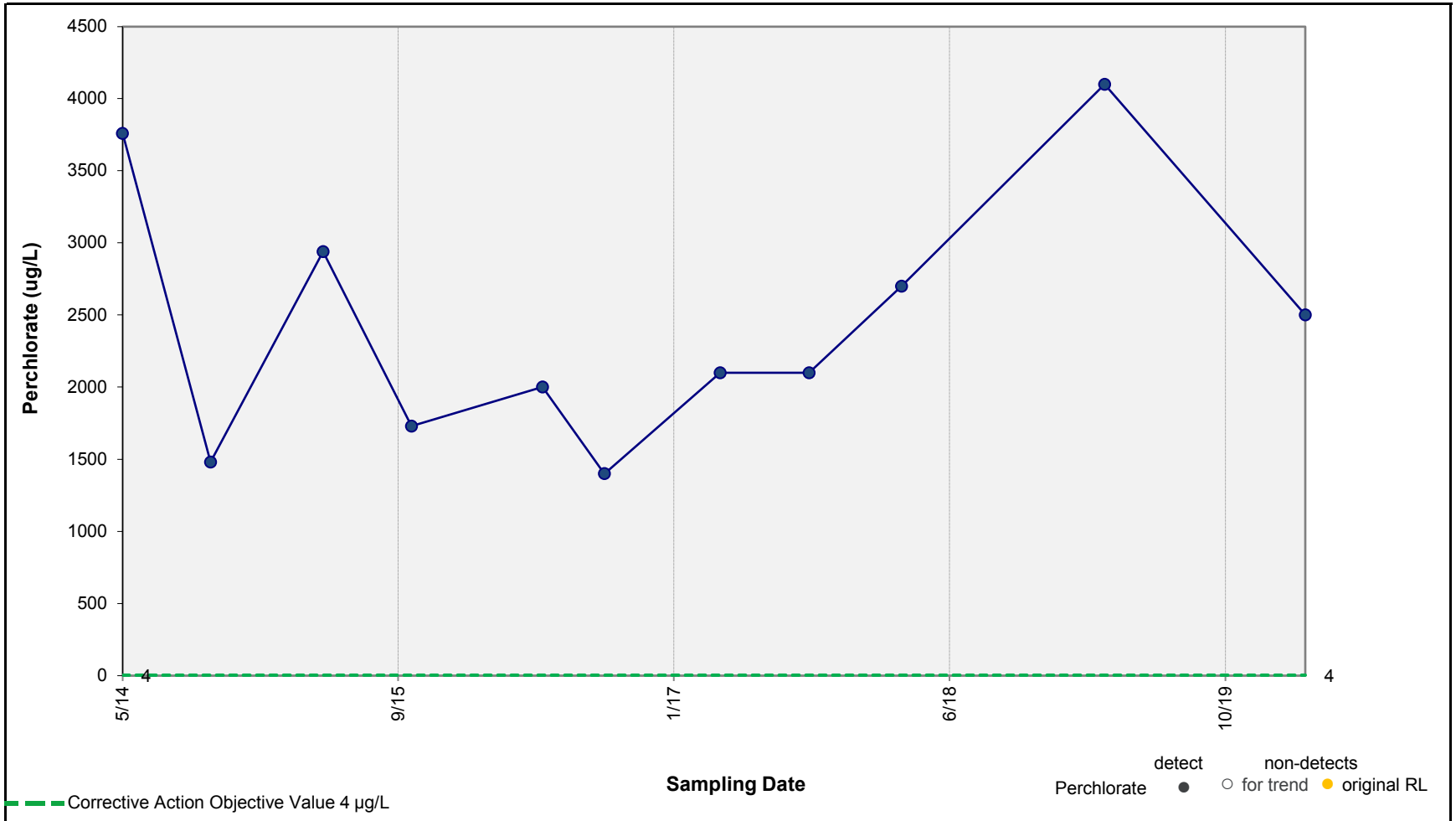
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-28

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-118



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.195 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 4.4E-01 ug/L Per Day

95% Confidence Interval = -9.4E-01 to 1.1E+00 ug/L Per Day

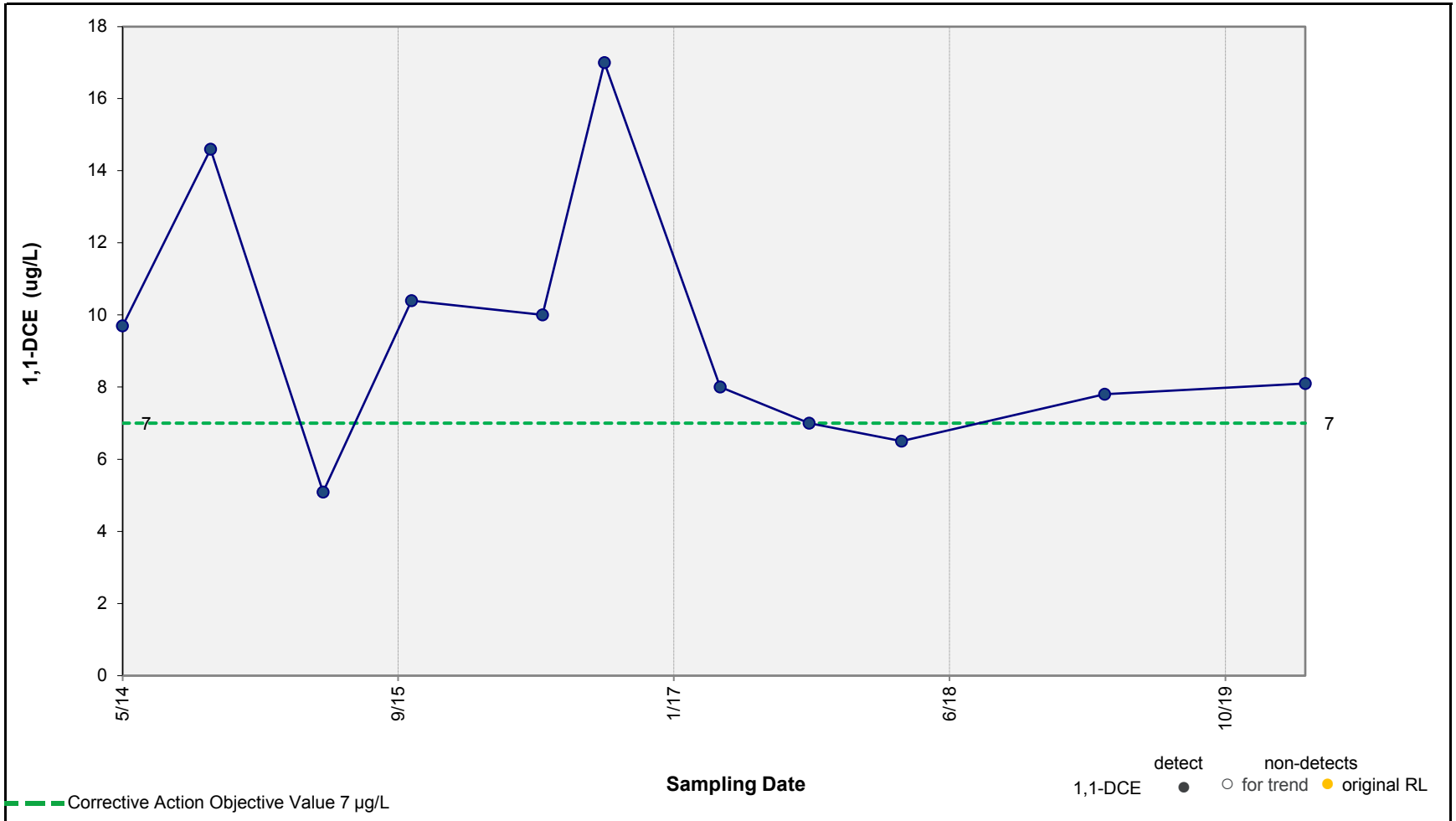
ARCADIS

Concentration vs. Time Plot – Perchlorate in Well MW-29

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-119



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.175 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.7E-03 ug/L Per Day

95% Confidence Interval = -6.2E-03 to 1.4E-03 ug/L Per Day

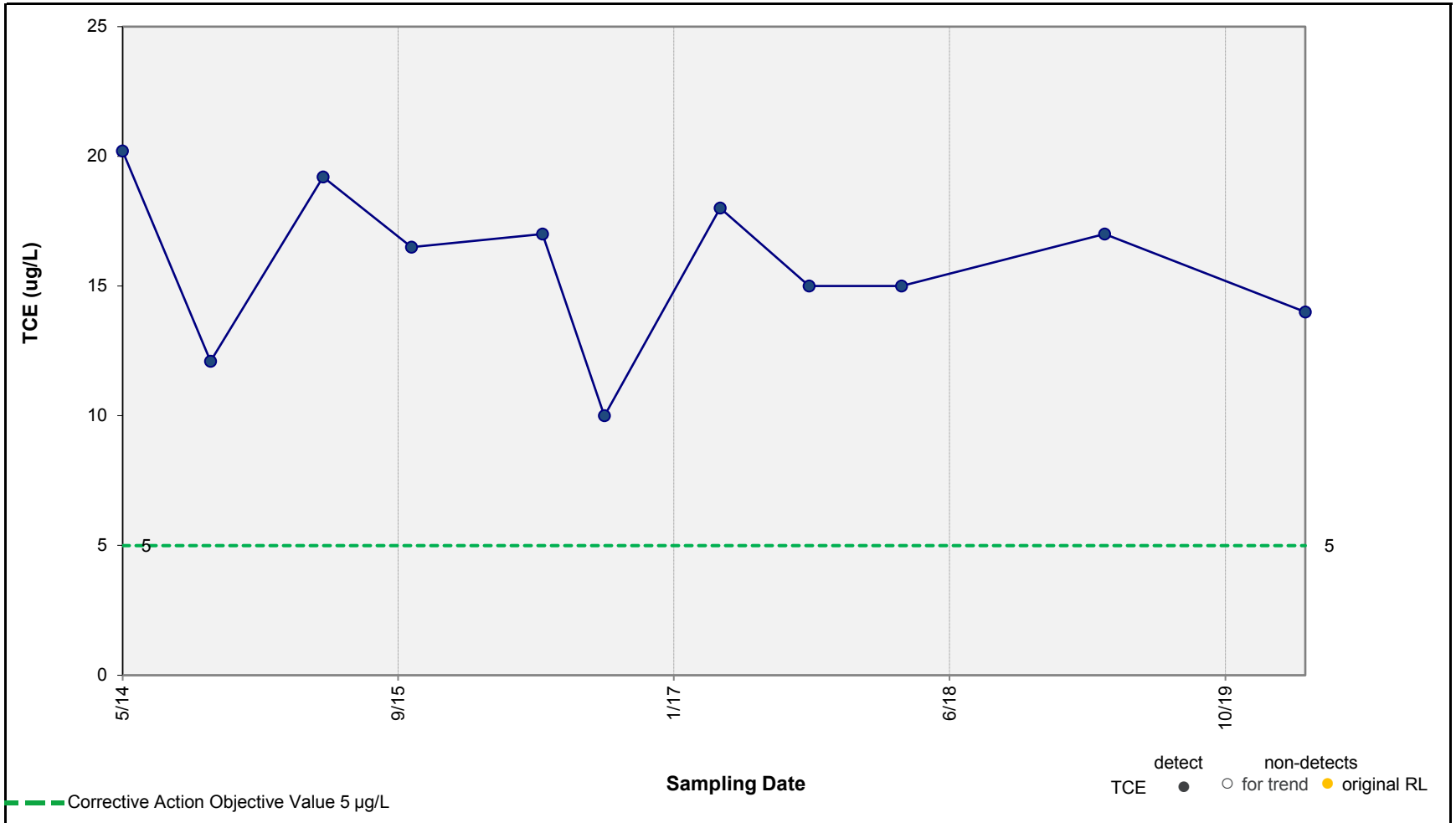
ARCADIS

Concentration vs. Time Plot – 1,1-DCE in Well MW-29

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-120



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.136 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -1.7E-03 ug/L Per Day

95% Confidence Interval = -4.1E-03 to 2.3E-03 ug/L Per Day

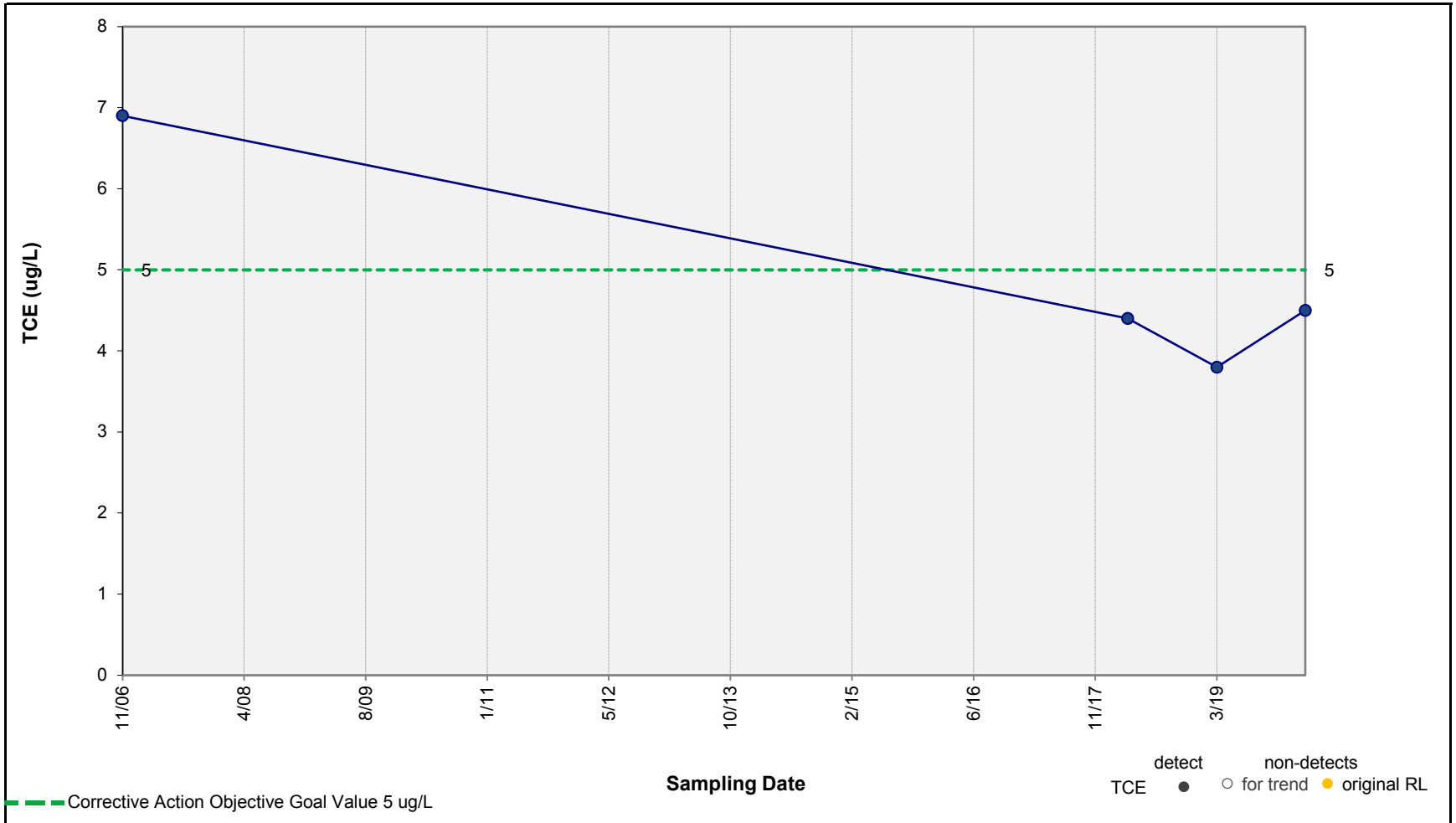
ARCADIS

Concentration vs. Time Plot – TCE in Well MW-29

Alliant Techsystems Operations LLC, Elkton, Maryland

C-Area SWMU

Figure L-121



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

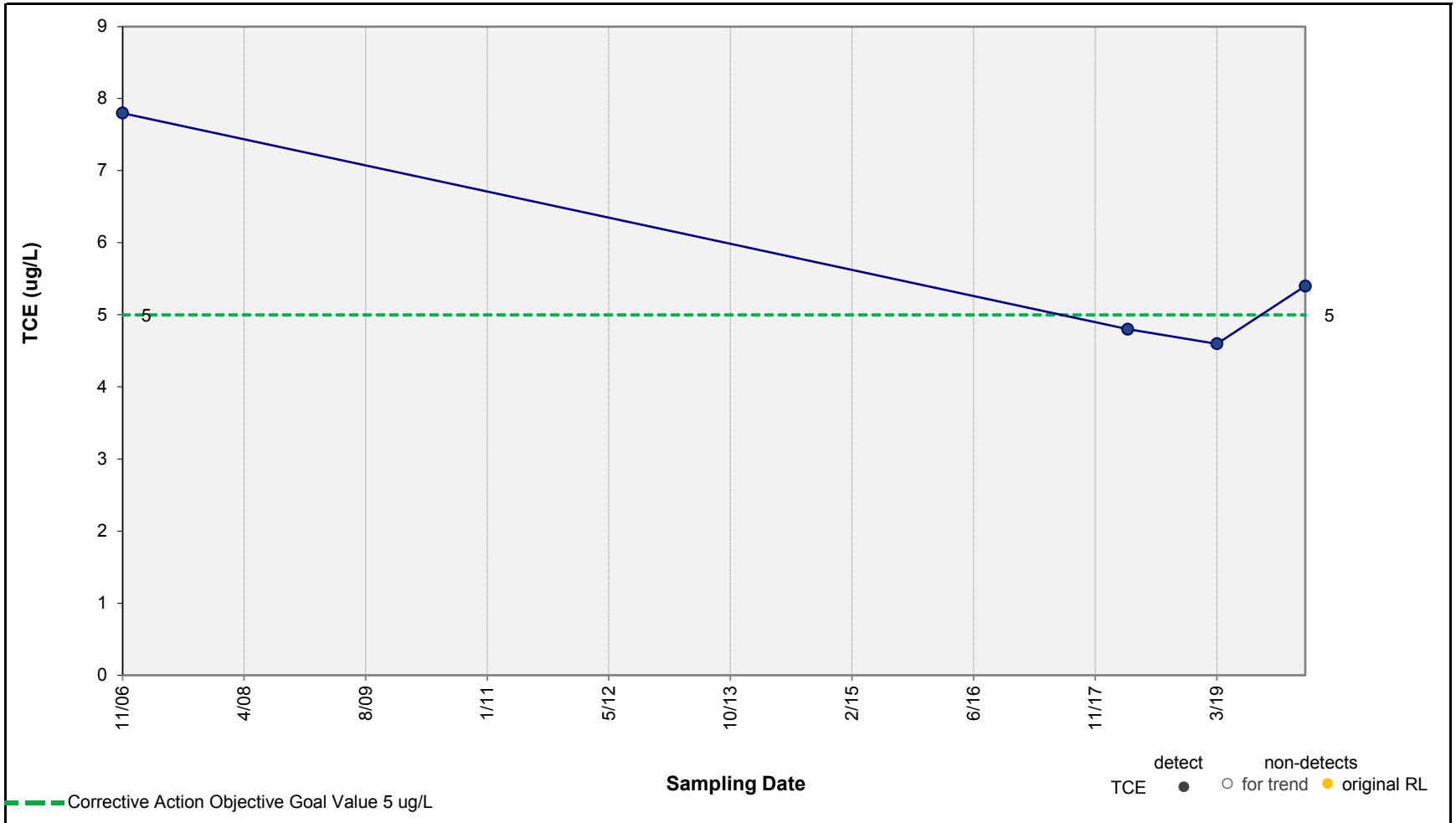
ARCADIS

Concentration vs. Time Plot – TCE in Well SW-6B

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-122



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

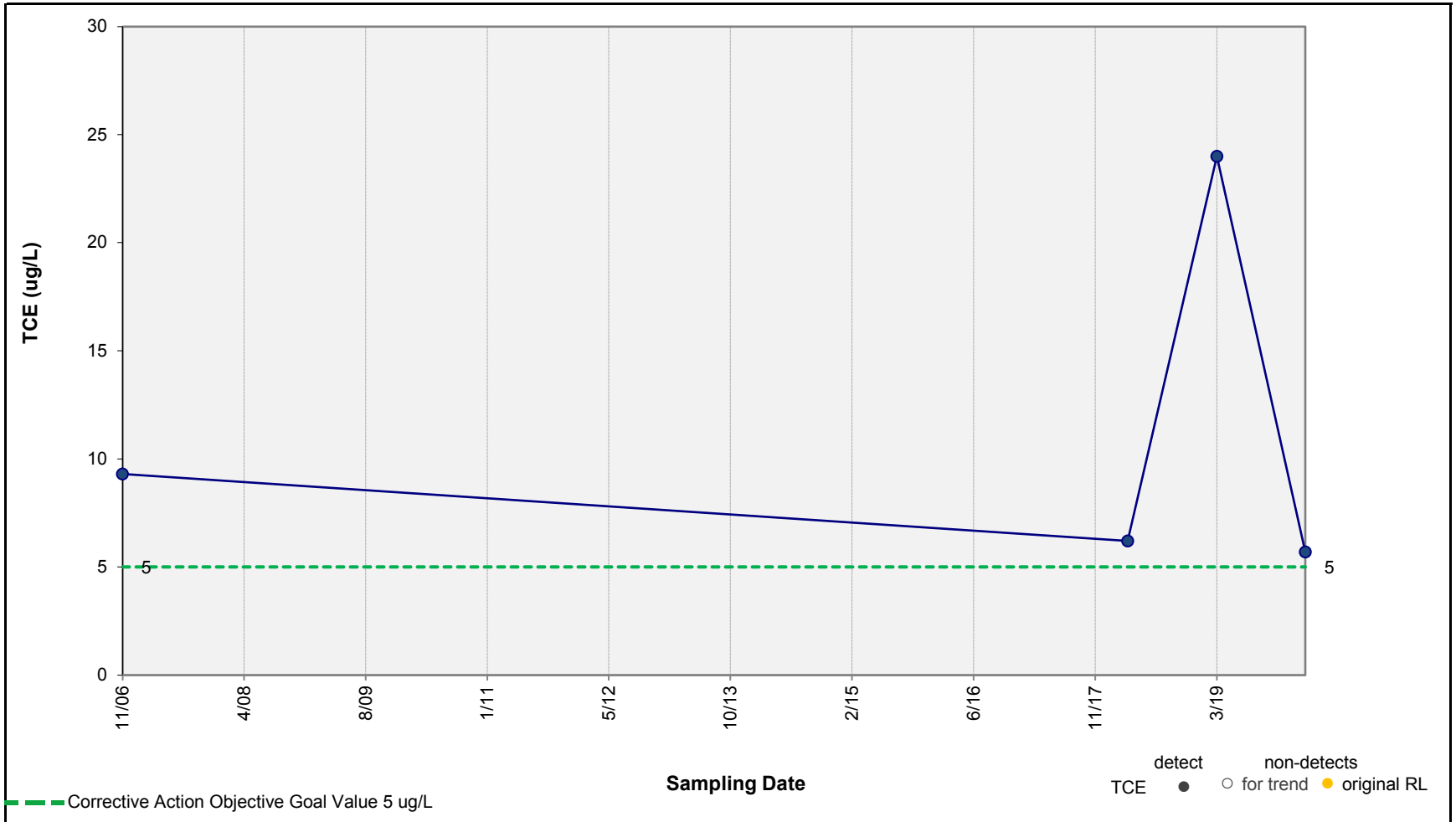
ARCADIS

Concentration vs. Time Plot – TCE in Well SW-6C

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-123



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

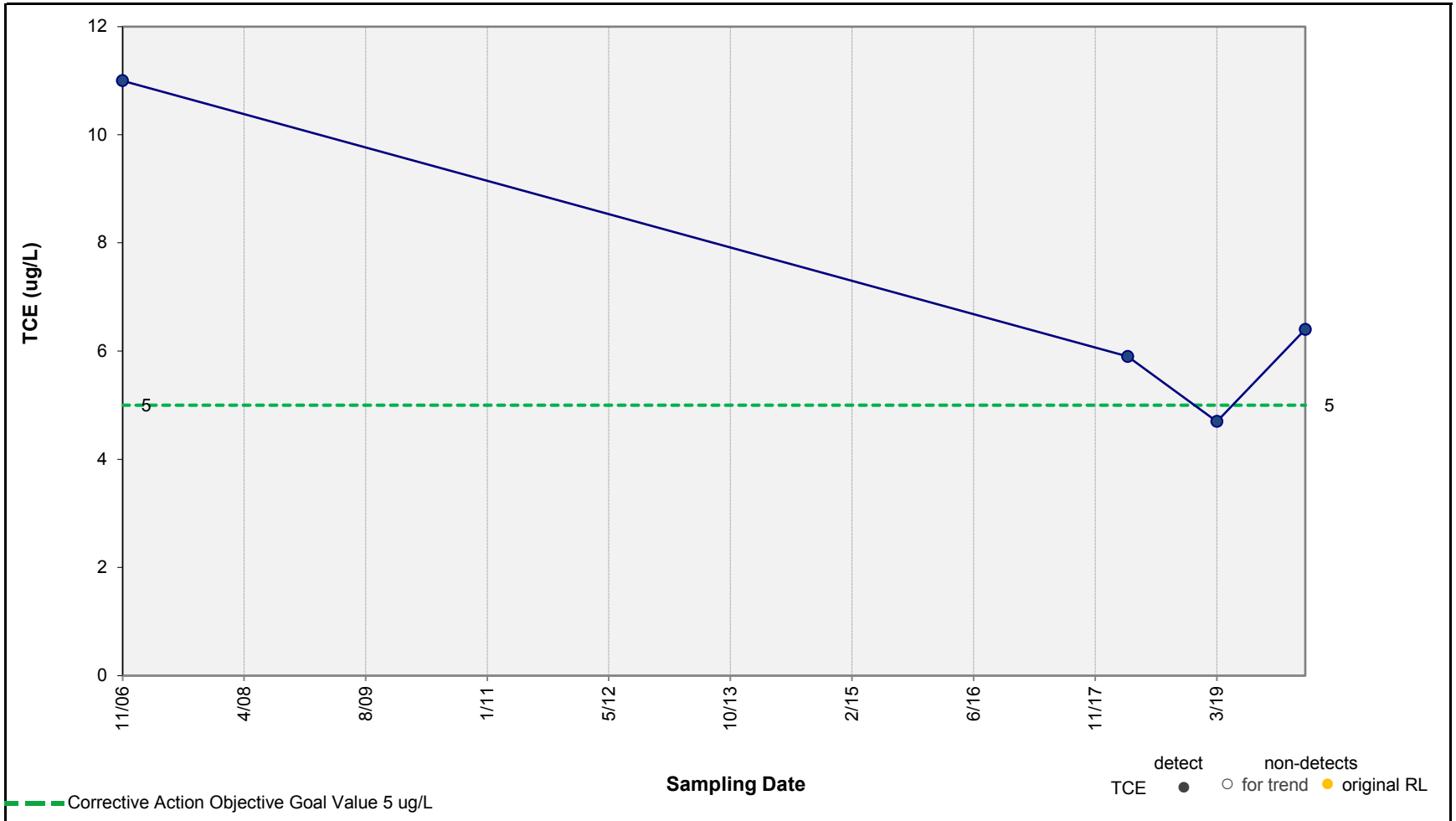
ARCADIS

Concentration vs. Time Plot – TCE in Well SW-6D

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-124



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.375 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **NA**

Median Slope Estimate = NA ug/L Per Day

95% Confidence Interval = NA to NA ug/L Per Day

ARCADIS

Concentration vs. Time Plot – TCE in Well SW-7B

Alliant Techsystems Operations LLC, Elkton, Maryland

TCE-Area SWMU

Figure L-125

APPENDIX M

Historical Data

M-1 A-Area SWMU
M-2 Beryllium SWMU
M-3 C-Area SWMU
M-4 TCE-Area SWMU

Appendix M-1
A-Area SWMU Historical Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

Matrix:			Groundwater													
Location ID:			GM-1B	GM-1B	GM-1B	GM-1B	GM-1B	GM-1B	GM-1B	GM-15M	GM-15M	GM-15M	GM-15M	DUP-01 (GM-15M)	GM-15M	GM-15M
Sample ID:			GM1B(mmdd88)	GM1B(091694)	GM1B(111402)	GM1B(032204)	GM1B(03282018)	GM1B(03192019)	GM-1B (031720)	GM15M(091594)	GM15M(1114902)	GM15M(031504)	GM15M(03282018)	DUP01(03192019)	GM15M(03192019)	GM-15M (031720)
Sample Date:			mm/dd/1988	09/16/1994	11/14/2002	03/22/2004	03/28/2018	3/19/2019	03/17/2020	09/15/1994	11/14/2002	03/15/2004	03/28/2018	3/19/2019	3/19/2019	03/17/2020
Analyte	**Units**	**CAO**														
Anions																
Perchlorate	ug/L	14	--	--	**47.10**	**37.1**	**41 J**	**62**	**94**	--	**233**	**148 J**	**40**	**43**	**44**	**32**
SVOCs																
1,4-Dioxane	ug/L	0.46	--	--	--	**15**	**5.9**	**3.7**	**2.3**	--	--	< 5.0 U	--	--	--	--
VOCs																
1,1,1-Trichloroethane	ug/L	200	< 5.0 U	< 0.28 U	**0.95 J**	**1.2 J**	< 1.0 U	< 1.0 U	< 1.0 U	**0.59**	**0.95 J**	**0.71 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L	2.7	< 5.0 U	--	**--**	**1.3 J**	**1.7**	< 1.0 U	**1.0 J**	--	**1.4**	**1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 5.0 U	--	**1.8**	**2.2**	**1.5**	**1.8**	**3.3 J**		**0.41 J**	**0.44 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	ug/L	15	--	--	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	--	--	< 1 U	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	--	--	--	**4.7**	**1.9**	**1.6**	**2.6 J**	--	--	**2**	**0.55 J**	**0.56 J**	**0.67 J**	**0.77 J**
Trichloroethene	ug/L	5	**247**	**170**	**97 D**	**100**	**46**	**40**	**50 J**	**0.72**	**4**	**4.4**	**4.1**	**4.4**	**4.5**	**4.0 J**
Vinyl chloride	ug/L	2	--	--	< 1 U	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
1. Values exceeding laboratory reporting limits are bolded. Vales exceeding the numerical Corrective Action Objective goals are highlighted in gray.
2. Water quality parameters are measured in the field during each purge event.
3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
CAO - Corrective Action Objective
-- - not analyzed or measured
B - Compound was found in the blank and in the sample
D - Indicates all compounds identified in an analysis at a secondary dilution factor
J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

Appendix M-2
Beryllium SWMU Historical Analytical Results
Alliant Techsystems Operations LLC
Elkton, Maryland

Matrix:		Groundwater					Porewater			Surface Water			
Location:		BS-1	BS-1	BS-1	BS-1	BS-1	PW-02B	PW-02B	PW-02B	SW-2B	DUP-06 (SW-2B)	SW-2B	SW-2B
Sample Date:		3/18/2004	5/12/2004	3/23/2018	3/22/2019	3/24/2020	3/26/2018	3/27/2019	3/25/2020	3/26/2018	3/27/2019	3/27/2019	3/25/2020
Sample ID:		BS1(031804)	BS1(051204)	BS1(032318)	BS1(032219)	BS-1 (032420)	PW2B(032618)	PW2B(032719)	PW-2B (032520)	SW2B(032618)	DUP06(032719)	SW2B(032719)	SW-2B (032520)
Sample Type:		N	N	N	N	N	N	N	N	N	FD	N	N
Analyte	**Units**												
Anions													
Perchlorate	ug/L	**1260**	--	< 1.0 U	< 1.0 U	**0.41 J**	**0.41 J**	**0.42 J**	**1**	**0.61 J**	**0.83 J**	**0.80 J**	**0.58 J**
Sulfate	mg/L	--	--	**1.6**	**1200**	**3.6**	**16**	**9900**	**7.3**	--	--	--	--
Metals													
Aluminum	ug/L	**437**	--	**2900**	**320**	**290**	**68 J**	**2000**	**2900**	**88 J**	**58 J**	**55 J**	**180 J**
Antimony	ug/L	< 60.0 U	--	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
Arsenic	ug/L	< 10.0 U	--	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
Barium	ug/L	**64.6 B**	--	**18**	**21**	**8.7 J**	**63**	**64**	**38**	**30**	**36**	**36**	**35**
Beryllium	ug/L	< 5.0 U	--	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**0.16 J**	**0.11 J**	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U
Cadmium	ug/L	< 5.0 U	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Calcium	ug/L	**6660**	--	**16000**	**35000**	**13000**	**8700**	**7800**	**4800**	**12000**	**13000**	**13000**	**12000**
Chromium	ug/L	**6.1 B**	--	**9.4 J**	**3.0 J**	< 10 U	< 10 U	**12**	**10**	< 10 U	< 10 U	< 10 U	< 10 U
Cobalt	ug/L	**7.3 B**	--	**1.3 J**	**2.7 J**	< 10 U	**7.3 J**	**12**	**3.4 J**	< 10 U	< 10 U	< 10 U	< 10 U
Copper	ug/L	**5.1 B**	--	**5.6 J**	**6.5 JB**	**4.4 J**	< 20 U	**3.4 J**	**6.0 J**	< 20 U	< 20 U	< 20 U	< 20 U
Iron	ug/L	--	--	**210**	**200**	**330 J**	**6100**	**9900**	**11000**		--	--	**430**
Iron (filtered)	ug/L	**744**	--	**2800**	**1800**	**410 J**	**6100**	**12000**	**5800**	**230**	**160**	**140**	**--**
Lead	ug/L	< 3.0 U	--	< 10 U	< 10 U	< 10 U	< 10 U	**7.8 J**	**4.7 J**	< 10 U	**5.3 J**	< 10 U	< 10 U
Magnesium	ug/L	**6630**	--	**5100**	**10000**	**4100**	**5700**	**5100**	**2700**	**8800**	**8200**	**8000**	**8300**
Manganese	ug/L	**72.6**	--	**13**	**230**	**5.1 J**	**390**	**820**	**1000**	**24**	**31**	**30**	**46**
Mercury	ug/L	< 0.20 U	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	**0.12 JB**	< 0.20 U	< 0.20 U	**0.084 JB**	< 0.20 U	**0.33**
Nickel	ug/L	**37.1 B**	--	**5.4 J**	**5.5 J**	< 40 U	**14 J**	**21 J**	**12 J**	**3.9 J**	**3.1 J**	< 40 U	**3.5 J**
Potassium	ug/L	**134 B**	--	**1400**	**1100**	**560 J**	**690 J**	**900 J**	**740 J**	**2600**	**2100**	**2000**	**2100**
Selenium	ug/L	< 5.0 U	--	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
Silver	ug/L	< 10.0 U	--	< 10 U	< 10 U	< 10 UB	< 10 U	< 10 U	< 10 UB	< 10 U	< 10 U	< 10 U	< 10 U
Sodium	ug/L	**5000**	--	**19000**	**24000**	**5800**	**11000**	**12000**	**6700**	**20000**	**15000**	**15000**	**12000**
Thallium	ug/L	**4.9 B**	--	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Vanadium	ug/L	< 50.0 U	--	**4.6 J**	**2.4 J**	**1.1 J**	< 10 U	**5.1 J**	**6.5 J**	< 10 U	< 10 U	< 10 U	**1.0 J**
Zinc	ug/L	**8.7 B**	--	< 20 U	**7.3 J**	< 20 U	**12 J**	**28**	**15 J**	< 20 U	< 20 U	< 20 U	< 20 U
SVOCs													
1,1-Biphenyl	ug/L	--	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
1,2,4-Trichlorobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.6 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
1,2-Dichlorobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.6 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
1,3-Dichlorobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.6 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
1,4-Dichlorobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.6 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
1,4-Dioxane	ug/L	**3 J**	--	--	--	--	--	--	--	--	--	--	--
2,2-Oxybis(1-Chloropropane)	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	--	< 9.8 U	< 9.9 U	--	< 9.6 U	< 9.7 U	< 9.9 U	--
2,4,5-Trichlorophenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2,4,6-Trichlorophenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2,4-Dichlorophenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2,4-Dimethylphenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2,4-Dinitrophenol	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
2,4-Dinitrotoluene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2,6-Dinitrotoluene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2-Chloronaphthalene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2-Chlorophenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2-Methyl-4,6-dinitrophenol	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
2-Methylnaphthalene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
2-Methylphenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U

Matrix:		Groundwater					Porewater			Surface Water			
Location:		BS-1	BS-1	BS-1	BS-1	BS-1	PW-02B	PW-02B	PW-02B	SW-2B	DUP-06 (SW-2B)	SW-2B	SW-2B
Sample Date:		3/18/2004	5/12/2004	3/23/2018	3/22/2019	3/24/2020	3/26/2018	3/27/2019	3/25/2020	3/26/2018	3/27/2019	3/27/2019	3/25/2020
Sample ID:		BS1(031804)	BS1(051204)	BS1(032318)	BS1(032219)	BS-1 (032420)	PW2B(032618)	PW2B(032719)	PW-2B (032520)	SW2B(032618)	DUP06(032719)	SW2B(032719)	SW-2B (032520)
Sample Type:		N	N	N	N	N	N	N	N	N	FD	N	N
Analyte	**Units**												
2-Nitroaniline	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
2-Nitrophenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
3,3-Dichlorobenzidine	ug/L	< 50 U	--	< 59 U	< 58 U	< 59 U	< 59 U	< 60 U	< 58 U	R	< 58 U	< 59 U	< 58 U
3-Nitroaniline	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
4-Bromophenyl phenyl ether	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
4-Chloro-3-Methylphenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
4-Chlorophenyl phenyl ether	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
4-Methylphenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	--	< 9.8 U	< 9.9 U	--	< 9.6 U	< 9.7 U	< 9.9 U	--
4-Nitroaniline	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
4-Nitrophenol	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U
Acenaphthene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Acenaphthylene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Acetophenone	ug/L		--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Anthracene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Atrazine	ug/L		--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzaldehyde	ug/L		--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzo(a)anthracene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzo(a)pyrene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzo(b)fluoranthene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzo(g,h,i)perylene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Benzo(k)fluoranthene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
bis(2-Chloroethoxy)methane	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
bis(2-Chloroethyl)ether	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
bis(2-Ethylhexyl)phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Butyl benzyl phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Caprolactam	ug/L		--	**30**	**87**	**7.2 J**	< 9.8 U	< 9.9 U	< 9.7 U	**2.5 J**	< 9.7 U	< 9.9 U	< 9.6 U
Carbazole	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Chrysene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Dibenzo(a,h)anthracene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Dibenzofuran	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Diethyl phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Dimethyl phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Di-n-butyl phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Di-n-octyl phthalate	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Fluoranthene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Fluorene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Hexachloro-1,3-butadiene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Hexachlorobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Hexachlorocyclopentadiene	ug/L	< 50 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Hexachloroethane	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Indeno(1,2,3-cd)pyrene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Isophorone	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Naphthalene	ug/L	< 10 U	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
N-Nitrosodi-n-propylamine	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
N-Nitrosodiphenylamine	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
p-Chloroaniline	ug/L	< 10 U	--	< 20 U	< 19 U	< 20 U	< 20 U	< 20 U	< 19 U	< 19 U	< 19 U	< 20 U	< 19 U
Pentachlorophenol	ug/L	< 50 U	--	< 49 U	< 48 U	< 50 U	< 49 U	< 50 U	< 49 U	< 48 U	< 49 U	< 49 U	< 48 U

Matrix:		Groundwater					Porewater			Surface Water			
Location:		BS-1	BS-1	BS-1	BS-1	BS-1	PW-02B	PW-02B	PW-02B	SW-2B	DUP-06 (SW-2B)	SW-2B	SW-2B
Sample Date:		3/18/2004	5/12/2004	3/23/2018	3/22/2019	3/24/2020	3/26/2018	3/27/2019	3/25/2020	3/26/2018	3/27/2019	3/27/2019	3/25/2020
Sample ID:		BS1(031804)	BS1(051204)	BS1(032318)	BS1(032219)	BS-1 (032420)	PW2B(032618)	PW2B(032719)	PW-2B (032520)	SW2B(032618)	DUP06(032719)	SW2B(032719)	SW-2B (032520)
Sample Type:		N	N	N	N	N	N	N	N	N	FD	N	N
Analyte	**Units**												
Phenanthrene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Phenol	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
Pyrene	ug/L	< 10 U	--	< 9.8 U	< 9.6 U	< 9.9 U	< 9.8 U	< 9.9 U	< 9.7 U	< 9.6 U	< 9.7 U	< 9.9 U	< 9.6 U
SVOCs SIM													
Naphthalene	ug/L	--	--	< 0.20 U	--	--	< 0.20 U	--	--	< 0.20 U	--	--	--
TOC													
Total Organic Carbon	ug/L	--	--	**7**	**4000**	**7**	**1.5**	**1700**	**3**	--	--	--	--
VOCs													
1,1,1,2-Tetrachloroethane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/L	**150 D**	**110**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2,2-Tetrachloroethane	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L	**86 D**	**73**	< 1.0 U	< 1.0 U	< 1.0 U	**0.69 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	**13**	**8.7**	< 1.0 U	< 1.0 U	< 1.0 U	**18**	**19**	**0.53 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloropropene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichlorobenzene	ug/L	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2,3-Trichloropropane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trichlorobenzene	ug/L	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 9.7 U	< 9.9 U	< 5.0 U
1,2,4-Trimethylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromo-3-chloropropane	ug/L	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dibromoethane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichlorobenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 9.7 U	< 9.9 U	< 1.0 U
1,2-Dichloroethane	ug/L	**0.27 J**	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethene, Total	ug/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
1,2-Dichloropropane	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3,5-Trimethylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 9.7 U	< 9.9 U	< 1.0 U
1,3-Dichloropropane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 9.7 U	< 9.9 U	< 1.0 U
2,2-Dichloropropane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Butanone (MEK)	ug/L	< 5.0 U	< 25 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Chloroethyl vinyl ether	ug/L	--	--	< 10 U	< 10 U	R	< 10 U	< 10 U	R	< 10 U	< 10 U	< 10 U	R
2-Chlorotoluene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Chlorotoluene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Methyl-2-Pentanone	ug/L	< 5.0 U	< 25 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Acetone	ug/L	< 10 U	< 50 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Benzene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromobenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromochloromethane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

	Matrix:	Groundwater					Porewater			Surface Water			
	Location:	BS-1	BS-1	BS-1	BS-1	BS-1	PW-02B	PW-02B	PW-02B	SW-2B	DUP-06 (SW-2B)	SW-2B	SW-2B
	Sample Date:	3/18/2004	5/12/2004	3/23/2018	3/22/2019	3/24/2020	3/26/2018	3/27/2019	3/25/2020	3/26/2018	3/27/2019	3/27/2019	3/25/2020
	Sample ID:	BS1(031804)	BS1(051204)	BS1(032318)	BS1(032219)	BS-1 (032420)	PW2B(032618)	PW2B(032719)	PW-2B (032520)	SW2B(032618)	DUP06(032719)	SW2B(032719)	SW-2B (032520)
	Sample Type:	N	N	N	N	N	N	N	N	N	FD	N	N
Analyte	Units												
Bromodichloromethane	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromoform	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromomethane	ug/L	< 2.0 U	< 10 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	ug/L	< 1.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Carbon Tetrachloride	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CFC-11	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CFC-12	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorodibromomethane	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	ug/L	< 2.0 U	< 10 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**2.8 J**	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloromethane	ug/L	< 2.0 U	< 10 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,3-Dichloropropene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Cymene (p-Isopropyltoluene)	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dibromomethane	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	< 2.0 U	**2.2 B**	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Hexachloro-1,3-butadiene	ug/L	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 9.7 U	< 9.9 U	< 5.0 U
Isopropylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Methyl N-Butyl Ketone (2-Hexanone)	ug/L	< 5.0 U	< 25 U	< 10 U	< 10 U	< 10 U	< 10 UJ	< 10 U	< 10 U	< 10 UJ	< 10 U	< 10 U	< 10 U
Methyl-tert-butylether	ug/L	--	--	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
n-Butylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
n-Propylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
o,p-Xylene	ug/L	--	--	< 1.0 U	--	--	< 1.0 U	**--**	**--**	< 1.0 U	--	--	--
o-Xylene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
sec-Butylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Styrene (Monomer)	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
tert-Butylbenzene	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	ug/L	**0.32 J**	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Total Xylenes	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,3-Dichloropropene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl acetate	ug/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Vinyl chloride	ug/L	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1.5**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
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3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
-- - not analyzed or measured
CAO - corrective action objective
SIM - selective ion monitoring
SVOC - semi-volatile organic compound
VOC - volatile organic compound
B - Compound was found in the blank and in the sample
D - Indicates all compounds identified in an analysis at a secondary dilution factor
J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit
-- - not analyzed or measured

			Groundwater									
			CFMW-01 MW-01-10142014 10/14/2014	CFMW-01 MW-01-05052015 5/5/2015	CFMW-01 MW-01-10122015 10/12/2015	CFMW-01 MW-01-06062016 6/6/2016	CFMW-01 MW-01-09262016 9/26/2016	CFMW-01 MW-01(04242017) 4/24/2017	CFMW-01 MW-01(10022017) 10/2/2017	CFMW-01 MW-1 (031918) 3/19/2018	CFMW-01 MW-1 (032019) 3/20/2019	CFMW-01 MW-1 (031820) 03/18/2020
Analyte	**Units**	**CAO**										
Anions												
Perchlorate	ug/L	4	**14700**	**3610**	**455**	**9900**	**5200**	**1000**	**7500**	**180**	**240**	**1900**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--
Metals												
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--
TOC												
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--
VOCs												
1,1,1-Trichloroethane	ug/L	200	**2880**	**2680**	**15100**	**1300**	**2800**	**2100**	**1500**	**41**	**34**	**250 D**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	**3**	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**885**	**427**	**384**	**360**	**820**	**470**	**560**	**16**	**12**	**140**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	**2**	**4**	**2**	**4**	< 1.0 U	< 1.0 U	**0.69 J**
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.3**	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	**57**	< 1.0 U	< 1.0 U	**4**	**24**	**2**	**24**	< 1.0 U	< 1.0 U	**1.3**
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**10**	**35**	**16**	**32**	**0.60 J**	**0.55 J**	**4.6**
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	**4**	**8**	**4**	**8**	< 1.0 U	< 1.0 U	**0.93 J**
Trichloroethene	ug/L	5	**132**	< 1.0 U	< 1.0 U	**50**	**61**	**27**	**64**	**0.78 J**	**0.66 J**	**9.8**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U

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3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

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VOC - volatile organic compound

			Groundwater											
			CFMW-02 MW-02-05062014 5/6/2014	CFMW-02 MW-02-10142014 10/14/2014	CFMW-02 MW-02-05052015 5/5/2015	CFMW-02 MW-02-10122015 10/12/2015	CFMW-02 MW-02-06062016 6/6/2016	CFMW-02 MW-02-09262016 9/26/2016	CFMW-02 MW-02(04242017) 4/24/2017	CFMW-02 MW-02(10022017) 10/2/2017	CFMW-02 MW-2 (032318) 3/23/2018	CFMW-02 DUP02 (032019) 3/20/2019	CFMW-02 MW-2 (032019) 3/20/2019	CFMW-02 MW-2 (031820) 03/18/2020
Analyte	Units	CAO												
Anions														
Perchlorate	ug/L	4	**975**	**1280**	**494**	**4970**	**150**	**210**	**190**	**68**	**86**	**960**	**1000**	**490**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	**6.8**	**8200**	**8200**	**5.3**
Metals														
Iron	ug/L	--	--	--	--	--	--	--	--	--	**120**	< 50 U	**18 J**	< 50 U
TOC														
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	**2.6**	**1100**	**1100**	**2.5**
VOCs														
1,1,1-Trichloroethane	ug/L	200	**16000**	**10800**	**13600**	**3230**	**51000**	**13000**	**12000**	**8300**	**3800**	**47**	**43**	**11000 D**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	< 0.5 U	< 20 U	< 1.0 U	< 1.0 UH	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	**700**	< 1.0 U	**878**	**1600**	**750**	**210**	**340**	**52**	**1.1**	< 1.0 UH	**120 D**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	< 0.5 U	< 0.5 U	< 20 U	< 1.0 U	< 1.0 UH	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	< 0.5 U	< 20 U	< 1.0 U	< 1.0 UH	**0.47 J**
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 20 U	< 1.0 U	< 1.0 UH	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**170**	**150**	**37**	**32**	**16 J**	< 1.0 U	< 1.0 UH	**62**
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**15**	**14**	< 0.5 U	**2**	< 20 U	< 1.0 U	< 1.0 UH	**2.3**
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**19**	--	--	< 100 U	< 5.0 U	< 1.0 UH	< 5.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	2	**19 J**	< 1.0 U	< 1.0 UH	**1**
Trichloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	**107**	**29**	**24**	< 0.5 U	**27**	**18 J**	< 1.0 U	< 1.0 UH	**9.1**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5**	< 0.5 U	**2**	< 20 U	< 1.0 U	< 1.0 UH	**5.6**

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			Groundwater										
			CFMW-05 MW-05-05072014 5/7/2014	CFMW-05 MW-05-10142014 10/14/2014	CFMW-05 MW-05-05052015 5/5/2015	CFMW-05 MW-05-10122015 10/12/2015	CFMW-05 MW-05-06062016 6/6/2016	CFMW-05 MW-05-09262016 9/26/2016	CFMW-05 MW-05(04242017) 4/24/2017	CFMW-05 MW-05(10022017) 10/2/2017	CFMW-05 MW-5 (032318) 3/23/2018	CFMW-05 MW-5 (032219) 3/22/2019	CFMW-05 MW-5 (031820) 03/18/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**186**	**398**	**102**	**257**	**330**	**680**	**110**	**160**	**110**	**15**	**110**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
VOCs													
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	**1**	**3**	**2**	**0.63 J**	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**3.3**	**9.6**	**2.21**	**4.57**	**6**	**9**	**2**	**5**	**3.6**	**0.60 J**	**2.5**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	**420**	< 1.0 U	**1.19**	< 1.0 U	**150**	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	**0.28 J**
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.18**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	**65.5**	**13.9**	**49.1**	**52.6**	**53**	**16**	**21**	**240**	**22**	**29**	**84**
Trichloroethene	ug/L	5	**61**	**431**	**41**	**189**	**110**	**280**	**32**	**110**	**71**	**14**	**110**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
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U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

			Groundwater										
			CFMW-10 MW-10-04242014 4/24/2014	CFMW-10 MW-10-10142014 10/14/2014	CFMW-10 MW-10-05052015 5/5/2015	CFMW-10 MW-10-10122015 10/12/2015	CFMW-10 MW-10-06062016 6/6/2016	CFMW-10 MW-10-09262016 9/26/2016	CFMW-10 MW-10(04242017) 4/24/2017	CFMW-10 MW-10(10022017) 10/2/2017	CFMW-10 MW-10 (032318) 3/23/2018	CFMW-10 MW-10 (032019) 3/20/2019	CFMW-10 MW-10 (031820) 03/18/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**203**	**217**	**331**	**214**	**200**	**180**	**290**	**82**	**200**	**46**	**110**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
VOCs													
1,1,1-Trichloroethane	ug/L	200	**1.86**	**3.52**	**16.1**	**1.33**	**8**	**5**	**25**	**8**	**21**	**0.45 J**	**8.3**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**5.57**	**14.8**	**2.89**	**8.65**	**8**	**15**	**11**	**3**	**8.4**	**5.9**	**4.2**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**14**	**3**	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.14**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**7.11**	**27.6**	**9.46**	**9.7**	**14**	**30**	< 0.5 U	< 0.5 U	**5.6**	**7.8**	**4.3**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U

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SVOC - semi-volatile organic compound
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			Groundwater															
			CFMW-11 MW-11(3/30/1999) 3/30/1999	CFMW-11 MW-11(5/28/1999) 5/28/1999	CFMW-11 MW-11(9/27/1999) 9/27/1999	CFMW-11 MW-11(12/17/1999) 12/17/1999	CFMW-11 MW-11(3/29/2000) 3/29/2000	CFMW-11 MW-11(6/16/2000) 6/16/2000	CFMW-11 MW-11(9/30/2000) 9/30/2000	CFMW-11 MW-11(11/28/2000) 11/28/2000	CFMW-11 MW-11(6/30/2001) 6/30/2001	CFMW-11 MW-11(9/28/2001) 9/28/2001	CFMW-11 MW-11(12/31/2001) 12/31/2001	CFMW-11 MW-11(3/31/2002) 3/31/2002	CFMW-11 MW-11(6/30/2002) 6/30/2002	CFMW-11 MW-11(9/30/2002) 9/30/2002	CFMW-11 MW-11(12/31/2002) 12/31/2002	CFMW-11 MW-11(3/31/2003) 3/31/2003
Analyte	**Units**	**CAO**																
Anions																		
Perchlorate	ug/L	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																		
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC																		
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																		
1,1,1-Trichloroethane	ug/L	200	**280**	**106**	**154**	**190**	**290**	**260**	**250**	**105**	**162**	**153**	**154**	**316**	**77**	**104**	**103**	**157**
1,1,2-Trichloroethane	ug/L	5	< 0.700 U	< 0.700 U	< 0.700 U	< 0.700 U	< 0.700 U	< 0.700 U	< 0.700 U	< 0.700 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**66**	**40**	**46**	**45**	**104**	**100**	**32**	**3.4**	**70**	**55**	**64**	**110**	**41**	**36**	**19**	**25**
1,2-Dichloroethane	ug/L	5	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	**0.7**	< 0.5 U	< 0.5 U	**0.8**	< 1.0 U	< 1.0 U	**0.6**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 0.8 U	< 0.8 U	< 0.8 U	< 0.8 U	< 0.8 U	< 0.8 U	< 0.8 U	< 0.8 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**39**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.5 U	< 1.5 U	< 1.5 U	< 1.5 U	< 1.5 U	< 1.5 U	< 1.5 U	< 0.7 U	< 1.0 U	< 1.0 U	**2.4**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	**6**	**3.2**	**4**	**2.6**	**8.2**	**8.7**	**2.4**	**2.8**	**5.7**	**4.7**	**5.7**	**8.8**	**3.2**	**2.9**	**1.6**	**1.1**
Dichloromethane	ug/L	5	< 0.7 U	< 0.7 U	< 0.7 U	**0.8**	< 0.7 U	< 0.7 U	< 0.7 U	< 0.7 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**2.9**	< 2.2 U	**1.1**	< 2.2 U	< 2.2 U	< 2.2 U	< 2.2 U	< 1.1 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.5**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**13**	**12**	**11**	**12**	**23**	**22**	**13**	**13**	**12**	**11**	**13**	**14**	**7.6**	**6.4**	**4.5**	**7.8**
Vinyl chloride	ug/L	2	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 1.4 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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			Groundwater										
			CFMW-12 MW-12-05062014 5/6/2014	CFMW-12 MW-12-10142014 10/14/2014	CFMW-12 MW-12-05052015 5/5/2015	CFMW-12 MW-12-10122015 10/12/2015	CFMW-12 MW-12-06062016 6/6/2016	CFMW-12 MW-12-09262016 9/26/2016	CFMW-12 MW-12(04242017) 4/24/2017	CFMW-12 MW-12(10022017) 10/2/2017	CFMW-12 MW-12 (031918) 3/19/2018	CFMW-12 MW-12 (032019) 3/20/2019	CFMW-12 MW-12 (031820) 03/18/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**1380**	**12900**	**1010**	**1790**	**190**	**3400**	**590**	**2200**	**550**	**350**	**640**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	**17**	**19000**	**18**
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	< 50 U	**17 J**	< 50 U
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	**1.5**	**1500**	**1.4**
VOCs													
1,1,1-Trichloroethane	ug/L	200	**2120**	**10300**	**2060**	**2580**	**460**	**7800**	**110**	**2200**	**5.7**	< 1.0 U	1
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**216**	**865**	**160**	**359**	**67**	**610**	**11**	**460**	**0.40 J**	< 1.0 U	< 1.0 U
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	< 0.5 U	**1**	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**36**	< 0.5 U	**6**	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13**	< 0.5 U	**6**	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6**	--	--	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	**15**	< 0.5 U	**8**	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**25.8**	< 1.0 U	< 1.0 U	< 1.0 U	**6**	**57**	< 0.5 U	**44**	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**4**	**55**	< 0.5 U	**9**	< 1.0 U	< 1.0 U	< 1.0 U

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			Groundwater										
			CFMW-13 MW-13-05072014 5/7/2014	CFMW-13 MW-13-10142014 10/14/2014	CFMW-13 MW-13-05052015 5/5/2015	CFMW-13 MW-13-10122015 10/12/2015	CFMW-13 MW-13-06062016 6/6/2016	CFMW-13 MW-13-09262016 9/26/2016	CFMW-13 MW-13(04242017) 4/24/2017	CFMW-13 MW-13(10022017) 10/2/2017	CFMW-13 MW-13 (032318) 3/23/2018	CFMW-13 MW-13 (032019) 3/20/2019	CFMW-13 MW-13 (031820) 03/18/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**627**	**364**	**930**	**824**	**190**	**310**	**660**	**50**	**400**	**250**	**76**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
VOCs													
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**4**	**12**	**8**	**3**	< 5.0 U	< 10 U	< 10 U
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U
1,1-Dichloroethene	ug/L	7	**13.7**	**5.12**	**13.1**	**18.7**	**20**	**3**	**13**	**16**	**7.7**	**8.4 J**	< 10 U
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U
Chlorobenzene	ug/L	100	**725**	**102**	< 1.0 U	**815**	**430**	**36**	**660**	**450**	**330**	**740**	< 10 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 25 U	< 50 U	< 10 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	< 1.0 U	< 0.5 U	**1**	< 5.0 U	< 10 U	< 10 U
Trichloroethene	ug/L	5	**378**	**50.8**	**194**	**291**	**170**	**26**	**330**	**110**	**210**	**350**	**32**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**1**	< 1.0 U	< 0.5 U	< 0.5 U	< 5.0 U	< 10 U	< 10 U

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			Groundwater										
			CFMW-19 MW-19-05062014 5/6/2014	CFMW-19 MW-19-10132014 10/13/2014	CFMW-19 MW-19-05052015 5/5/2015	CFMW-19 MW-19-10122015 10/12/2015	CFMW-19 MW-19-06062016 6/6/2016	CFMW-19 MW-19-09262016 9/26/2016	CFMW-19 MW-19(04242017) 4/24/2017	CFMW-19 MW-19(10022017) 10/2/2017	CFMW-19 MW-19 (032318) 3/23/2018	CFMW-19 MW-19 (032219) 3/22/2019)	CFMW-19 MW-19 (032020) 03/20/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**925**	**1310**	**701**	**625**	**770**	**270**	**790**	**880**	**95**	**650**	**890**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
VOCs													
1,1,1-Trichloroethane	ug/L	200	**5.51**	**21.9**	**3.57**	**7.89**	**7**	**8**	**7**	**8**	**5**	**2.8**	**10**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**16.5**	**32.7**	**16.2**	**19.7**	**16**	**24**	**16**	**18**	**14**	**10**	**16**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.48**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**2.92**	**6.58**	**2.94**	**3.93**	**3**	**5**	**3**	**3**	**2.5**	**1.7**	**2.6**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U

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VOC - volatile organic compound

			Groundwater											
			CFMW-20 MW-20-05072014 5/7/2014	CFMW-20 MW-20-10132014 10/13/2014	CFMW-20 MW-20-05052015 5/5/2015	CFMW-20 MW-20-10122015 10/12/2015	CFMW-20 MW-20-06062016 6/6/2016	CFMW-20 MW-20-09262016 9/26/2016	CFMW-20 MW-20(04242017) 4/24/2017	CFMW-20 MW-20(10022017) 10/2/2017	CFMW-20 DUP-02 (31918) 3/19/2018	CFMW-20 MW-20 (031918) 3/19/2018	CFMW-20 MW-20 (032019) 3/20/2019	CFMW-20 MW-20 (032020) 03/20/2020
Analyte	**Units**	**CAO**												
Anions														
Perchlorate	ug/L	4	**17.4**	**884**	**36.7**	**47.1**	**20**	**1700**	**21**	**270**	**270**	**250**	**480**	**490**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals														
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC														
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs														
1,1,1-Trichloroethane	ug/L	200	**200**	**94.4**	**10.7**	**732**	**25**	**150**	**7**	**49**	**11**	**11**	**120**	**37**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**21.4**	**37.2**	**2.24**	**38**	**2**	**65**	**2**	**20**	**4.6**	**4.2**	**29**	**12**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	**1.09**	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	**0.55 J**	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	**1.66**	**2.22**	< 1.0 U	< 1.0 U	**2**	**2**	**1**	< 1.0 U	< 1.0 U	**0.80 J**	**0.99 J**
Trichloroethene	ug/L	5	**8.87**	**6.49**	**8.77**	**12.3**	**2**	**10**	**7**	**7**	**1.7**	**1.6**	**5.8**	**2.9**
Vinyl chloride	ug/L	2	**8.76**	**1.9**	**1.88**	**17.2**	**1.88**	**4**	< 0.5 U	**4**	< 1.0 U	< 1.0 U	**3.9**	< 1.0 U

Notes:
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2. Water quality parameters are measured in the field during each purge event.
3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
CAO - Corrective Action Objective
-- - not analyzed or measured
B - Compound was found in the blank and in the sample
D - Indicates all compounds identified in an analysis at a secondary dilution factor
J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

			Groundwater											
			CFMW-22 MW-22-05072014 5/7/2014	CFMW-22 MW-22-10132014 10/13/2014	CFMW-22 MW-22-05052015 5/5/2015	CFMW-22 MW-22-10122015 10/12/2015	CFMW-22 MW-22-06062016 6/6/2016	CFMW-22 MW-22-09262016 9/26/2016	CFMW-22 MW-22(04242017) 4/24/2017	CFMW-22 MW-22(10022017) 10/2/2017	CFMW-22 MW-22 (032318) 3/23/2018	CFMW-22 MW-22 (032019) 3/20/2019	CFMW-22 DUP-03 (032020) 03/20/2020	CFMW-22 MW-22 (032020) 03/20/2020
Analyte	**Units**	**CAO**												
Anions														
Perchlorate	ug/L	4	**176**	**8.07**	**94.5**	**47.8**	**100**	**2.1**	**150**	**140**	**120**	**24**	**58**	**56**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	**23**	**23000**	**23**	**23**
Metals														
Iron	ug/L	--	--	--	--	--	--	--	--	--	< 50 U	**57**	**55**	< 50 U
TOC														
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	**0.86 J**	**680 J**	**0.71 J**	**0.77 J**
VOCs														
1,1,1-Trichloroethane	ug/L	200	**382**	**23.7**	**45.5**	**22.7**	**26**	**6**	**14**	**8**	**13**	**78**	**61**	**55**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**29.1**	**2.3**	< 1.0 U	**3.56**	**6**	**1**	**7**	**4**	**4.5**	**9.9**	**9.4**	**9.1**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.15**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**53.8**	**31.6**	**53.6**	**58.7**	**87**	**25**	**76**	**100**	**46**	**13**	**16**	**16**
Trichloroethene	ug/L	5	**44.8**	**18.5**	**80.8**	**59.7**	**55**	**19**	**150**	**97**	**60**	**21**	**34**	**32**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	**1.9**	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
1. Values exceeding laboratory reporting limits are bolded. Vales exceeding the numerical Corrective Action Objective goals are highlighted in gray.
2. Water quality parameters are measured in the field during each purge event.
3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
CAO - Corrective Action Objective
-- - not analyzed or measured
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SVOC - semi-volatile organic compound
VOC - volatile organic compound

			Groundwater												
			CFMW-23 MW-23-05072014 5/7/2014	CFMW-23 MW-23-10132014 10/13/2014	CFMW-23 MW-23-05052015 5/5/2015	CFMW-23 MW-23-10122015 10/12/2015	CFMW-23 MW-23-06062016 6/6/2016	CFMW-23 MW-23-09262016 9/26/2016	CFMW-23 MW-23(04242017) 4/24/2017	CFMW-23 MW-23(10022017) 10/2/2017	CFMW-23 DUP-01 (031618) 3/16/2018	CFMW-23 MW-23 (031618) 3/16/2018	CFMW-23 DUP03 (032219) 3/22/2019	CFMW-23 MW-23 (032219) 3/22/2019	CFMW-23 MW-23 (031820) 03/18/2020
Analyte	**Units**	**CAO**													
Anions															
Perchlorate	ug/L	4	**48.8**	**35.8**	**67.2**	**16.7**	**21**	**21**	**21**	**16**	**18**	**18**	**7.7**	**7.9**	**15**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC															
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs															
1,1,1-Trichloroethane	ug/L	200	**78.3**	**89.5**	**42.1**	**46.3**	**100**	**38**	**66**	**24**	**20**	**19**	**7.3**	**7.9**	**20**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**11.6**	**15.8**	**7.32**	**7.83**	**19**	**9**	**11**	**4**	**3.6**	**3.2**	**1.3**	**1.4**	**3.9**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**1.51**	**2.2**	**1.01**	**1.42**	**2**	**2**	**1**	< 0.5 U	**0.61 J**	**0.62 J**	< 1.0 U	< 1.0 U	**0.94 J**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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			Groundwater										
			CFMW-25 MW-25-05072014 5/7/2014	CFMW-25 MW-25-10132014 10/13/2014	CFMW-25 MW-25-05052015 5/5/2015	CFMW-25 MW-25-10122015 10/12/2015	CFMW-25 MW-25-06062016 6/6/2016	CFMW-25 MW-25-09262016 9/26/2016	CFMW-25 MW-25(04242017) 4/24/2017	CFMW-25 MW-25(10022017) 10/2/2017	CFMW-25 MW-25 (032318) 3/23/2018	CFMW-25 MW-25 (032219) 3/22/2019	CFMW-25 MW-25 (032020) 03/20/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**105**	**154**	**94.1**	**120**	**150**	**120**	**10**	**72**	**54**	**56**	**110**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	**21**	**22000**	**41**
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	**19 J**	< 50 U	< 50 U
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	**3.7**	**3100**	**1.1**
VOCs													
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**1.34**	< 1.0 U	< 1.0 U	< 1.0 U	**1**	**1**	**2**	< 0.5 U	**0.42 J**	< 1.0 U	**0.52 J**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.14**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**1.42**	**1.81**	**1.37**	**1.06**	**1**	**2**	**2**	< 0.5 U	**0.49 J**	< 1.0 U	**0.52 J**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U

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VOC - volatile organic compound

			Groundwater										
			CFMW-28 MW-28-05062014 5/6/2014	CFMW-28 MW-28-10142014 10/14/2014	CFMW-28 MW-28-05052015 5/5/2015	CFMW-28 MW-28-10122015 10/12/2015	CFMW-28 MW-28-06062016 6/6/2016	CFMW-28 MW-28-09262016 9/26/2016	CFMW-28 MW-28(04242017) 4/24/2017	CFMW-28 MW-28(10022017) 10/2/2017	CFMW-28 MW-28 (031918) 3/19/2018	CFMW-28 MW-28 (032219) 3/22/2019	CFMW-28 MW-28 (032020) 03/20/2020
Analyte	**Units**	**CAO**											
Anions													
Perchlorate	ug/L	4	**3810**	**1640**	**1580**	**1180**	**1600**	**1200**	**1400**	**1200**	**1700**	**160**	**150**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	**38**	**26000**	**20**
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	**490**	**14000**	**9800**
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	**3.4**	**9200**	**6.3**
VOCs													
1,1,1-Trichloroethane	ug/L	200	**51**	**62.6**	**54**	**60.7**	**48**	**64**	**53**	**29**	**36**	**14**	**8.4**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**10.6**	**12.2**	**7.6**	**9.54**	**8**	**10**	**9**	**5**	**5.5**	**2.3**	**1.9**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	**0.64 J**	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	**0.87**	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	**0.57 J**	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	**1.01**	< 1.0 U	**1.06**	**1.14**	**1**	**1 J**	**1**	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**53.5**	**74**	**51.7**	**60.1**	**57**	**84**	**81**	**50**	**49**	**20**	**13**
Vinyl chloride	ug/L	2	**1.82**	**1.93**	**1.62**	**1.93**	**1**	**2**	**2**	< 0.5 U	< 1.0 U	**2.1**	< 1.0 U

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VOC - volatile organic compound

			Groundwater										
			CFMW-29 MW-29-05062014 5/6/2014	CFMW-29 MW-29-10132014 10/13/2014	CFMW-29 MW-29-05052015 5/5/2015	CFMW-29 MW-29-10122015 10/12/2015	CFMW-29 MW-29-06062016 6/6/2016	CFMW-29 MW-29-09262016 9/26/2016	CFMW-29 MW-29(04242017) 4/24/2017	CFMW-29 MW-29(10022017) 10/2/2017	CFMW-29 MW-29 (031918) 3/19/2018	CFMW-29 MW-29 (032219) 3/22/2019	CFMW-29 MW-29 (032020) 03/20/2020
Analyte	Units	CAO											
Anions													
Perchlorate	ug/L	4	**3760**	**1480**	**2940**	**1730**	**2000**	**1400**	**2100**	**2100**	**2700**	**4100**	**2500**
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Metals													
Iron	ug/L	--	--	--	--	--	--	--	--	--	--	--	--
TOC													
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
VOCs													
1,1,1-Trichloroethane	ug/L	200	**17.2**	**9.95**	**15.1**	**11**	**12**	**8**	**12**	**8**	**11**	**12**	**9.6 J**
1,1,2-Trichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	**9.7**	**14.6**	**5.09**	**10.4**	**10**	**17**	**8**	**7**	**6.5**	**7.8**	**8.1 J**
1,2-Dichloroethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon Tetrachloride	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	ug/L	80	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Dichloromethane	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**20.2**	**12.1**	**19.2**	**16.5**	**17**	**10**	**18**	**15**	**15**	**17**	**14 J**
Vinyl chloride	ug/L	2	**1.1**	< 1.0 U	**1.1**	< 1.0 U	< 1.0 U	< 1.0 U	< 0.5 U	< 0.5 U	< 1.0 U	< 1.0 U	< 1.0 U

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		Matrix:	Groundwater							
		Location ID:	GM-2B	GM-2B	GM-2B	GM-2B	GM-2B	GM-2B	GM-2B	GM-2B
		Sample ID:	GM2B(mmdd88)	GM2B(091594)	GM2B(111202)	GM2B(031704)	GM2B(052314)	GM2B (032918)	GM2B (032619)	GM-2B (032320)
		Sample Date:	mm/dd/1988	09/15/1994	11/12/2002	03/17/2004	05/23/2014	03/29/2018	3/26/2019	03/23/2020
		Sample Type:	N	N	N	N	N	N	N	N
Analyte	CAO	Units								
Anions										
Perchlorate	14	ug/L	--	--	**2020**	**1650**	**700**	--	--	--
SVOCs										
1,4-Dioxane	0.46	ug/L	--	--	--	**110**	**26**	--	--	--
VOCs										
1,1,1-Trichloroethane	200	ug/L	< 5.0 U	**580**	**370**	**370**	**140**	--	--	--
1,1-Dichloroethane	2.7	ug/L	**298**	--	**15 J**	**18 J**	**10**	--	--	--
1,1-Dichloroethene	7	ug/L	< 5.0 U	--	**340**	**390**	**180**	--	--	--
1,2,4-Trimethylbenzene	15	ug/L	--	--	--	--	< 1.0 U	--	--	--
Benzene	5	ug/L	--	--	< 50 U	< 50 U	< 0.50 U	--	--	--
cis-1,2-Dichloroethene	70	ug/L	--	--	--	**54**	**25**	--	--	--
Naphthalene	0.17	ug/L	--	--	--	--	< 1.0 U	--	--	--
Trichloroethene	5	ug/L	**3465**	**3100**	**2200**	**2600**	**950**	--	--	--
Vinyl chloride	2	ug/L	--	--	< 50 U	< 50 U	< 0.50 U	--	--	--

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		Matrix:	Groundwater									
		Location ID:	GM-4B	GM-4B	GM-4B	GM-4B	GM-4B	GM-9M	GM-9M	GM-9M	GM-9M	GM-9M
		Sample ID:	GM4B(mmdd88)	GM4B (092094)	GM4B (03282018)	GM4B (03192019)	GM-4B (031720)	GM9M (091394)	GM9M (021099)	GM9M (031918)	GM9M (032019)	GM-9M (031820)
		Sample Date:	mm/dd/1988	9/20/1994	03/28/2018	3/19/2019	03/17/2020	9/13/1994	2/10/1999	03/19/2018	3/20/2019	03/18/2020
		Sample Type:	N	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units										
Anions												
Perchlorate	14	ug/L	--	--	**43**	**1.4**	**1**	**--**	**10**	**620**	**570**	**620**
SVOCs												
1,4-Dioxane	0.46	ug/L	**--**	--	**0.31 J**	< 0.40 U	**0.4**	**--**		**13 J**	**8.3**	**7.4**
VOCs												
1,1,1-Trichloroethane	200	ug/L	< 5.0 U	**12**	< 1.0 U	< 1.0 U	< 1.0 U	**180**	**8.8**	**7**	**8**	**11**
1,1-Dichloroethane	2.7	ug/L	< 5.0 U	**0.36**	< 1.0 U	< 1.0 U	< 1.0 U	**57**	**23**	**18**	**18**	**16**
1,1-Dichloroethene	7	ug/L	< 5.0 U	**3.2**	< 1.0 U	< 1.0 U	< 1.0 U	**84**	**21**	**43**	**52**	**63**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	--	**2.8**	**2.6**	**2.2**
Naphthalene	0.17	ug/L	--	--	--	< 0.20 U	--	--	--	--	< 0.20 U	--
Trichloroethene	5	ug/L	**23.1**	**36**	**14**	**13**	**5.1 J**	**330**	**127**	**120**	**120**	**120**
Vinyl chloride	2	ug/L	--	< 0.09	< 1.0 U	< 1.0 U	< 1.0 U	< 1.8 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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		Matrix:	Groundwater								
		Location ID:	GM-10S	GM-10S	GM-10S	GM-10S	GM-10S	GM-14S	GM-14S	GM-14S	GM-14S
		Sample ID:	GM10S(091294)	GM10S(031804)	GM10S (031918)	GM10S (032019)	GM-10S (031720)	GM14S(091694)	GM14S(031504)	GM14S (51.5) (051314)N	GM14S (56.5) (051314)N
		Sample Date:	09/12/1994	03/18/2004	03/19/2018	3/20/2019	03/17/2020	09/16/1994	03/15/2004	05/13/2014	05/13/2014
		Sample Type:	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units									
Anions											
Perchlorate	14	ug/L	--	**45.7**	**14**	**4.2**	**20**	--	**229 J**	**6.9**	**22**
SVOCs											
1,4-Dioxane	0.46	ug/L	--	**7.6**	**5.3 J**	**0.89**	**4.7**	--	**52**	**19**	**24**
VOCs											
1,1,1-Trichloroethane	200	ug/L	**1.5**	**0.36 J**	< 1.0 U	< 1.0 U	< 1.0 U	**360**	**120**	**4.3**	**9.1**
1,1-Dichloroethane	2.7	ug/L	--	**2.7**	**3.4**	**0.88 J**	**5.1 J**	--	**5.1 J**	**13**	**11**
1,1-Dichloroethene	7	ug/L	--	**19**	**20**	**6.3**	**33 J**	--	**170**	**33**	**46**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 1.0 U	< 1.0 U
Benzene	5	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 20 U	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	70	ug/L	--	**0.21 J**	< 1.0 U	< 1.0 U	< 1.0 U	--	**13 J**	**100**	**86**
Naphthalene	0.17	ug/L	--	--	--	< 0.20 U	--	--	--	< 1.0 U	< 1.0 U
Trichloroethene	5	ug/L	**6**	**8.7**	**7.8**	**3**	**12 J**	**2100**	**570**	**64**	**140**
Vinyl chloride	2	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 20 U	**9.1**	**7.6**

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		Matrix:	Groundwater									
		Location ID:	GM-14S	GM-14S	GM-14S	GM-14S	GM-14S	GM-14M	GM-14M	GM-14M	GM-14M	GM-14M
		Sample ID:	GM14S (61.5) (051314)N	GM14S (65.5) (051314)N	GM14S (03282018)	GM14S (03192019)	GM-14S (031720)	GM14M(091694)	GM14M	GM14M(031504)	GM14M(022305)	GM14M(033005)
		Sample Date:	05/13/2014	05/13/2014	03/28/2018	3/19/2019	03/17/2020	09/16/1994	11/14/2002	03/15/2004	02/23/2005	03/30/2005
		Sample Type:	N	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units										
Anions												
Perchlorate	14	ug/L	**1.3 J**	**1.5 J**	< 1.0 U	< 1.0 U	6.1	--	**1330**	**1240 J**	**1120**	**1370**
SVOCs												
1,4-Dioxane	0.46	ug/L	**20**	**25**	**11**	**9.8**	**7.3**	--	--	**92**	--	--
VOCs												
1,1,1-Trichloroethane	200	ug/L	**2.1**	**5.4**	**1**	**1.6**	**6.6 J**	**200**	**110**	**79**	**69**	**53**
1,1-Dichloroethane	2.7	ug/L	**15**	**15**	**8.2**	**9.2**	**6.3 J**	--	**11 J**	**8.5 J**	**8.9 J**	**9.8 J**
1,1-Dichloroethene	7	ug/L	**28**	**29**	**18**	**27**	**47 J**	--	**110**	**110**	**110**	**79**
1,2,4-Trimethylbenzene	15	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	--	--	--	--
Benzene	5	ug/L	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 33 U	< 40 U	< 40 U	< 10 U
cis-1,2-Dichloroethene	70	ug/L	**130**	**120**	**72**	**86**	**35 J**	--	--	**34 J**	--	--
Naphthalene	0.17	ug/L	< 1.0 U	< 1.0 U	--	< 0.20 U	--	--	--	--	--	--
Trichloroethene	5	ug/L	**13**	**19**	**7.1**	**8.4**	**160 J**	**1900**	**1400**	**1000**	**1200**	**1300 D**
Vinyl chloride	2	ug/L	**14**	**16**	**7.3**	**13**	**5.3 J**	--	< 33 U	< 40 U	< 40 U	< 10 U

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		Matrix:	Groundwater					
		Location ID:	GM-14M	GM-14M	GM-14M	GM-14M	GM-14M	GM-14M
		Sample ID:	GM14M (103) (051314)N	GM14M (93) (051314)N	GM14M (98) (051314)N	GM14M(83)(051314)N	GM14M(88)(051314)N	GM14M (03282018)
		Sample Date:	05/13/2014	05/13/2014	05/13/2014	05/13/2014	05/13/2014	03/28/2018
		Sample Type:	N	N	N	N	N	N
Analyte	CAO	Units						
Anions								
Perchlorate	14	ug/L	< 4.0 U	**9.3**	**12**	< 4.0 U	**5.8**	< 1.0 UB
SVOCs								
1,4-Dioxane	0.46	ug/L	**12**	**9.5 J**	**9.3 J**	**15**	**20**	**6.1**
VOCs								
1,1,1-Trichloroethane	200	ug/L	< 1.0 U	**0.81 J**	**0.71 J**	**0.66 J**	**0.74 J**	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	**3.9**	**4.9**	**4.5**	**5.5**	**5.3**	**4.9**
1,1-Dichloroethene	7	ug/L	**0.75 J**	**2.9**	**2.5**	**2.3**	**2.6**	< 1.0 U
1,2,4-Trimethylbenzene	15	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	**0.25 J**	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	**7**	**19**	**16**	**21**	**20**	**1.7**
Naphthalene	0.17	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--
Trichloroethene	5	ug/L	**8**	**35**	**31**	**27**	**32**	**2.2**
Vinyl chloride	2	ug/L	**2.1**	**4.2**	**3.5**	**5**	**4.4**	**0.99 J**

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		Matrix:	Groundwater									
		Location ID:	GM-14M	GM-14M	GM-14M	GM-16S	GM-16S	GM-16S	GM-16S	GM-16S	GM-16S	GM-16S
		Sample ID:	GM14M (03192019)	DUP-01 (031720)	GM-14M (031720)	GM16S(091594)	GM16S(021299)	GM16S(110702)	GM16S(032404)	GM16S (032718)	GM16S (032619)	GM-16S (032320)
		Sample Date:	3/19/2019	03/17/2020	03/17/2020	09/15/1994	02/12/1999	11/07/2002	03/24/2004	03/27/2018	3/26/2019	03/23/2020
		Sample Type:	N	FD	N	N	N	N	N	N	N	N
Analyte	CAO	Units										
Anions												
Perchlorate	14	ug/L	**96**	< 1.0 U	< 1.0 U	--	**5**	**10.4**	**11.3**	**89**	**280**	**230**
SVOCs												
1,4-Dioxane	0.46	ug/L	**4.7**	**2.8**	**3**	--	--	--	< 5.0 U	**2**	**15**	**12**
VOCs												
1,1,1-Trichloroethane	200	ug/L	**4.5**	< 1.0 U	**1.8 J**	**1.5**	**1.3 J**	**1.3 J**	**1.1 J**	**1.9 J**	**30**	**27**
1,1-Dichloroethane	2.7	ug/L	**5.1**	**6.8 J**	**6.7 J**	--	--	< 2 U	< 2.0 U	< 5.0 U	**11**	**11**
1,1-Dichloroethene	7	ug/L	**28**	**20 J**	**21 J**	--	--	**2.7**	**3.3**	**14**	**100**	**89**
1,2,4-Trimethylbenzene	15	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	--	--	--	--	< 5.0 U	< 5.0 U	< 5.0 U
Benzene	5	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	--	--	< 2 U	< 2.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene	70	ug/L	**40**	**190 J**	**190 J**	--	--	--	**0.64 J**	**8.2**	**150**	**150**
Naphthalene	0.17	ug/L	< 0.20 U	--	--	--	--	--	--	--	< 0.20 U	--
Trichloroethene	5	ug/L	**270**	**58 J**	**59 J**	**49**	**51**	**65**	**62**	**210**	**740**	**550**
Vinyl chloride	2	ug/L	**6.4**	**9.7 J**	**10 J**	--	--	< 2 U	< 2.0 U	< 5.0 U	**12**	**18**

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		Matrix:	Groundwater							
		Location ID:	GM-16M	GM-16M	GM-16M	GM-16M	GM-16M	GM-16M	GM-16M	GM-16M
		Sample ID:	GM16M(091494)	GM16M(021299)	GM16M(110702)	GM16M(032404)	GM16M(051304)	GM16M(60.26) (052014)N	GM16M(65.26) (052014)N	GM16M(70.26) (052014)N
		Sample Date:	09/14/1994	02/12/1999	11/07/2002	03/24/2004	05/13/2004	05/20/2014	05/20/2014	05/20/2014
		Sample Type:	N	N	N	N	N	N	N	N
Analyte	CAO	Units								
Anions										
Perchlorate	14	ug/L	--	**8**	**19.2**	--	**36.8**	**36**	**38**	**33**
SVOCs										
1,4-Dioxane	0.46	ug/L	--	--	--	**4.1 J**	--	**2.3 J**	< 9.8 U	< 9.8 U
VOCs										
1,1,1-Trichloroethane	200	ug/L	**2.5**	**2.5**	**2.1**	**2.9**	--	**1.4**	**1.5**	**0.97 J**
1,1-Dichloroethane	2.7	ug/L	--	--	< 2 U	**0.27 J**	--	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	--	--	**3.4**	**5.2**	--	**4.3**	**4.6**	**3.4**
1,2,4-Trimethylbenzene	15	ug/L	--	--	--	--	--	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	--	--	< 2 U	< 2.0 U	--	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	70	ug/L	--	--	--	**1.3 J**	--	**0.99 J**	**0.95 J**	**0.75 J**
Naphthalene	0.17	ug/L	--	--	--	--	--	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	5	ug/L	**68**	**76**	**66**	**95**	--	**60**	**61**	**44**
Vinyl chloride	2	ug/L	--	--	< 2 U	< 2.0 U	--	< 0.50 U	< 0.50 U	< 0.50 U

Notes:
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3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

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SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater									
		Location ID:	GM-16M	GM-16M	GM-16M	GM-21S	GM-21S	GM-21S	GM-21S	GM-21S	GM-21S	GM-21S
		Sample ID:	GM16M (032718)	GM16M (032619)	GM-16M (032320)	GM21S(110502)	GM21S(032404)	GM21S(113006)	GM21S 052014)N	GM21S (032218)	GM21S (032519)	GM-21S (031920)
		Sample Date:	03/27/2018	3/26/2019	03/23/2020	11/05/2002	03/24/2004	11/30/2006	05/20/2014	03/22/2018	3/25/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units										
Anions												
Perchlorate	14	ug/L	**54**	< 1.0 U	< 1.0 U	**510**	**532**	--	**890**	**690**	**64**	**600**
SVOCs												
1,4-Dioxane	0.46	ug/L	**1**	**0.18 J**	< 0.40 U	--	**120**	--	**48**	**19**	**20**	**25**
VOCs												
1,1,1-Trichloroethane	200	ug/L	**0.97 J**	< 1.0 U	< 1.0 U	**190**	**210**	**85**	**98**	**68**	**72**	**72**
1,1-Dichloroethane	2.7	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	**9.3 J**	**10 J**	**5.8 J**	**9.3**	**8.9 J**	**9.3 J**	**11**
1,1-Dichloroethene	7	ug/L	**4.6**	< 1.0 U	< 1.0 U	**220**	**320**	**120**	**240**	**180**	**210**	**200**
1,2,4-Trimethylbenzene	15	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	--	--	--	< 5.0 U	< 10 U	< 10 U	< 10 U
Benzene	5	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 50 U	< 36 U	< 2.5 U	< 10 U	< 10 U	< 10 U
cis-1,2-Dichloroethene	70	ug/L	**0.96 J**	< 1.0 U	< 1.0 U	--	**27 J**	--	**23**	**20**	**23**	**27**
Naphthalene	0.17	ug/L	--	< 0.20 U	--	--	--	--	< 5.0 U	--	< 1.0 U	--
Trichloroethene	5	ug/L	**54**	**2.1**	< 1.0 U	**1100 D**	**1500**	**890**	**1200**	**980**	**1100**	**1000**
Vinyl chloride	2	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 50 U	< 36 U	< 2.5 U	< 10 U	< 10 U	< 10 U

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U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater								
		Location ID:	GM-21M	GM-21M	GM-21M	GM-21M	GM-21M	GM-21M	GM-21M	GM-21M	GM-21M
		Sample ID:	GM21M	GM21M(032404)	GM21M(41.5) (052014)N	GM21M(46.5) (052014)N	GM21M(51.5) (052014)N	GM21M (032218)	DUP04 (032519)	GM21M (032519)	GM-21M (031920)
		Sample Date:	11/05/2002	03/24/2004	05/20/2014	05/20/2014	05/20/2014	03/22/2018	3/25/2019	3/25/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N	FD	N	N
Analyte	CAO	Units									
Anions											
Perchlorate	14	ug/L	**59.9**	**87.3**	**190**	**200**	**190**	**96**	**210**	**220**	**210**
SVOCs											
1,4-Dioxane	0.46	ug/L	--	**6.4**	**5.6 J**	**6.2 J**	**4.9 J**	**1.6**	**3.6**	**3.1**	**3**
VOCs											
1,1,1-Trichloroethane	200	ug/L	**5.2**	**6.2 J**	**3.5**	**3.8**	**3.6**	**1.4**	< 1.0 U	**2.7**	**5.1**
1,1-Dichloroethane	2.7	ug/L	< 5 U	< 10 U	**0.67 J**	**0.67 J**	**0.72 J**	**0.44 J**	**0.92 J**	**0.81 J**	**1.8**
1,1-Dichloroethene	7	ug/L	**12**	**17**	**14**	**15**	**14**	**7.7**	**14**	**15**	**31**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 5 U	< 10 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	**4.3 J**	**4.2**	**4.5**	**4.1**	**2.7**	**4**	**4.1**	**12**
Naphthalene	0.17	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 0.20 U	< 0.20 U	--
Trichloroethene	5	ug/L	**190**	**230**	**220**	**230**	**230**	**100**	**190**	**190**	**170 D**
Vinyl chloride	2	ug/L	< 5 U	< 10 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater					
		Location ID:	GM-22S	GM-22S	GM-22S	GM-22S	GM-22S	GM-22S
		Sample ID:	GM22S(110402)	GM22S(032304)	GM22S (052014)N	GM22S (032218)	GM22S (032519)	GM-22S (031920)
		Sample Date:	11/04/2002	03/23/2004	05/20/2014	03/22/2018	3/25/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N
Analyte	CAO	Units						
Anions								
Perchlorate	14	ug/L	**230**	**183**	**97**	**67**	**61**	**55**
SVOCs								
1,4-Dioxane	0.46	ug/L	--	**150**	**33**	**13**	**13**	**10**
VOCs								
1,1,1-Trichloroethane	200	ug/L	**780**	**610**	**170**	**94**	**95**	**77**
1,1-Dichloroethane	2.7	ug/L	**27 J**	**25 J**	< 5.0 U	**10**	**11**	**9.6 J**
1,1-Dichloroethene	7	ug/L	**780**	**750**	**350**	**240**	**270**	**200**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 5.0 U	< 10 U	< 10 U	< 10 U
Benzene	5	ug/L	< 50 U	< 100 U	< 2.5 U	< 10 U	< 10 U	< 10 U
cis-1,2-Dichloroethene	70	ug/L	--	**36 J**	**22**	**17**	**20**	**17**
Naphthalene	0.17	ug/L	--	--	< 5.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	**3000**	**3200**	**1500**	**1000**	**1200**	**890**
Vinyl chloride	2	ug/L	< 50 U	< 100 U	< 2.5 U	< 10 U	< 10 U	< 10 U

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Alliant Techsystems Operations LLC
Elkton, Maryland

		Matrix:	Groundwater								
		Location ID:	GM-22M	GM-22M	GM-22M	GM-22M	GM-22M	GM-22M	GM-22M	GM-22M	GM-22M
		Sample ID:	GM22M(110402)	GM22M(032304)	GM22M(113006)	GM22M(26.38) (052014)N	GM22M(31.38) (052014)N	GM22M(36.38) (052014)N	GM22M (032218)	GM22M (032519)	GM-22M (031920)
		Sample Date:	11/04/2002	03/23/2004	11/30/2006	05/20/2014	05/20/2014	05/20/2014	03/22/2018	3/25/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units									
Anions											
Perchlorate	14	ug/L	**189**	**258**	--	**89**	**88**	**92**	**67**	**71**	**66**
SVOCs											
1,4-Dioxane	0.46	ug/L	--	**140**	--	**32**	**33**	**29**	**13**	**16**	**11**
VOCs											
1,1,1-Trichloroethane	200	ug/L	**960**	**1100**	**650**	**180**	**190**	**210**	**120**	**150**	**110**
1,1-Dichloroethane	2.7	ug/L	**52 J**	**39 J**	**24 J**	**13**	**12**	**14**	**12**	**14**	**12**
1,1-Dichloroethene	7	ug/L	**930**	**1200**	**700**	**350**	**360**	**390**	**270**	**340**	**240**
1,2,4-Trimethylbenzene	15	ug/L	--	--	--	< 5.0 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U
Benzene	5	ug/L	< 100 U	< 100 U	< 100 U	< 2.5 U	< 2.5 U	< 2.5 U	< 10 U	< 10 U	< 10 U
cis-1,2-Dichloroethene	70	ug/L	--	**65 J**	--	**23**	**24**	**25**	**20**	**26**	**23**
Naphthalene	0.17	ug/L	--	--	--	< 5.0 U	< 5.0 U	< 5.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	**5100**	**6400**	**4300**	**1600**	**1600**	**1700**	**1300**	**1500**	**1100**
Vinyl chloride	2	ug/L	< 100 U	< 100 U	< 100 U	< 2.5 U	< 2.5 U	< 2.5 U	< 10 U	< 10 U	< 10 U

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		Matrix:	Groundwater							
		Location ID:	GM-24	GM-24	GM-24	GM-24	GM-24	GM-24	GM-24	GM-24
		Sample ID:	GM24(111902)	GM24(032204)	GM24 (79.8) (051414)N	GM24 (84.8) (051414)N	GM24 (87.8) (051414)N	GM24 (03282018)	GM24 (03192019)	GM-24 (031820)
		Sample Date:	11/19/2002	03/22/2004	05/14/2014	05/14/2014	05/14/2014	03/28/2018	3/19/2019	03/18/2020
		Sample Type:	N	N	N	N	N	N	N	N
Analyte	CAO	Units								
Anions										
Perchlorate	14	ug/L	**362**	**342**	**180**	**170**	**160**	**140**	**130**	**160**
SVOCs										
1,4-Dioxane	0.46	ug/L	--	**4.3 J**	< 9.8 U	< 9.8 U	< 10 U	**0.44**	< 0.40 U	**0.44**
VOCs										
1,1,1-Trichloroethane	200	ug/L	**5.6**	**8.8**	**0.59 J**	**0.63 J**	**0.65 J**	**0.54 J**	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	**0.31 J**	**0.47 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	**3.2**	**5.4**	**1.2**	**1.5**	**1.3**	**2.1**	**2**	< 1.0 U
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 2 U	< 1.0 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	**1.5**	< 1.0 U	**0.50 J**	< 1.0 U	**0.45 J**	< 1.0 U	< 1.0 U
Naphthalene	0.17	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	**46**	**68**	**22**	**24**	**21**	**27**	**20**	**7.2**
Vinyl chloride	2	ug/L	< 2 U	< 1.0 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U

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VOC - volatile organic compound

		Matrix:	Groundwater					
		Location ID:	GM-26S	GM-26S	GM-26S	GM-26S	GM-26S	GM-26S
		Sample ID:	GM26S(110502)	GM26S(031904)	GM26S (052114)N	GM26S (032718)	GM26S (032619)	GM-26S (031920)
		Sample Date:	11/05/2002	03/19/2004	05/21/2014	03/27/2018	3/26/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N
Analyte	**CAO**	**Units**						
Anions								
Perchlorate	14	ug/L	**19.2**	**6.7**	**100**	**98**	**110**	**130**
SVOCs								
1,4-Dioxane	0.46	ug/L	--	< 5.0 U	< 11 U	**1.2**	**2.1**	**1.5**
VOCs								
1,1,1-Trichloroethane	200	ug/L	**0.36 J**	**0.33 J**	**1.3**	**1.1**	< 1.0 U	**1.6**
1,1-Dichloroethane	2.7	ug/L	< 1 U	< 1.0 U	< 1.0 U	**0.43 J**	< 1.0 U	**0.59 J**
1,1-Dichloroethene	7	ug/L	**0.88 J**	**0.86 J**	**4.9**	**6**	**8.6**	**10**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 1 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	**0.31 J**	**4.7**	**3.7**	**5.1**	**6.9**
Naphthalene	0.17	ug/L	--	--	< 1.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	**18**	**15**	**120**	**110**	**150**	**170**
Vinyl chloride	2	ug/L	< 1 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U

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SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater							
		Location ID:	GM-26M	GM-26M	GM-26M	GM-26M	GM-26M	GM-26M	GM-26M	GM-26M
		Sample ID:	GM26M(110502)	GM26M(031904)	GM26M(80) (052114)N	GM26M(85) (052114)N	GM26M(89) (052114)N	GM26M (032718)	GM26M (032619)	GM-26M (031920)
		Sample Date:	11/05/2002	03/19/2004	05/21/2014	05/21/2014	05/21/2014	03/27/2018	3/26/2019	03/19/2020
		Sample Type:	N	N	N	N	N	N	N	N
Analyte	CAO	Units								
Anions										
Perchlorate	14	ug/L	**101**	**113**	**160**	**160**	**160**	**110**	**96**	**94**
SVOCs										
1,4-Dioxane	0.46	ug/L	--	**6.6**	**5.5 J**	< 10 U	< 10 U	**1.5**	**2.6**	**1.5**
VOCs										
1,1,1-Trichloroethane	200	ug/L	**6.2**	**5.9 J**	**3**	**2.9**	**3**	**1.9**	< 1.0 U	**2.6**
1,1-Dichloroethane	2.7	ug/L	**0.62 J**	< 10 U	**0.84 J**	**0.79 J**	**0.78 J**	**0.72 J**	**0.67 J**	**1.1**
1,1-Dichloroethene	7	ug/L	**13**	**15**	**12**	**12**	**12**	**11**	**10**	**17**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 5 U	< 10 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	**6.6 J**	**8.5**	**8.4**	**8.1**	**4.7**	**4.9**	**8**
Naphthalene	0.17	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	**290**	**280**	**270**	**240**	**260**	**170**	**180**	**120**
Vinyl chloride	2	ug/L	< 5 U	< 10 U	< 0.50 U	< 0.50 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U

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Appendix M-4
TCE-Area SWMU Historical Analytical Results
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Elkton, Maryland

		Matrix:	Groundwater											
		Location ID:	GM-27	GM-27	GM-27	GM-27	GM-27	GM-27	GM-30M	GM-30M	GM-30M	GM-30M	GM-30M	GM-30M
		Sample ID:	GM27(040104)	GM27(022305)	GM27 (052014)N	GM27 (032218)	GM27 (032119)	GM-27 (032320)	GM30M(032704)	GM30M(051304)	GM30M (052214)N	GM30M (032918)	GM30M (032619)	GM-30M (032420)
		Sample Date:	04/01/2004	02/23/2005	05/20/2014	03/22/2018	3/21/2019	03/23/2020	03/26/2004	05/13/2004	05/22/2014	03/29/2018	3/26/2019	03/24/2020
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units												
Anions														
Perchlorate	14	ug/L	< 4.0 U	< 1.0 U	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**4.9**	**6.3**	**13**	**14**	< 1.0 U	**15**
SVOCs														
1,4-Dioxane	0.46	ug/L	< 5.0 U	--	< 9.5 U	< 0.42 U	< 0.40 U	< 0.40 U	< 5.0 U	--	< 11 U	< 0.40 U	< 0.40 U	< 0.40 U
VOCs														
1,1,1-Trichloroethane	200	ug/L	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**0.21 J**	--	< 1.0 U	< 1.0 U	< 1.0 U	**0.44 J**
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	**1.5**	< 1.0 U	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 10 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	< 10 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	**0.43 J**
Naphthalene	0.17	ug/L	--	--	< 1.0 U	--	< 0.20 U	--	--	--	< 1.0 U	--	< 0.20 U	--
Trichloroethene	5	ug/L	< 10 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.1**	--	**9.3**	**5.8**	**0.70 J**	**6.4**
Vinyl chloride	2	ug/L	< 10 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
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2. Water quality parameters are measured in the field during each purge event.
3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

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CAO - Corrective Action Objective
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D - Indicates all compounds identified in an analysis at a secondary dilution factor
J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater										
		Location ID:	GM-31S	GM-31S	GM-31S	GM-31S	GM-31S	GM-31S	GM-31M	GM-31M	GM-31M	GM-31M	GM-31M
		Sample ID:	GM31S(031904)	GM31S(051104)	GM31S (032218)	GM31S (032619)	DUP-02 (031920)	GM-31S (031920)	GM31M(031904)	GM31M (032218)	DUP05 (032619)	GM31M (032619)	GM-31M (031920)
		Sample Date:	03/19/2004	05/11/2004	03/22/2018	3/26/2019	03/19/2020	03/19/2020	03/19/2004	03/22/2018	3/26/2019	3/26/2019	03/19/2020
		Sample Type:	N	N	N	N	FD	N	N	N	N	N	N
Analyte	CAO	Units											
Anions													
Perchlorate	14	ug/L	**4.8**	< 4.0 U	< 1.0 U	< 1.0 U	**1.1**	**1.1**	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
SVOCs													
1,4-Dioxane	0.46	ug/L	< 5.0 U	--	< 0.42 U	< 0.40 U	< 0.40 U	< 0.40 U	< 5.0 U	< 0.42 U	< 0.40 U	< 0.40 U	< 0.40 U
VOCs													
1,1,1-Trichloroethane	200	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	15	ug/L	--	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	0.17	ug/L	--	--	--	< 0.20 U	--	--	--	--	< 0.20 U	< 0.20 U	--
Trichloroethene	5	ug/L	**0.11 J**	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	2	ug/L	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
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2. Water quality parameters are measured in the field during each purge event.
3. CAO applies only to groundwater and porewater and was not compared to surface water samples.

µg/L - microgram per liter
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-- - not analyzed or measured
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J - Indicates an estimated result
U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Groundwater								
		Location ID:	GM-32	GM-32	GM-32	GM-32	GM-32	GM-32D	GM-32D	GM-32D	GM-32D
		Sample ID:	GM32(032504)	GM32(052314)N	GM32 (032718)	GM32 (032519)	GM-32 (032420)	GM32D(060914)N	GM32D (032718)	GM32D (032519)	GM-32D (032420)
		Sample Date:	03/25/2004	05/23/2014	03/27/2018	3/25/2019	03/24/2020	06/09/2014	03/27/2018	3/25/2019	03/24/2020
		Sample Type:	N	N	N	N	N	N	N	N	N
Analyte	CAO	Units									
Anions											
Perchlorate	14	ug/L	< 4.0 U	**2.6 J**	**5.4**	**11**	**16**	< 4.0 U	< 1.0 U	< 1.0 U	< 1.0 U
SVOCs											
1,4-Dioxane	0.46	ug/L	< 5.0 U	< 10 U	**0.25 J**	**0.91**	< 0.40 U	< 9.9 U	< 0.40 U	< 0.40 U	< 0.40 U
VOCs											
1,1,1-Trichloroethane	200	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**0.38 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	**0.41 J**	< 1.0 U	**0.61 J**	**1.4**	**1.9**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	15	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.7**	**0.54 J**	< 1.0 U	< 1.0 U
Benzene	5	ug/L	**0.11 J**	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	**17**	**0.84 J**	**0.68 J**	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	**0.42 J**	**1.8**	**1.4**	**1.6**	**1.9**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	0.17	ug/L	--	< 1.0 U	--	< 0.20 U	--	**5.8**	--	**0.31**	**--**
Trichloroethene	5	ug/L	**7**	**11**	**16**	**25**	**34**	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	2	ug/L	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U

Notes:
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U - Indicates the analyte was analyzed but not detected above the detection limit
SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Porewater					
		Location ID:	PW-06C	PW-06C	PW-06C	PW-06D	PW-06D	PW-06D
		Sample ID:	PW6C (032618)	PW6C (032719)	PW-6C (032520)	PW6D (032618)	PW6D (032719)	PW-6D (032520)
		Sample Date:	03/26/2018	3/27/2019	03/25/2020	03/26/2018	3/27/2019	03/25/2020
		Sample Type:	N	N	N	N	N	N
Analyte	CAO	Units						
Anions								
Perchlorate	14	ug/L	**30**	**28**	**47**	**2.5**	**57**	**95**
SVOCs								
1,4-Dioxane	0.46	ug/L	**1.1**	**4.7**	**7**	< 0.50 U	**3.7**	**5.4**
VOCs								
1,1,1-Trichloroethane	200	ug/L	**1.1**	**27**	**52**	< 1.0 U	**11**	**19**
1,1-Dichloroethane	2.7	ug/L	**0.51 J**	**3.5**	**7.1**	< 1.0 U	**2.1**	**2.8**
1,1-Dichloroethene	7	ug/L	**4**	**77**	**150**	**0.46 J**	**37**	**64**
1,2,4-Trimethylbenzene	15	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	**1.2**	**8.1**	**18**	< 1.0 U	**8.3**	**8.3**
Naphthalene	0.17	ug/L	--	< 0.20 U	--	--	< 0.20 U	--
Trichloroethene	5	ug/L	**62**	**370**	**570 J**	**6.1**	**160**	**230 J**
Vinyl chloride	2	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2**	< 1.0 U

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SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Surface Water								
		Location ID:	SW-6B	SW-6B	SW-6B	SW-6B	SW-6C	SW-6C	SW-6C	SW6C (032618)	SW-6C
		Sample ID:	SW6B (113006)	SW6B (032618)	SW6B (032718)	SW-6B (032520)	SW6C (113006)	SW6C (032618)	SW6C (032719)	DUP06 (032618)	SW-6C (032520)
		Sample Date:	11/30/2006	03/26/2018	3/27/2019	03/25/2020	11/30/2006	03/26/2018	3/27/2019	03/26/2018	03/25/2020
		Sample Type:	N	N	N	N	N	N	N	FD	N
Analyte	CAO	Units									
Anions											
Perchlorate	14	ug/L	**--**	**2.1**	**1.6**	**1.4**	**--**	**2.2**	**1.5**	**2.3**	**1.3**
SVOCs											
1,4-Dioxane	0.46	ug/L	--	< 0.40 U	< 0.40 U	--	--	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
VOCs											
1,1,1-Trichloroethane	200	ug/L	0.13	< 1.0 U	< 1.0 U	< 1.0 U	**0.17**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	15	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	0.17	ug/L	--	--	< 0.20 U	--	--	--	< 0.20 U	--	--
Trichloroethene	5	ug/L	**6.9**	**4.4**	**3.8**	**4.5**	**7.8**	**4.8**	**4.6**	**4.1**	**5.4**
Vinyl chloride	2	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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SVOC - semi-volatile organic compound
VOC - volatile organic compound

		Matrix:	Surface Water							
		Location ID:	SW-6D	SW-6D	SW-6D	SW-6D	SW-7B	SW-7B	SW-7B	SW-7B
		Sample ID:	SW6D (113006)	SW6D (032618)	SW6D (032719)	SW-6D (032520)	SW7B (113006)	SW7B (032618)	SW7B (032719)	SW-7B (032520)
		Sample Date:	11/30/2006	03/26/2018	3/27/2019	03/25/2020	11/30/2006	03/26/2018	3/27/2019	03/25/2020
		Sample Type:	N	N	N	N	N	N	N	N
Analyte	CAO	Units								
Anions										
Perchlorate	14	ug/L	**--**	**2.7**	**4.4**	**1.6**	**--**	**2.7**	**2**	**1.4**
SVOCs										
1,4-Dioxane	0.46	ug/L	--	< 0.40 U	**1.6**	< 0.40 U	--	< 0.40 U	< 0.40 U	< 0.40 U
VOCs										
1,1,1-Trichloroethane	200	ug/L	**0.45**	< 1.0 U	**5.4**	< 1.0 U	0.75	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	2.7	ug/L	< 1.0 U	< 1.0 U	**1.1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	7	ug/L	**0.43**	**0.51 J**	**16**	**0.55 J**	**0.85**	**0.46 J**	< 1.0 U	**0.60 J**
1,2,4-Trimethylbenzene	15	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	5	ug/L	--	< 1.0 U	< 1.0 U	< 1.0 U	--	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	70	ug/L	--	< 1.0 U	**14**	**0.48 J**	--	< 1.0 U	< 1.0 U	**0.54 J**
Naphthalene	0.17	ug/L	--	--	< 0.20 U	--	--	--	< 0.20 U	--
Trichloroethene	5	ug/L	**9.3**	**6.2**	**24**	**5.7**	**11**	**5.9**	**4.7**	**6.4**
Vinyl chloride	2	ug/L	< 1.0 U	< 1.0 U	**1.1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

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APPENDIX N

Waste Minimalization Certification

Duty to Minimize Waste

Alliant Techsystems Operations LLC (Permit No. MDD003067121) has a program in place to reduce the volume and toxicity of hazardous waste that it generates to the degree determined to be economically practicable. This program includes segregation of waste streams when feasible and continuing tracking of waste quantities and types being generated to identify further opportunities for hazardous waste reduction. The facility's current method of treatment, storage, and disposal is the most practicable method currently available that minimizes the present and future threat to human health and the environment.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person who manages the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

July 13, 2020

Richard L Zambito P.E.
Sr. Principal Engineer Environmental
Alliant Techsystems Operations LLC