SECOND QUARTER 2019 GROUNDWATER ASSESSMENT MONITORING REPORT JUNE 2019 MONITORING EVENT

FORMER ENVIRONMENTAL WASTE SOLUTIONS CAMDEN CLASS II LANDFILL

TDSWM PERMIT NUMBER IDL 03-0212 (TERMINATED) 200 OMAR CIRCLE CAMDEN, TN 38320

Prepared for:
THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FORMER ENVIRONMENTAL WASTE SOLUTIONS CAMDEN CLASS II LANDFILL

Prepared by:
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
117 SEABOARD LANE, SUITE E-100
FRANKLIN, TENNESSEE 37067

CEC PROJECT 181-364

SEPTEMBER 2019

Philip Campbell, P.G.
Project Manager

Kevin B. Wolfe
Vice-President

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

This report documents the second quarter 2019 assessment-monitoring event, which was performed at the former Environmental Waste Solutions, LLC (EWS) Camden Class II Landfill on June 4, 2019 and June 14, 2019.

The former EWS Camden Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/longitude -88°05'16" W), and was formerly registered with the Tennessee Division of Solid Waste Management (DSWM) with permit number IDL 03-0212 and previously received secondary aluminum smelter waste for disposal including aluminum dross, salt cakes, and other industrial wastes. The IDL 03-0212 permit was terminated in July 2017.

Beginning in 2008, the site entered into the Groundwater Detection-Monitoring Program, and groundwater samples were collected from site monitoring wells on a semi-annual basis. EWS entered the Assessment Monitoring Program because of chloride concentrations reported above the 250 mg/l EPA secondary drinking water standard (2DWS) at monitoring well MW-3 during the November 2015 semi-annual detection-monitoring event. As a result, additional groundwater quality assessment activities were completed which included the installation of a new permanent groundwater monitoring well (MW-5), the installation of three (3) temporary monitoring wells (TMW-1, TMW-2, TMW-3), and completion of a private water-use survey. In addition, the semi-annual detection monitoring frequency was increased from semi-annual to quarterly assessment monitoring. The observed chloride concentration at MW-3 during this June 2019 event (23.9 mg/l) was well below the 2DWS.

Quarterly assessment monitoring activities have been performed since the November 2015 monitoring event in general accordance with the site's Groundwater Quality Assessment Plan (GWQAP) dated March 14, 2016. During the second quarter 2017 assessment-monitoring event, total cadmium was detected above the maximum contaminant level (MCL) at MW-3, which was the first MCL exceedance for total cadmium concentrations at any well location on site. As a result, enhancements have been made to the sampling and analytical program for the site. Additional quarterly sampling activities have been added to the sampling and analytical program for the site, which includes the addition of stream and sediment sampling in nearby Charlie Creek and Cane Creek and quarterly leachate sampling.

The Second Quarter 2019 sampling event at the facility included the following sampling activities:

Groundwater samples were collected by CEC on June 4, 2019 from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Leachate samples were also collected by CEC on June 4, 2019 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" locations. On June 14, 2019, surface water and sediment samples were collected from Cane Creek and Charlie Creek by CEC. The stream (surface water and sediment) sample locations included

Charlie Creek Upstream (US), Charlie Creek Midstream (MS), Cane Creek US, Cane Creek MS, and Cane Creek Downstream (DS-1).

Pace Analytical (Pace), formerly ESC Lab Sciences, was the laboratory sub-contracted to perform the chemical analyses. Laboratory reports for the 2nd quarter 2019 groundwater analyses were prepared by Pace and reported to CEC on June 21, 2019. Laboratory reports from the 2nd quarter 2019 stream (surface water and sediment) analysis were prepared by Pace and reported to CEC on June 25, 2019. Laboratory reports from the 2nd quarter 2019 leachate analysis were prepared by Pace and reported to CEC on June 23, 2019.

The reported concentrations of chemicals detected in the groundwater monitoring wells and temporary monitoring wells were reviewed and compared against their respective U.S. EPA Maximum Contaminant Levels (MCLs) and U.S. National Secondary Drinking Water Standards (2DWS). Stream (surface water) samples were reviewed and compared to the upstream sampling results and the General Water Quality Criteria established in TDEC Rule Chapter 0400-40.03 of the Rules of the Tennessee Department of Environment and Conservation. Statistical analysis methods were used to identify whether there were any statistically significant increases (SSIs) in any site monitoring wells over background concentrations for the analyzed water quality parameters. Statistical analysis methods were not used to identify any SSIs for the stream (surface water) samples, since the sample size is very limited at this time. The results of the analyses during this assessment monitoring event are summarized in the following paragraphs.

Total cadmium was detected above the MCL (0.005 mg/l) at MW-3 during the June 4, 2019 monitoring event (total cadmium at MW-3 = 0.0292 mg/l). Total cadmium was also detected above the MCL in the duplicate sample collected at MW-3 during the June 4, 2019 monitoring event (total cadmium at MW-3 duplicate sample = 0.0288 mg/l). The cadmium detections at MW-3 during this event were the only cadmium detections above the MCL at any of the groundwater monitoring locations. The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance when considering all current and past data for cadmium at MW-3. However, no distinct statistically significant trend was identified for total cadmium concentrations at MW-3 when considering data from the past 12 sampling events since November 10, 2016. The total cadmium concentrations at MW-3 and the duplicate sample collected at MW-3 during this June 4, 2019 were higher in concentration than the previous March 5, 2019 monitoring event. However, the cadmium concentrations remain less than the previous 4th quarter 2018 event (total cadmium at MW-3=0.144 mg/l), the 3rd quarter 2018 event on September 12, 2018 (total cadmium at MW-3=0.297 mg/l), and the 3rd quarter 2018 re-sample event on September 27, 2018 (total cadmium at MW-3=0.204 mg/l). Total cadmium was first detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l).

Although there have been elevated concentrations of total cadmium in MW-3, the extent of cadmium in the groundwater at the site appears to be limited to the area around MW-3 as there have been no detections of cadmium above the Practical Quantitative Limit (PQL) of 0.001 mg/l, as of this date, from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.

Total cadmium was not detected above the laboratory PQL of 0.001 mg/l in the surface water samples collected from nearby Charlie Creek and Cane Creek during the June 14, 2019 monitoring event. In addition, total cadmium was not detected above the laboratory PQL of 0.500 mg/kg in the sediment samples collected from nearby Charlie Creek and Cane Creek during the June 14, 2019 monitoring event.

Nine SSIs were identified over background during this event. In addition to the total cadmium in MW-3, SSIs included chloride (MW-3, MW-5, TMW-1, TMW-2, and TMW-3), fluoride (MW-3), zinc (MW-3), and sulfate (MW-3). The chloride, fluoride, zinc, and sulfate detections observed in the site monitoring wells were all below their associated MCLs or 2DWS.

Glossary of Terms

Appendix I	Refers to the required regulatory sample list of groundwater parameters
CEC	Civil & Environmental Consultants, Inc.
Class I Landfill	Municipal Solid Waste Landfill
Class II Landfill	Industrial Waste Landfill
Class IV Landfill	Construction/Demolition Waste Landfill
Class III/IV Landfill	Landscaping and Construction/Demolition Waste Landfill
DML	Construction Demolition Landfill
US EPA	United States Environmental Protection Agency
Pace	Pace Analytical
EWS	Environmental Waste Solutions
GW	Groundwater
HDPE	High Density Polyethylene
HI	Hydrogeologic Investigation
MCL	Maximum Contaminant Level
microomhos•cm-1	micro-Siemens per centimeter
mg/l	milligrams per Liter
MW	Monitor Well
NPPL	Non-parametric prediction limit analysis
ORP	Oxidation Reduction Potential
POTW	Publically Owned Treatment Works
ppm	parts per million*
PQL	Practical Quantitation Limit
QC	Quality Control
2DWS	Secondary Drinking Water Standard (EPA)
SESD	Science and Ecosystem Support Division
SNL	Sanitary Landfill
SSI	Statistically Significant Increase
TDEC	Tennessee Department of Environment and Conservation
TDOG	Tennessee Division of Geology
TDSWM	Tennessee Division of Solid Waste Management
TOC	Top of Casing
VOC	Volatile Organic Compound

* ppm – parts per million* is equivalent to mg/l – milligrams per Liter for water samples

1.0 INTRODUCTION

1.1 SITE LOCATION

The former Camden Class II landfill is located just off Highway US 70 at 200 Omar Circle, Camden, Tennessee. The site is located on the Camden, Tennessee USGS quadrangle at north latitude 36° 03' 16" and west longitude -88° 05' 16" at an average elevation of 400 feet above mean sea level datum (MSL). The location of the facility is shown in Appendix A – Figure 1 – Site Location Map. The landfill footprint can be viewed in Appendix A – Figure 2 – Potentiometric Surface Map.

1.2 CURRENT ACTIVITIES

The former EWS Camden Class II landfill is not currently operating (i.e., the permit has been terminated, and TDEC is in the process of achieving certified final closure of the site) and substantial landfill cap construction activities have been completed. Continued post-closure activities being implemented at the facility are intended to protect the environment and human health and include leachate pre-treatment, leachate hauling and disposal, storm water management activities, and groundwater monitoring activities.

2.0 AQUIFER CHARACTERISTICS

2.1 GEOLOGIC AND AQUIFER CHARACTERISTICS

The extensive reworking of the site because of the excavation of chert for local road and fill projects has impacted the original site geology. Based upon a review of the Tennessee Division of Geology (TDOG) Geologic Map and site observations, it appears that the site is within the Camden and Harriman Formations. It is reported by the TDOG that the Camden and Harriman Formations are lithologically identical and not enough fossils are present to form a convenient basis for subdivision.

2.1.1 Camden and Harriman Formations

The Camden and Harriman Formations are described as follows: chert, gray with specks and mottling's of very light-gray and yellowish-gray (surfaces stained pale to dark yellowish-orange), bedded and blocky (beds 2 to 8 inches thick), dense, conchoidal fracture, contains pods of white to light gray tripolitic clay, locally stained yellow and brown, and fossiliferous. Locally, especially near the top, fragments of chert are cemented into large masses and beds of breccia by dark-brown to moderate-red limonite.

Groundwater potentiometric data collected from the uppermost water-bearing zone across the entire landfill site footprint during the 1999 and 2006 hydrogeological investigations indicated that groundwater flow in the uppermost aquifer is generally to the south. Comparisons of the water bearing zone elevations to static groundwater elevations indicate an unconfined aquifer.

2.2 MONITOR WELL INTEGRITY & STATIC WATER LEVELS

The groundwater-monitoring network for the former EWS Class II Landfill currently consists of monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Due to insufficient groundwater volumes for sampling, MW-2 has been removed from the regular sampling network and replaced by MW-4. MW-2 is still intact and is used for potentiometric surface measurements and field parameter testing. Monitoring well MW-1 serves as an up-gradient monitoring point, while monitoring wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 serve as down-gradient monitoring points. The temporary wells (TMW-1, TMW-2, and TMW-3) were installed with the purpose of delineating the areal extent of groundwater contamination and providing additional potentiometric interpretation. The installation of these temporary wells were in response to elevated chloride concentrations at MW-3, which were first detected during the November 2015 sampling event. In addition to providing potentiometric information for the site, these temporary wells yield groundwater samples for water-quality analyses.

The following table presents the wells that were used to develop this report.

Up-gradient Monitoring Points	Down-gradient Monitoring Points
MW-1	MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3

Before purging and sampling activities began, depth to water (DTW) measurements were collected at each of the above-referenced monitoring wells using an electronic water level indicator such as the Solinst® model #122 electronic water-level indicator. DTW measurements were also collected from MW-2 for potentiometric interpretation. DTW measurements were collected in the following order from first to last: MW-1, MW-5, TMW-1, TMW-2, TMW-3, MW-4, MW-2, and finally MW-3.

The integrity of each monitoring well was checked during each sampling event prior to groundwater collection. The physical condition of each wellhead was observed and noted along with the condition of all locking mechanisms for each monitoring well. Once the watertight seal was removed from the top of each monitoring well's casing, the well was allowed to equilibrate to atmospheric conditions. The water-level indicator was decontaminated in accordance with the United States Environmental Protection Agency-Science and Ecosystem Support Division (USEPA SESD) procedures for field water-level measurements in between wells and a new pair of clean nitrile gloves were donned at each monitoring location while collecting DTW measurements. The decontaminated electronic water-level indicator was slowly lowered into the well to establish the distance between the top of casing and the elevation of free groundwater. The electronic probe was capable of determining this distance to within one-hundredth of one foot (0.01 foot). The distance was written in the site-specific field book or field data sheet as DTW. Upon collection of these data, the electronic water-level indicator was removed from the monitoring well and decontaminated.

The following equation is used to determine the elevation of groundwater at each well:

Established Top of Casing Elevation – Depth to Water = Groundwater Elevation

Top of casing elevation has been determined by a licensed land surveyor and is referenced to the current Tennessee State Plan Coordinate System. The top of casing elevations for all site-monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) were updated by a licensed land surveyor on May 12, 2016. Groundwater elevations are listed in Appendix A – Table 1 – Field Parameters & Potentiometric Data and reflect the most recent survey.

2.3 GROUNDWATER FLOW DIRECTION

Groundwater at the landfill appears to generally flow in a southern direction towards Charlie Creek and Cane Creek. Groundwater flow in the vicinity of the former EWS Class II Landfill generally flows from a topographic high north of the landfill towards monitoring wells MW-2, MW-3, MW-4, and MW-5 and temporary monitoring wells TMW-1, TMW-2, and TMW-3, which are all down-gradient of the waste cells.

2.4 POTENTIOMETRIC GRADIENT

The potentiometric surface of the unconfined aquifer occurring beneath the former EWS Class II Landfill occurs at approximately twenty-two (22) feet below the top of casing at the up-gradient monitor well MW-1 to approximately eleven (11) feet below the top of casing at monitor well MW-4. The potentiometric gradient calculated from groundwater elevation data collected on June 4, 2019 is approximately 1.27%.

The potentiometric gradient is calculated according to the following formula:

$$\frac{\text{Highest GW. Elev. (MW-1) } \_ \text{ – Lowest GW. Elev. (MW-4)}}{\text{Horizontal Distance between the Wells}} * 100 = \text{Pot. Grad.}$$

$$\frac{(394.22') - (370.02')}{1{,}910'} * 100 = 1.27\%$$

The above calculation assumes a perpendicular gradient between the potentiometric elevations from MW-1 and MW-4. These assumptions may provide an artificially higher potentiometric gradient than is likely occurring at the site.

2.5 HYDRAULIC CONDUCTIVITY

Hydraulic conductivity estimations within the uppermost aquifer occurring beneath the landfill have not been determined at this time.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 INSTRUMENTATION

Before purging and sampling activities began, DTW measurements were collected at each of the monitoring wells. A YSI Professional Plus® multi-parameter instrument (YSI) was used to record pH, conductivity, temperature, dissolved oxygen (DO), and oxidation-reduction potential (ORP) during groundwater sampling events at the landfill. A Hach® model 2100Q turbidity meter was used to collect turbidity readings. Each instrument was either checked against known standards or calibrated per manufacturers' specifications prior to the commencement of sampling activities.

3.2 GROUNDWATER PURGING AND COLLECTION OF FIELD PARAMETER VALUES

On November 29, 2017, dedicated submersible bladder pumps (low-flow bladder pumps) were installed in each of the groundwater monitoring wells (MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). During the December 11, 2017 sampling event, monitoring personnel for the former EWS Class II Landfill began utilizing low-flow protocols as described within the USEPA's Issue Paper EPA/540/S-95/504: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, April 1996. The low-flow protocols have continued to be utilized by monitoring personnel during each quarterly groundwater assessment-monitoring event since December 11, 2017. Additionally, groundwater-sampling activities were completed during this sampling event in accordance with the USEPA SESD sampling procedure -SESDPROC-301-R4 titled "Groundwater Sampling", effective April 26, 2017.

Each dedicated submersible bladder pump is of stainless steel construction, and each is equipped with a Teflon™ bladder and dedicated Teflon™-lined bonded twin polyethylene tubing (airline and water discharge line). The low-flow bladder pumps were operated by using a special control box, which controls the pressure and frequency of the pumping action and was used to adjust the flow rate of the water. The flow rate used was adjusted to minimize stress (drawdown), prevent damage to monitoring well components, and to minimize the risk of introducing sediments into the monitoring well through the well's gravel pack. Water pumped was withdrawn directly from the formation with little mixing of casing water or disturbance to the sampling zone. The initial amount of purged groundwater was collected in a clean, high density polyethylene (HDPE) flow-through cell while measuring temperature, pH, conductivity, DO, and ORP. A turbidity meter was used to collect turbidity readings during low-flow purging activities.

The start time of purging, the parameter measurements at intervals during purging, estimated pumped volumes, depths to water for low-flow sampling, and any notes of unusual conditions were recorded during purging activities. Field parameter measurements (temperature, pH, conductivity, DO, ORP, and turbidity) were collected periodically until proper field stabilization goals had been met, which are defined by the USEPA SESD as: "for at least three consecutive measurements, the pH remains constant within 0.1 Standard Unit (SU), conductivity varies no more than 5 percent, and the turbidity has either stabilized or is below 10 Nephelometric Turbidity

Units (NTUs)". Other parameters such as DO were also measured as a purge-adequacy parameter. Normal goals for DO are 0.2 mg/l or 10% saturation, whichever is greater. Temperature and ORP were measured during purging to obtain measurements of record for these parameters for each sampling event.

During the June 4, 2019 monitoring event, a peristaltic pump was utilized during purging activities in the temporary monitoring wells (TMW-1, TMW-2, and TMW-3). According to the USEPA SESD groundwater sampling procedures, peristaltic pumps can be utilized as an alternative and acceptable method for low-flow or multiple volume purging and sampling activities.

Peristaltic pumps require three separate pieces of tubing in order to function: (1) a section of Teflon® tubing, which is lowered into the well, (2) a small section of flexible Masterflex® silicone tubing, which is installed into the peristaltic pump head, and (3) a small section of Teflon® tubing, which connects the pump head to the flow-through cell. The first section of tubing was deployed to the approximate mid-screen within the well (approximately 4 feet above the bottom of the well casing) and cut above the ground surface. The free end of the first section of tubing was connected to the flexible Masterflex® silicone tubing situated in the peristaltic pump head. Finally, the third section of tubing (second section of Teflon® tubing) connected the Masterflex® silicone tubing at the pump head to the flow-through cell for collection of field chemistry parameter measurements. In order to prevent the transfer of residuals between sampling locations, all three sections of tubing were replaced between each well. After replacement of all sections of tubing, the peristaltic pump was turned on, and a suitable (slow) pumping rate was achieved to maintain a minimal and stable drawdown level. Field parameters were collected from the initial amount of water that was purged and measurements were collected periodically until the parameters had stabilized as described above.

With respect to groundwater chemistry, an adequate purge is achieved when the pH and conductivity have stabilized and the turbidity either has stabilized or is below 10 NTUs. If the field parameters were not stable, the purging procedures continued until one of the following adequate purge conditions were met:

1. Field stabilization occurred.
2. Well was purged dry. For wells with slow recovery, attempts were made to avoid purging to dryness by slowing the purge rate. In some situations, even with slow purge rates, the well may be pumped dry. This situation generally indicates that an adequate purge had been achieved and the well was sampled following sufficient recovery (enough volume to allow filling of all sample containers).
3. A minimum of three well volumes were purged.

Field chemistry parameters were collected periodically at the temporary wells until field parameter measurements had stabilized, and at least three well volumes were removed from each temporary monitoring well. The purge water from down-gradient monitoring wells MW-3, MW-4, MW-5,

TMW-1, TMW-2, and TMW-3 were containerized and discarded into the on-site leachate collection system storage tank.

Field parameter values for each well are presented in Table 1 – Field Parameters and Potentiometric Data in Appendix A. A detailed account of each purge and sample procedure conducted at each monitoring well is presented in Appendix D – CEC Standard Operating Procedures.

3.3 GROUNDWATER SAMPLE COLLECTION & PRESERVATION

Groundwater samples were collected from monitoring wells when field parameter data indicated that stagnant water had been purged from the well and replaced by groundwater from the adjacent formation that is representative of actual aquifer conditions. Groundwater was placed in the laboratory supplied sample vessels in the following order: Appendix I organics – three (3) forty (40) mL amber glass containers preserved with hydrochloric acid (HCl); Appendix I organics EDB and DBCP– three (3) forty (40) mL clear glass containers preserved with sodium thiosulfate ($Na_2S_2O_3$); total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) – one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO_3); alkalinity, bromide, chloride, nitrate, and sulfate – one (1) two-hundred fifty (250) ml unpreserved HDPE container; COD & ammonia – one (1) two-hundred fifty (250) ml HDPE jar preserved with sulfuric acid (H_2SO_4). In addition to total metals analysis, dissolved metals samples were collected for analysis (dissolved Appendix I metals, Al, Ca, Fe, K, Mg, Na, and Boron) at each location. Each dissolved metals sample was collected by field filtering the groundwater using a new disposable 0.45-micron filter and placing the filtered groundwater into one (1) five-hundred (500) ml HDPE container preserved with HNO_3. As soon as samples were collected in their respective containers, samples were preserved accordingly and placed on ice in a sample cooler.

As described in the previous section, a peristaltic pump was used to purge temporary monitoring wells TMW-1, TMW-2, and TMW-3. Samples for organic analysis cannot be exposed to the flexible peristaltic pump-head tubing, due to the risk of contaminant sorption and/or the risk of the dissolution of organic compounds to the sample. Therefore, the sample containers for the more turbidity-sensitive analysis were filled first (metals), and samples for organic analysis were collected using a clean Teflon® bailer at each temporary monitoring well.

3.4 STREAM (SURFACE WATER AND SEDIMENT) SAMPLE COLLECTION AND PRESERVATION

The stream surface water sampling activities were completed in accordance with the USEPA SESD sampling procedure -SESDPROC-201-R4 titled “Surface Water Sampling”. The stream sediment sampling activities were completed in accordance with the USEPA SESD sampling procedure -SESDPROC-200-R3 titled “Sediment Sampling”. Surface water and sediment samples were collected from the stream, beginning at the furthest downstream sampling location, moving upstream, and ending with the furthest designated upstream sampling location. Stream (surface water and sediment) sample locations included the following:

- Charlie Creek US: Charlie creek upstream north side of SR-191 within Right-of-Way (ROW)
- Cane Creek US: Cane creek upstream side of S Forrest Ave. within ROW
- Charlie Creek MS: South of landfill footprint, before confluence
- Cane Creek MS: South of landfill footprint, after confluence
- Cane Creek DS-1: Stream location at landfill property boundary, before Camden WWTP

The laboratory results for all stream (surface water and sediment) sample locations are summarized in Table 2b – Stream and Sediment Analytical Data in Appendix A. The stream (surface water and sediment) sample locations are shown on Figure 3 – "Groundwater and Stream Sample Locations" located in Appendix A.

3.4.1 Stream Sampling

The surface water samples were collected prior to the collection of the sediment samples at approximately the same dedicated sampling locations in the stream. CEC sampling personnel faced upstream and collected the sample without disturbing the bottom sediments. The surface water samples were collected directly in laboratory-supplied sample vessels for the analysis of: total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and boron) – one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO_3); total hardness, bromide, chloride, and fluoride – one (1) two-hundred fifty (250) ml unpreserved HDPE container; dissolved metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and boron) - one (1) five-hundred (500) ml unpreserved HDPE container, which was submitted to the laboratory for filtering prior to analysis for dissolved metals. The CEC sampler added the laboratory-supplied preservative to the appropriate sample vessels directly after sample collection (except for the metals samples designated for lab filtering).

3.4.2 Sediment Sampling

The sediment sampling method was accomplished by wading into the surface water body and, while facing upstream (into the current), removing the upper surface layer of sediment using a stainless steel scoop or spoon along the bottom of the surface water body in the upstream direction. Excess water was carefully drained from the scoop or spoon so as to minimize the loss of fine-grained particles associated with the sampled substrate. Aliquots of the collected sample were placed in a glass pan and homogenized according to the quartering method described in the USEPA SESD sampling procedures.

After the sediment aliquots were homogenized, the samples were placed into appropriate lab-supplied sample containers using the alternative shoveling method, and the caps were tightly secured. The alternate shoveling method is accomplished by placing separate scoops of the homogenized sediments in each container in sequence and repeating until all containers are full or

the sample has been exhausted. The threads on each container and lid were cleaned to ensure a tight seal when closed. The sediment samples were collected in their respective sample containers for the analysis of: total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron), bromide, chloride, and fluoride. All sediment samples collected from the stream were analyzed for the same list of parameters as the surface water samples, with the exception of total hardness and dissolved metals.

Equipment used to collect field samples was cleaned and decontaminated in accordance with the USEPA SESD - Field Equipment Cleaning and Decontamination procedures.

3.5 LEACHATE SAMPLING PROCEDURES

Leachate samples were collected by CEC on June 4, 2019, from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" locations. The APWC leachate sample was collected from the leachate collection system associated with the aluminum processing waste cell and was collected directly from the associated leachate collection hose before the leachate entered the APWC leachate collection tanks. The IWC leachate sample was collected from the leachate collection system associated with the industrial waste cell and was collected directly from the associated leachate collection hose within the lift station. Laboratory reports from the leachate analysis were prepared by Pace and reported to CEC on June 23, 2019. The approximate APWC and IWC leachate sample locations are shown on Figure 2 – Potentiometric Surface Map located in Appendix A.

3.6 QUALITY ASSURANCE AND QUALITY CONTROL

3.6.1 Field Quality Assurance and Quality Control

Field Quality Assurance and Quality Control (QA/QC) samples were collected as part of the groundwater-sampling program. Quality assurance (with internal laboratory quality controls) addresses the accuracy and repeatability of analytical results after analysis in the laboratory. Quality control addresses methods to preserve the integrity of samples in the field and during shipping to the laboratory. Quality control may be accomplished by incorporating trip blanks, field blanks, field duplicates, and equipment (rinsate) blanks into the analytical program.

A field blank and a duplicate sample were collected during this groundwater-monitoring event. CEC collected a field blank next to monitoring well MW-3 and a duplicate sample was collected from MW-3. The field blank was collected by pouring deionized water into a set of sample bottles provided by the laboratory, thereby allowing any airborne contaminants a chance to enter the field blank sample. The duplicate sample was collected by taking separate samples from within MW-3 at the same time. In addition, a laboratory supplied trip blank for VOC analysis was prepared and placed in a cooler, which was present during groundwater sampling activities. Upon the collection of the final groundwater sample, the trip blank was placed in a sample cooler and delivered to Pace for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

Pace reported the groundwater laboratory analytical results to CEC on June 21, 2019. Laboratory analytical testing of the field blank presented in the analytical report revealed that none of the tested constituents were above the PQL. Most of the results for the duplicate sample collected from MW-3 were similar to the original MW-3 sample results.

3.6.2 Laboratory Quality Assurance and Quality Control

In order to demonstrate that a laboratory is producing data of adequate precision, accuracy and sensitivity, it is necessary to assess all laboratory procedures at all stages from sampling to reporting. The laboratory completed specific control and assessment procedures designed to monitor, quantitatively, the accuracy and precision of specific assays. Laboratory Internal Quality Assurance (IQA) refers to the full range of practices employed to ensure that laboratory results are reliable. Internal Laboratory Quality Control (IQC) consists of the operational techniques used by the laboratory staff for continuous assessment of the quality of the results of individual analytical procedures. The specific quality-control procedures utilized by the analytical laboratory are summarized in the following table:

Quality Criteria Category	Quality Control Laboratory Methods
Precision	Laboratory duplicates at a frequency of one per matrix spike, one per laboratory control sample, and one per method blank.
Bias	Matrix spikes, laboratory control samples, method blanks at a frequency of one sample per standard batch.
Representative and Comparable Data	Adherence to standard analytical procedures, analytical methods, units of measurement, and detection limits.

The groundwater analytical report from the June 2019 event indicated that the same analyte was found in the associated laboratory blank for the detected concentrations of total Hardness (MW-3, TMW-1, and TMW-2), Alkalinity (MW-1), chromium (MW-3, MW-5), and copper (TMW-3) and are indicated as laboratory qualifier "B". Since the same constituent concentrations were found in the method blank, the reported concentrations (indicated as laboratory qualifier "B") may be falsely higher than the actual concentrations. The internal laboratory IQA and IQC results are included in the laboratory analytical reports located in Appendix C – Laboratory Analytical Reports & Field Information Logs.

3.7 SAMPLE CHAIN-OF-CUSTODY

A sample Chain-of-Custody (COC) traveled with the sample kit from Pace to the former EWS Class II Landfill site and back to Pace for the June 2019 sampling event. The CEC SOP 07-01-01 for maintaining sample Chain of Custody may is presented in Appendix D – CEC Standard Operating Procedures.

4.0 LABORATORY ANALYTICAL PROCEDURES

4.1 ANALYTICAL METHODS

All laboratory analyses for the second quarter 2019 groundwater assessment-monitoring event were completed by Pace Analytical. The analytical methods chosen for these monitoring events were in full compliance with the procedures required by the DSWM and the USEPA's publication SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (3rd Edition).

The SW-846 methods used for the analysis of **groundwater and leachate samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals & dissolved metals)
Method 2320 B-2011	Alkalinity
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 8011	1,2-dibromoethane & 1,2 dibromo-3-chloropropane by Micro-extraction and Gas Chromatography
Method 8260B	Volatile Organic Compounds by Gas Chromatograph/Mass Spectrometry
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride, Nitrate, and Sulfate)
Method 350.1	Ammonia Nitrogen
Method 410.4	Chemical Oxygen Demand (COD)

The SW-846 methods used for the analysis of **stream surface water samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals & dissolved metals)
Method 130.1	Total Hardness
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride)

The SW-846 methods used for the analysis of **stream sediment samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride)

4.2 LABORATORY ANALYTICAL RESULTS

Second quarter groundwater samples were collected by CEC on June 4, 2019. Pace performed the groundwater analysis and reported the results on June 21, 2019. Second quarter leachate samples were collected by CEC on June 4, 2019 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" leachate sampling locations. Pace performed the leachate analysis and reported the results on June 23, 2019. First quarter stream (surface water and sediment) samples were collected from the Cane Creek and Charlie Creek by CEC on June 14, 2019, and Pace reported the results on June 25, 2019.

Constituent values from all inorganic laboratory analyses for groundwater and leachate samples, along with applicable MCLs or 2DWSs, are presented in Table 2a – Groundwater and Leachate Analytical Data in Appendix A. Constituent values from all inorganic laboratory analyses for stream and sediment samples collected on June 14, 2019 are presented in Table 2b – Stream and Sediment Analytical Data in Appendix A. Copies of the laboratory reports are located in Appendix C – Laboratory Analytical Reports.

4.2.1 EWS Groundwater Quality Relative to the EPA Primary Drinking Water Standards

Total Cadmium was detected above the MCL (0.005 mg/l) at MW-3 during the June 4, 2019 monitoring event (total cadmium at MW-3 = 0.0292 mg/l). In addition, total cadmium was detected above the MCL in the duplicate sample collected from MW-3 during the June 4, 2019 monitoring event (total cadmium at duplicate MW-3=0.0288 mg/l). A summary of cadmium concentrations (total cadmium and dissolved cadmium) and turbidity values observed at MW-3 during each sampling event since May 9, 2016 is referenced in the table below:

MW-3 Summary of Cadmium Concentrations and Turbidity Measurements			
Date	**Total Cadmium (mg/l)**	**Cadmium, Dissolved (mg/l)**	**Turbidity (NTU)**
6/4/19	**0.0292**	**0.0297**	**2.98**
3/5/2019	**0.0117**	**0.0133**	**6.27**
12/4/2018	**0.144**	**0.139**	**4.77**
9/27/2018	**0.204**	**0.204**	**1.05**
9/12/2018	**0.297**	**0.320**	**1.12**
6/19/2018	**0.0312**	**0.0292**	**4.90**
3/22/2018	**0.00671**	**0.00637**	**24.3**
12/14/2017	**0.00659**	**0.00733**	**23.0**
9/28/2017	**0.00926**	**0.0102**	**18.9**
8/8/2017	**0.0113**	NA	**16.6**
6/8/2017	**0.0286**	NA	**34.8**
11/10/2016	**0.00177**	NA	**64.5**
5/9/2016	<0.001	NA	**8.39**

As demonstrated in the summary table above, the total cadmium concentrations at MW-3 and the duplicate sample collected at MW-3 during this June 4, 2019 were higher in concentration than the previous March 5, 2019 monitoring event. Prior to this event, the cadmium concentrations at MW-3 appeared to be decreasing compared to previous monitoring events since September 12, 2018. Although the observed cadmium concentrations at MW-3 were higher during this event compared to the previous event, the cadmium concentrations remain less than the September 12, 2018, September 27, 2018, and December 4, 2018 monitoring events. In addition, the turbidity result for MW-3 on June 4, 2019 (2.98 NTUs) was within the recommended goal of 10 NTUs and is consistent with recent monitoring events. Also, the sampling results from the June 4, 2019 groundwater event and the previous eight sampling events revealed that the dissolved cadmium results in the field-filtered samples collected at MW-3 were above the MCL and similar to the total cadmium results.

Total cadmium was first detected at a level above the laboratory PQL, but at a level below the MCL (<0.005 mg/l), in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016. Total cadmium was first detected above the MCL of 0.005 mg/l at MW-3 during the June 8, 2017 event. Although there have been elevated detections of total cadmium in MW-3, there have been no detections, as of this date, from groundwater samples extracted from any other monitoring wells at the site including monitoring wells TMW-1, TMW-2, and TMW-3, which are down-gradient from MW-3.

Total Cobalt was detected in up-gradient well MW-1 (0.0411 mg/l) and down-gradient wells MW-3 (0.00398 mg/l), MW-3 duplicate (0.00371 mg/l), and MW-5 (0.00248 mg/l) during this June 2019 event. Cobalt does not have an MCL; however, the TDEC-DSWM uses the EPA regional screening level (RSL) of 0.006 mg/l as the groundwater protection standard for this constituent. The reported cobalt detection at upgradient well MW-1 was above the RSL for cobalt during this June 2019 event. However, the reported cobalt concentrations in downgradient MW-3 (and the MW-3 duplicate) and MW-5 were below the RSL for cobalt concentrations during this June 2019 event. Cobalt has historically been detected at concentrations that exceed the RSL at MW-1 prior to the disposal of waste in the landfill, and total cobalt was detected in MW-1 at similar concentrations during previous events. For this site, the presence of cobalt in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, since there is no immediate development up-gradient of MW-1.

Total Chromium was detected in MW-3 (0.00402 mg/l), MW-3 duplicate (0.00325 mg/l), and MW-5 (0.00415 mg/l), and these values were not above the MCL of 0.1 mg/l for chromium. As indicated by the laboratory qualifier “B” in the analytical report, chromium was found in the associated laboratory blank for MW-3, MW-3 duplicate, and MW-5. Therefore, the chromium concentrations reported at MW-3, MW-3 duplicate, and MW-5 during this event may have been falsely reported at higher concentrations than the actual concentrations.

Total Copper was detected in down-gradient TMW-3 (0.00500 mg/l) and was not above the MCL of 1.3 mg/l for copper. As indicated by the laboratory qualifier "B" in the analytical report, total copper was found in the associated laboratory blank for TMW-3. Therefore, the copper concentrations reported at TMW-3 during this event may have been falsely reported at a higher concentration than the actual concentration.

Total Mercury was detected in up-gradient well MW-1 (total mercury = 0.000889 mg/l) during this June 2019 monitoring event, which was below the MCL of 0.002 mg/l for mercury concentrations and lower in concentration than the previous March 2019 event (total mercury = 0.000922 mg/l) at MW-1. Total mercury was not detected above the laboratory PQL (0.000200 mg/l) at any of the down-gradient wells during this June 2019 event. During the June 2018 event, total mercury was detected above the MCL at MW-1 (total mercury=0.00319 mg/l), which was the first time the total mercury concentration has exceeded the MCL at MW-1. Total mercury has previously been detected above the laboratory PQL (0.0002 mg/l) at up-gradient well MW-1 at concentrations ranging from 0.00024 mg/l (February 2011) to 0.00101 mg/l (December 2018). Although total mercury has been previously detected above the PQL at up-gradient MW-1, total mercury has not been detected above the laboratory PQL in any of the down-gradient monitoring wells since monitoring began at the site in 2008. The presence of mercury in the local groundwater near up-gradient monitoring well MW-1 may be attributable to naturally occurring deposits in the soil overburden, since there is no immediate development up-gradient of MW-1. The observed concentrations of mercury at MW-1 will continue to be monitored in future monitoring events.

4.2.2 EWS Groundwater Quality Relative to the National Secondary Drinking Water Standards

Laboratory analytical results for the groundwater samples collected in June of 2019 from the former EWS Class II Landfill groundwater monitoring well network indicated that three of the site-specific groundwater-monitoring list of compounds were detected at concentrations that exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters include iron and manganese in up-gradient well MW-1, aluminum in down-gradient wells TMW-1 and TMW-2, iron in down-gradient wells MW-4, TMW-1 and TMW-2, manganese in down-gradient wells MW-3, and the duplicate sample collected at MW-3, MW-5, and TMW-1. Chloride, sulfate, and nickel detections were below the 2DWS during this event. The observed concentrations at the monitoring wells at the site for the constituents given below are discussed relative to the 2DWS.

Total Aluminum concentrations observed in TMW-1 (0.238 mg/l) and TMW-2 (0.436 mg/l) during the June 2019 sampling event were above the 2DWS (0.2 mg/l). These observed aluminum concentrations were lower than the previous March 2019 sampling event at TMW-1 (0.340 mg/l) and TMW-2 (0.562 mg/l). In addition, during the previous March 2019 event, the aluminum concentration at TMW-3 (0.371 mg/l) was above the 2DWS but was below the laboratory PQL (<0.1 mg/l) during this June 2019 event. Aluminum was detected in MW-3 (0.178 mg/l) during this June 2019 event, which was below the 2DWS. Aluminum was not detected above the PQL (<0.1 mg/l) at MW-1, MW-4, MW-5, and TMW-3 during this June 2019 event.

Sampling data suggests that total aluminum concentrations are sensitive to turbidity values, given that the dissolved aluminum concentrations at TMW-1 and TMW-2 were less than the laboratory PQL (<0.1 mg/l). The total aluminum detections were likely affected by the turbidity at the time of sampling at TMW-1 (13.6 NTU) and TMW-2 (36.6 NTU).

The **Chloride** concentrations reported at MW-3 (23.9 mg/l) and MW-5 (83.5 mg/l) during this June 2019 event were below the 2DWS for chloride concentrations (250 mg/l). The reported chloride concentration at MW-3 during this event was slightly higher than the previous March 2019 event (13.9 mg/l). However, the chloride concentration at MW-3 during this event was considerably lower in concentration compared to the previous December 2018 event (65 mg/l) and September 2018 event (222 mg/l). Since the second semi-annual monitoring event in November 2015 (458 mg/l) and the supplemental re-sampling event (360 mg/l) in December 2015, chloride concentrations at MW-3 have remained below the 250 mg/l 2DWS for chloride. In addition, the chloride concentration at MW-3 during this event was lower than the previous twenty-two monitoring events from July 16, 2010 to December 4, 2018. Although the chloride concentrations reported at MW-5 have remained below the 2DWS for chloride concentrations, the chloride concentrations at MW-5 appear to be increasing slightly since November 2016, based on the time-series graphs. The observed increase in the chloride concentration at MW-5 during this event is noted, and chloride concentrations at MW-3 and MW-5 will continue to be evaluated.

Total Iron was detected above the 2DWS (0.3 mg/l) in up-gradient well MW-1 (13.6 mg/l) and down-gradient wells MW-4 (0.583 mg/l), TMW-1 (0.377 mg/l), and TMW-2 (0.642 mg/l) during the June 2019 monitoring event. The reported total iron concentrations at each of the groundwater monitoring wells were less than the highest concentrations observed prior to placement of waste and do not exhibit a trend via time-series graphs. The presence of iron in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, and iron has consistently been detected above the 2DWS in up-gradient well MW-1.

Total Manganese has been consistently detected at concentrations above the 2DWS (0.05 mg/l) in up-gradient well MW-1. Manganese detections were observed above the 2DWS (0.05 mg/l) in up-gradient MW-1 (0.966 mg/l) and down-gradient wells MW-3 (1.27 mg/l), MW-5 (0.193 mg/l), and TMW-1 (0.0593 mg/l) during the June 2019 monitoring event. The presence of total manganese in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden.

Total Nickel was detected in up-gradient well MW-1 (0.00880 mg/l) and down-gradient wells MW-3 (0.0397 mg/l) and MW-5 (0.00767 mg/l) during the June 4, 2019 sampling event, and these values were not above the MCL value obtained from the Tennessee Division of Water Resources (TN DWR) Public Water Systems chapter rule 0400-45-01-.06 (0.10 mg/l). Total nickel has been detected at concentrations above the TN DWR Public Water Systems MCL (0.1 mg/l) in up-gradient well MW-1 during previous events on April 9, 2009 (total nickel at MW-1= 0.2 mg/l) and May 19, 2009 (total nickel at MW-1=0.17 mg/l). Therefore, the presence of total nickel in the local groundwater is considered to be naturally occurring, originating from deposits in the soil

overburden. The observed total nickel concentration at MW-3 during this event was lower in concentration compared to the December 2018 monitoring event (total nickel at MW-3=0.0714 mg/l) and September 2018 monitoring event (total nickel at MW-3=0.126 mg/l).

The **Sulfate** concentration reported at MW-3 during this sampling event was 219 mg/l, which was higher in concentration than the previous March 2019 event (85.8 mg/l). However, the sulfate concentration at MW-3 during this event was **below** the 2DWS for sulfate (250 mg/l) and lower in concentration than the previous December 2018 event (324 mg/l) and the previous September 2018 event (484 mg/l). The September 2018 event was the first time the sulfate concentration at MW-3 was above the 2DWS. Prior to September 2018, the sulfate concentration at MW-3 had remained below the 2DWS during previous events in June 2018 (30.1 mg/l), December 2017 (46.2 mg/l), September 2017 (46.2 mg/l), and June 2017 (93.7 mg/) monitoring events. For further comparisons, the detected sulfate concentration at MW-3 in November 2016 was 34 mg/l, 95.7 mg/l in August 2016, and 105 mg/l in March 2017. Prior to August 2016, the reported sulfate concentrations at MW-3 ranged from <5 mg/l to 29.1 mg/l. Sulfate was also detected in MW-5 (6.48 mg/l), which was just above the laboratory PQL of 5.00 mg/l during this June 2019 event. Sulfate was not detected above the PQL of 5.00 mg/l in any of the other monitoring wells across the site.

Total Magnesium does not currently have an established MCL, 2DWS, EPA RSL, or an approved alternate groundwater protection standard (GWPS). The total magnesium concentration at MW-3 during this June 2019 event was 20.8 mg/l, which was slightly higher than the previous March 2019 event (7.83 mg/l). However, the observed magnesium concentration at MW-3 during this event was lower in concentration than the previous December 2018 event (36.4 mg/l) and previous September 2018 event (64 mg/l). Before the September 2018 event, the highest total magnesium concentration observed at MW-3 was 31.9 mg/l during the November 2015 monitoring event, and total magnesium concentrations have remained below 31.9 mg/l at MW-3 in recent groundwater events from November 2015 to June 2018.

4.3 SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

Total cadmium was not detected above the laboratory PQL of 0.001 mg/l in the surface water samples collected from nearby Charlie Creek and Cane Creek during the June 14, 2019 monitoring event. In addition, total cadmium was not detected above the laboratory PQL of 0.500 mg/kg in the sediment samples collected from nearby Charlie Creek and Cane Creek during this June 14, 2019 monitoring event.

4.4 QUALITY CONTROL QUALIFIER CODES

The EPA Contract Laboratory Program states that sample and result qualifiers should be utilized as part of a total quality-control process. Pace complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. Seven QC qualifier codes (B, J3, J4, J5, J6, O1, and V) were indicated during the laboratory analysis of samples collected in June 2019. Three qualifier codes (B, J4, and J5) were indicated during the laboratory analysis of groundwater

samples. One QC qualifier code (J4) was indicated during the laboratory analysis of leachate samples. Seven QC qualifier code (B, J3, J4, J5, J6, O1, and V) were indicated during the laboratory analysis of stream and sediment samples. Specific information concerning each laboratory QC qualifier code are described in the Laboratory Analytical Reports in Appendix C.

5.0 STATISTICAL ANALYSIS

5.1 APPLICABLE METHODS

The Rules of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management Chapter 1200-1-7-.04 state, in part, that each landfill must conduct and report statistical analyses as part of the evaluation of groundwater monitoring data. Statistical analyses of the sampling data was performed on monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3.

The solid waste rules require groundwater sample results and associated statistical methods used to determine the statistical background of a groundwater detection/assessment monitoring program be "protective of human health and the environment". Furthermore, the rules require that the results be "representative" of the background groundwater quality of the geologic formation(s) being monitored. Various influences may affect the representativeness of sample results, which include possible errors in sampling. As previously discussed, reported total metals concentrations are likely affected by elevated turbidity values and would not be representative of the natural groundwater conditions. Before statistical evaluations were completed, the turbidity values which were collected during historical groundwater sampling events were evaluated for elevated turbidity values (>150 NTU). If the turbidity value at the time of sample collection at any given location was greater than 150 NTUs, the total metals concentrations for each sample location would not be representative of natural groundwater conditions. As a result, the corresponding data were removed from the background data set.

After the non-representative background sample data were removed, the distribution of the data was evaluated for normality. The test for normality was conducted using the Shapiro-Wilks method if N <50 or Shapiro-Francia method if N>50. The normality test was performed for both raw and log-transformed data, with replacement of non-detects to half of the corresponding laboratory PQL. Data determined to be normally distributed were evaluated using parametric prediction limit (PPL) analysis. Inter-well and intra-well (intra-well utilized for upgradient MW-1) statistical methods were appropriately utilized to determine statistically significant increases in constituent concentrations.

Intra-well analyses was utilized only at MW-1 to compare the concentrations observed during the current groundwater-sampling event to the established background data set for MW-1 concentrations. Intra-well PPL and non-parametric statistical methods were appropriately utilized to determine statistically significant changes in background water quality data in up-gradient monitoring well MW-1. The arsenic and cobalt data at MW-1 were normally distributed using the Shapiro-Wilks test for normality. Therefore, intra-well PPL analysis was performed for the arsenic and cobalt data sets that passed normality testing. However, all other data sets (barium, chloride, nickel, and mercury data) for MW-1 were not normally distributed and were evaluated using intra-well non-parametric statistical methods.

Inter-well analyses compared the concentrations observed at the down-gradient monitoring locations (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) to the concentrations observed at the up-gradient monitoring location (MW-1) during this monitoring event. Chloride data distribution tests from all up-gradient and down-gradient monitoring wells indicated normality when the data were log-transformed and non-detects were replaced by half of the corresponding PQL. Therefore, the chloride data at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were evaluated using PPL inter-well analysis. All other data sets (aluminum, barium, total cadmium, chromium, cobalt, copper, fluoride, nickel, zinc, and sulfate data) at all up-gradient and down-gradient monitoring wells were not normally distributed and were evaluated using non-parametric statistical methods.

The percentage of inter-well non-detects for each parameter determined the primary statistical method utilized. If the percentage of non-detects in the samples was less than 50%, Shewart-CUSUM control charts were utilized. If more than 50% non-detects existed for the given parameter, non-parametric inter-well prediction limit analysis was conducted on the data. For this site, the total % non-detects for aluminum (37.74% non-detects) and barium (0% non-detects) were less than 50%, and Shewart-CUSUM control charts were utilized for aluminum and barium analysis. Based on the high amount of left-censored data (>50% of non-detects) for total cadmium, chromium, cobalt, copper, fluoride, nickel, zinc, and sulfate, non-parametric inter-well prediction limit analysis was conducted for the background data from up-gradient well MW-1 compared to down-gradient monitoring wells (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). Additional statistical procedures performed included Mann-Kendall trend analyses and the non-parametric Wilcoxon Rank Sum group comparisons (with non-detects set to the highest reporting limit for the given constituent analyzed). The Wilcoxon Rank Sum non-parametric inter-well analysis was conducted as a confirmation test for any parameter that failed the above-mentioned statistical analysis methods for final determination of a statistical increase.

The computer program ChemStat was used for all statistical computations. Worksheets for inter-well and intra-well statistical analysis and time versus concentration charts are given in Appendix B – Statistical Evaluations and Time Series Plots.

5.2 STATISTICAL RESULTS

No statistically significant increases (SSIs) in reported constituent concentrations were identified in up-gradient well MW-1 using intra-well non-parametric prediction limit analysis.

SSIs over background identified for the current monitoring event include total cadmium at MW-3, chloride at MW-3, MW-5, TMW-1, TMW-2, and TMW-3, fluoride at MW-3, sulfate at MW-3, and zinc at MW-3. Trend analyses revealed a statistically significant upward trend in total cadmium, chloride, fluoride, sulfate, and zinc concentrations reported at MW-3. In addition, trend analyses revealed a statistically significant upward trend in total barium, chloride, chromium, and sulfate at MW-5. A statistically significant upward trend in chloride concentrations was reported at TMW-1, TMW-2, and TMW-3.

Trend analyses revealed a statistically significant downward trend in aluminum, chromium and cobalt at MW-3 with no distinct statistically significant trends with total barium and nickel concentrations reported at MW-3. In addition, trend analysis revealed a downward trend in total barium concentrations at MW-4.

The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance when considering all current and past data for cadmium at MW-3. However, no distinct statistically significant trend was identified for total cadmium concentrations at MW-3 when considering data from the past 12 sampling events since November 10, 2016. The total cadmium concentrations reported at MW-3 during this sampling event on June 4, 2019 (0.0292 mg/l and 0.0288 mg/l in duplicate sample) were slightly higher in concentration than the previous March 5, 2019 event (0.0117 mg/l and 0.0113 mg/l in duplicate sample). However, the observed cadmium concentrations during this event remain lower than the December 4, 2018 (0.144 mg/l and 0.137 mg/l in duplicate sample) event.

The chloride concentrations observed at MW-3 (23.9 mg/l), MW-5 (83.5 mg/l), TMW-1 (16.7 mg/l), TMW-2 (19.6 mg/l), and TMW-3 (59.4 mg/l) produced a SSI over background during this event. The chloride detections at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are consistent with previous data and are below the 2DWS for chloride concentrations (250 mg/l). When considering all chloride data to date from MW-4, the data do not show an upward or downward trend in chloride concentrations using the Mann-Kendall trend analysis at the 95% confidence level. However, the chloride concentrations observed at MW-3, MW-5, TMW-1, TMW-2, and TMW-3 indicated an upward trend in chloride concentrations using the Mann-Kendall trend analyses at the 95% confidence level.

The chromium concentrations observed at MW-3 (0.00402 mg/l) and MW-5 (0.00415 mg/l) were less than the MCL (0.1 mg/l), and did not produce a SSI in reported concentrations during this event. As indicated by the laboratory qualifier “B” in the analytical report, chromium was found in the associated laboratory blank for MW-3 and MW-5. Therefore, the chromium concentrations reported at MW-3 and MW-5 during this event may have been falsely reported at higher concentrations than the actual concentrations.

The fluoride concentration at MW-3 (fluoride at MW-3=0.183 mg/l) was less than the MCL (4.0 mg/l) during this event. When considering all data accumulated from MW-3 since January 21, 2009, a statistically significant upward trend in fluoride concentrations at MW-3 was indicated using the Mann-Kendall trend analysis at the 95% confidence level. However, the reported fluoride concentration at MW-3 during this event was less than the December 2018 event (fluoride at MW-3=0.4 mg/l) and September 2018 event (fluoride at MW-3=0.543 mg/l). The fluoride detection at MW-3 in September 2018 was higher than the previous ten sampling events. As indicated by the laboratory qualifier “B” in the analytical report, fluoride was found in the associated laboratory blank for MW-3 and the fluoride concentration reported at MW-3 during this event may have been falsely reported at a higher concentration than the actual concentration.

A SSI in reported sulfate concentrations at MW-3 was identified during this sampling event. In addition, when considering all data accumulated from MW-3 since May 19, 2009, a statistically significant upward trend in sulfate concentrations at MW-3 was indicated using the Mann-Kendall trend analysis at the 95% confidence level. The sulfate concentration reported during this sampling event was 219 mg/l and was higher than the previous March 2019 event (85.8 mg/l), but the concentration remains below the 2DWS of 250 mg/l. Also, the observed sulfate concentration during this event is lower than the previous December 2018 event (324 mg/l) and the previous September 2018 event (484 mg/l). The sulfate concentrations observed at MW-3 had remained below the 2DWS during all previous monitoring events prior to September 2018. Sulfate was also detected in MW-5 (6.48 mg/l) during this June 2019 event, which was well below the 2DWS of 250 mg/l. Sulfate was not detected above the PQL in any of the other monitoring wells across the site.

A SSI in reported total zinc concentrations at MW-3 was identified during this sampling event, and the statistical trend analysis for total zinc at MW-3, using all detected zinc data including data from this June 2019 event (total zinc at MW-3=0.197 mg/l), confirmed an increasing trend having statistical significance. Although the zinc concentration during this event was higher than the previous March 2019 event (total zinc at MW-3=0.0994 mg/l), the zinc concentration was less than the previous three monitoring events in December 2018 (total zinc at MW-3= 1.34 mg/l), initial September 12, 2018 event (total zinc at MW-3= 1.68 mg/l), and the subsequent re-sample event on September 27, 2018 (total zinc =1.58 mg/l). The September 12, 2018 event was the highest zinc concentration reported at MW-3 since April 19, 2008. Total zinc was first detected above the laboratory PQL (<0.025 mg/l) at MW-3 during the June 2017 groundwater event (total zinc=0.0769 mg/l) and was detected during the September 2017 event (total zinc= 0.0439 mg/l), December 2017 event (total zinc = 0.159 mg/l), and March 2018 event (total zinc = 0.0499 mg/l). Before June 2017, zinc had remained below the current laboratory PQL of 0.025 mg/l since July of 2010. Although zinc levels at MW-3 are above the PQL, the levels appear to be decreasing in concentration since September 2018 and are still below the 2DWS of 5 mg/l.

A summary of intra-well and inter-well statistical analysis is presented in Table 3 – Intra-Well and Inter-Well Statistical Summary in Appendix A.

6.0 CONCLUSIONS

The results of the second quarter assessment-monitoring event of 2019 are summarized as follows:

- SSIs over background identified for the current monitoring event include total cadmium at MW-3, chloride at MW-3, MW-5, TMW-1, TMW-2, and TMW-3, fluoride at MW-3, sulfate at MW-3, and zinc at MW-3. Trend analyses revealed a statistically significant upward trend, using all concentrations detected since the beginning of the monitoring program, in total cadmium, chloride, fluoride, sulfate, and zinc concentrations reported at MW-3. In addition, trend analyses for all data revealed a statistically significant upward trend in total barium, chloride, chromium, and sulfate concentrations at MW-5. In addition, a statistically significant upward trend in chloride concentrations was reported at TMW-1, TMW-2, and TMW-3.

- The total and dissolved cadmium concentrations at MW-3 during this event were above the MCL. In addition, statistical trend analysis for all total cadmium concentrations detected at MW-3 since the beginning of the monitoring program does confirm an increasing trend having statistical significance when analyzing the data using the Mann-Kendall trend analysis method. However, no distinct statistically significant trend was identified for total cadmium concentrations at MW-3 using the Mann-Kendall trend analysis method when considering data only from the past 12 sampling events since November 10, 2016. Based on current data, the impacted area appears to be limited to the MW-3 location, since there have been no cadmium detections from groundwater samples obtained from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3. The cadmium concentration reported at MW-3 during this event was higher than the previous March 2019 event. However, during the monitoring events in December 2018 and September 2018, cadmium concentrations were considerably higher in MW-3 than the concentration detected during this current June 2019 event and the previous March 2019 event. The elevated concentrations of cadmium in September 2018 at MW-3 may have been associated with closure construction activities in and around the storm water pond located immediately adjacent to MW-3 at that time. After construction activities are completed, the cadmium levels observed in MW-3 are expected to decrease over time.

- A SSI was identified for the reported sulfate concentration at MW-3, and the sulfate concentrations at MW-3 exhibited a statistically significant increasing trend. During the previous events in September 2018 and December 2018, the observed sulfate concentrations at MW-3 had been above the 2DWS for sulfate (250 mg/l). However, the sulfate concentration reported at MW-3 during this sampling event was 219 mg/l, which was below the 2DWS for sulfate. Sulfate was also detected in MW-5 (6.48 mg/l) during this June 2019 event, which was well below the 2DWS. Sulfate has not consistently been detected above the PQL (5 mg/l) at any of the other permanent monitoring wells or temporary monitoring wells across the site. Although the sulfate concentration at MW-3 was below the 2DWS during this event, the observed sulfate concentration during this event was higher than the previous March 2019 event and is

relatively higher compared to most sampling events prior to September 2018. Therefore, MW-3 will be closely monitored for increasing trends in sulfate concentrations during the next monitoring event.

- Based on the review of the time-series graphs, it appears that the concentrations of total cadmium, calcium, magnesium, manganese, nickel, potassium, zinc, chloride, fluoride, and sulfate at MW-3 increased in concentration during this second quarter monitoring event compared to the previous first quarter 2019 monitoring event. However, these constituent concentrations decreased in concentration during this first quarter 2019 monitoring event compared to the previous fourth quarter 2018 monitoring event and third quarter 2018 monitoring event. During the third quarter 2018 event, the same above-referenced constituents at MW-3 increased in concentration compared to previous groundwater events. Specifically, the observed cadmium, calcium, fluoride, magnesium, manganese, nickel, and zinc concentrations reported at MW-3 during the September 2018 event were the highest reported concentrations of these constituents since April 19, 2008, when monitoring began at MW-3. In addition, the conductivity measured in uS/cm observed at MW-3 during the previous third quarter 2018 monitoring event was higher than previous monitoring events since the April 2016 monitoring event. However, the conductivity measurement during recent events are lower than the previous third quarter 2018 monitoring event.
- The chloride concentrations at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are still well below the 250 mg/l 2DWS.
- Trend analyses revealed a statistically significant downward trend in aluminum, chromium, and cobalt concentrations reported at MW-3, and there were no distinct statistically significant trends in barium or nickel concentrations were reported at MW-3. When considering all chloride data to date from MW-4, the data do not show an upward or downward trend in chloride concentrations using the Mann-Kendall trend analysis at the 95% confidence level. In addition, trend analysis revealed a downward trend in total barium concentrations at MW-4. No other statistically significant upward or downward trends in data were identified for this event.
- No VOCs were detected above their respective laboratory PQL in any of the groundwater monitoring wells or stream samples during the monitoring event.
- Total cadmium was not detected above the laboratory PQL of 0.001 mg/l in the surface water samples collected from nearby Charlie Creek and Cane Creek during the June 4, 2019 monitoring event. In addition, total cadmium was not detected above the laboratory PQL of 0.500 mg/kg in the sediment samples collected from nearby Charlie Creek and Cane Creek during this June 4, 2019 monitoring event. No constituents were detected above regulatory limits at any of the stream samples. Sediment samples do not have an MCL and surface water is compared to general water quality criteria.

The third quarter 2019 assessment-monitoring event is tentatively scheduled for September 2019 and will consist of collecting groundwater samples from up-gradient well MW-1 and down-

gradient wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Leachate samples will be collected from the APWC and IWC.

Surface water and sediment samples will no longer be collected from selected locations along Charlie Creek and Cane Creek during quarterly monitoring events moving forward. The surface water and sediment monitoring activities were conducted while the closure construction activities were being performed. The landfill cap construction activities are now complete. In addition, cadmium was not detected in surface water or sediment samples collected from selected locations along Charlie Creek and Cane Creek. Therefore, quarterly monitoring of the surface water and sediment along Charlie Creek and Cane Creek is no longer needed.

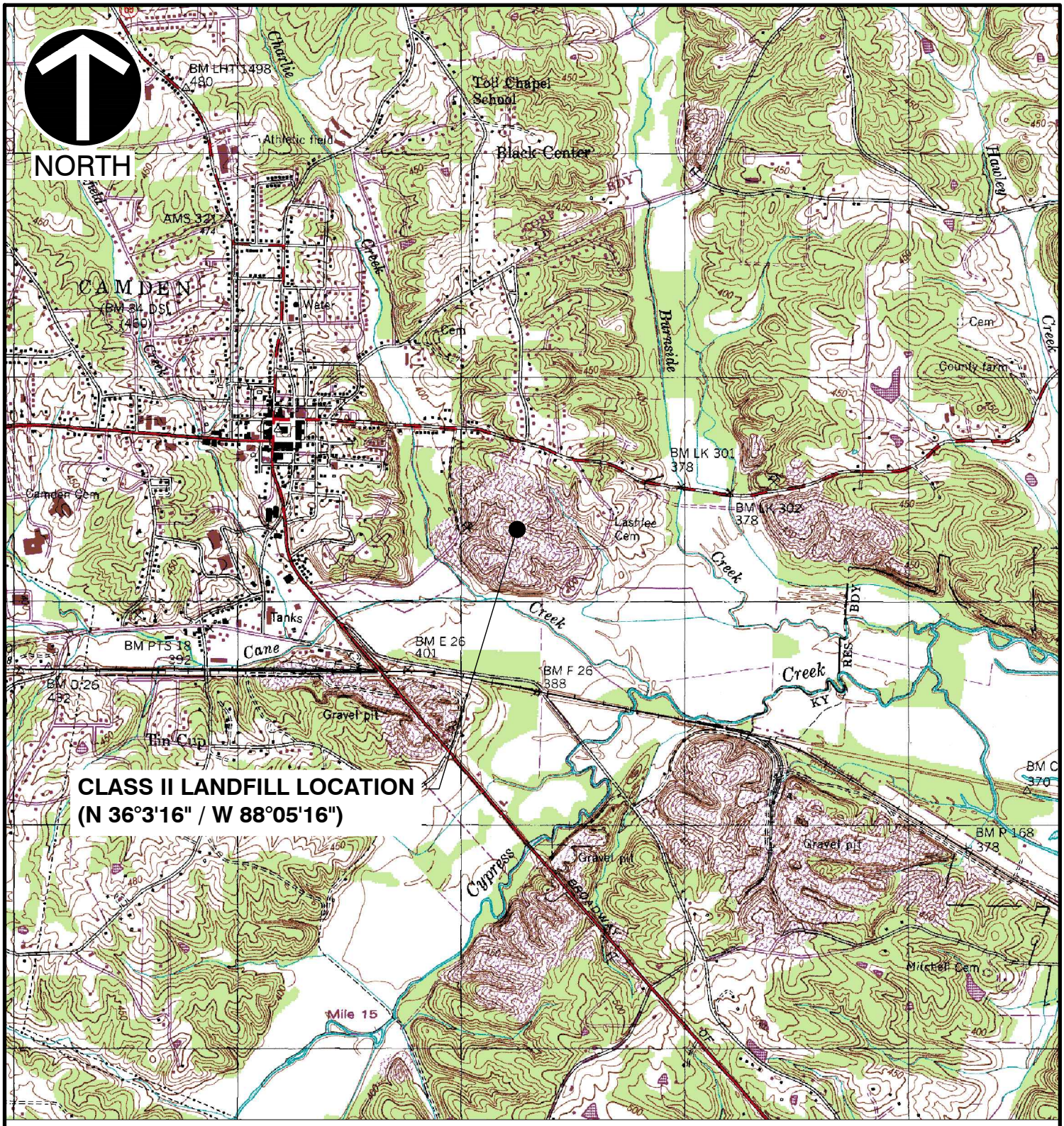
Since the former EWS Class II Landfill site remains in assessment monitoring, a private water use survey update is required annually. The previous annual water use survey for the former EWS Class II Landfill site was completed in December 2018, and no new wells or springs were identified within the approved search radius for the site during the December 2018 update. The next annual water use survey update for the former EWS Class II Landfill is scheduled to be completed in December 2019.

7.0 RECOMMENDATIONS

The following recommendations are presented in an effort to ensure the continuance of securing representative groundwater samples and to obtain analytical results with a high-degree of accuracy and precision (i.e., repeatability).

1. It is recommended that all permanent monitoring wells on the site continue to be monitored quarterly. In addition, quarterly groundwater samples will continue to be collected from temporary monitoring wells down-gradient from MW-3.
2. It is recommended that quarterly monitoring of surface water and sediment in Charlie Creek and Cane Creek cease, since landfill cap construction activities have been completed. Cadmium was not detected above the PQL at any of the surface water or sediment samples collected during recent events and no constituents were detected above regulatory limits at any of the stream (surface water or sediment) samples collected while landfill cap construction activities were being performed. In addition, quarterly monitoring of the down-gradient groundwater wells (MW-4, MW-5, TMW-1, TMW-2, and TMW-3) will adequately delineate potential sources of contamination down-gradient of the landfill.
3. It is recommended that the chosen analytical laboratory (Pace) continue to analyze for total metal constituents using methods that will produce the lowest reporting limit. Additional sampling analysis for dissolved metals will not be necessary if sample turbidities are below 10 NTUs, considering recent analytical data has shown that total and dissolved metals concentrations have been similar when samples have turbidities below 10 NTUs, and sampling for dissolved metals analysis (in addition to total metals) is not standard protocol when sample turbidities are low. If certain groundwater samples have turbidities that are above 10 NTUs (observed primarily in temporary monitoring wells TMW-1, TMW-2, and TMW-3), samples may be collected for dissolved metals analysis (in addition to total metals analysis).
4. It is recommended that total metals sample data will continue to be removed from the background data set for statistical evaluations, if elevated turbidity values are observed during sample collection.

APPENDIX A
MAPS & TABLES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, CAMDEN QUADRANGLE, TENN. DATED: 1950, PHOTOREVISED: 1984.

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.

117 Seaboard Lane · Suite E-100 · Franklin, TN 37067

615-333-7797 · 800-763-2326

www.cecinc.com

FORMER EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	KLU	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	1
DATE:	SEPTEMBER 2019	DWG SCALE:	1"=2000'	PROJECT NO:	181-364		

P:\2018\181-364\-CADD\Dwg\181-364_ SITE LOCATION MAP.dwg{LAYOUT1} LS:(9/3/2019 - pcampbell) - LP: 9/4/2019 9:34 AM

NORTH

LEGEND

MW1 394.62	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 375.46	TEMPORARY GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
390	POTENTIOMETRIC SURFACE CONTOUR (FMSL)
	GROUND WATER FLOW DIRECTION
MH1	MANHOLE
	APPROXIMATE FILL LIMITS
FM	LEACHATE FORCE MAIN

NOTE:

Hydraulic gradient calculation between MW-1 and MW-4 locations.

$$i = \frac{394.22' \text{ (MW-1)} - 370.02' \text{ (MW-4)}}{1{,}910'} = 0.0127 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

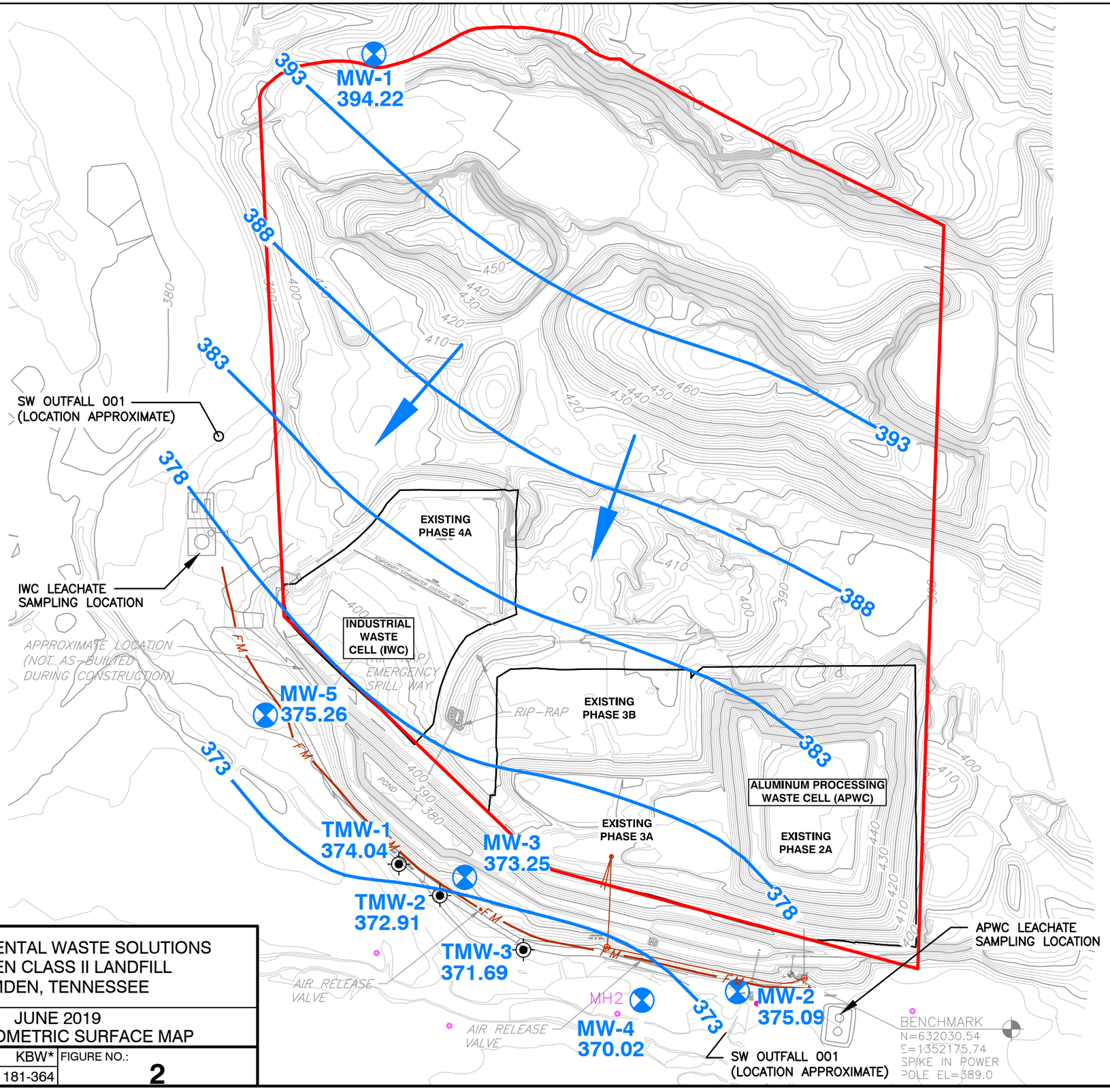
THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

POTENTIOMETRIC CONTOURS GENERATED FROM THESE DATA ARE CONSTRUCTED BY INTERPOLATION BETWEEN POINTS OF KNOWN STATIC WATER LEVEL ELEVATIONS AND USING KNOWLEDGE OF SPECIFIC SITE CONDITIONS. ACTUAL STATIC WATER LEVELS AT LOCATIONS BETWEEN THE MONITORING POINTS MAY DIFFER FROM THOSE DEPICTED.

SCALE IN FEET

0 200 400

*HAND SIGNATURE ON FILE



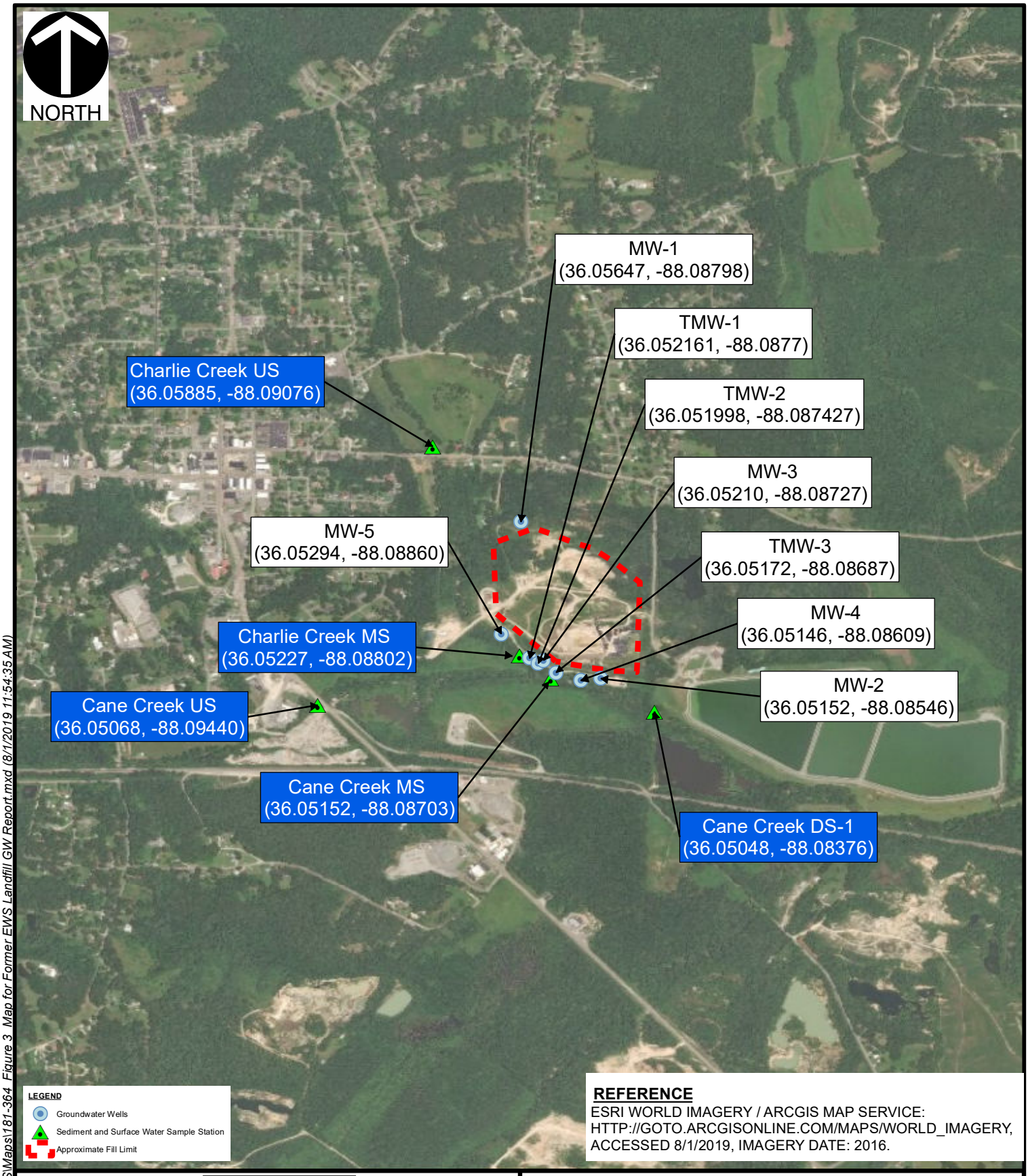
Civil & Environmental Consultants, Inc.
117 Seaboard Lane · Suite E-100 · Franklin, TN 37067
615-333-7797 · 800-763-2326
www.cecinc.com

ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

JUNE 2019
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	CDS	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	2
DATE:	AUGUST 2019	DWG SCALE:	1"=200'	PROJECT NO:	181-364		

P:\2018\181-364\-CADD\DWG\181-364_ GROUNDWATER MAP JUNE 2019.DWG[FIG 2 (2)]LS:(CSLIGER - 9/3/2019) - LP: 9/4/2019_9:39:38_AM



Civil & Environmental Consultants, Inc.
117 Seaboard Lane, Ste. E-100, Franklin, Tennessee 37067
615-333-7797 • 800-763-2326
www.cecinc.com

FORMER EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, BENTON COUNTY, TN

GROUNDWATER AND STREAM SAMPLE LOCATIONS

DRAWN BY:	CDS	CHECKED BY:	PJC	APPROVED BY:	KBW* * Hand signature on file	FIGURE NO:	3
DATE:	JULY 2019	SCALE:	1 " = 1,500 '	PROJECT NO:	181-364		

\\SVR-NASH\P:\2018\181-364\GIS\Maps\181-364 Figure 3 Map for Former EWS Landfill GW Report.mxd (8/1/2019 11:54:35 AM)

Table 1

Former Environmental Waste Solutions Camden Class II Landfill

Field Parameters and Potentiometric Data - June 2019

Monitoring Well/ Sample Location	Date	Sample Time	Top of Casing Elevation[1] (Feet MSL)	Bottom of Well Elevation (Feet)	Well Diameter (Feet)	Well Volume Gallons	Depth to Water (Feet)[2]	Potentiometric Surface (Feet MSL)	Temperature (˚C)	Conductivity (micromhos/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (Millivolts)	Turbidity (NTU)
MW-1	6/4/2019	12:10	416.47	385.97	0.17	1.4	22.25	394.22	15.3	86.9	5.57	0.92	73.2	2.89
MW-2*	6/4/2019	16:35	380.35	367.70	0.17	1.3	5.26	375.09	21.3	319.7	6.18	1.70	79.3	2.50
MW-3	6/4/2019	15:15	392.90	365.10	0.17	1.4	19.65	373.25	18.9	529	5.11	0.34	332.9	2.98
MW-4	6/4/2019	14:05	381.47	358.37	0.17	2.0	11.45	370.02	14.8	63.9	5.75	2.54	222.8	2.67
MW-5	6/4/2019	13:05	385.25	351.40	0.17	4.0	9.99	375.26	16.7	315.6	5.17	0.77	265.8	14.4
TMW-1	6/4/2019	12:15	381.19	348.99	0.085	1.1	7.15	374.04	16.1	93.3	5.34	4.35	103.1	13.6
TMW-2	6/4/2019	14:05	384.27	356.77	0.085	0.7	11.36	372.91	15.7	81.2	5.25	5.70	101.9	36.6
TMW-3	6/4/2019	16:10	381.37	353.37	0.085	0.8	9.68	371.69	16.8	242.9	5.04	1.12	87.9	32.2
Charlie Creek US	6/14/2019	12:00	NA	NA	NA	NA	NA	NA	19.2	125.2	6.67	9.14	70.2	NA
Cane Creek US	6/14/2019	11:40	NA	NA	NA	NA	NA	NA	20.6	228.7	6.85	6.67	64.3	6.25
Charlie Creek MS	6/14/2019	11:15	NA	NA	NA	NA	NA	NA	19.2	145.8	6.61	7.53	70.4	9.60
Cane Creek MS	6/14/2019	10:45	NA	NA	NA	NA	NA	NA	18.6	192.9	6.78	5.68	66.1	7.81
Cane Creek DS-1	6/14/2019	10:15	NA	NA	NA	NA	NA	NA	19.0	221.9	6.66	4.82	57.8	9.00
Leachate (IWC-L)	6/4/2019	16:45	NA	NA	NA	NA	NA	NA	6.10	117,321	5.07	3.58	200.3	20.1
Leachate (APWC-L)	6/4/2019	16:10	NA	NA	NA	NA	NA	NA	58.8	411,407	8.67	0.04	33.7	NA

[1] Top of Casing Elevations from survey by Civil & Environmental Consultants, Inc. on May 12, 2016.

[2] Depth to water measurements collected by Civil & Environmental Consultants, Inc. on March 5, 2019.

* - MW-2 has been removed from monitoring network. Only water level and field parameters collected at MW-2.

NS= Not Sampled

NA= Not Applicable.

Table 2a
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Groundwater and Leachate Analytical Data - June 2019

		MW-1	Qualifier	MW-3	Qualifier	Duplicate (MW-3)	Qualifier	MW-4	Qualifier	MW-5	Qualifier	TMW-1	Qualifier	TMW-2	Qualifier	TMW-3	Qualifier	Field Blank	Qualifier	Leachate IWC-L	Qualifier	Leachate-APWC-L	Qualifier
		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019	
Parameter	**MCL/GWPS (mg/l)**	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**	
Hardness	-	<30.0		**223**	B	**238**		<30.0		**104**		**33.9**	B	**31.3**	B	**84.5**		<30.0		**29,900**		**161**	
Alkalinity	-	**43.8**	B	<20.0		<20.0		<20.0		<20.0		<20.0		<20.0		<20.0		<20.0		<20.0		**9,120**	
Ammonia Nitrogen	-	<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		**909**		**4,740**	
COD	-	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		**6,910**		**9,070**	
Boron	-	<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<1.00		**9.75**	
Boron, Dissolved	-	<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		NS		<2.00		**9.92**	
Bromide	-	<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<100		<100	
Chloride	250 [2]	**2.15**		**23.9**		**24.0**		**8.4**		**83.5**		**16.7**		**19.6**		**59.4**		<1.00		**57,200**		**122,000**	
Fluoride	2 [2]	<0.100		**0.183**	B	**0.185**	B	<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		**3.33**		**20.9**	
Nitrate	10	<0.100		**1.07**		**1.05**		**0.616**		**1.33**		**1.76**		**0.646**		**4.99**		<0.100		<1.00		**63.4**	
Sulfate	250 [2]	<5.00		**219**		**213**		<5.00		**6.48**		<5.00		<5.00		<5.00		<5.00		**1,760**		**1,000**	
Aluminum	0.2 [2]	<0.100		**0.178**		**0.166**		<0.100		<0.100		**0.238**		**0.436**		<0.100		<0.100		**231**		<10.0	
Aluminum, Dissolved	0.2 [2]	<0.100		**0.147**		**0.142**		<0.100		<0.100		<0.100		<0.100		<0.100		NS		**229**		<0.100	
Antimony	0.006	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.200		<0.200	
Antimony, Dissolved	-	<0.00200	J4,J5	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4	NS		<0.0100	J4	<0.200	
Arsenic	0.01	**0.0194**		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.335**		<0.200	
Arsenic, Dissolved	0.01	**0.0204**		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**NS**		<0.400		**0.0207**	
Barium	2	**0.0219**		**0.0584**		**0.0588**		**0.00921**		**0.0493**		**0.0165**		**0.0279**		**0.044**		<0.00500		**1.82**		**1.0**	
Barium, Dissolved	-	**0.0196**		**0.0599**		**0.0600**		**0.00832**		**0.0482**		**0.015**		**0.0234**		**0.0433**		NS		**2.02**		**1.09**	
Beryllium	0.004	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.200		<0.200	
Total Cadmium	0.005	<0.00100		**0.0292**		**0.0288**		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**31.3**		<0.100	
Cadmium, Dissolved	0.005	<0.00100		**0.0297**		**0.0296**		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		NS		**34.4**		**0.0929**	
Calcium	-	**4.03**		**56.4**		**56.4**		**5.19**		**18.3**		**9.59**		**8.38**		**20.6**		<1.00		**9,300**		<100	
Calcium, Dissolved	-	**3.77**		**57.1**		**57.3**		**4.94**		**18.4**		**9.52**		**8.58**		**20.4**		NS		**9,300**		**58.1**	
Chromium	0.1	<0.00200		**0.00402**	B	**0.00325**	B	<0.00200		**0.00415**	B	<0.00200		<0.00200		<0.00200		<0.00200		<0.200		<0.200	
Chromium, Dissolved	0.1	<0.00200		<0.00200		**0.00637**		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NS		<0.400		<0.00200	
Cobalt	0.006 [3]	**0.0411**		**0.00398**		**0.00371**		<0.00200		**0.00248**		<0.00200		<0.00200		<0.00200		<0.00200		**0.494**		<0.200	
Cobalt, Dissolved	0.006 [3]	**0.0419**		**0.00382**		**0.00392**		<0.00200		**0.0024**		<0.00200		<0.00200		<0.00200		NS		**0.54**		**0.00896**	
Copper	1.3	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		**0.00505**	B	<0.00500		**2.62**		**27.3**	
Copper, Dissolved	1.3	<0.00500		<0.00500		**0.00558**	B	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		NS		**2.45**		**28.7**	
Iron	0.3 [2]	**13.6**		**0.141**		<0.100		**0.583**		<0.100		**0.377**		**0.642**		**0.128**		<0.100		**411**		<10.0	
Iron, Dissolved	0.3 [2]	**13.4**		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		NS		**404**		<0.100	
Lead	0.015	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.471**		<0.200	
Lead, Dissolved	0.015	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NS		**0.487**		<0.0100	
Magnesium	-	**2.78**		**20.8**		**21.4**		**2.88**		**12.9**		**2.84**		**3.08**		**6.76**		<1.00		**1,030**		<100	
Magnesium, Dissolved	-	**2.77**		**22.3**		**22.1**		**2.81**		**12.7**		**2.8**		**3.05**		**6.75**		NS		**975**		<1.00	
Manganese	0.05 [2]	**0.966**		**1.27**		**1.29**		**0.0415**		**0.193**		**0.0593**		**0.0112**		**0.015**		<0.00500		**66.5**		<0.500	
Manganese, Dissolved	0.05 [2]	**0.837**		**1.32**		**1.32**		**0.0355**		**0.183**		**0.0497**		<0.00500		**0.0114**		NS		**68.0**		**0.0273**	
Nickel	0.10 [1]	**0.0088**		**0.0397**		**0.0397**		<0.00200		**0.00767**		<0.00200		<0.00200		<0.00200		<0.00200		**0.594**		<0.200	
Nickel, Dissolved	0.10 [1]	**0.00631**		**0.0403**		**0.0436**		<0.00200		**0.00799**		<0.00200		<0.00200		<0.00200		NS		**0.638**		**0.0424**	
Potassium	-	**1.16**		**7.52**		**7.63**		<1.00		**1.45**		**1.01**		<1.00		**1.74**		<1.00		**8,570**		**30,800**	
Potassium, Dissolved	-	**1.11**		**7.43**		**7.47**		<1.00		**1.46**		<1.00		<1.00		**1.77**		NS		**9,040**		**31,800**	

Table 2a
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Groundwater and Leachate Analytical Data - June 2019

		MW-1	Qualifier	MW-3	Qualifier	Duplicate (MW-3)	Qualifier	MW-4	Qualifier	MW-5	Qualifier	TMW-1	Qualifier	TMW-2	Qualifier	TMW-3	Qualifier	Field Blank	Qualifier	Leachate IWC-L	Qualifier	Leachate-APWC-L	Qualifier
		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019		6/4/2019	
Parameter	**MCL/GWPS (mg/l)**	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**	
Selenium	0.05	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.292**		<0.200	
Selenium, Dissolved	0.05	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NS		**0.75**		<0.400	
Silver	0.10 [2]	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.200		<0.200	
Sodium	-	**2.88**		**9.62**		**9.88**		**3.75**		**20.5**		**3.74**		**3.85**		**12.9**		<1.00		**16,100**		**45,200**	
Sodium, Dissolved	-	**3.06**		**9.82**		**9.92**		**3.9**		**19.8**		**3.67**		**3.72**		**12.4**		NS		**16,500**		**54,200**	
Thallium	0.002	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.200		<0.200	
Vanadium	-	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.500		<0.500	
Zinc	5 [2]	<0.0250		**0.197**		**0.198**		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		**336**		**3.77**	
Zinc, Dissolved	5 [2]	<0.0250		**0.200**		**0.201**		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		NS		**359**		**2.04**	
Mercury	0.002	**0.000889**		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		**0.000209**		<0.000200	
Mercury, Dissolved	0.002	<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		NS		<0.000200		**0.000671**	
Acetone	-	<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		**1.22**		**0.713**	
Carbon Disulfide	-	<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**0.0014**		<0.00100	
Chloroform		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500	
2-Butanone (MEK)	-	<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		**0.142**		**0.0211**	
Toluene	1.0	<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**0.00129**		<0.00100	
4-Methyl-2-Pentanone (MIBK)	-	<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		**0.0295**		<0.0100	
Ethylene Dibromide (EDB)	0.00005	<0.0000100		<0.0000100		<0.0000100		<0.0000100		<0.0000100		<0.0000100		<0.0000100		<0.0000100		<0.0000100		**0.000275**		<0.0000100	

Notes:
MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standard
GWPS: Groundwater Protection Standard
[1] - MCL value obtained from TN Division of Water Supply rule 1200-5-.06(1)(b)11
[2] - MCL value obtained from TN Division of Water Supply rule 1200-5-1-.12(1)(n). (EPA Secondary Drinking Water Standard
[3] - GWPS value is referenced from EPA Regional Screening Level for Cobal
NS- Not Sampled for analysis.
NA-Not Analyzed by the Laboratory.
Bold text indicates laboratory analytical detections above the practical quantitation leve
Dark gray shaded text indicates detection above respective MCL/GWPS
Light gray shaded text indicates detection above respective Non-Enforceable National Secondary Drinking Water Standard
B-The same analyte is found in the associated blank.
J4- The associated batch QC was outside the established quality control range for accuracy.
J5- The sample matrix interfered with the ability to make any accurate determination; spike value is hig

Table 2b
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Stream and Sediment Analytical Data - June 2019

	Stream Samples (Water)										Sediment Samples (Solids)									
	Charlie Creek US	Qualifier	Charlie Creek MS	Qualifier	Cane Creek US	Qualifier	Cane Creek MS	Qualifier	Cane Creek DS-1	Qualifier	Charlie Creek US	Qualifier	Charlie Creek MS	Qualifier	Cane Creek US	Qualifier	Cane Creek MS	Qualifier	Cane Creek DS-1	Qualifier
	6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019		6/14/2019	
Parameter	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**	
Total Hardness	**46.6**		**56.8**		**92.2**		**81.4**		**83.8**		NA		NA		NA		NA		NA	
Ammonia (as N)	<0.100		<0.100		<0.100		<0.100		**0.116**		NA		NA		NA		NA		NA	
Boron	<0.200		<0.200		<0.200		<0.200		<0.200		<10.0		<10.0		<10.0		<10.0		<10.0	
Bromide	<1.00		<1.00		<1.00		<1.00		<1.00		<10.0		<10.0		<10.0		<10.0		<10.0	
Chloride	**7.84**		**11.2**		**13.1**		**12.4**		**20**		**26.7**		**46.1**		**37.9**		**18.5**		**33.6**	
Fluoride	<0.100		<0.100		**0.153**		**0.129**		**0.131**		**1.57**		**2.1**		**2.32**		**1.35**		**1.13**	
Aluminum	<0.100		**0.209**		**0.103**		<0.100		<0.100		**775**		**1,470**		**2,140**		**1,060**		**746**	
Aluminum (Dissolved-LF)	<0.100		<0.100		<0.100		<0.100		<0.100		NA		NA		NA		NA		NA	
Antimony	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4	<0.00200	J4,J5	<2.00		<2.00		<2.00		<2.00		<2.00	
Arsenic	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3,J6	<2.00		<2.00		<2.00		<2.00		<2.00	
Arsenic (Dissolved-LF)	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NA		NA		NA		NA		NA	
Barium	**0.0289**		**0.0343**		**0.0319**		**0.0289**		**0.0416**	J6	**6.28**		**8.84**		**27**		**11.6**		**12**	
Barium (Dissolved-LF)	**0.0263**		**0.0315**		**0.0271**		**0.0276**		**0.0391**		NA		NA		NA		NA		NA	
Beryllium	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3,J6	<0.200		<0.200		<0.200		<0.200		<0.200	
Total Cadmium	<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.500		<0.500		<0.500		<0.500		<0.500	
Cadmium (Dissolved-LF)	<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		NA		NA		NA		NA		NA	
Calcium	**14**		**16.4**		**24.1**		**22.1**		**22.1**		<100		**176**	B	**5,810**		**186**	B	<100	
Calcium (Dissolved-LF)	**14**		**16.5**		**24**		**22.2**		**22.5**		NA		NA		NA		NA		NA	
Chromium	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3	**3.48**		**4.1**		**4.93**		**5.05**		**3.79**	
Cobalt	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<1.00		**1.31**		**1.39**		**1.54**		**1.4**	
Cobalt (Dissolved-LF)	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NA		NA		NA		NA		NA	
Copper	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<2.00		<2.00		<2.00		<2.00		<2.00	
Iron	**0.208**		**0.412**		**0.731**		**0.383**		**0.692**	O1	**1,850**		**3,230**		**3,970**		**3,730**		**2,790**	
Iron (Dissolved-LF)	<0.100		<0.100		<0.100		<0.100		**0.106**		NA		NA		NA		NA		NA	
Lead	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3	**2.28**	B	**2.71**	B	**5.73**		**2.09**	B	**2.08**	B
Lead (Dissolved-LF)	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NA		NA		NA		NA		NA	
Magnesium	**2.36**		**2.92**		**5.68**		**4.72**		**4.94**		<100		**123**		**616**		<100		<100	
Magnesium (Dissolved-LF)	**2.34**		**2.9**		**5.71**		**4.77**		**5.08**		NA		NA		NA		NA		NA	
Manganese	**0.0888**		**0.171**		**0.287**		**0.144**		**0.251**	V	**18.6**		**102**		**241**		**249**		**193**	
Manganese (Dissolved-LF)	**0.0233**		**0.0671**		**0.0255**		**0.0379**		**0.145**		NA		NA		NA		NA		NA	
Nickel	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<2.00		<2.00		**2.03**		<2.00		<2.00	
Nickel (Dissolved-LF)	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		NA		NA		NA		NA		NA	
Potassium	**1.22**		**1.54**		**2.37**		**2.2**		**3.27**		**116**	B	**167**	B	**337**		**122**	B	**110**	B
Potassium (Dissolved-LF)	**1.25**		**1.55**		**2.34**		**2.17**		**3.33**		NA		NA		NA		NA		NA	
Selenium	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<2.00		<2.00		<2.00		<2.00		<2.00	
Silver	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3	<1.00		<1.00		<1.00		<1.00		<1.00	
Sodium	**5.54**		**5.88**		**8.34**		**7.33**		**10.1**	J6	<100		<100		<100		<100		<100	
Sodium (Dissolved-LF)	**6.08**		**6.52**		**9.21**		**8.05**		**12.2**		NA		NA		NA		NA		NA	
Thallium	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200	J3	<2.00		<2.00		<2.00		<2.00		<2.00	
Vanadium	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500	J3	**3.9**		**5.3**		**6.77**		**5.97**		**4.08**	
Zinc	<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		**5.16**	B	**9.55**	B	**10.6**	B	**9.45**	B	**6.56**	B
Mercury	<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.0200		<0.0200		<0.0200		<0.0200		<0.0200	

Notes:

Bold text indicates laboratory analytical detections above the laboratory practical quantitation level (PQL)

NA: Not Analyzed

(Dissolved-LF): Dissolved metals samples were filtered in the laboratory. Samples were placed into unpreserved sample containers in the field.

B-The same analyte is found in the associated blank

J3-The associated batch QC was outside the established quality control range for precision

J4-The associated batch QC was outside the established quality control range for accuracy

J5-The sample matrix interfered with the ability to make any accurate determination; spike value is high

J6-The sample matrix interfered with the ability to make any accurate determination; spike value is low

O1-The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

V-The sample concentration is too high to evaluate accurate spike recoveries.

Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data - June 2019

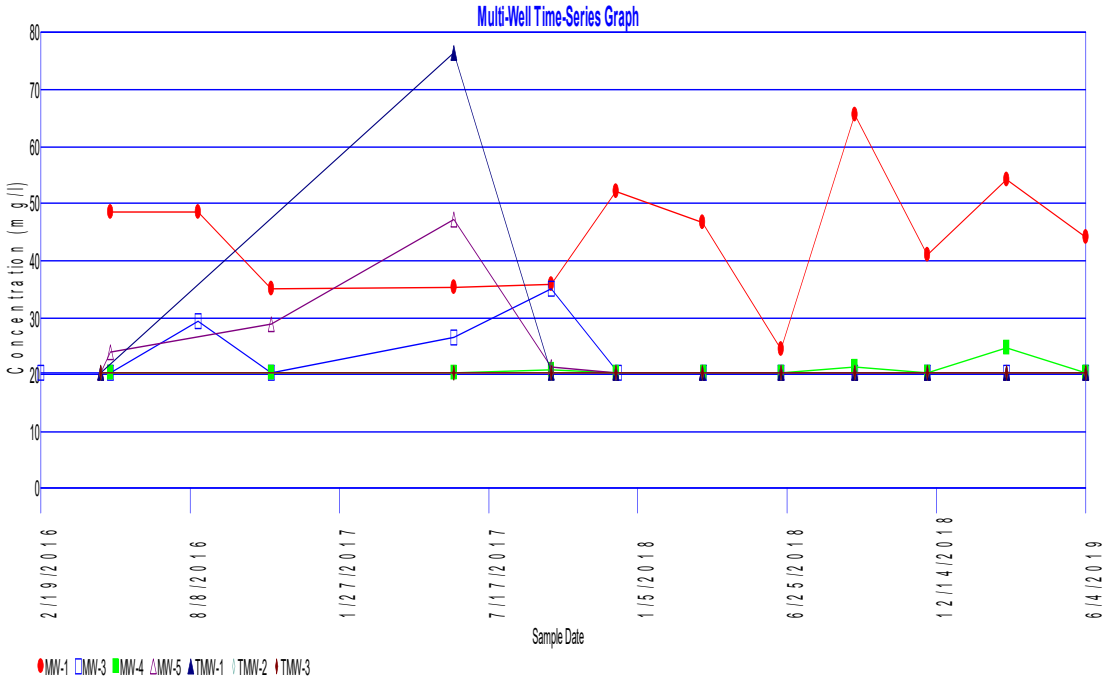
Intra-Well Statistical Summary (Upgradient Background Well MW-1)								
Constituent	Well	% Non Detects	Normality	Intra-well NPPL	Intra-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI
Arsenic	MW-1	0.00	parametric	--	Pass	--	--	No
Barium	MW-1	0.00	non-parametric	Pass	--	Pass	--	No
Chloride	MW-1	0.00	non-parametric	Pass	Pass*	Pass	--	No
Cobalt	MW-1	0.00	parametric	--	Pass	--	--	No
Nickel	MW-1	44.00	non-parametric	Pass	--	Pass	--	No
Mercury	MW-1	36.00	non-parametric	Pass	--	Pass	--	No

Inter-Well Statistical Summary (Downgradient Compliance Wells)									
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI	Mann-Kendall Trend Analysis
Aluminum	MW-3	37.74	non-parametric	--	--	Pass	--	No	**Downward Trend**
	TMW-1		non-parametric	--	--	Pass	--	No	No Trend
	TMW-2		non-parametric	--	--	Pass	--	No	No Trend
Barium	MW-3	0.00	non-parametric	--	--	Pass	--	No	No Trend
	MW-4		non-parametric	--	--	Pass	--	No	**Downward Trend**
	MW-5		non-parametric	--	--	Pass	--	No	**Upward Trend**
	TMW-1		non-parametric	--	--	Pass	--	No	No Trend
	TMW-2		non-parametric	--	--	Pass	--	No	No Trend
	TMW-3		non-parametric	--	--	Pass	--	No	No Trend
Total Cadmium	MW-3	88.89	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
Chloride	MW-3	0.00	log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	MW-4		log-normal	--	Pass	--	--	No	No Trend
	MW-5		log-normal	--	**Fail**	--	**--**	**Yes**	**Upward Trend**
	TMW-1		log-normal	--	**Fail**	--	**--**	**Yes**	**Upward Trend**
	TMW-2		log-normal	--	**Fail**	--	**--**	**Yes**	**Upward Trend**
	TMW-3		log-normal	--	**Fail**	--	**--**	**Yes**	**Upward Trend**
Chromium	MW-3	74.75	non-parametric	Pass	--	--	--	No	**Downward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	**Upward Trend**
Cobalt	MW-3	57.55	non-parametric	Pass	--	--	--	No	**Downward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Copper	TMW-3	82.86	non-parametric	Pass	--	--	--	No	No Trend
Fluoride	MW-3	85.71	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
Nickel	MW-3	62.04	non-parametric	Pass	--	--	--	No	No Trend
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Zinc	MW-3	64.81	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
Sulfate	MW-3	62.96	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	**Upward Trend**

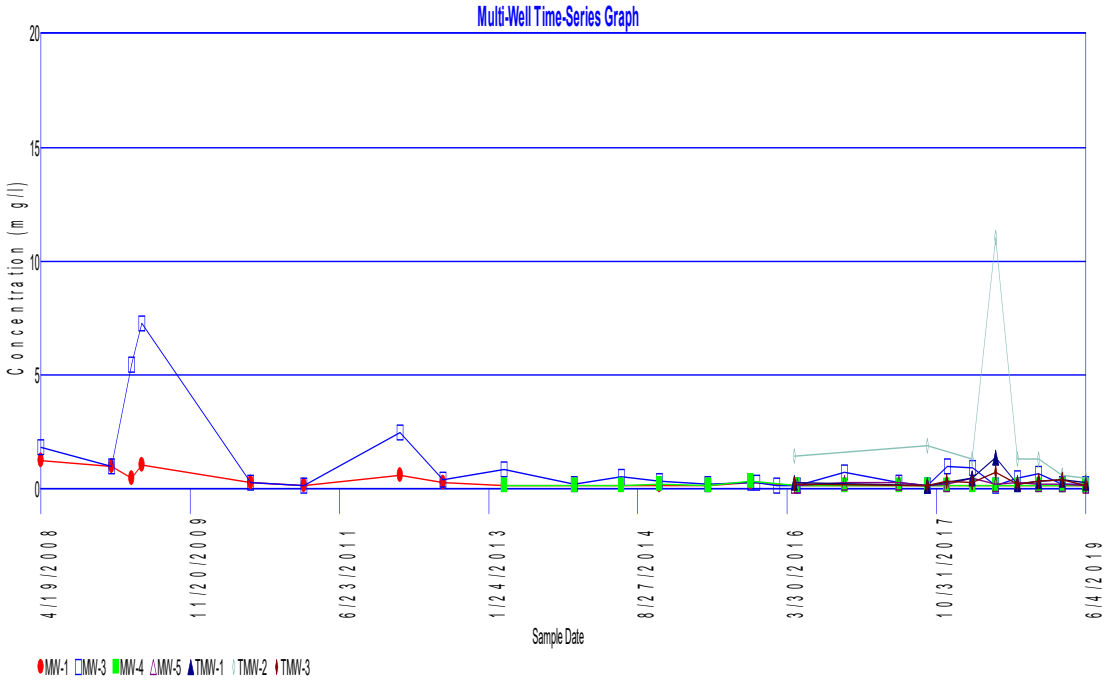
Notes:
* 99% Parametric Confidence level was used for Chloride when the data was log-transformed at 1/2 the detection limit.

APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

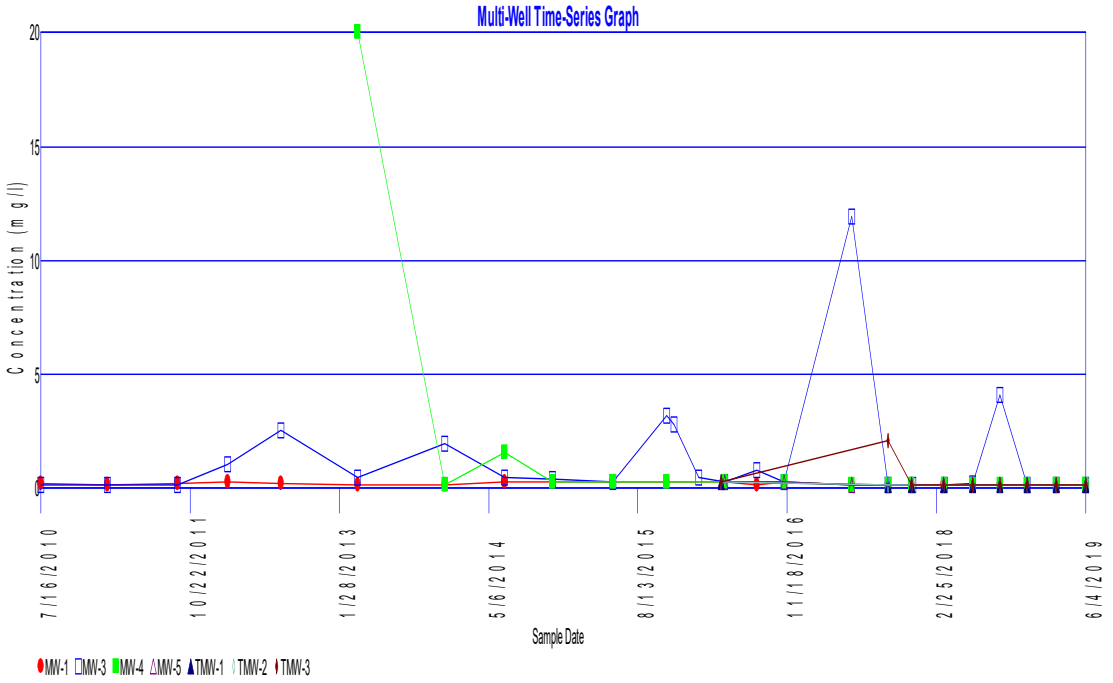
Alkalinity



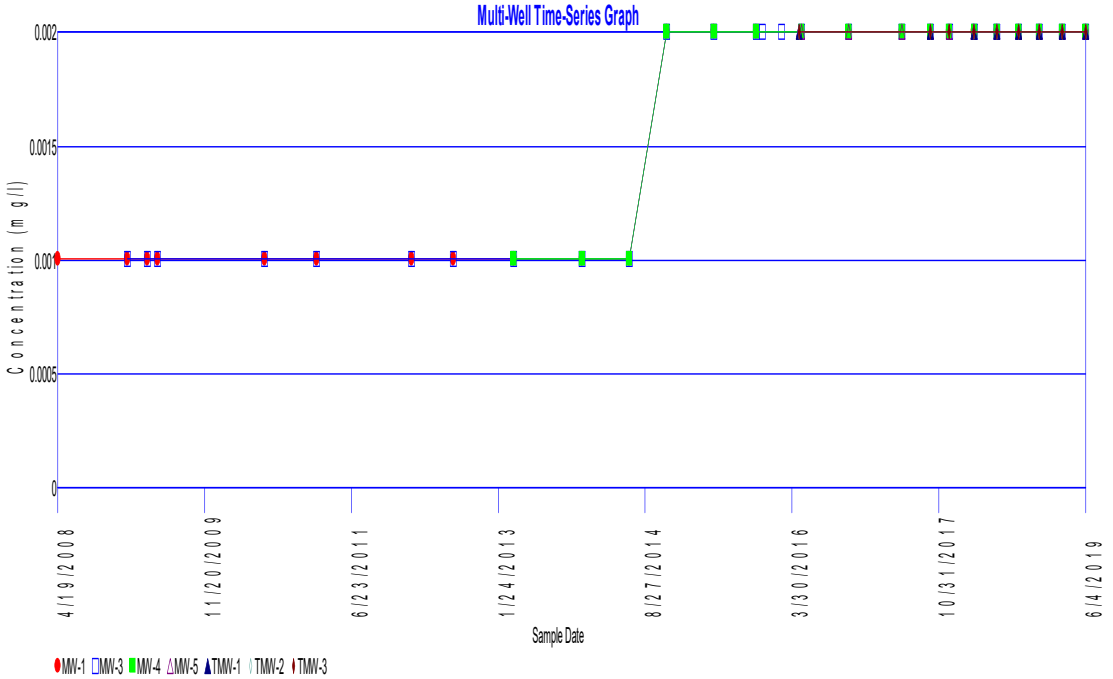
Aluminum



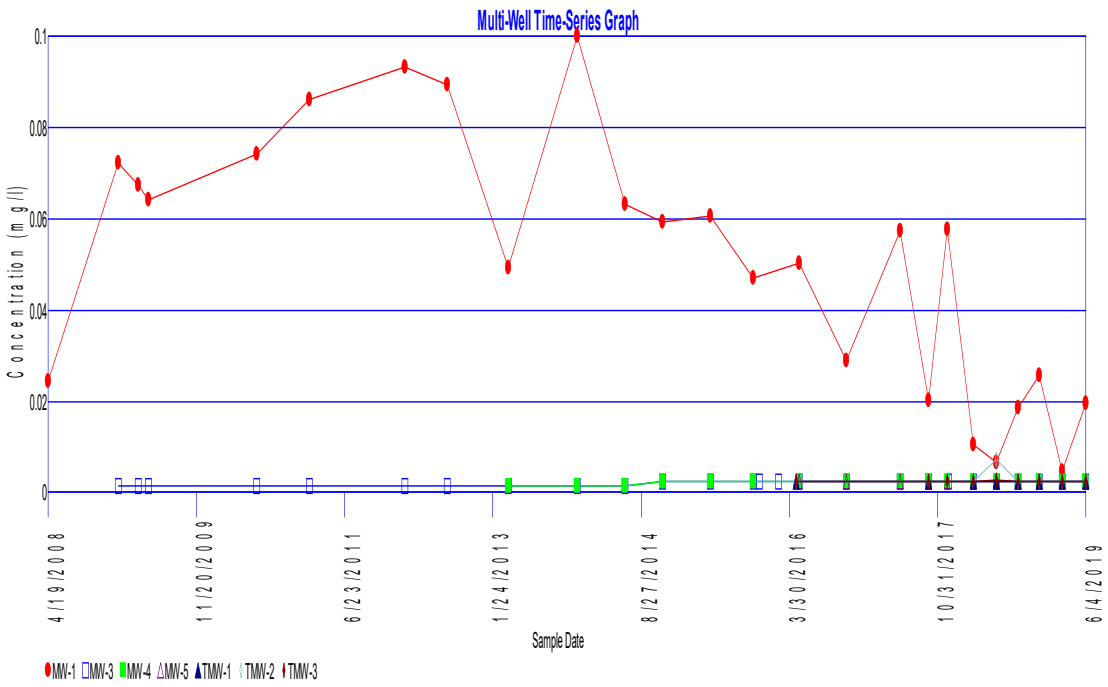
Ammonia Nitrogen



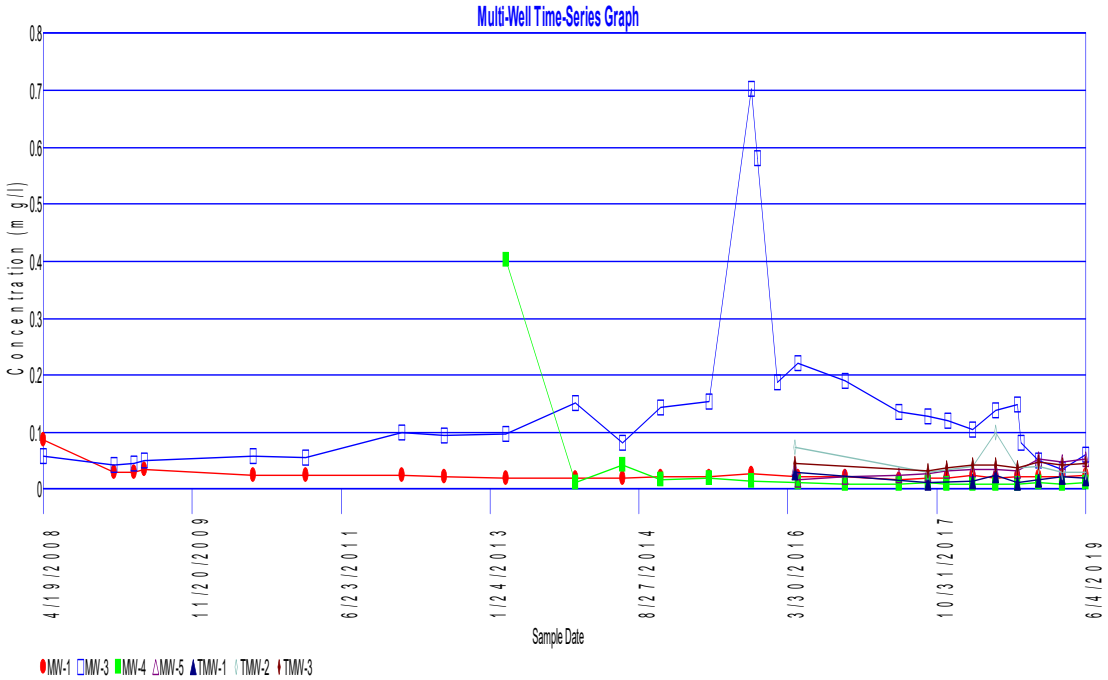
Antimony

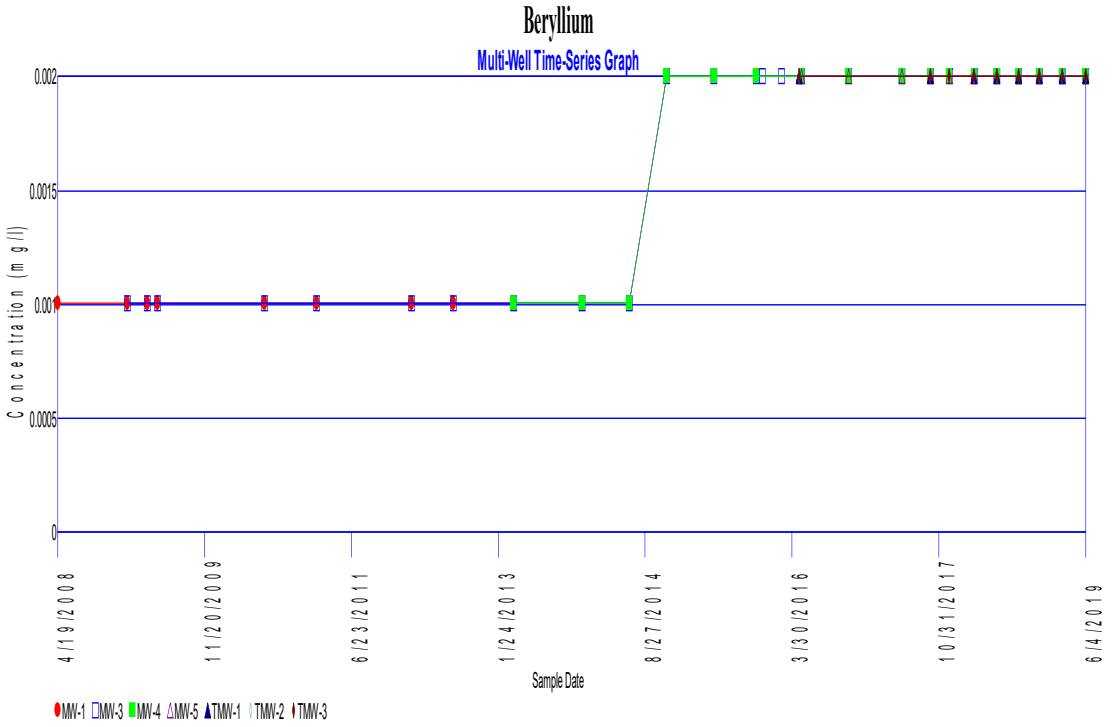


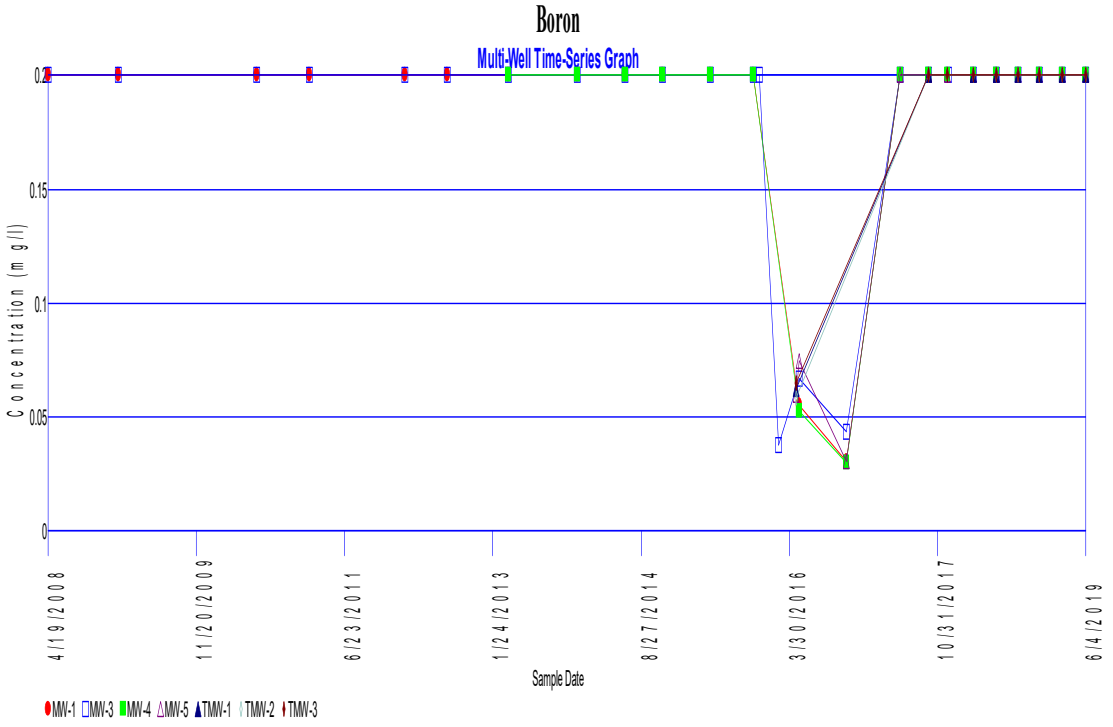
Arsenic



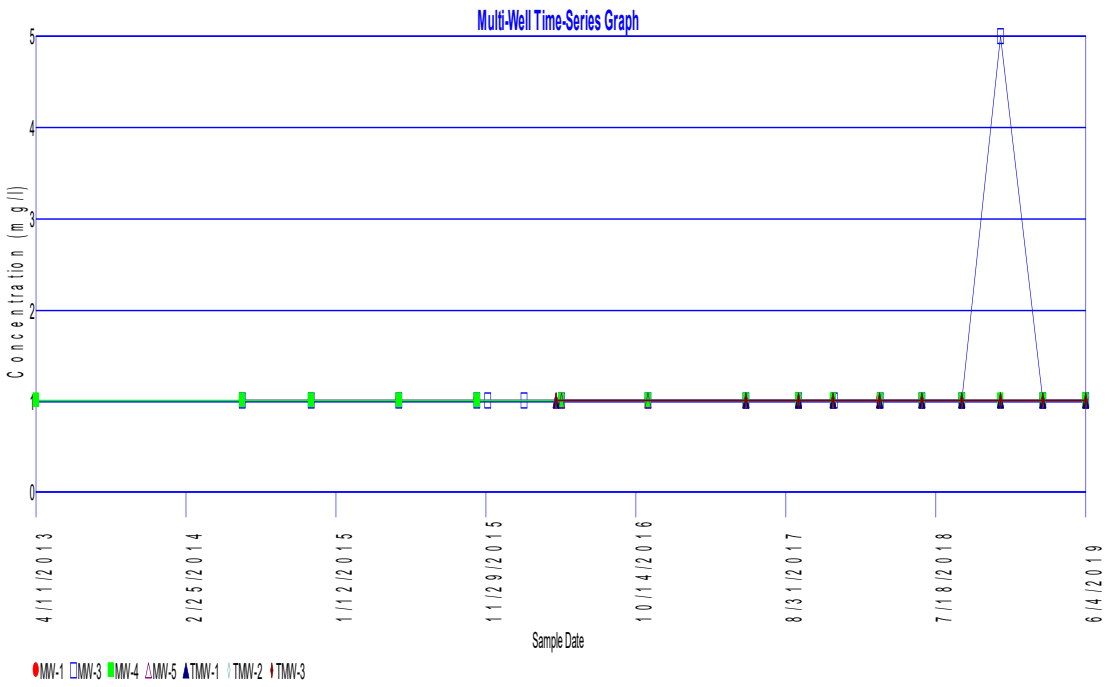
Barium



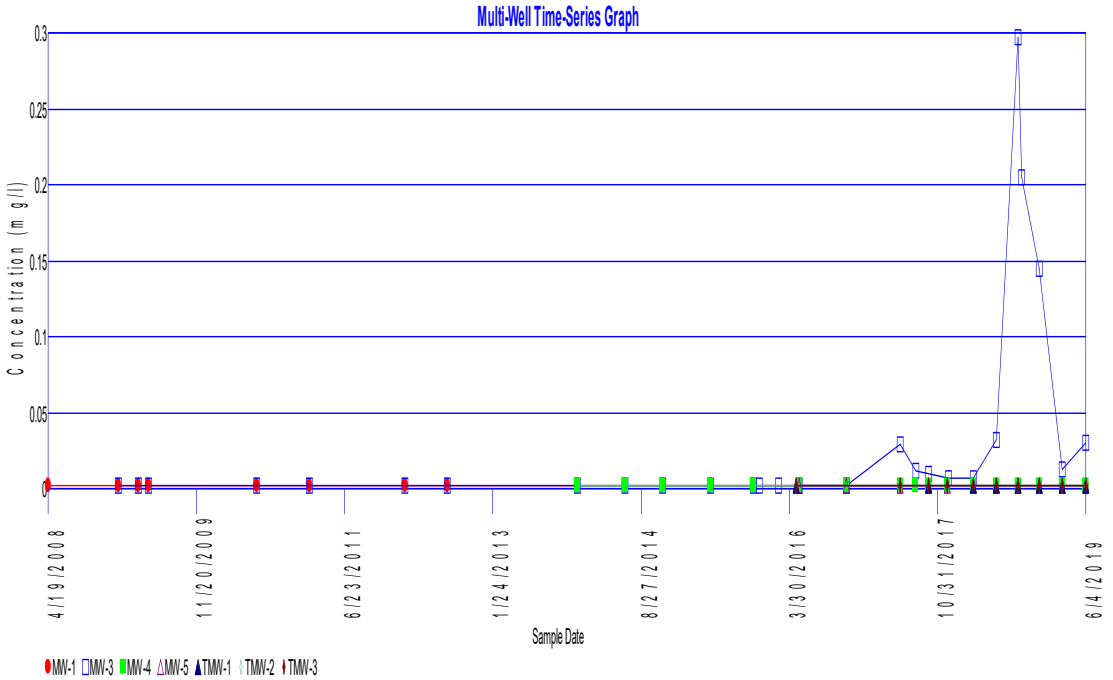

Beryllium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Boron
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

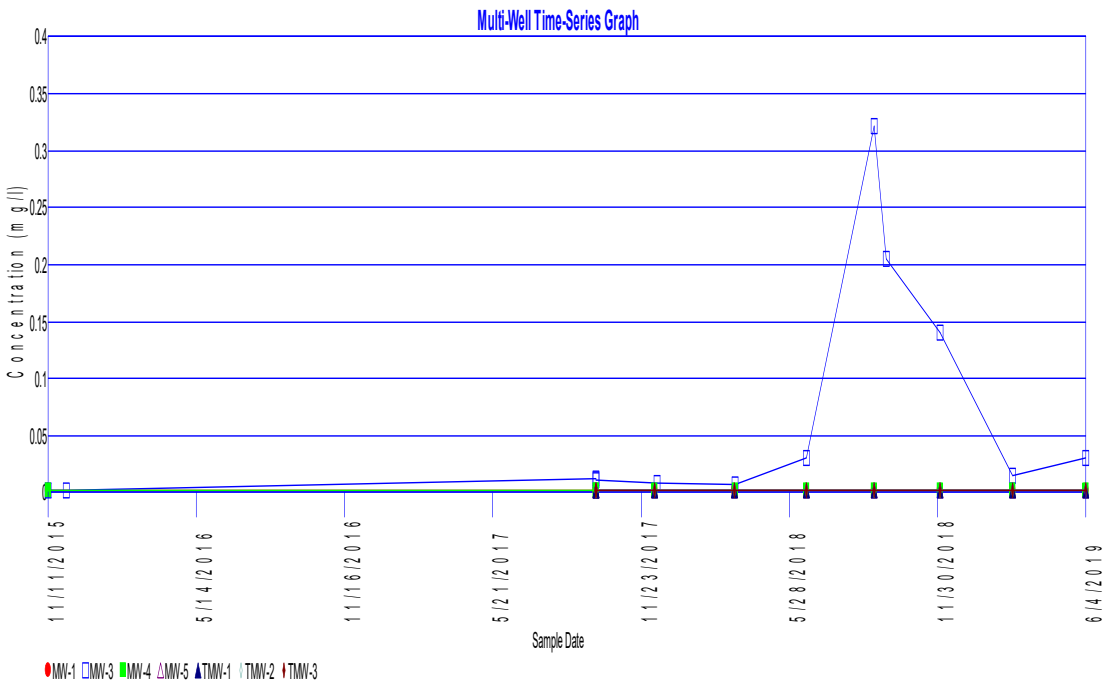
Bromide



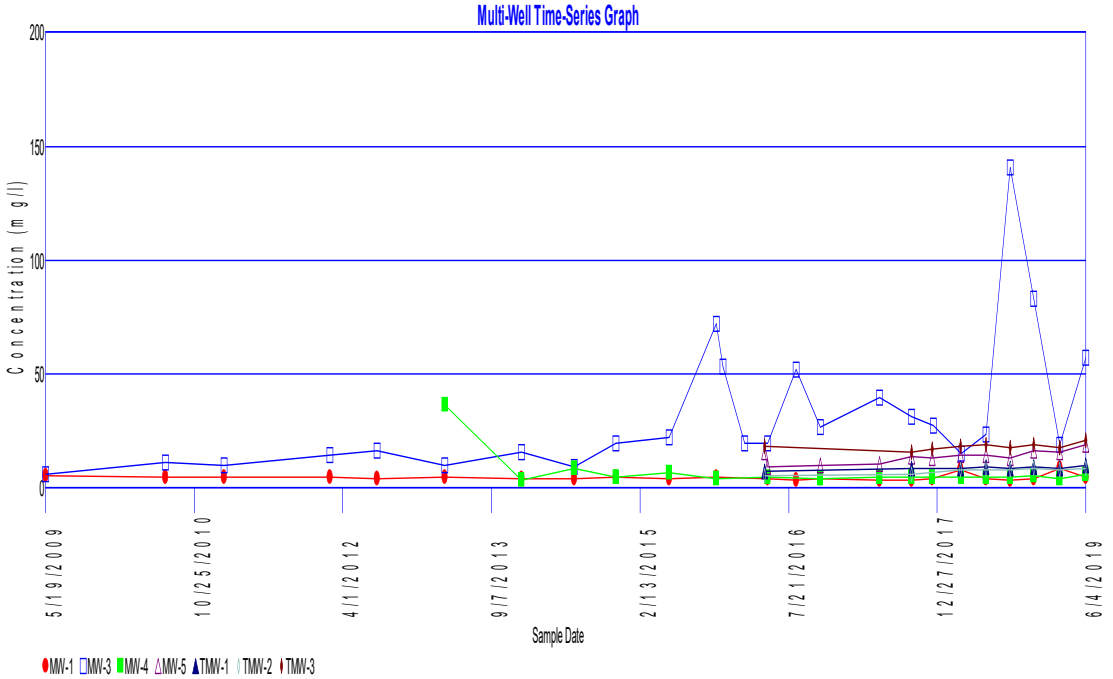
Total Cadmium



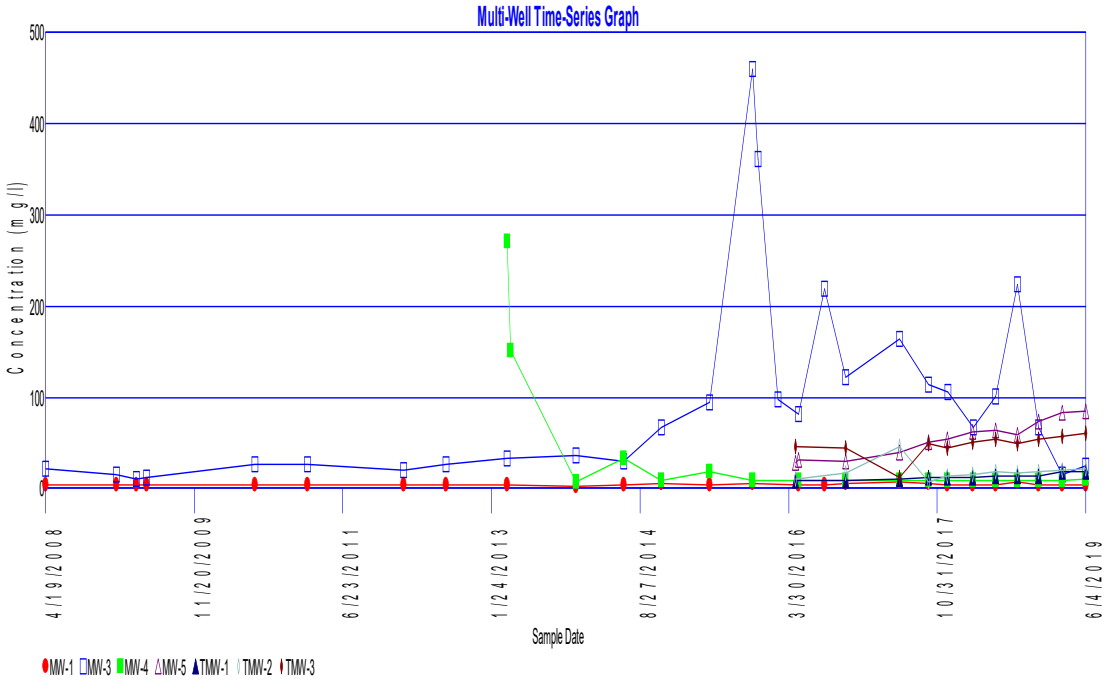
Cadmium,Dissolved



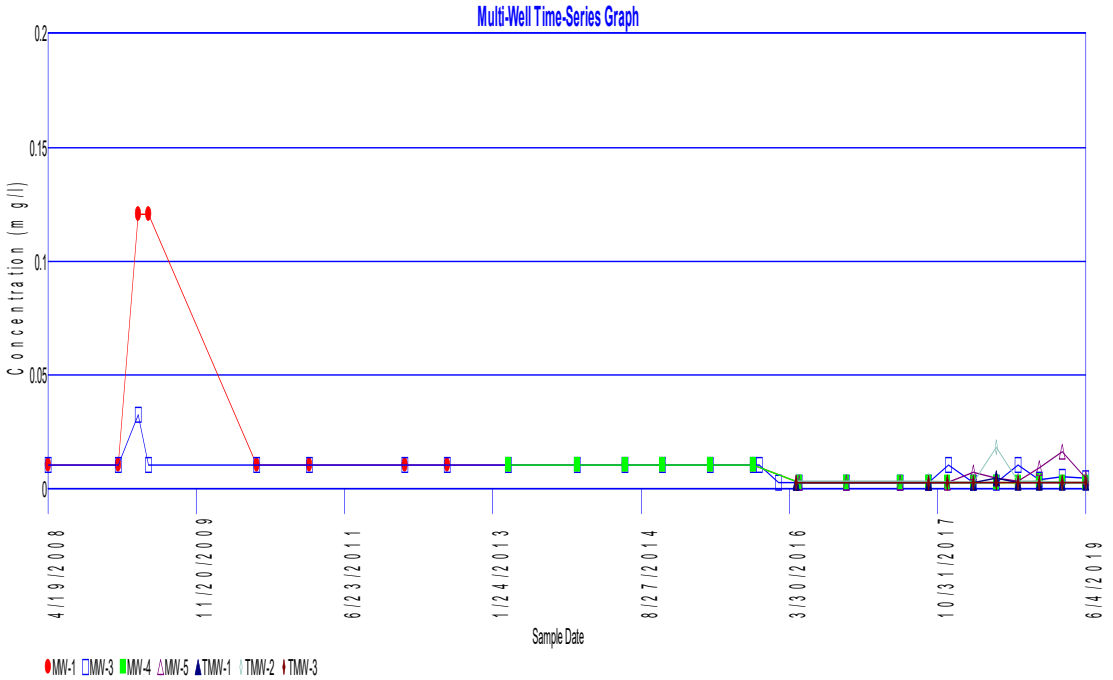
Calcium



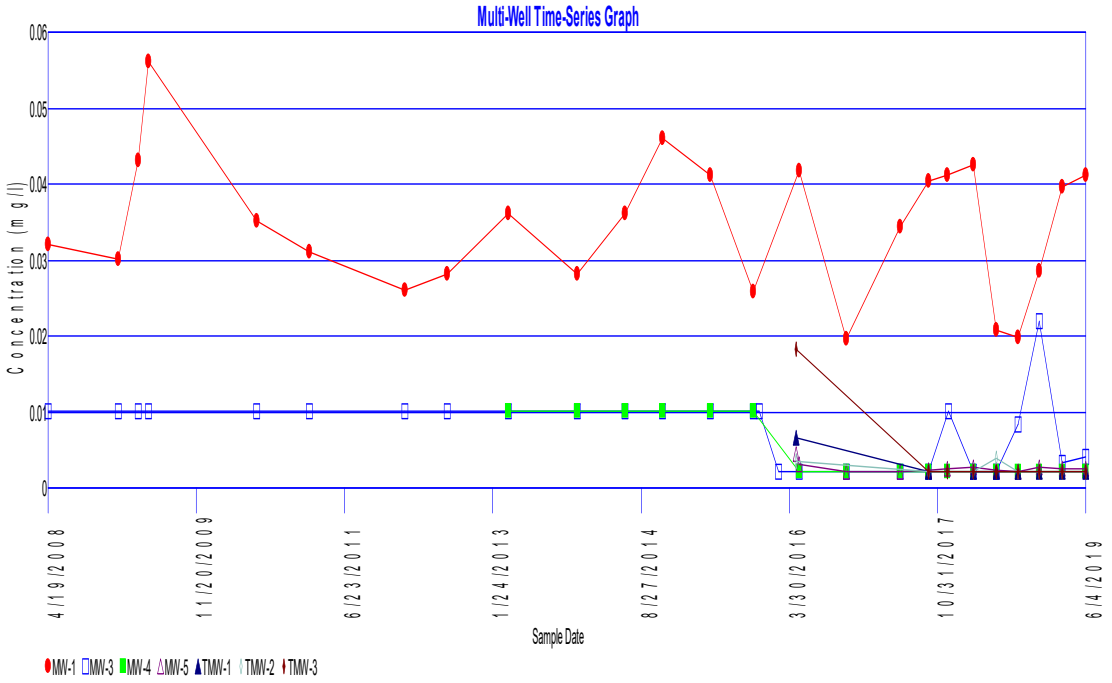
Chloride



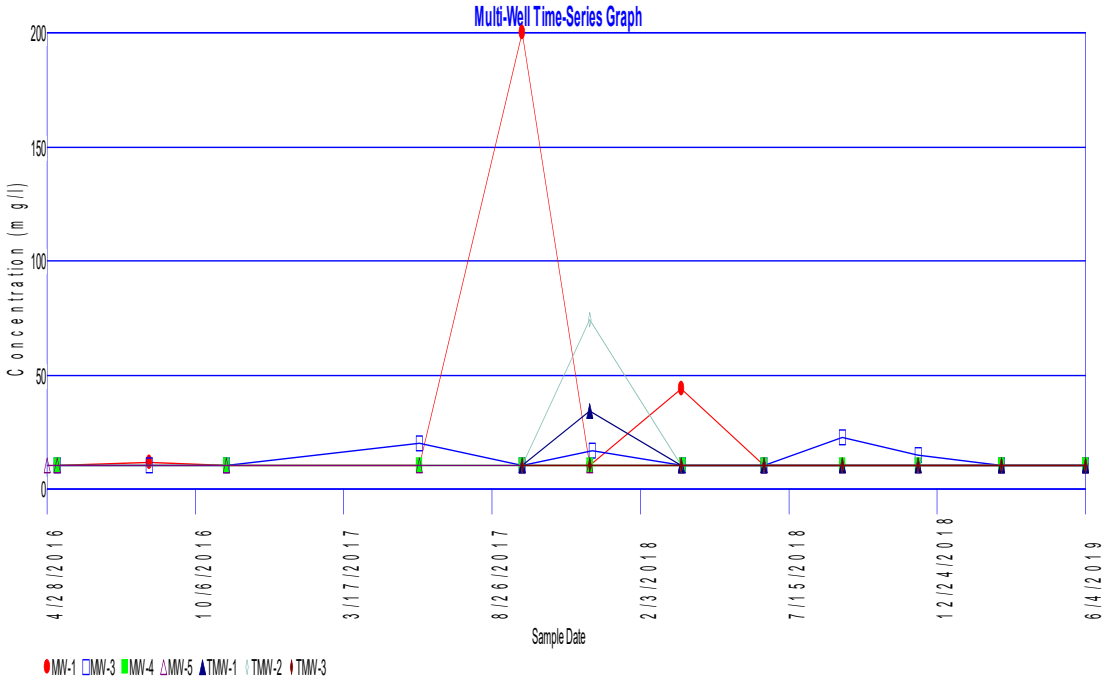
Chromium



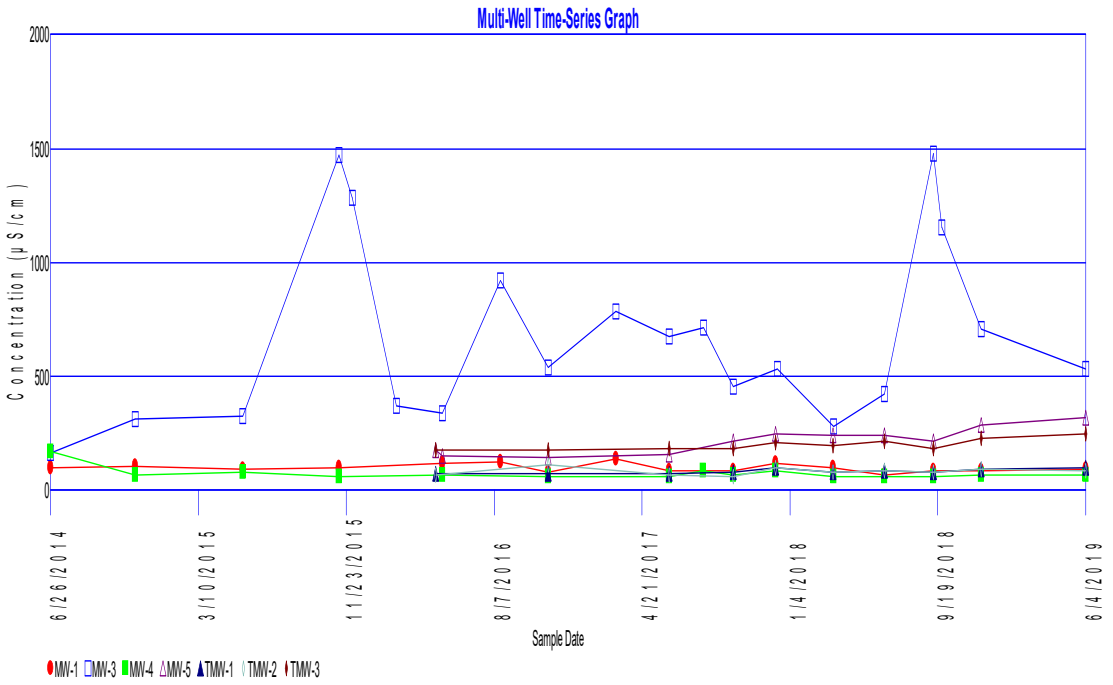
Cobalt


Multi-Well Time-Series Graph
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

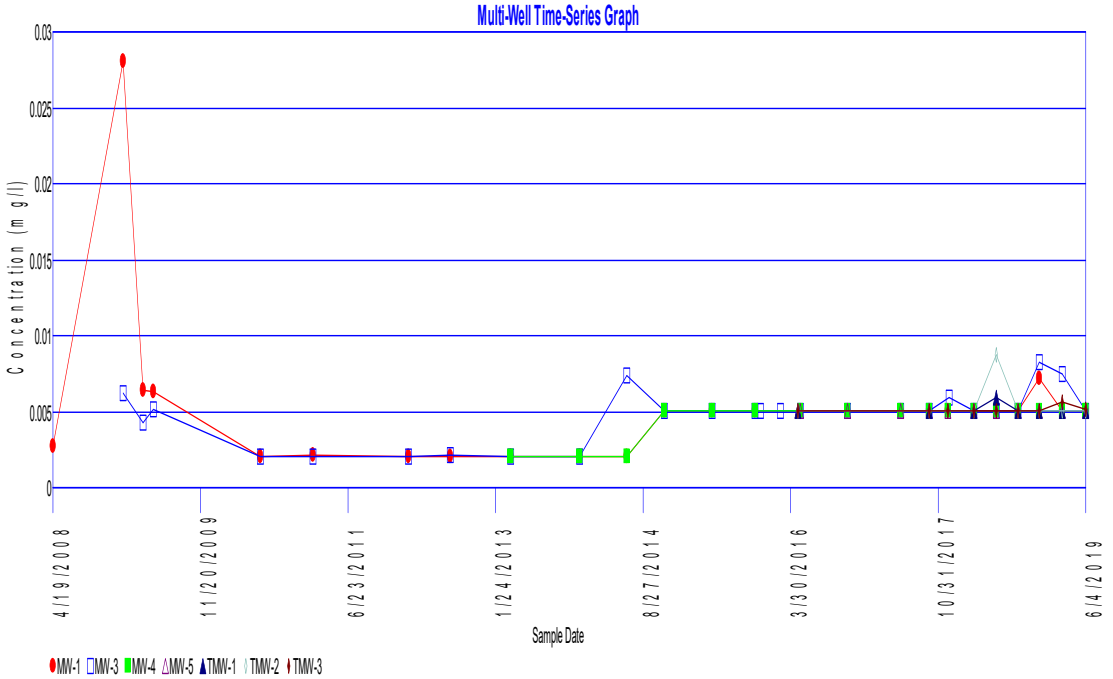
COD


Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
4/28/2016
10/6/2016
3/17/2017
8/26/2017
2/3/2018
7/15/2018
12/24/2018
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

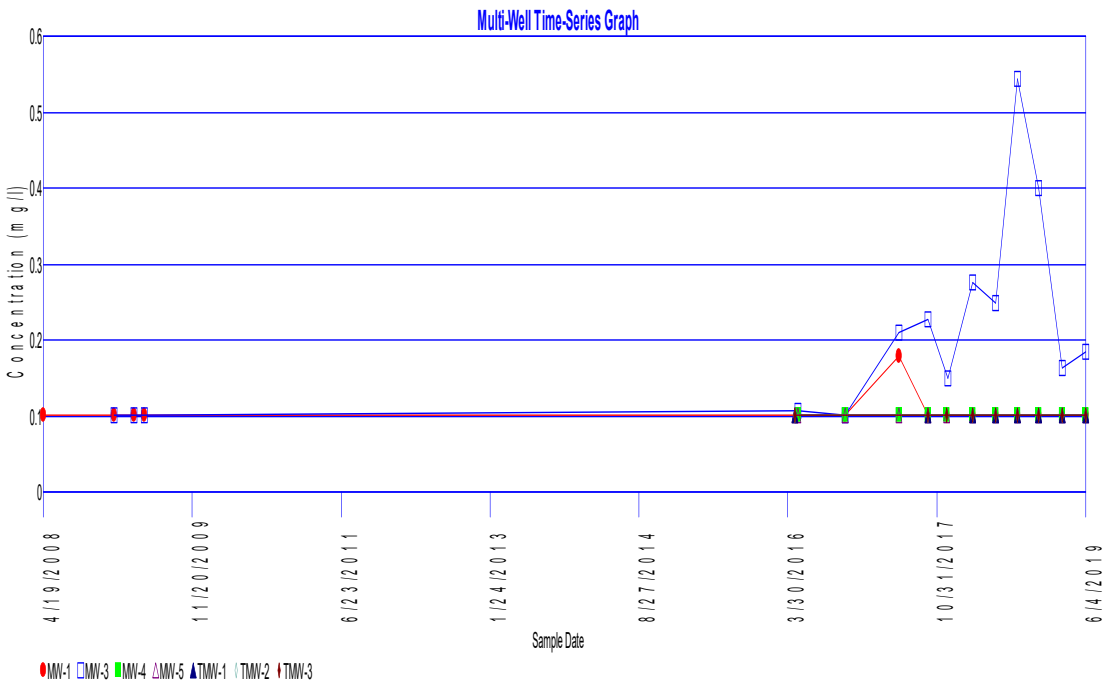
Conductivity



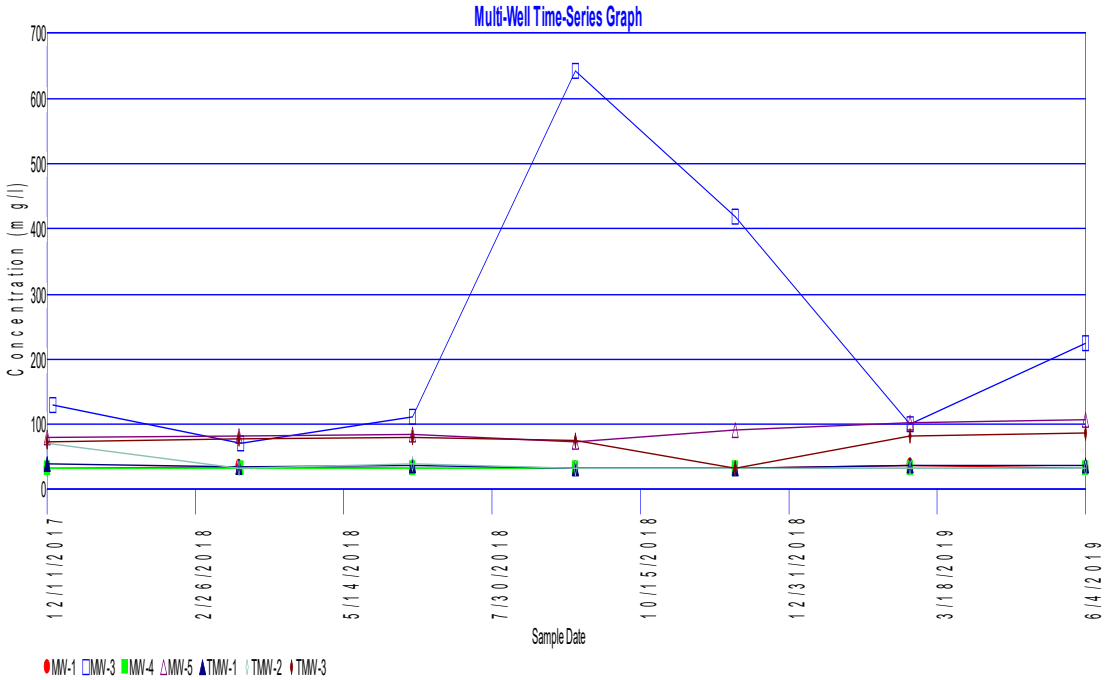
Copper



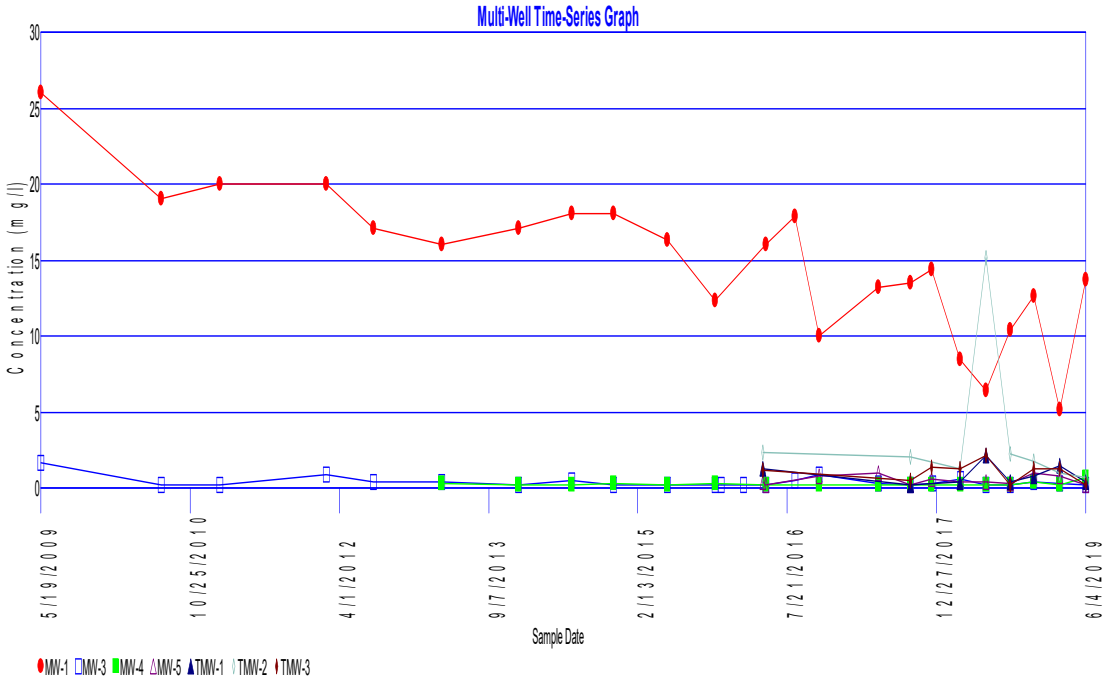
Fluoride



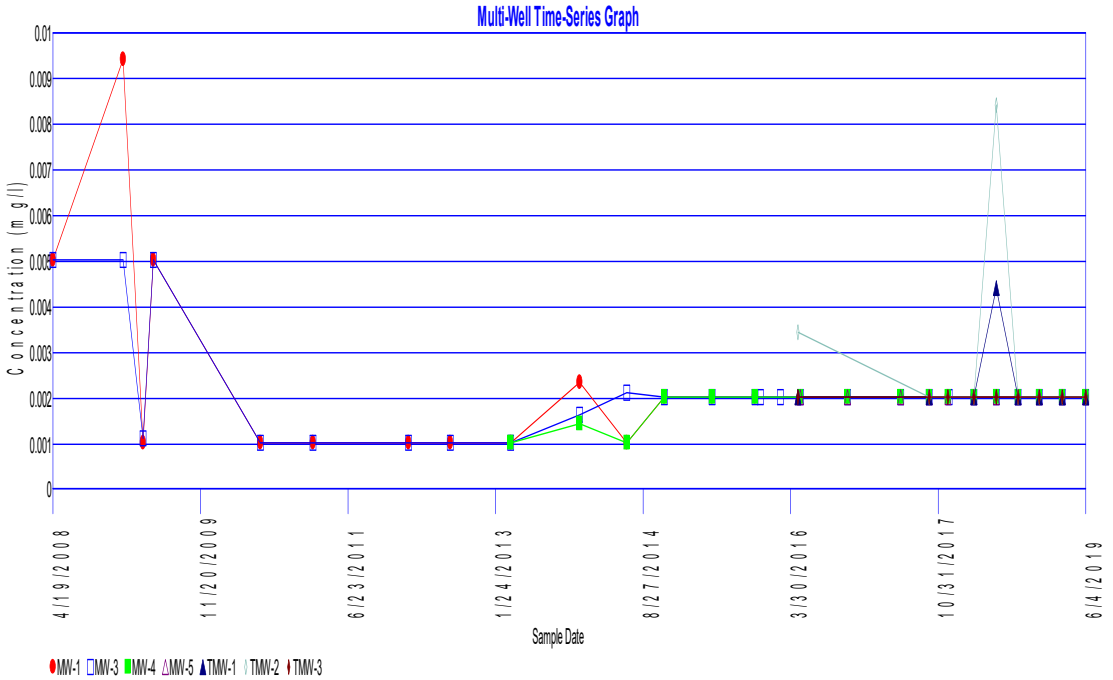
Hardness



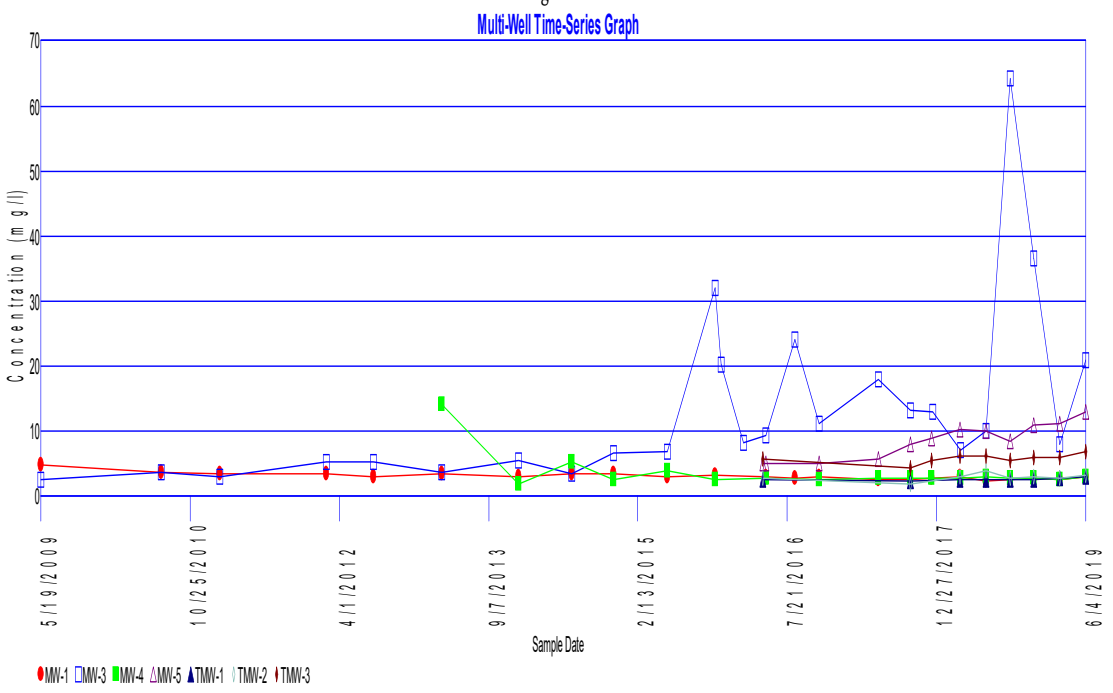
Iron


Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
5/19/2009
10/25/2010
4/1/2012
9/7/2013
2/13/2015
7/21/2016
12/27/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

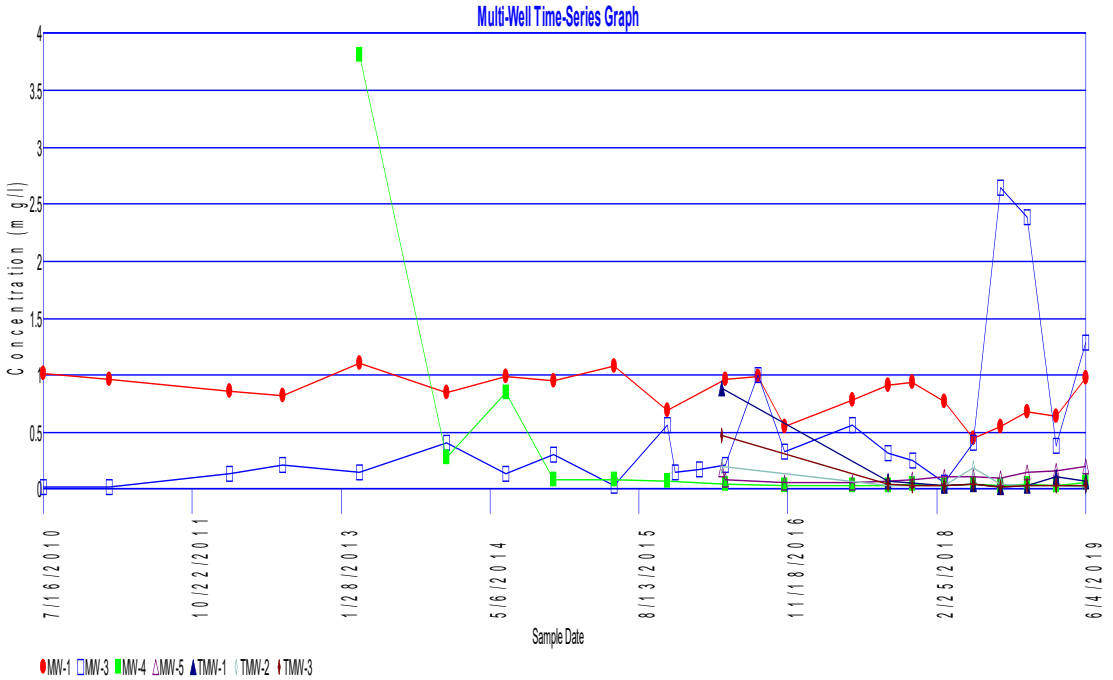
Lead


Multi-Well Time-Series Graph
Concentration (mg/l)
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

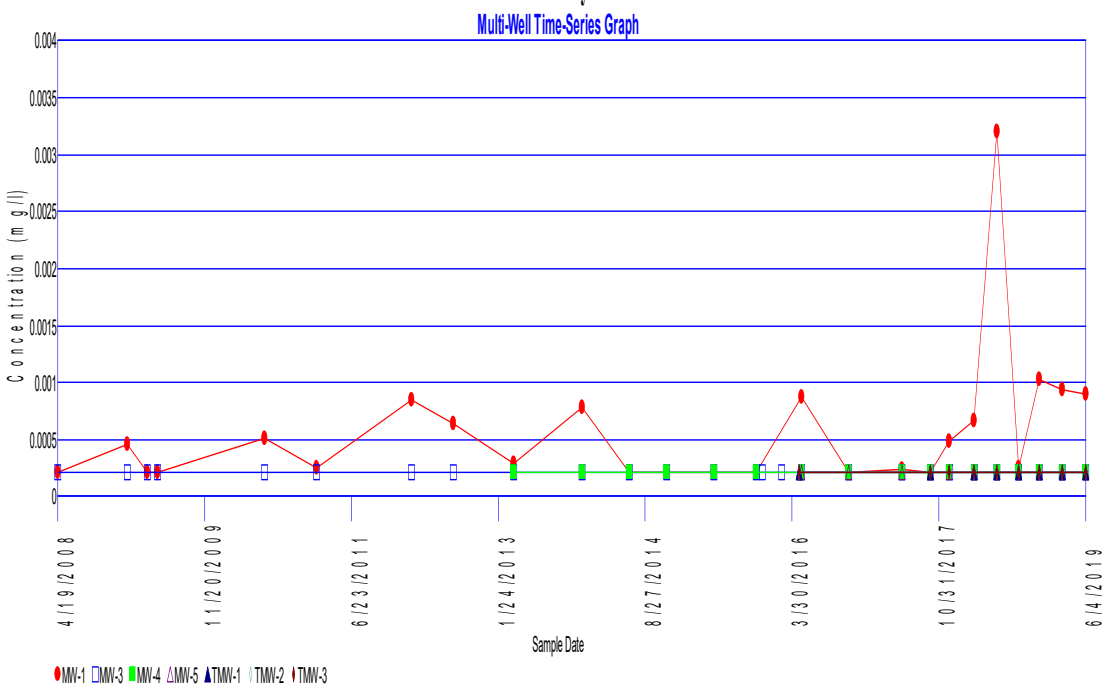
Magnesium



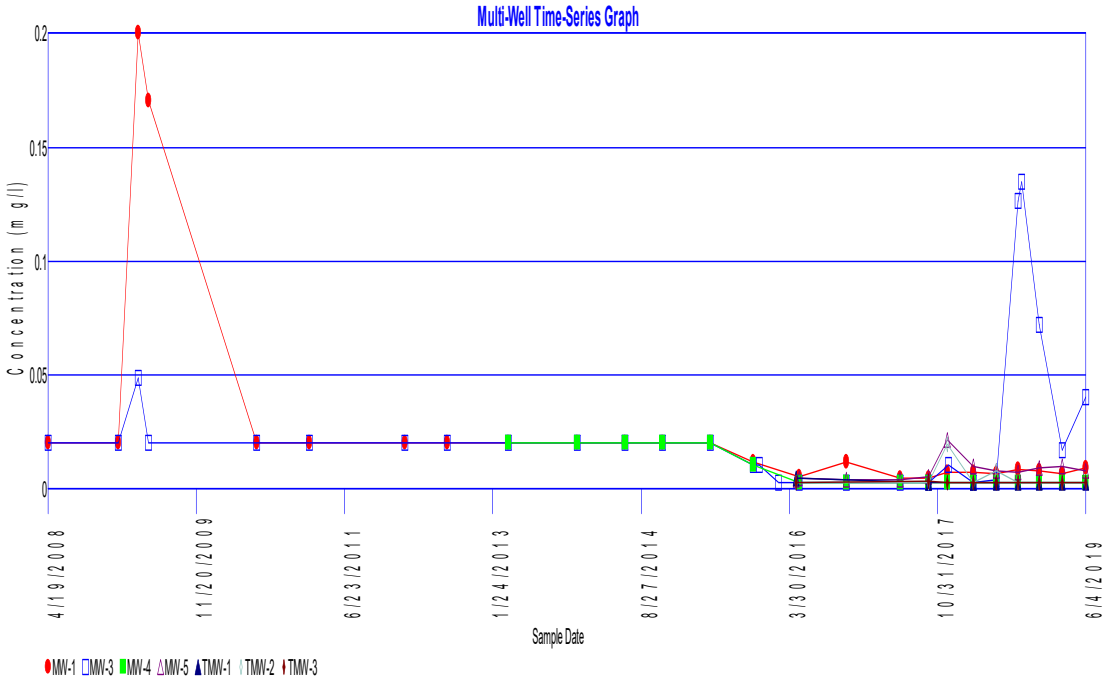
Manganese



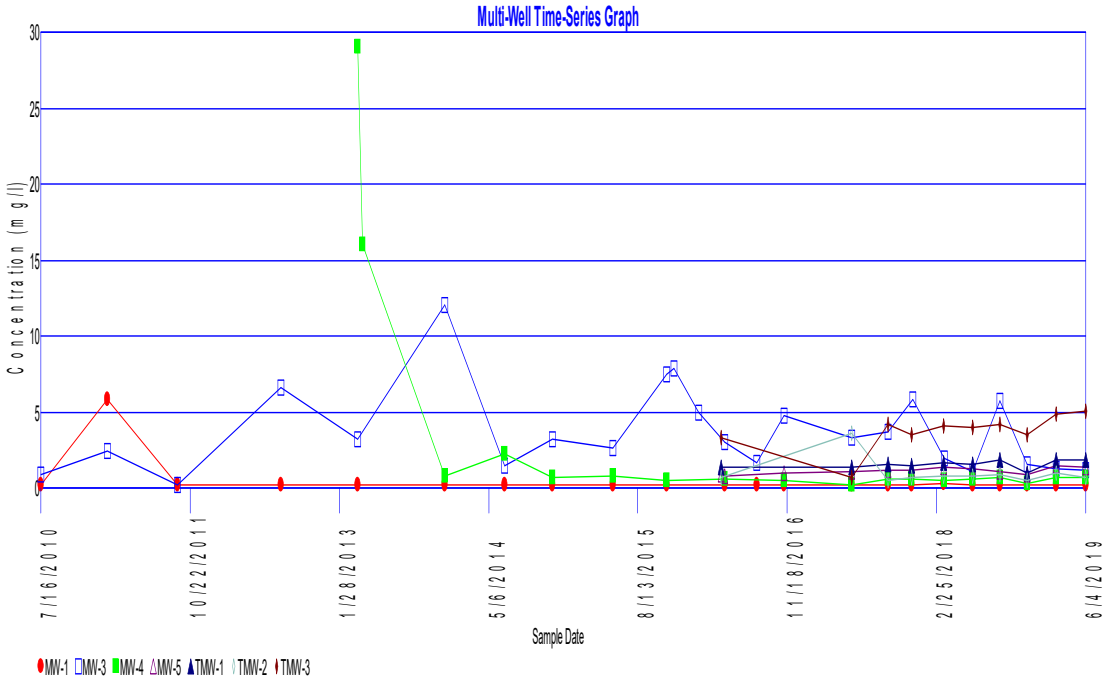
Mercury



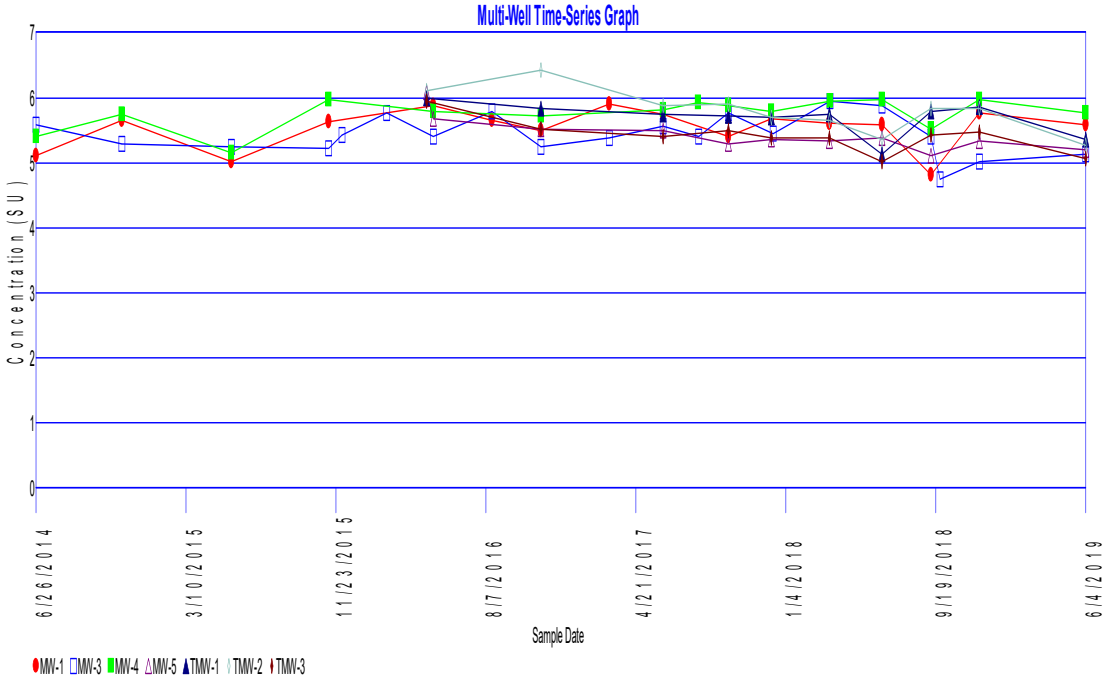
Nickel



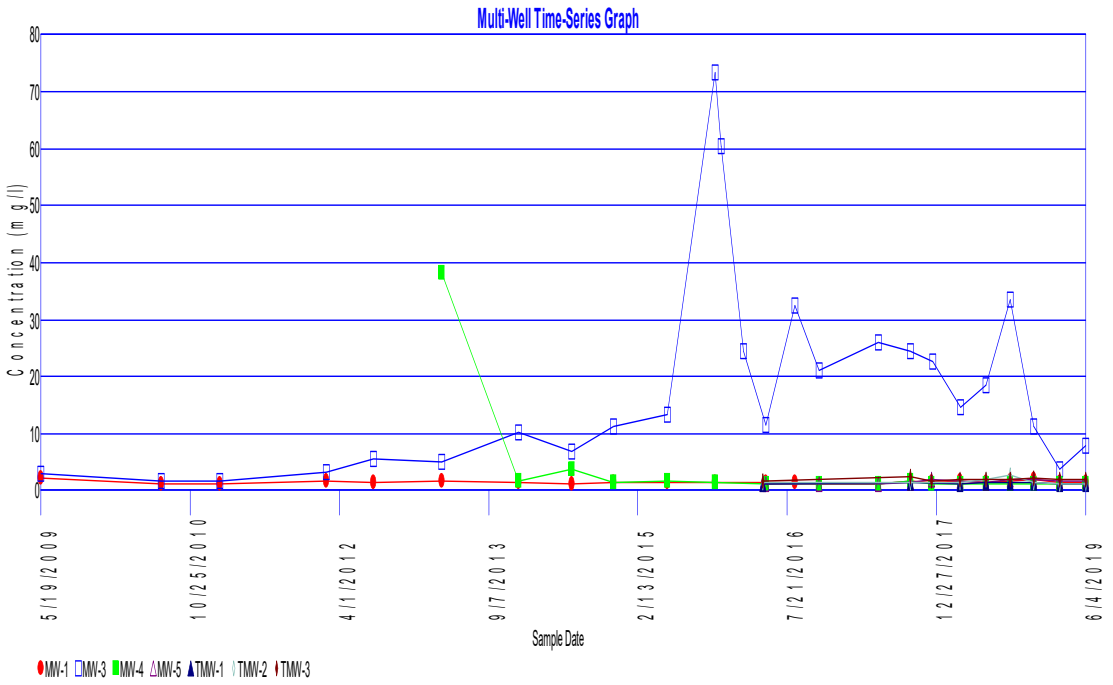
Nitrate


Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
7/16/2010
10/22/2011
1/28/2013
5/6/2014
8/13/2015
11/18/2016
2/25/2018
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

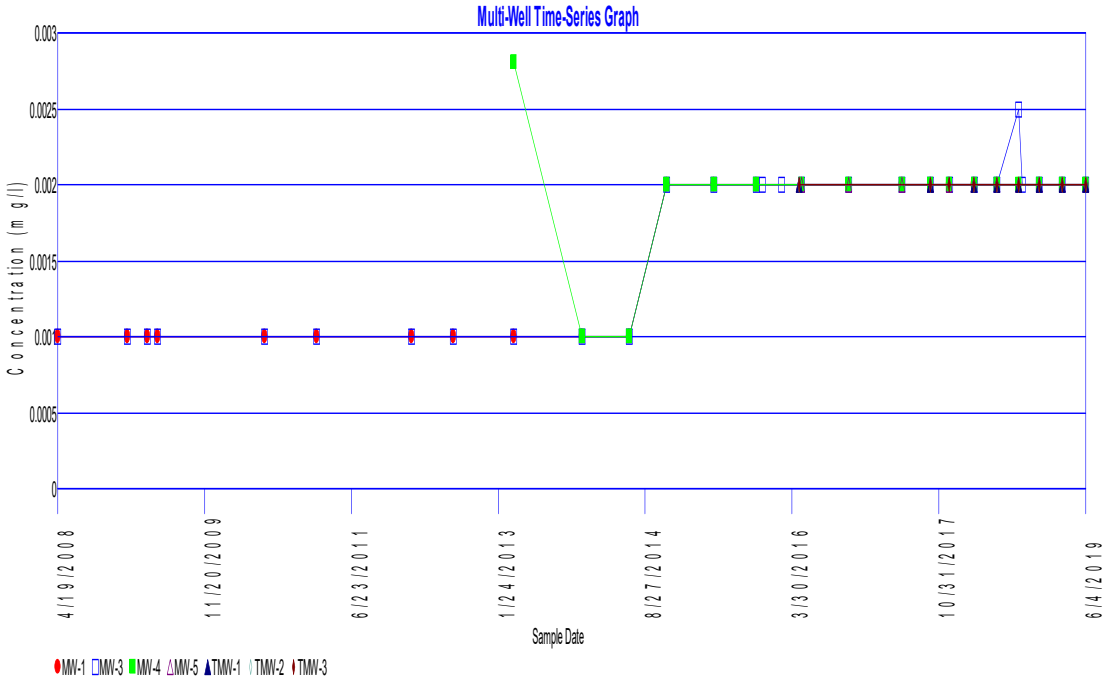
pH

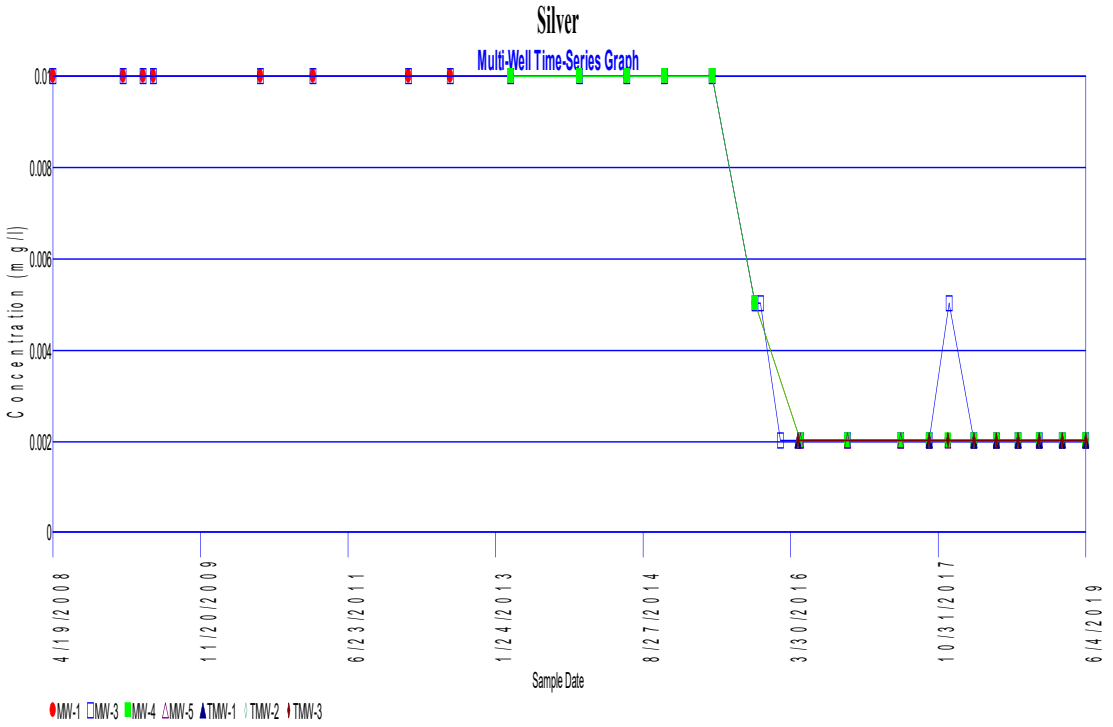

Multi-Well Time-Series Graph
Concentration (SU)
7
6
5
4
3
2
1
0
6/26/2014
3/10/2015
11/23/2015
8/7/2016
4/21/2017
1/4/2018
9/19/2018
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

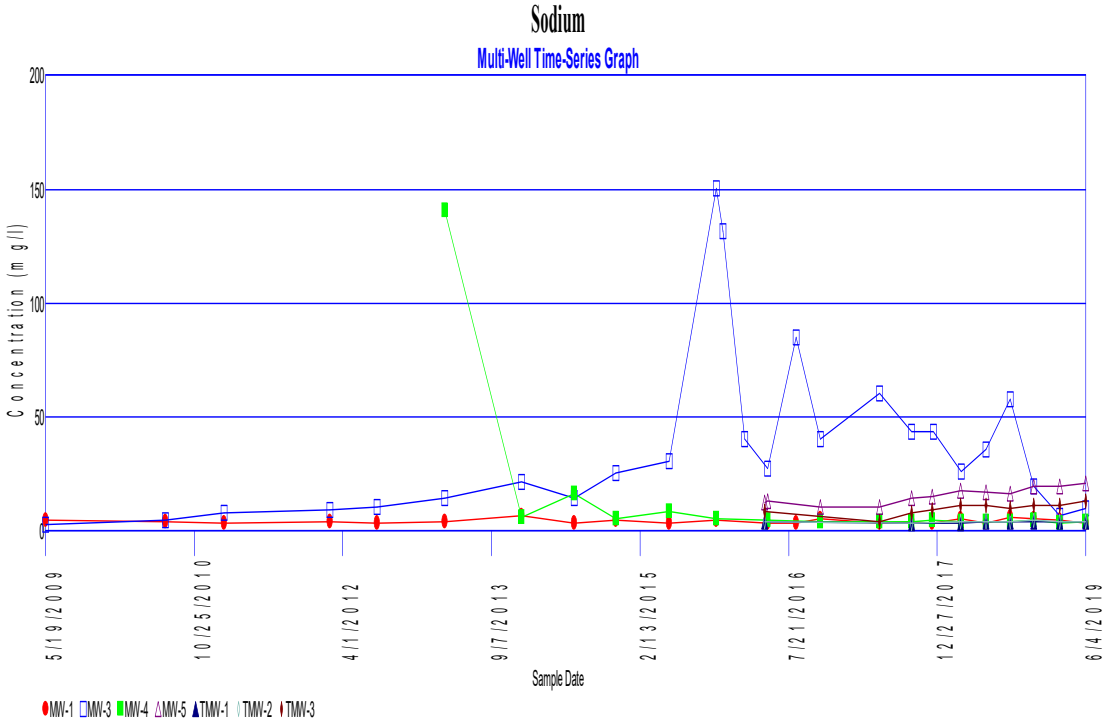
Potassium



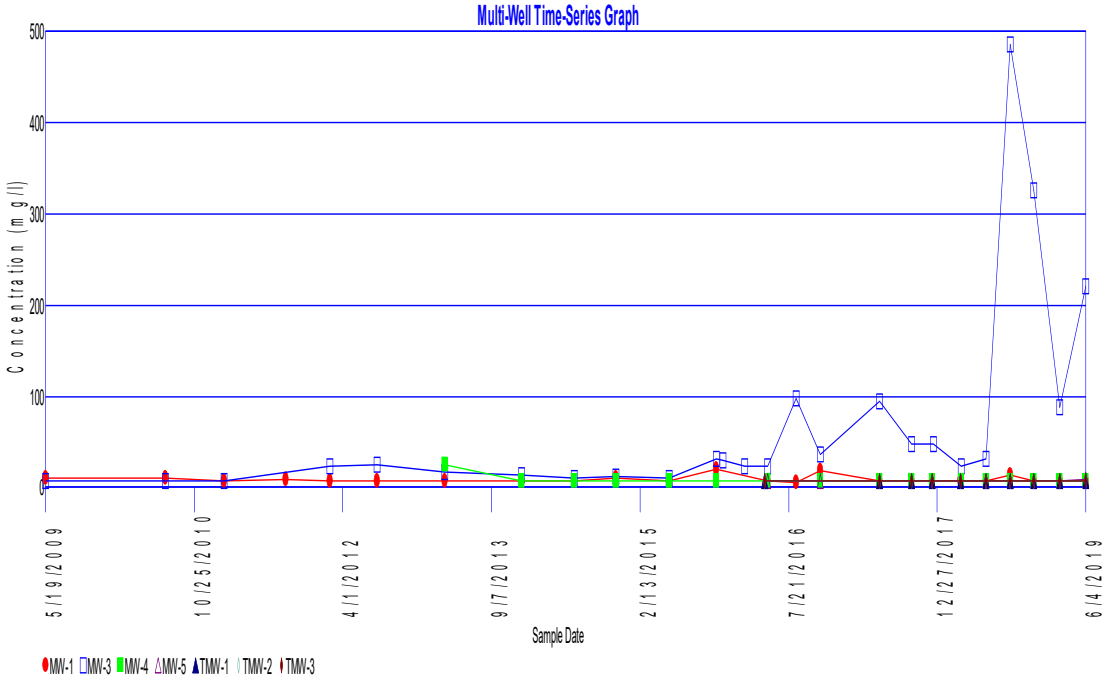
Selenium



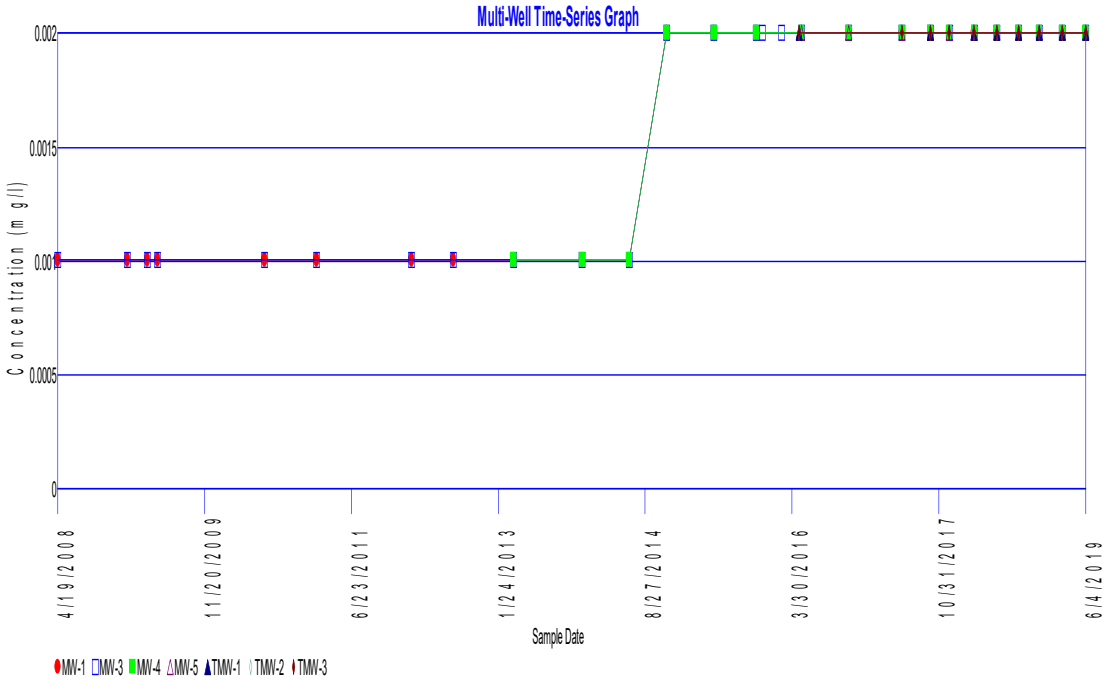

Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Sodium
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
10/25/2010
4/1/2012
9/7/2013
2/13/2015
7/21/2016
12/27/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

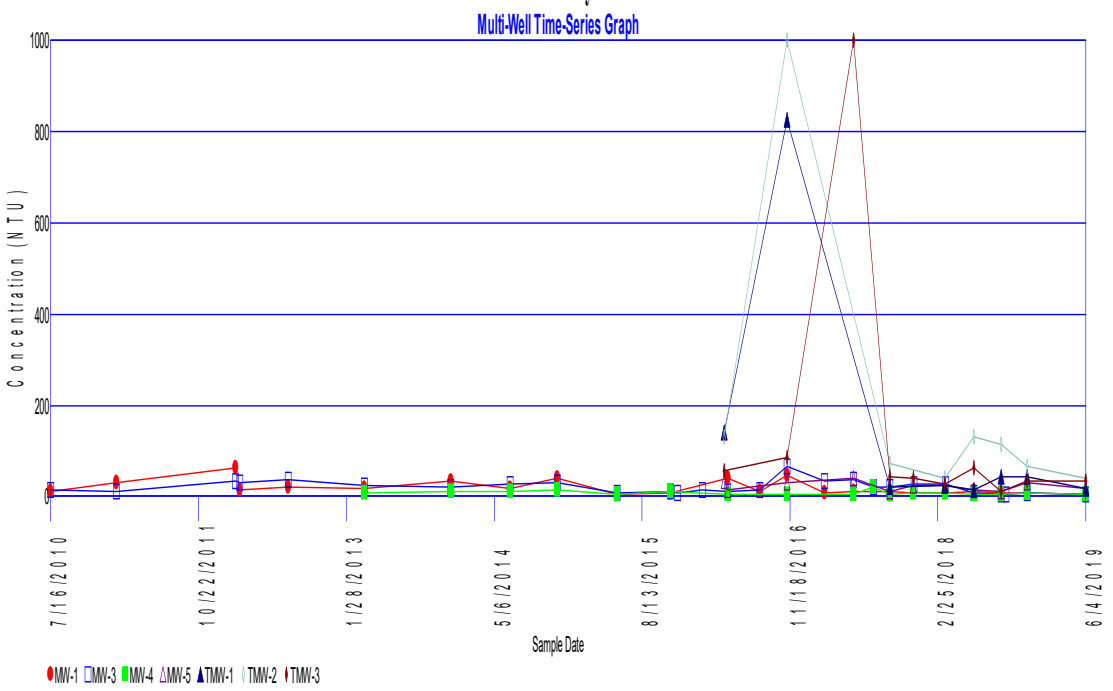
Sulfate



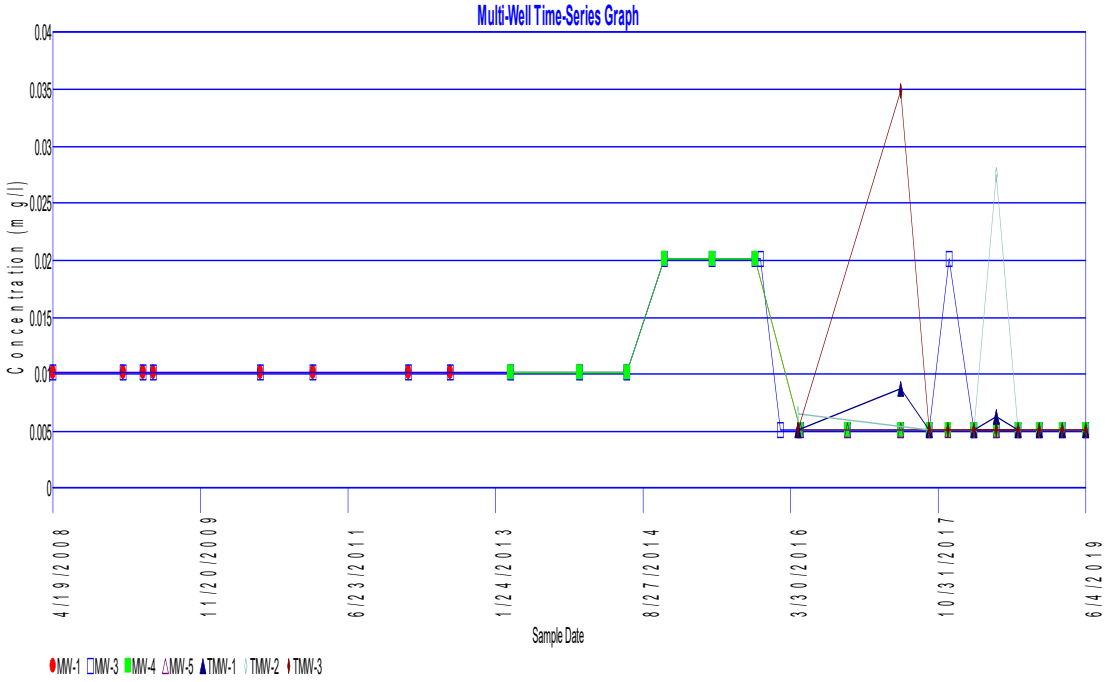
Thallium



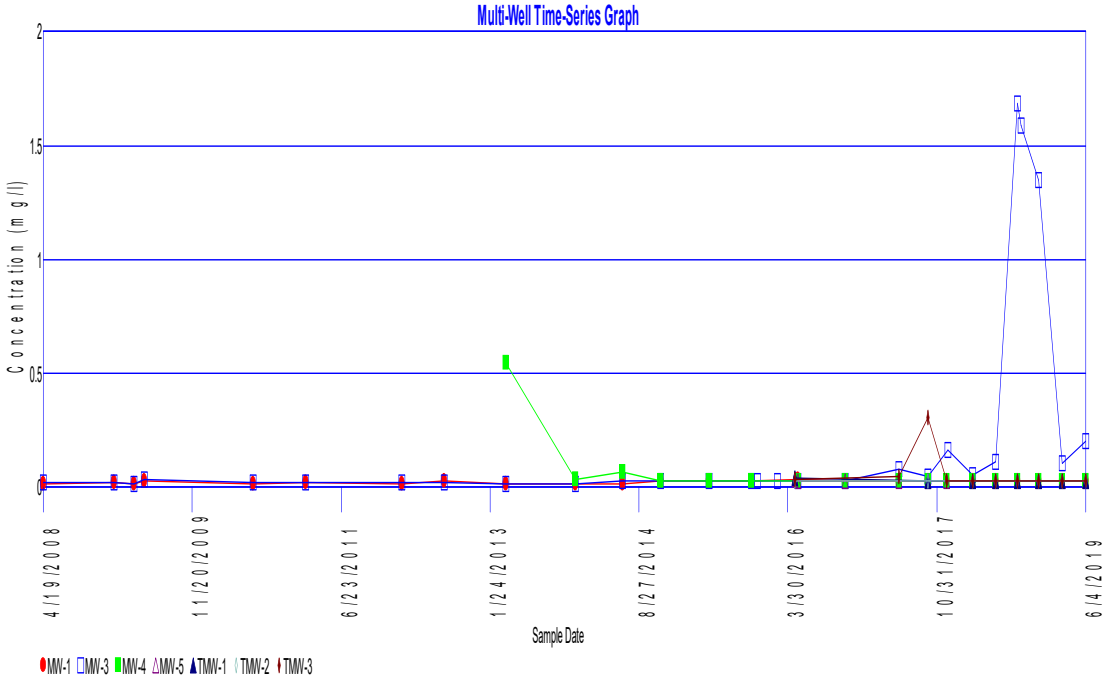
Turbidity



Vanadium



Zinc


Multi-Well Time-Series Graph
2
1.5
1
0.5
0
Concentration (mg/l)
4/19/2008
11/20/2009
6/23/2011
1/24/2013
8/27/2014
3/30/2016
10/31/2017
6/4/2019
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

Shapiro-Wilks Test of Normality

Parameter: Arsenic
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 12 for 25 measurements

Sum of b values = 0.135419
Sample Standard Deviation = 0.0283836
W Statistic = 0.948452

5% Critical value of 0.918 is less than 0.948452
Data is normally distributed at 95% level of significance

1% Critical value of 0.888 is less than 0.948452
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 12 for 25 measurements

Sum of b values = 0.0442108
Sample Standard Deviation = 0.0133299
W Statistic = 0.458344

5% Critical value of 0.918 exceeds 0.458344
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.458344
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 13 for 26 measurements

Sum of b values = 5.00266
Sample Standard Deviation = 1.09271
W Statistic = 0.838403

5% Critical value of 0.92 exceeds 0.838403
Evidence of non-normality at 95% level of significance

1% Critical value of 0.891 exceeds 0.838403
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cobalt
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 12 for 25 measurements

Sum of b values = 0.0429824
Sample Standard Deviation = 0.00893705
W Statistic = 0.963791

5% Critical value of 0.918 is less than 0.963791
Data is normally distributed at 95% level of significance

1% Critical value of 0.888 is less than 0.963791
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Nickel
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 12 for 25 measurements

Sum of b values = 0.15442
Sample Standard Deviation = 0.0481627
W Statistic = 0.428325

5% Critical value of 0.918 exceeds 0.428325
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.428325
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Mercury
Location: MW-1
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 12 for 25 measurements

Sum of b values = 0.00231375
Sample Standard Deviation = 0.000617865
W Statistic = 0.584297

5% Critical value of 0.918 exceeds 0.584297
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.584297
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
Location: MW-1
Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 12 for 25 measurements

Sum of b values = 1.38167
Sample Standard Deviation = 0.337982
W Statistic = 0.696323

5% Critical value of 0.918 exceeds 0.696323
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.696323
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride
Location: MW-1
Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 13 for 26 measurements

Sum of b values = 1.68228
Sample Standard Deviation = 0.35121
W Statistic = 0.91775

5% Critical value of 0.92 exceeds 0.91775
Evidence of non-normality at 95% level of significance

1% Critical value of 0.891 is less than 0.91775
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Mercury

Location: MW-1

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 12 for 25 measurements

Sum of b values = 4.70054
Sample Standard Deviation = 1.02723
W Statistic = 0.872464

5% Critical value of 0.918 exceeds 0.872464
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.872464
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Nickel

Location: MW-1

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 12 for 25 measurements

Sum of b values = 3.41412
Sample Standard Deviation = 0.906368
W Statistic = 0.591205

5% Critical value of 0.918 exceeds 0.591205
Evidence of non-normality at 95% level of significance

1% Critical value of 0.888 exceeds 0.591205
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	0.024
	1/21/2009	0.072
	4/9/2009	0.067
	5/19/2009	0.064
	7/16/2010	0.074
	2/8/2011	0.086
	2/17/2012	0.093
	7/31/2012	0.089
	3/27/2013	0.049
	12/23/2013	0.1
	6/26/2014	0.063
	11/21/2014	0.059
	5/28/2015	0.0604
	11/11/2015	0.0469
	5/9/2016	0.05
	11/10/2016	0.0286
	6/8/2017	0.0571
	9/28/2017	0.0199
	12/11/2017	0.0573
	3/21/2018	0.0101
	6/19/2018	0.0063
	9/12/2018	0.0184
	12/4/2018	0.0254
	3/5/2019	0.00449

From 24 baseline samples
Baseline mean = 0.0510371
Baseline std Dev = 0.0282644

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 24 (background observations) - 1
t(0.99, 23) = 2.49987

Date	Samples	Mean	Interval	Significant
6/4/2019	1	0.0194	[0, 0.123152]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Cobalt

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	0.032
	1/21/2009	0.03
	4/9/2009	0.043
	5/19/2009	0.056
	7/16/2010	0.035
	2/8/2011	0.031
	2/17/2012	0.026
	7/31/2012	0.028
	3/27/2013	0.036
	12/23/2013	0.028
	6/26/2014	0.036
	11/21/2014	0.046
	5/28/2015	0.041
	11/11/2015	0.0257
	5/9/2016	0.0417
	11/10/2016	0.0196
	6/8/2017	0.0342
	9/28/2017	0.0403
	12/11/2017	0.0411
	3/21/2018	0.0425
	6/19/2018	0.0206
	9/12/2018	0.0198
	12/4/2018	0.0284
	3/5/2019	0.0395

From 24 baseline samples
Baseline mean = 0.034225
Baseline std Dev = 0.00902057

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 24 (background observations) - 1
t(0.99, 23) = 2.49987

Date	Samples	Mean	Interval	Significant
6/4/2019	1	0.0411	[0, 0.0572403]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Chloride

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	0.693147
	1/21/2009	1.06471
	4/9/2009	0.641854
	5/19/2009	1.02962
	7/16/2010	1.02962
	2/8/2011	0.955511
	2/17/2012	0.741937
	7/31/2012	0.788457
	3/27/2013	0.587787
	12/23/2013	0.405465
	6/26/2014	1.06471
	11/21/2014	1.36098
	5/28/2015	0.698135
	11/11/2015	1.37877
	5/9/2016	0.751416
	8/18/2016	0.875469
	11/10/2016	1.52388
	6/8/2017	1.73695
	9/28/2017	1.41342
	12/11/2017	0.837248
	3/21/2018	0.741937
	6/19/2018	0.806476
	9/12/2018	1.59737
	12/4/2018	0.512824
	3/5/2019	0.746688

From 25 baseline samples
Baseline mean = 0.959375
Baseline std Dev = 0.356345

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 25 (background observations) - 1
t(0.99, 24) = 2.49216

Date	Samples	Mean	Interval	Significant
6/4/2019	1	0.765468	[0, 1.86503]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Barium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 24
Maximum Baseline Concentration = 0.084
Confidence Level = 96%
False Positive Rate = 4%

Baseline Measurem	Date	Value
	4/19/2008	0.084
	1/21/2009	0.028
	4/9/2009	0.028
	5/19/2009	0.033
	7/16/2010	0.021
	2/8/2011	0.021
	2/17/2012	0.022
	7/31/2012	0.019
	3/27/2013	0.018
	12/23/2013	0.017
	6/26/2014	0.018
	11/21/2014	0.02
	5/28/2015	0.0188
	11/11/2015	0.0237
	5/9/2016	0.02
	11/10/2016	0.0207
	6/8/2017	0.0146
	9/28/2017	0.0175
	12/11/2017	0.0166
	3/21/2018	0.0212
	6/19/2018	0.0163
	9/12/2018	0.0186
	12/4/2018	0.0199
	3/5/2019	0.0184

Date	Count	Mean	Significant
6/4/2019	1	0.0219	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 24
Maximum Baseline Concentration = 5.68
Confidence Level = 96%
False Positive Rate = 4%

Baseline Measurem	Date	Value
	4/19/2008	2
	1/21/2009	2.9
	4/9/2009	1.9
	5/19/2009	2.8
	7/16/2010	2.8
	2/8/2011	2.6
	2/17/2012	2.1
	7/31/2012	2.2
	3/27/2013	1.8
	12/23/2013	1.5
	6/26/2014	2.9
	11/21/2014	3.9
	5/28/2015	2.01
	11/11/2015	3.97
	5/9/2016	2.12
	8/18/2016	2.4
	11/10/2016	4.59
	6/8/2017	5.68
	9/28/2017	4.11
	12/11/2017	2.31
	3/21/2018	2.1
	6/19/2018	2.24
	9/12/2018	4.94
	12/4/2018	1.67

Date	Count	Mean	Significant
6/4/2019	1	2.15	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Mercury

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 37.5%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 24
Maximum Baseline Concentration = 0.00319
Confidence Level = 96%
False Positive Rate = 4%

Baseline Measurem	Date	Value
	4/19/2008	ND<0.0002
	1/21/2009	0.00045
	4/9/2009	ND<0.0002
	5/19/2009	ND<0.0002
	7/16/2010	0.0005
	2/8/2011	0.00024
	2/17/2012	0.00083
	7/31/2012	0.00063
	3/27/2013	0.00028
	12/23/2013	0.00077
	6/26/2014	ND<0.0002
	11/21/2014	ND<0.0002
	5/28/2015	ND<0.0002
	11/11/2015	ND<0.0002
	5/9/2016	0.000858
	11/10/2016	ND<0.0002
	6/8/2017	0.000222
	9/28/2017	ND<0.0002
	12/11/2017	0.000473
	3/21/2018	0.000651
	6/19/2018	0.00319
	9/12/2018	0.000244
	12/4/2018	0.00101
	3/5/2019	0.000922

Date	Count	Mean	Significant
6/4/2019	1	0.000889	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Nickel

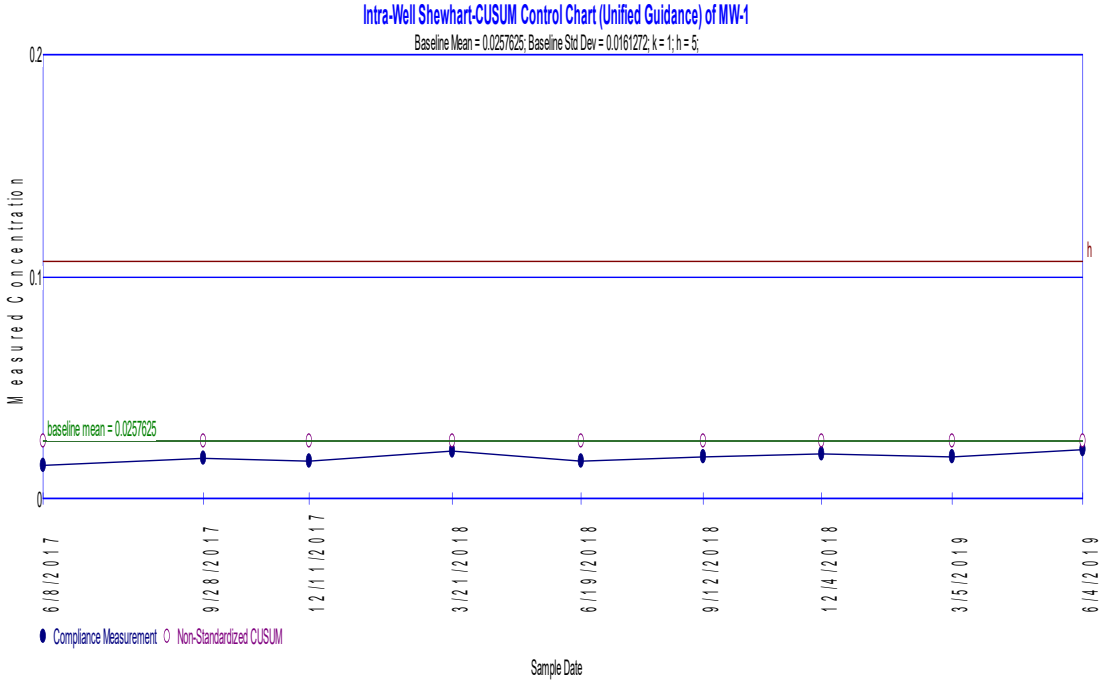
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 45.8333%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 24
Maximum Baseline Concentration = 0.2
Confidence Level = 96%
False Positive Rate = 4%

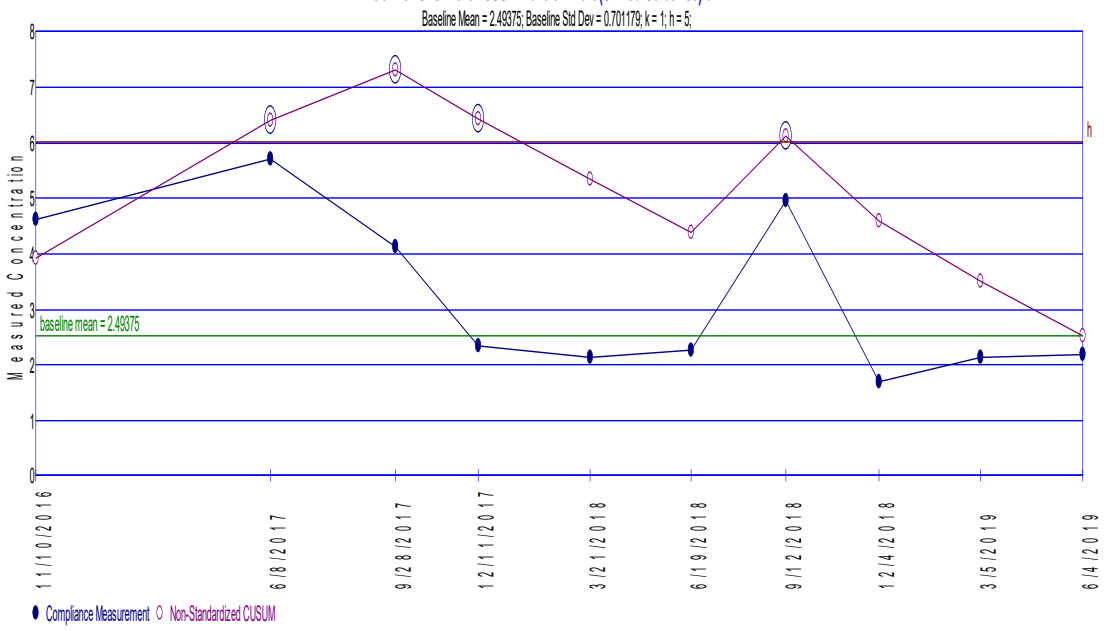
Baseline Measurem	Date	Value
	4/19/2008	ND<0.02
	1/21/2009	ND<0.02
	4/9/2009	0.2
	5/19/2009	0.17
	7/16/2010	ND<0.02
	2/8/2011	ND<0.02
	2/17/2012	ND<0.02
	7/31/2012	ND<0.02
	3/27/2013	ND<0.02
	12/23/2013	ND<0.02
	6/26/2014	ND<0.02
	11/21/2014	ND<0.02
	5/28/2015	ND<0.02
	11/11/2015	0.0112
	5/9/2016	0.00512
	11/10/2016	0.0112
	6/8/2017	0.00418
	9/28/2017	0.00445
	12/11/2017	0.00652
	3/21/2018	0.00658
	6/19/2018	0.00637
	9/12/2018	0.00839
	12/4/2018	0.00744
	3/5/2019	0.00638

Date	Count	Mean	Significant
6/4/2019	1	0.0088	FALSE

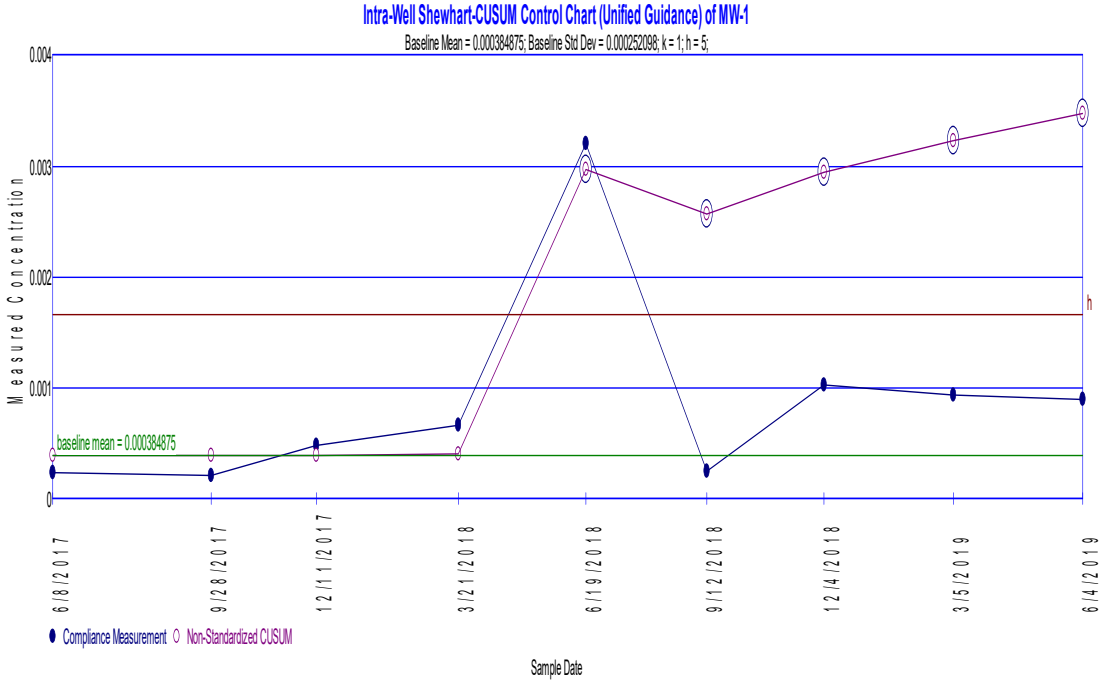
Barium



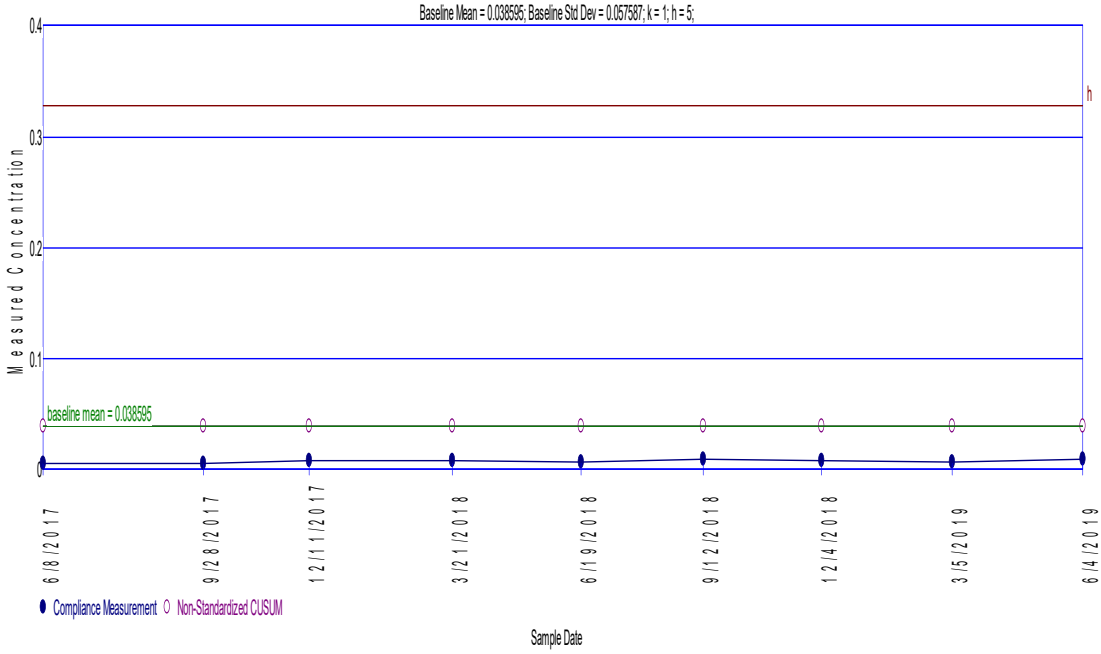
Chloride



Mercury



Nickel



Shapiro-Francia Test of Normality

Parameter: Aluminum

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 106

Data Set Standard Deviation = 1.38146
Numerator = 6482.98
Denominator = 19795
W Statistic = 0.327506 = 6482.98 / 19795

5% Critical value of 0.976 exceeds 0.327506
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.327506
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 107

Data Set Standard Deviation = 0.098326
Numerator = 47.0443
Denominator = 102.233
W Statistic = 0.460167 = 47.0443 / 102.233

5% Critical value of 0.976 exceeds 0.460167
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.460167
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 106

Data Set Standard Deviation = 0.0373545
Numerator = 2.56829
Denominator = 14.4732
W Statistic = 0.177451 = 2.56829 / 14.4732

5% Critical value of 0.976 exceeds 0.177451
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.177451
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 117

Data Set Standard Deviation = 67.7389
Numerator = 3.20943e+007
Denominator = 5.85001e+007
W Statistic = 0.548619 = 3.20943e+007 / 5.85001e+007

5% Critical value of 0.976 exceeds 0.548619
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.548619
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chromium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 106

Data Set Standard Deviation = 0.0163575
Numerator = 0.767285
Denominator = 2.77531
W Statistic = 0.276468 = 0.767285 / 2.77531

5% Critical value of 0.976 exceeds 0.276468
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.276468
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 106

Data Set Standard Deviation = 0.0138352
Numerator = 1.46635
Denominator = 1.98541
W Statistic = 0.73856 = 1.46635 / 1.98541

5% Critical value of 0.976 exceeds 0.73856
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.73856
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chromium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 106

Data Set Standard Deviation = 0.0163575
Numerator = 0.767285
Denominator = 2.77531
W Statistic = 0.276468 = 0.767285 / 2.77531

5% Critical value of 0.976 exceeds 0.276468
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.276468
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Copper

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 105

Data Set Standard Deviation = 0.00263733
Numerator = 0.0265977
Denominator = 0.0708193
W Statistic = 0.375572 = 0.0265977 / 0.0708193

5% Critical value of 0.976 exceeds 0.375572
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.375572
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 77

Data Set Standard Deviation = 0.0681561
Numerator = 8.02405
Denominator = 24.8211
W Statistic = 0.323276 = 8.02405 / 24.8211

5% Critical value of 0.969 exceeds 0.323276
Evidence of non-normality at 95% level of significance

1% Critical value of 0.957 exceeds 0.323276
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 108

Data Set Standard Deviation = 0.030434
Numerator = 4.13844
Denominator = 9.98173
W Statistic = 0.414601 = 4.13844 / 9.98173

5% Critical value of 0.976 exceeds 0.414601
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.414601
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 108

Data Set Standard Deviation = 59.8346
Numerator = 9.60215e+006
Denominator = 3.85826e+007
W Statistic = 0.248872 = 9.60215e+006 / 3.85826e+007

5% Critical value of 0.976 exceeds 0.248872
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.248872
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Zinc

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 108

Data Set Standard Deviation = 0.255634
Numerator = 153.118
Denominator = 704.247
W Statistic = 0.217421 = 153.118 / 704.247

5% Critical value of 0.976 exceeds 0.217421
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.217421
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Aluminum

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 106

Data Set Standard Deviation = 1.3023
Numerator = 15682
Denominator = 17591.5
W Statistic = 0.891455 = 15682 / 17591.5

5% Critical value of 0.976 exceeds 0.891455
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.891455
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 107

Data Set Standard Deviation = 0.982046
Numerator = 9811.39
Denominator = 10198.1
W Statistic = 0.962081 = 9811.39 / 10198.1

5% Critical value of 0.976 exceeds 0.962081
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.962081
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 106

Data Set Standard Deviation = 1.31752
Numerator = 6522.28
Denominator = 18004.9
W Statistic = 0.36225 = 6522.28 / 18004.9

5% Critical value of 0.976 exceeds 0.36225
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.36225
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 117

Data Set Standard Deviation = 1.37678
Numerator = 23692.4
Denominator = 24166.3
W Statistic = 0.980389 = 23692.4 / 24166.3

5% Critical value of 0.976 is less than 0.980389
Data is normally distributed at 95% level of significance

1% Critical value of 0.967 is less than 0.980389
Data is normally distributed at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chromium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 106

Data Set Standard Deviation = 0.998382
Numerator = 8101.23
Denominator = 10338.8
W Statistic = 0.783572 = 8101.23 / 10338.8

5% Critical value of 0.976 exceeds 0.783572
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.783572
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 106

Data Set Standard Deviation = 1.37811
Numerator = 16849
Denominator = 19699
W Statistic = 0.855322 = 16849 / 19699

5% Critical value of 0.976 exceeds 0.855322
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.855322
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Copper

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 105

Data Set Standard Deviation = 0.536341
Numerator = 2095.13
Denominator = 2928.9
W Statistic = 0.71533 = 2095.13 / 2928.9

5% Critical value of 0.976 exceeds 0.71533
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.71533
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 77

Data Set Standard Deviation = 0.547361
Numerator = 689.153
Denominator = 1600.88
W Statistic = 0.430483 = 689.153 / 1600.88

5% Critical value of 0.969 exceeds 0.430483
Evidence of non-normality at 95% level of significance

1% Critical value of 0.957 exceeds 0.430483
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 108

Data Set Standard Deviation = 1.29663
Numerator = 15680.9
Denominator = 18118.4
W Statistic = 0.865467 = 15680.9 / 18118.4

5% Critical value of 0.976 exceeds 0.865467
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.865467
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 108

Data Set Standard Deviation = 1.20742
Numerator = 10657.8
Denominator = 15711
W Statistic = 0.678365 = 10657.8 / 15711

5% Critical value of 0.976 exceeds 0.678365
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.678365
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Zinc

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 108

Data Set Standard Deviation = 1.06613
Numerator = 7202.4
Denominator = 12249.3
W Statistic = 0.587984 = 7202.4 / 12249.3

5% Critical value of 0.976 exceeds 0.587984
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.587984
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Inter-Well Comparison

Parameter: Chloride

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Inter-Well Unified Guid. Formula 99% One-Sided Comparison

Background Samples = 26
Background Mean = 0.951917
Background Std Dev = 0.35121

Number of comparisons = 6
Future Samples (k) = 6
Actual confidence level is 1.0 - (0.01/6) = 99.8333 %
t is Percentile of Student's T-Test (0.99/6) = 0.998333
Degrees of Freedom = 26 (background observations) - 1
t(0.998333, 25) = 3.33973

Well MW-3

Date	Samples	Mean	Interval	Significant
6/4/2019	1	3.17388	[0, 2.14721]	TRUE

Well MW-4

Date	Samples	Mean	Interval	Significant
6/4/2019	1	2.12823	[0, 2.14721]	FALSE

Well MW-5

Date	Samples	Mean	Interval	Significant
6/4/2019	1	4.42485	[0, 2.14721]	TRUE

Well TMW-1

Date	Samples	Mean	Interval	Significant
6/4/2019	1	2.81541	[0, 2.14721]	TRUE

Well TMW-2

Date	Samples	Mean	Interval	Significant
6/4/2019	1	2.97553	[0, 2.14721]	TRUE

Well TMW-3

Date	Samples	Mean	Interval	Significant
6/4/2019	1	4.08429	[0, 2.14721]	TRUE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Total Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 88.6792%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 24
Maximum Background Value = 0.001
Confidence Level = 80%
False Positive Rate = 20%

Location	Date	Count	Mean	Significant
MW-3	**6/4/2019**	**1**	**0.0292**	**TRUE**
MW-4	6/4/2019	1	0.001	FALSE
MW-5	6/4/2019	1	0.001	FALSE
TMW-1	6/4/2019	1	0.001	FALSE
TMW-2	6/4/2019	1	0.001	FALSE
TMW-3	6/4/2019	1	0.001	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Chromium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 74.5283%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 25
Maximum Background Value = 0.12
Confidence Level = 80.6%
False Positive Rate = 19.4%

Location	Date	Count	Mean	Significant
MW-3	6/4/2019	1	0.00402	FALSE
MW-4	6/4/2019	1	0.002	FALSE
MW-5	6/4/2019	1	0.00415	FALSE
TMW-1	6/4/2019	1	0.002	FALSE
TMW-2	6/4/2019	1	0.002	FALSE
TMW-3	6/4/2019	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Cobalt

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 57.5472%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 25
Maximum Background Value = 0.056
Confidence Level = 80.6%
False Positive Rate = 19.4%

Location	Date	Count	Mean	Significant
MW-3	6/4/2019	1	0.00398	FALSE
MW-4	6/4/2019	1	0.002	FALSE
MW-5	6/4/2019	1	0.00248	FALSE
TMW-1	6/4/2019	1	0.002	FALSE
TMW-2	6/4/2019	1	0.002	FALSE
TMW-3	6/4/2019	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Copper

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 82.8571%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 25
Maximum Background Value = 0.028
Confidence Level = 80.6%
False Positive Rate = 19.4%

Location	Date	Count	Mean	Significant
MW-3	6/4/2019	1	0.005	FALSE
MW-4	6/4/2019	1	0.005	FALSE
MW-5	6/4/2019	1	0.005	FALSE
TMW-1	6/4/2019	1	0.005	FALSE
TMW-2	6/4/2019	1	0.005	FALSE
TMW-3	6/4/2019	1	0.00505	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 85.7143%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 15
Maximum Background Value = 0.178
Confidence Level = 71.4%
False Positive Rate = 28.6%

Location	Date	Count	Mean	Significant
MW-3	**6/4/2019**	**1**	**0.183**	**TRUE**
MW-4	6/4/2019	1	0.1	FALSE
MW-5	6/4/2019	1	0.1	FALSE
TMW-1	6/4/2019	1	0.1	FALSE
TMW-2	6/4/2019	1	0.1	FALSE
TMW-3	6/4/2019	1	0.1	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Nickel

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 62.037%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 25
Maximum Background Value = 0.2
Confidence Level = 80.6%
False Positive Rate = 19.4%

Location	Date	Count	Mean	Significant
MW-3	6/4/2019	1	0.0397	FALSE
MW-4	6/4/2019	1	0.002	FALSE
MW-5	6/4/2019	1	0.00767	FALSE
TMW-1	6/4/2019	1	0.002	FALSE
TMW-2	6/4/2019	1	0.002	FALSE
TMW-3	6/4/2019	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 62.963%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 24
Maximum Background Value = 18.8
Confidence Level = 80%
False Positive Rate = 20%

Location	Date	Count	Mean	Significant
MW-3	**6/4/2019**	**1**	**219**	**TRUE**
MW-4	6/4/2019	1	5	FALSE
MW-5	6/4/2019	1	6.48	FALSE
TMW-1	6/4/2019	1	5	FALSE
TMW-2	6/4/2019	1	5	FALSE
TMW-3	6/4/2019	1	5	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Zinc

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

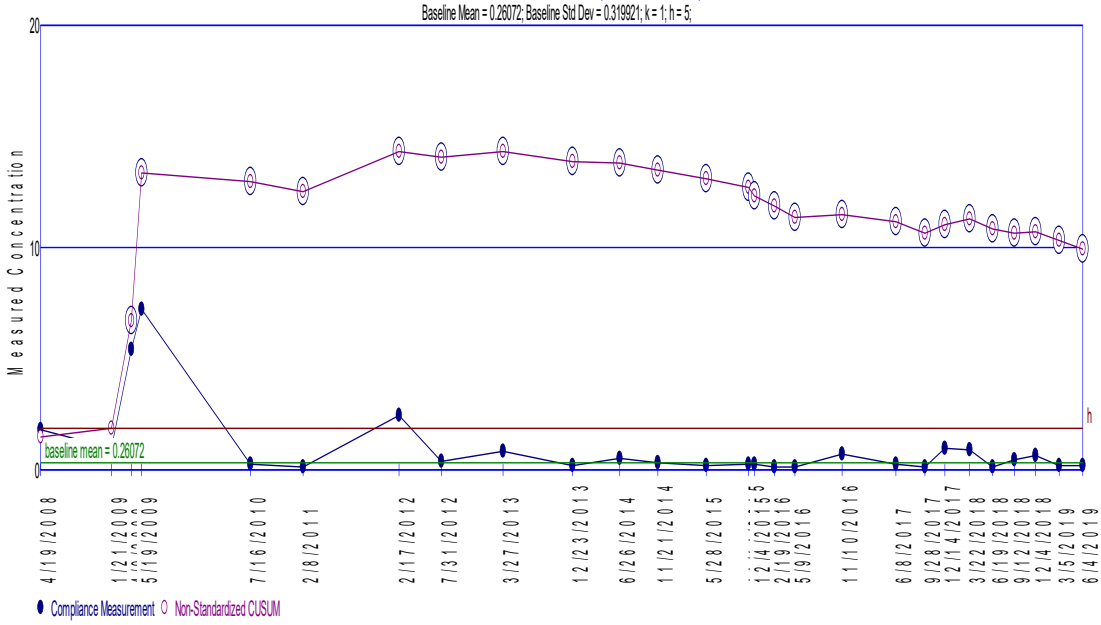
Total Percent Non-Detects = 64.8148%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 25
Maximum Background Value = 0.0281
Confidence Level = 80.6%
False Positive Rate = 19.4%

Location	Date	Count	Mean	Significant
MW-3	**6/4/2019**	**1**	**0.197**	**TRUE**
MW-4	6/4/2019	1	0.025	FALSE
MW-5	6/4/2019	1	0.025	FALSE
TMW-1	6/4/2019	1	0.025	FALSE
TMW-2	6/4/2019	1	0.025	FALSE
TMW-3	6/4/2019	1	0.025	FALSE

Aluminum

Inter-Well Shewhart-CUSUM Control Chart (Unified Guidance) of MW-3

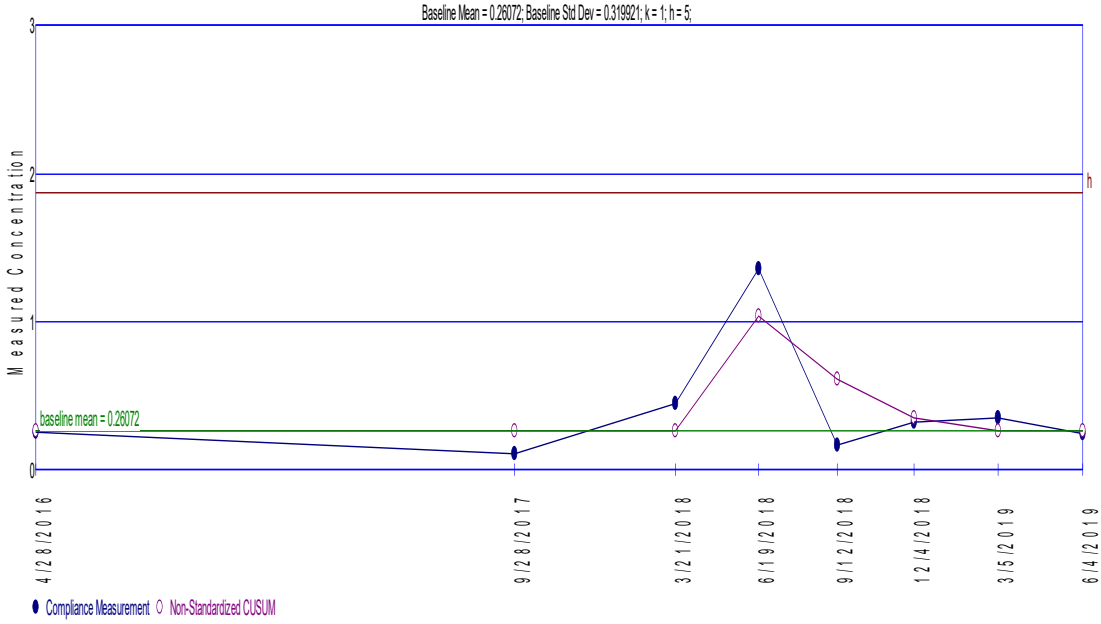
Baseline Mean = 0.26072; Baseline Std Dev = 0.319921; k = 1; h = 5;



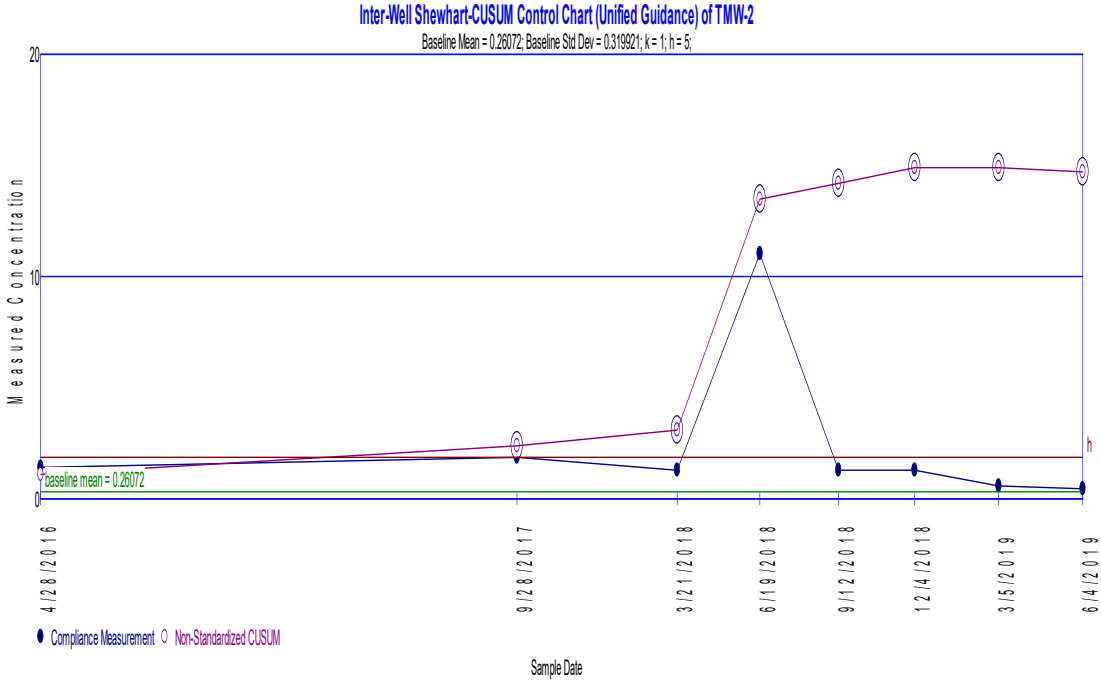
Aluminum

Inter-Well Shewhart-CUSUM Control Chart (Unified Guidance) of TMW-1

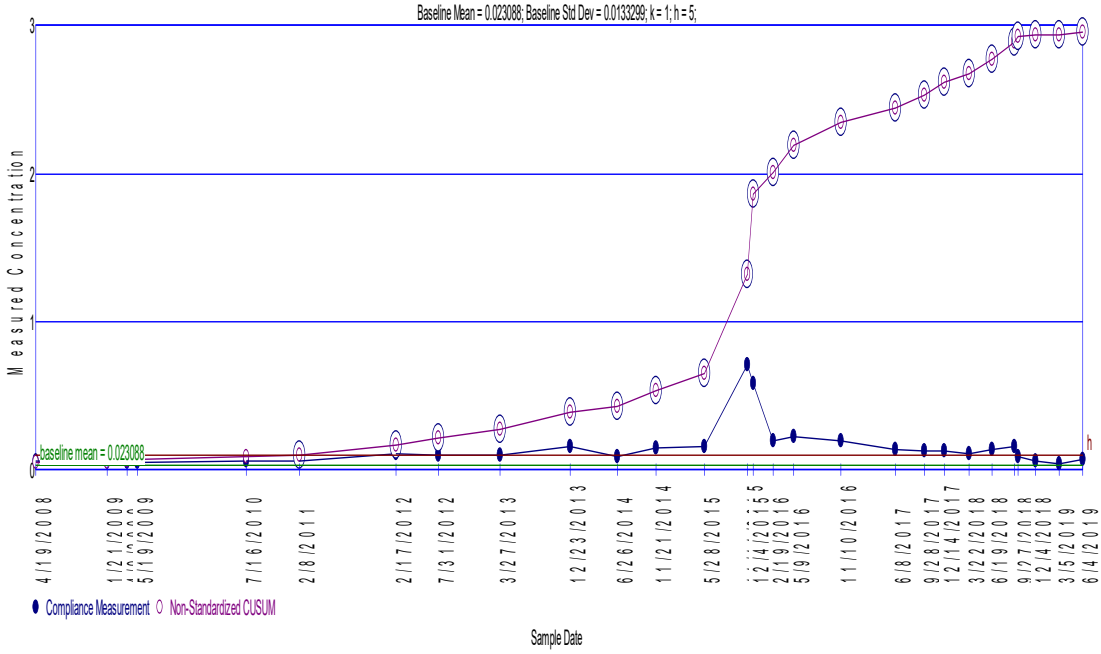
Baseline Mean = 0.26072; Baseline Std Dev = 0.319921; k = 1; h = 5;



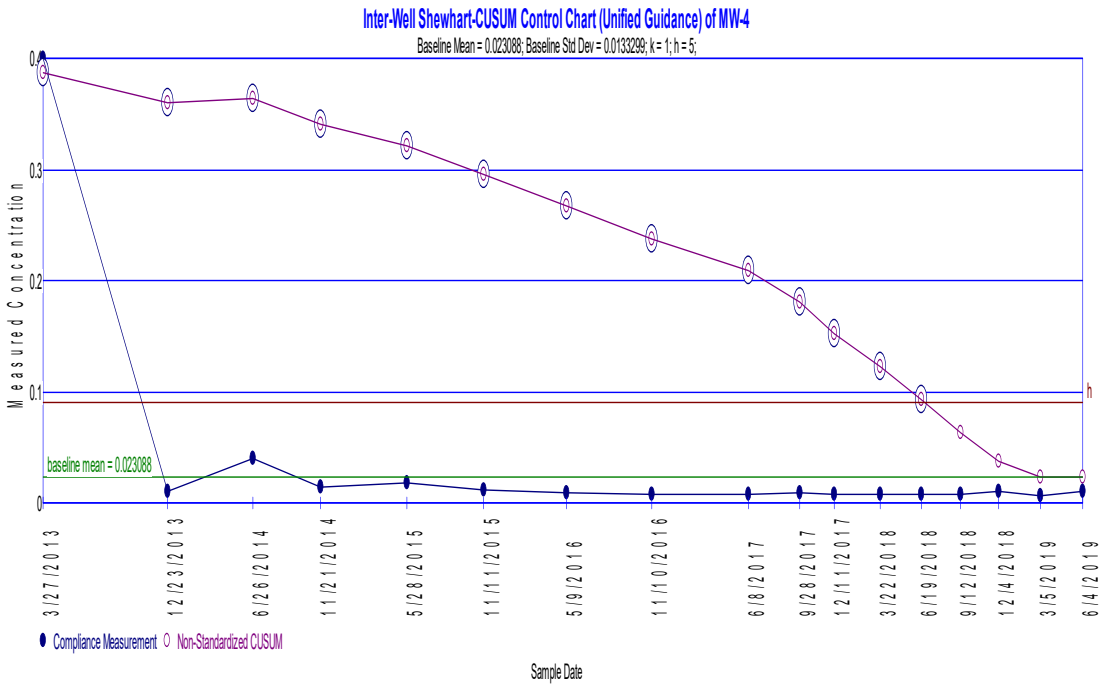
Aluminum



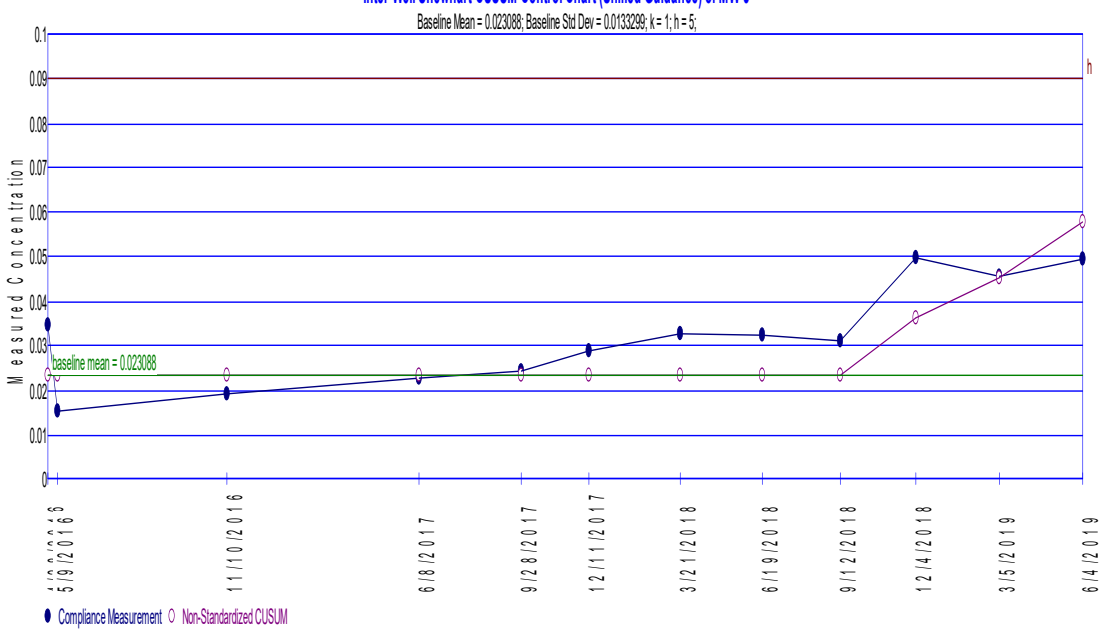
Barium



Barium



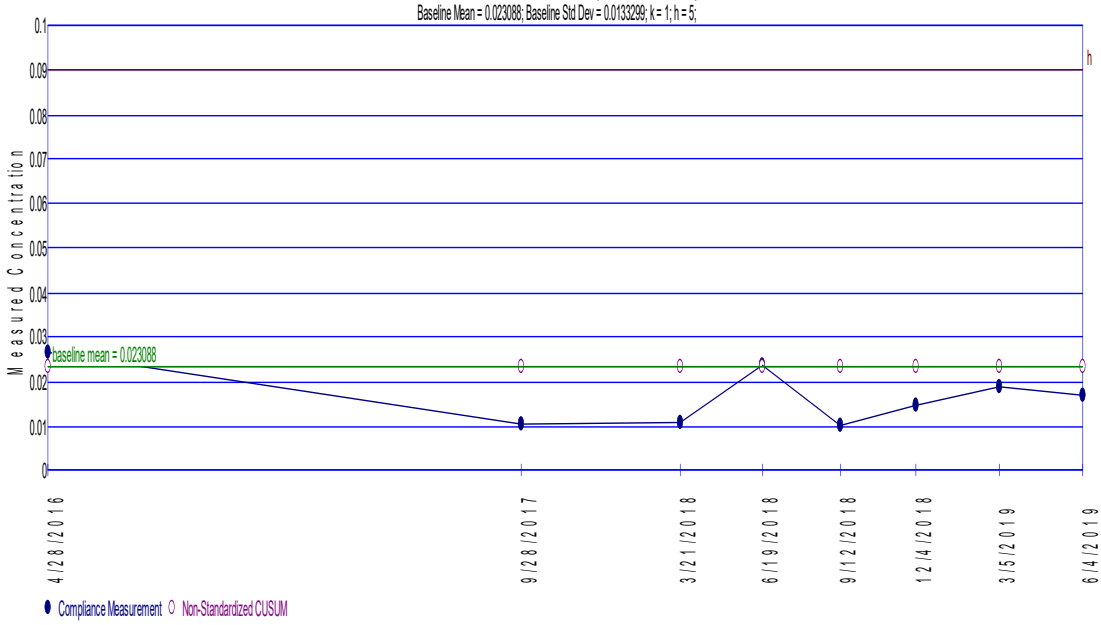
Barium



Barium

Inter-Well Shewhart-CUSUM Control Chart (Unified Guidance) of TMW-1

Baseline Mean = 0.023088; Baseline Std Dev = 0.0133299; k = 1; h = 5;

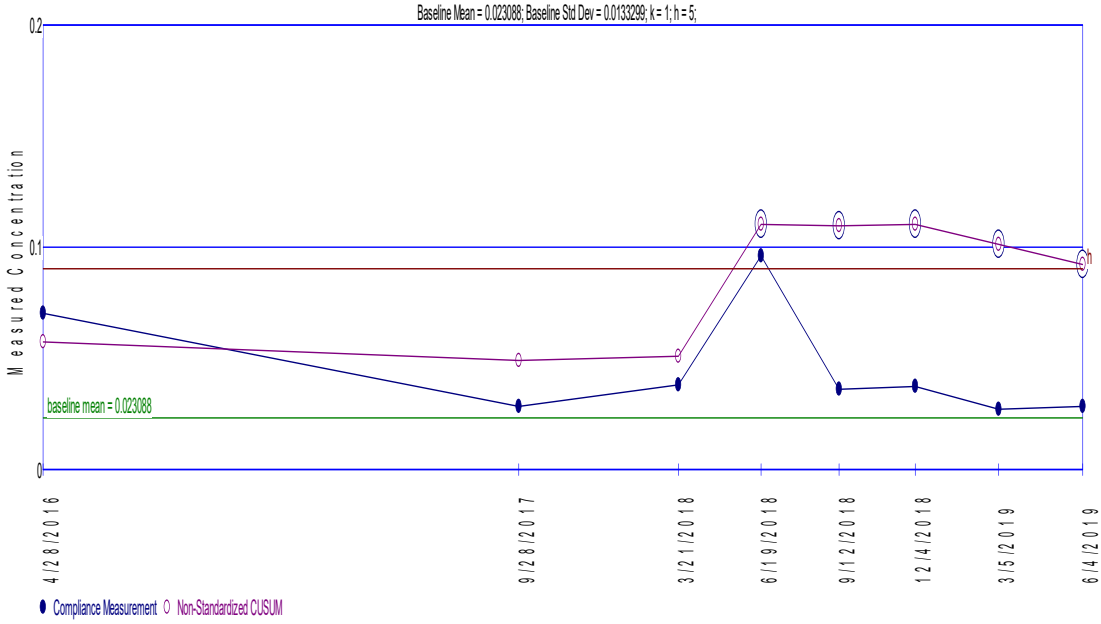


Sample Date

Barium

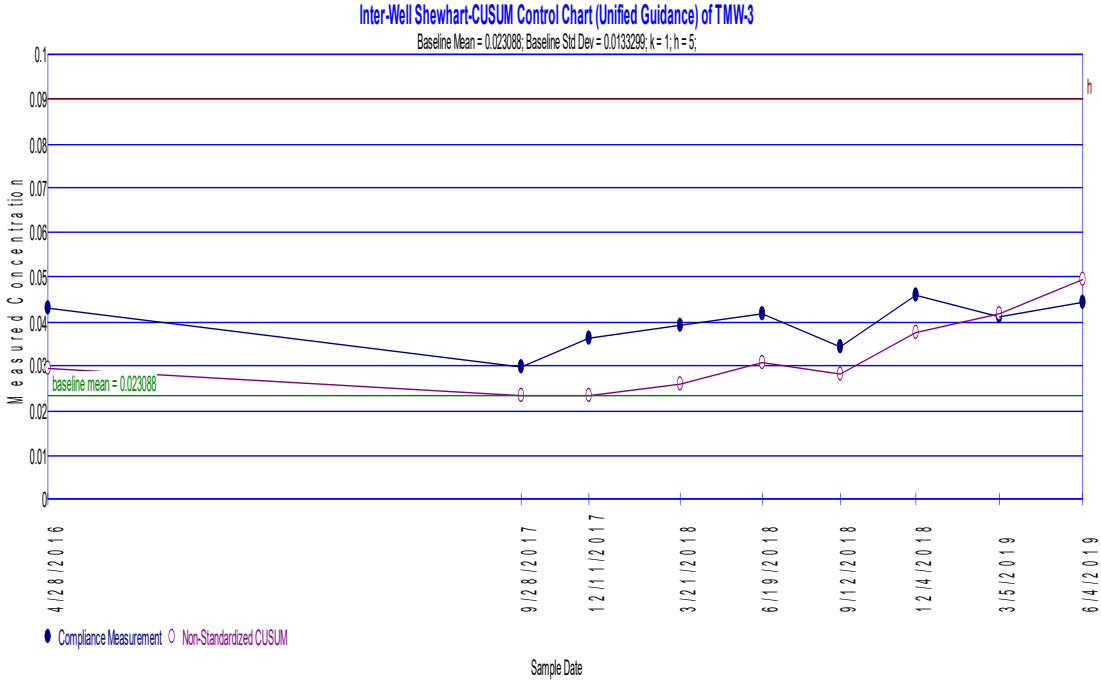
Inter-Well Shewhart-CUSUM Control Chart (Unified Guidance) of TMW-2

Baseline Mean = 0.023088; Baseline Std Dev = 0.0133299; k = 1; h = 5;



Sample Date

Barium


Inter-Well Shewhart-CUSUM Control Chart (Unified Guidance) of TMW-3
Baseline Mean = 0.023088; Baseline Std Dev = 0.0133299; k = 1; h = 5;
h
baseline mean = 0.023088
Measured Concentration
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
4/28/2016
9/28/2017
12/11/2017
3/21/2018
6/19/2018
9/12/2018
12/4/2018
3/5/2019
6/4/2019
Compliance Measurement
Non-Standardized CUSUM
Sample Date

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 39
Non detect rank is 20

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	ND<0.001	20
	1/21/2009	ND<0.001	20
	4/9/2009	ND<0.001	20
	5/19/2009	ND<0.001	20
	7/16/2010	ND<0.001	20
	2/8/2011	ND<0.001	20
	2/17/2012	ND<0.001	20
	7/31/2012	ND<0.001	20
	12/23/2013	ND<0.001	20
	6/26/2014	ND<0.001	20
	11/21/2014	ND<0.001	20
	5/28/2015	ND<0.001	20
	11/11/2015	ND<0.001	20
	5/9/2016	ND<0.001	20
	11/10/2016	ND<0.001	20
	6/8/2017	ND<0.001	20
	9/28/2017	ND<0.001	20
	12/11/2017	ND<0.001	20
	3/21/2018	ND<0.001	20
	6/19/2018	ND<0.001	20
	9/12/2018	ND<0.001	20
	12/4/2018	ND<0.001	20
	3/5/2019	ND<0.001	20
	6/4/2019	ND<0.001	20
MW-3	1/21/2009	ND<0.001	20
	4/9/2009	ND<0.001	20
	5/19/2009	ND<0.001	20
	7/16/2010	ND<0.001	20
	2/8/2011	ND<0.001	20
	2/17/2012	ND<0.001	20
	7/31/2012	ND<0.001	20
	12/23/2013	ND<0.001	20
	6/26/2014	ND<0.001	20
	11/21/2014	ND<0.001	20
	5/28/2015	ND<0.001	20
	11/11/2015	ND<0.001	20
	12/4/2015	ND<0.001	20
	2/19/2016	ND<0.001	20
	5/9/2016	ND<0.001	20
	11/10/2016	0.00177	40
	6/8/2017	0.0286	46
	8/8/2017	0.0113	44
	9/28/2017	0.00926	43
	12/14/2017	0.00659	41
	3/22/2018	0.00671	42

6/19/2018	0.0312	48
9/12/2018	0.297	51
9/27/2018	0.204	50
12/4/2018	0.144	49
3/5/2019	0.0117	45
6/4/2019	0.0292	47

The Wilcoxon Statistic is 468
The Expected value is is 324
The Standard Deviation is 52.9906
The Z Score is 2.70803
The Standard Deviation adjusted for ties is 39.4038
The Z Score adjusted for ties is 3.64178
2.70803 > 2.326 indicating statistical significance at 1% level
3.64178 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Fluoride

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 18
Non detect rank is 9.5

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	ND<0.1	9.5
	1/21/2009	ND<0.1	9.5
	4/9/2009	ND<0.1	9.5
	5/19/2009	ND<0.1	9.5
	5/9/2016	ND<0.1	9.5
	11/10/2016	ND<0.1	9.5
	6/8/2017	0.178	22
	9/28/2017	ND<0.1	9.5
	12/11/2017	ND<0.1	9.5
	3/21/2018	ND<0.1	9.5
	6/19/2018	ND<0.1	9.5
	9/12/2018	ND<0.1	9.5
	12/4/2018	ND<0.1	9.5
	3/5/2019	ND<0.1	9.5
	6/4/2019	ND<0.1	9.5
MW-3	1/21/2009	ND<0.1	9.5
	4/9/2009	ND<0.1	9.5
	5/19/2009	ND<0.1	9.5
	5/9/2016	0.105	19
	11/10/2016	ND<0.1	9.5
	6/8/2017	0.208	24
	9/28/2017	0.226	25
	12/14/2017	0.149	20
	3/22/2018	0.274	27
	6/19/2018	0.248	26
	9/12/2018	0.543	29
	12/4/2018	0.4	28
	3/5/2019	0.163	21
	6/4/2019	0.183	23

The Wilcoxon Statistic is 175
The Expected value is is 105
The Standard Deviation is 22.9129
The Z Score is 3.03323
The Standard Deviation adjusted for ties is 19.9925
The Z Score adjusted for ties is 3.47631
3.03323 > 2.326 indicating statistical significance at 1% level
3.47631 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Zinc

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 25
Non detect rank is 13

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.011	26
	1/21/2009	0.015	33
	4/9/2009	0.011	27
	5/19/2009	0.021	39
	7/16/2010	0.011	28
	2/8/2011	0.016	36
	2/17/2012	ND<0.01	13
	7/31/2012	0.023	40
	3/27/2013	0.012	30
	12/23/2013	ND<0.01	13
	6/26/2014	ND<0.01	13
	11/21/2014	ND<0.025	13
	5/28/2015	ND<0.025	13
	11/11/2015	ND<0.025	13
	5/9/2016	0.0281	42
	11/10/2016	ND<0.025	13
	6/8/2017	ND<0.025	13
	9/28/2017	ND<0.025	13
	12/11/2017	ND<0.025	13
	3/21/2018	ND<0.025	13
	6/19/2018	ND<0.025	13
	9/12/2018	ND<0.025	13
	12/4/2018	ND<0.025	13
	3/5/2019	ND<0.025	13
	6/4/2019	ND<0.025	13
MW-3	4/19/2008	0.017	38
	1/21/2009	0.015	34
	4/9/2009	0.011	29
	5/19/2009	0.031	43
	7/16/2010	0.015	35
	2/8/2011	0.013	31
	2/17/2012	0.014	32
	7/31/2012	0.016	37
	3/27/2013	ND<0.01	13
	12/23/2013	ND<0.01	13
	6/26/2014	0.023	41
	11/21/2014	ND<0.025	13
	5/28/2015	ND<0.025	13
	11/11/2015	ND<0.025	13
	12/4/2015	ND<0.025	13
	2/19/2016	ND<0.025	13
	5/9/2016	ND<0.025	13
	11/10/2016	ND<0.025	13
	6/8/2017	0.0769	46
	9/28/2017	0.0439	44

12/14/2017	0.159	49
3/22/2018	0.0499	45
6/19/2018	0.109	48
9/12/2018	1.68	53
9/27/2018	1.58	52
12/4/2018	1.34	51
3/5/2019	0.0994	47
6/4/2019	0.197	50

The Wilcoxon Statistic is 516
The Expected value is is 350
The Standard Deviation is 56.1249
The Z Score is 2.94878
The Standard Deviation adjusted for ties is 53.1019
The Z Score adjusted for ties is 3.11665
2.94878 > 2.326 indicating statistical significance at 1% level
3.11665 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Sulfate

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 15
Non detect rank is 8

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/19/2009	8.9	22
	7/16/2010	9.4	25
	2/8/2011	5.8	19
	9/14/2011	6.6	21
	2/17/2012	ND<5	8
	7/31/2012	ND<5	8
	3/27/2013	5.1	17
	12/23/2013	6.1	20
	6/26/2014	ND<5	8
	11/21/2014	9.1	24
	5/28/2015	ND<5	8
	11/11/2015	18.8	32
	5/9/2016	ND<5	8
	8/18/2016	3.51	16
	11/10/2016	16.5	31
	6/8/2017	ND<5	8
	9/28/2017	ND<5	8
	12/11/2017	ND<5	8
	3/21/2018	ND<5	8
	6/19/2018	ND<5	8
	9/12/2018	12.3	29
	12/4/2018	ND<5	8
	3/5/2019	ND<5	8
	6/4/2019	ND<5	8
MW-3	5/19/2009	ND<5	8
	7/16/2010	5.1	18
	2/8/2011	ND<5	8
	2/17/2012	22	33
	7/31/2012	23	37
	3/27/2013	16	30
	12/23/2013	12	28
	6/26/2014	9.7	26
	11/21/2014	11	27
	5/28/2015	9.09	23
	11/11/2015	29.3	39
	12/4/2015	29.1	38
	2/19/2016	22.2	34
	5/9/2016	22.3	35
	8/18/2016	95.7	46
	11/10/2016	34	41
	6/8/2017	93.7	45
	9/28/2017	46.2	42
	12/14/2017	46.2	43
	3/22/2018	22.3	36
	6/19/2018	30.1	40

9/12/2018	484	49
12/4/2018	324	48
3/5/2019	85.8	44
6/4/2019	219	47

The Wilcoxon Statistic is 540
The Expected value is is 300
The Standard Deviation is 50
The Z Score is 4.79
The Standard Deviation adjusted for ties is 49.2805
The Z Score adjusted for ties is 4.85993
4.79 > 2.326 indicating statistical significance at 1% level
4.85993 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 122 - 225 = -103

Tied Grou	Value	Members
1	0.1	3
2	0.2	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 84
B = 0
C = 6
D = 0
E = 8
F = 0
a = 41418
b = 157950
c = 1404
Group Variance = 2296.33
Z-Score = -2.12854
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.12854 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 15 - 13 = 2
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |2| is 0.904
0.904 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 5 - 23 = -18
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |-18| is 0.032
0.032 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 219 - 159 = 60

Tied GrouValue	Members

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 46116
b = 176904
c = 1512
Group Variance = 2562
Z-Score = 1.16563
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.16563| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-4

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 30 - 106 = -76

Tied GrouValue	Members

Time Period	Observations
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 10608
b = 36720
c = 544
Group Variance = 589.333
Z-Score = -3.08945
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.08945 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 53 - 13 = 40

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 2.67433
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.67433 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 14 - 14 = 0
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |0| is 1.096
1.096 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 8 - 20 = -12
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |-12| is 0.178
0.178 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 24 - 12 = 12
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |12| is 0.26
0.26 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 225 - 21 = 204

Tied Grou	Value	Members
1	0.001	15

Time Period	Observations
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 7350
B = 0
C = 2730
D = 0
E = 210
F = 0
a = 41418
b = 157950
c = 1404
Group Variance = 1892.67
Z-Score = 4.66615
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.66615 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 45 - 21 = 24

Tied Grou	Value	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 1.57717
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.57717| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 261 - 113 = 148

Tied GrouValue		Members
1	25	3
2	65	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
8/1/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 84
B = 0
C = 6
D = 0
E = 8
F = 0
a = 46116
b = 176904
c = 1512
Group Variance = 2557.33
Z-Score = 2.90686
Comparison Level at 95% confidence level = 1.65463 (upward trend)

2.90686 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-4

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 66 - 87 = -21

Tied GrouValue	Members

Time Period	Observations
3/27/2013	1
4/11/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 12546
b = 44064
c = 612
Group Variance = 697
Z-Score = -0.757554
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.757554| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 63 - 3 = 60

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 4.04578
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.04578 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 53 - 2 = 51

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = 3.89249
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.89249 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 40 - 15 = 25

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = 1.8684
Comparison Level at 95% confidence level = 1.65463 (upward trend)
1.8684 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 46 - 9 = 37

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = 2.8026
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.8026 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chromium
Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 52 - 173 = -121

Tied GrouValue		Members
1	0.01	15
2	0.002	7

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 8148
B = 0
C = 2940
D = 0
E = 252
F = 0
a = 41418
b = 157950
c = 1404
Group Variance = 1848.33
Z-Score = -2.7912
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.7912 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Chromium

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 44 - 7 = 37

Tied GrouValue		Members
1	0.002	6

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 510
B = 0
C = 120
D = 0
E = 30
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 184.333
Z-Score = 2.65155
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.65155 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Cobalt

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 53 - 163 = -110

Tied GrouValue		Members
1	0.01	16
2	0.002	6

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 9390
B = 0
C = 3480
D = 0
E = 270
F = 0
a = 41418
b = 157950
c = 1404
Group Variance = 1779.33
Z-Score = -2.58403
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.58403 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Cobalt
Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 32 - 33 = -1

Tied Grou	Value	Members
1	0.00264	2

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 211.667
Z-Score = 0
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Copper
Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 14 - 1 = 13
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |13| is 0.22
0.22 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Fluoride
Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 68 - 17 = 51

Tied Grou	Value	Members
1	0.1	4

Time Period	Observations
1/21/2009	1
4/9/2009	1
5/19/2009	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 156
B = 0
C = 24
D = 0
E = 12
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 325
Z-Score = 2.7735
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.7735 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Nickel
Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 120 - 183 = -63

Tied Grou	Value	Members
1	0.02	12
2	0.01	3
3	0.002	4

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 4050
B = 0
C = 1350
D = 0
E = 150
F = 0
a = 46116
b = 176904
c = 1512
Group Variance = 2337
Z-Score = -1.28251

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.28251| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Nickel

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 47 - 19 = 28

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 1.85146
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.85146| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Zinc

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 301 - 54 = 247

Tied GrouValue		Members
1	0.015	2
2	0.01	2
3	0.025	7

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 834
B = 0
C = 210
D = 0
E = 46
F = 0
a = 46116
b = 176904
c = 1512
Group Variance = 2515.67
Z-Score = 4.90466

Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.90466 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 244 - 53 = 191

Tied Group	Value	Members
1	5	2
2	22.3	2
3	46.2	2

Time Period	Observations
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 54
B = 0
C = 0
D = 0
E = 6
F = 0
a = 33000
b = 124200
c = 1200
Group Variance = 1830.33
Z-Score = 4.44108
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.44108 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 44 - 1 = 43

Tied Group	Value	Members
1	5	7

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1

There are 0 time periods with multiple data

A = 798
B = 0
C = 210
D = 0
E = 42
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 168.333
Z-Score = 3.23716
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.23716 > 1.65463 indicating an upward trend

APPENDIX C
LABORATORY ANALYTICAL REPORTS & FIELD INFORMATION LOGS

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 21, 2019

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1105572
Samples Received:	06/05/2019
Project Number:	181-364.0005
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

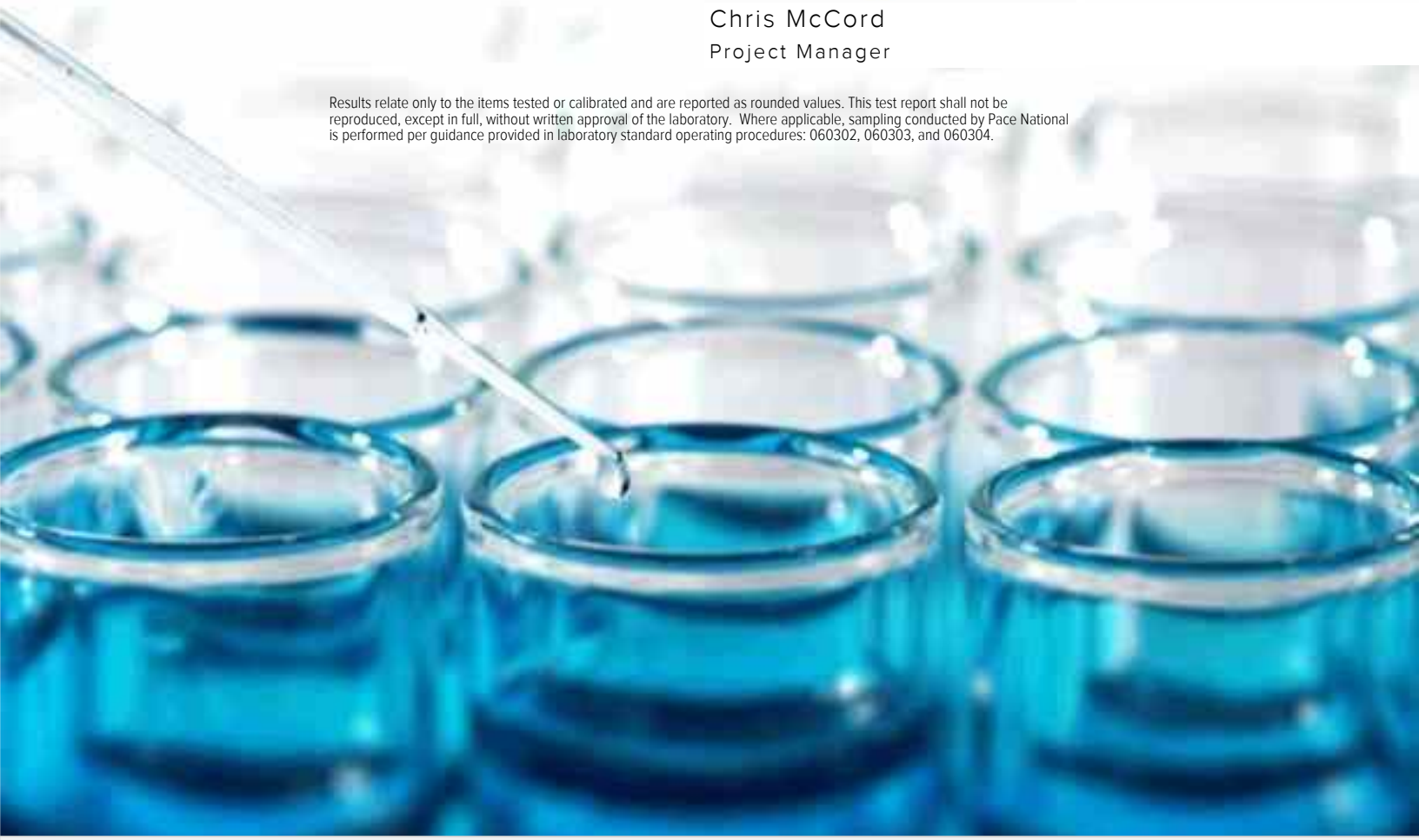


TABLE OF CONTENTS

MW-1 L1105572-01 GW

Collected by: BS/PC | Collected date/time: 06/04/19 12:10 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 17:08	06/10/19 17:08	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 14:43	06/09/19 14:43	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 13:49	06/07/19 13:49	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:11	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 23:35	06/05/19 23:35	NJM	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 17:59	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:26	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:23	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:11	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 21:02	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 18:52	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/13/19 11:09	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 20:43	06/08/19 20:43	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 17:57	HMH	Mt. Juliet, TN

MW-3 L1105572-02 GW

Collected by: BS/PC | Collected date/time: 06/04/19 15:15 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	5	06/10/19 17:06	06/10/19 17:06	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 14:50	06/09/19 14:50	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 13:52	06/07/19 13:52	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:11	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 23:57	06/05/19 23:57	NJM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	5	06/06/19 00:26	06/06/19 00:26	NJM	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:06	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:29	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:26	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 17:56	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 21:10	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 19:07	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/13/19 12:26	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 21:02	06/08/19 21:02	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 18:10	HMH	Mt. Juliet, TN

MW-4 L1105572-03 GW

Collected by: BS/PC | Collected date/time: 06/04/19 14:05 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:51	06/10/19 16:51	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 14:56	06/09/19 14:56	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 13:57	06/07/19 13:57	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:11	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/06/19 00:46	06/06/19 00:46	NJM	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:09	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:31	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:29	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:19	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 21:17	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 19:11	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/13/19 12:31	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 21:21	06/08/19 21:21	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 18:47	HMH	Mt. Juliet, TN

MW-5 L1105572-04 GW

Collected by: BS/PC | Collected date/time: 06/04/19 13:05 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:52	06/10/19 16:52	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:02	06/09/19 15:02	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 13:58	06/07/19 13:58	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:12	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 21:24	06/05/19 21:24	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:11	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:33	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:21	JDG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:37	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 19:14	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/13/19 12:37	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 21:38	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 21:40	06/08/19 21:40	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 18:59	HMH	Mt. Juliet, TN

TMW-1 L1105572-05 GW

Collected by: BS/PC | Collected date/time: 06/04/19 12:15 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:53	06/10/19 16:53	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:09	06/09/19 15:09	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 14:00	06/07/19 14:00	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:12	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/06/19 01:42	06/06/19 01:42	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:14	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:36	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:40	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:24	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 21:46	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 19:26	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/13/19 12:42	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 21:58	06/08/19 21:58	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 19:11	HMH	Mt. Juliet, TN

TMW-2 L1105572-06 GW

Collected by: BS/PC | Collected date/time: 06/04/19 14:05 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:54	06/10/19 16:54	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:15	06/09/19 15:15	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 14:06	06/07/19 14:06	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:12	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 22:29	06/05/19 22:29	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:21	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:38	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:26	JDG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:43	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 19:30	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/13/19 12:47	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 21:53	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 22:17	06/08/19 22:17	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 19:24	HMH	Mt. Juliet, TN

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

TMW-3 L1105572-07 GW

Collected by: BS/PC | Collected date/time: 06/04/19 16:10 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:55	06/10/19 16:55	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:31	06/09/19 15:31	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 14:08	06/07/19 14:08	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:12	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 22:40	06/05/19 22:40	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:23	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:41	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:29	JDG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:46	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 19:34	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/13/19 12:53	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 22:00	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 22:35	06/08/19 22:35	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 19:36	HMH	Mt. Juliet, TN

DUPLICATE L1105572-08 GW

Collected by: BS/PC | Collected date/time: 06/04/19 00:00 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	5	06/10/19 17:07	06/10/19 17:07	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:37	06/09/19 15:37	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 14:09	06/07/19 14:09	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:13	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 23:13	06/05/19 23:13	ST	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	5	06/06/19 00:57	06/06/19 00:57	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:26	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1291603	1	06/06/19 10:44	06/06/19 21:43	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291742	1	06/06/19 13:55	06/07/19 18:48	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:31	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 22:07	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 19:38	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/13/19 12:58	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 22:54	06/08/19 22:54	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 19:48	HMH	Mt. Juliet, TN

FIELD BLANK L1105572-09 GW

Collected by: BS/PC | Collected date/time: 06/04/19 15:50 | Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 16:58	06/10/19 16:58	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1293367	1	06/09/19 15:43	06/09/19 15:43	GB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1	06/07/19 14:11	06/07/19 14:11	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	1	06/13/19 14:06	06/13/19 17:13	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291609	1	06/05/19 23:24	06/05/19 23:24	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1291601	1	06/06/19 10:39	06/06/19 18:28	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:34	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	1	06/11/19 09:25	06/11/19 22:14	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1299538	1	06/20/19 21:09	06/21/19 00:53	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 18:50	06/08/19 18:50	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 20:01	HMH	Mt. Juliet, TN

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

TRIP BLANK L1105572-10 GW

Collected by	Collected date/time	Received date/time
BS/PC	06/04/19 00:00	06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 18:32	06/08/19 18:32	BMB	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	ND		30.0	1	06/10/2019 17:08	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	43.8	B	20.0	1	06/09/2019 14:43	WG1293367

Sample Narrative:
L1105572-01 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/07/2019 13:49	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/13/2019 17:11	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/05/2019 23:35	WG1291609
Chloride	2.15		1.00	1	06/05/2019 23:35	WG1291609
Fluoride	ND		0.100	1	06/05/2019 23:35	WG1291609
Nitrate	ND		0.100	1	06/05/2019 23:35	WG1291609
Sulfate	ND		5.00	1	06/05/2019 23:35	WG1291609

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	0.000889		0.000200	1	06/06/2019 17:59	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:26	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/07/2019 18:11	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:23	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/11/2019 21:02	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 18:52	WG1293088
Antimony	ND		0.00200	1	06/11/2019 21:02	WG1291740
Antimony,Dissolved	ND	J4 J5	0.00200	1	06/11/2019 18:52	WG1293088
Arsenic	0.0194		0.00200	1	06/11/2019 21:02	WG1291740
Arsenic,Dissolved	0.0204		0.00200	1	06/11/2019 18:52	WG1293088
Barium	0.0219		0.00500	1	06/11/2019 21:02	WG1291740
Barium,Dissolved	0.0196		0.00500	1	06/11/2019 18:52	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 21:02	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 21:02	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 18:52	WG1293088
Calcium	4.03		1.00	1	06/11/2019 21:02	WG1291740
Calcium,Dissolved	3.77		1.00	1	06/11/2019 18:52	WG1293088
Chromium	ND		0.00200	1	06/11/2019 21:02	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Cobalt	0.0411		0.00200	1	06/11/2019 21:02	WG1291740
Cobalt,Dissolved	0.0419		0.00200	1	06/11/2019 18:52	WG1293088
Copper	ND		0.00500	1	06/11/2019 21:02	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 18:52	WG1293088
Iron	13.6		0.100	1	06/11/2019 21:02	WG1291740
Iron,Dissolved	13.4		0.100	1	06/11/2019 18:52	WG1293088
Lead	ND		0.00200	1	06/11/2019 21:02	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Magnesium	2.78		1.00	1	06/11/2019 21:02	WG1291740
Magnesium,Dissolved	2.77		1.00	1	06/11/2019 18:52	WG1293088
Manganese	0.966		0.00500	1	06/11/2019 21:02	WG1291740
Manganese,Dissolved	0.837		0.00500	1	06/11/2019 18:52	WG1293088
Nickel	0.00880		0.00200	1	06/11/2019 21:02	WG1291740
Nickel,Dissolved	0.00631		0.00200	1	06/11/2019 18:52	WG1293088
Potassium	1.16		1.00	1	06/11/2019 21:02	WG1291740
Potassium,Dissolved	1.11		1.00	1	06/11/2019 18:52	WG1293088
Selenium	ND		0.00200	1	06/11/2019 21:02	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Silver	ND		0.00200	1	06/11/2019 21:02	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Sodium	2.88		1.00	1	06/11/2019 21:02	WG1291740
Sodium,Dissolved	3.06		1.00	1	06/13/2019 11:09	WG1293088
Thallium	ND		0.00200	1	06/11/2019 21:02	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 18:52	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 21:02	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 18:52	WG1293088
Zinc	ND		0.0250	1	06/11/2019 21:02	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 18:52	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 20:43	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 20:43	WG1293258
Benzene	ND		0.00100	1	06/08/2019 20:43	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 20:43	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 20:43	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 20:43	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 20:43	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 20:43	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 20:43	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 20:43	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 20:43	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 20:43	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 20:43	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 20:43	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 20:43	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 20:43	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 20:43	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 20:43	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 20:43	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 20:43	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 20:43	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 20:43	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 20:43	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 20:43	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 20:43	WG1293258
Styrene	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 20:43	WG1293258
Toluene	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 20:43	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 20:43	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 20:43	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 20:43	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 20:43	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 20:43	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 20:43	WG1293258
(S) Toluene-d8	*101*		*80.0-120*		*06/08/2019 20:43*	WG1293258
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*06/08/2019 20:43*	WG1293258
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*06/08/2019 20:43*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 17:57	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 17:57	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	223	B	150	5	06/10/2019 17:06	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	06/09/2019 14:50	WG1293367

Sample Narrative:
L1105572-02 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/07/2019 13:52	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/13/2019 17:11	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/05/2019 23:57	WG1291609
Chloride	23.9		1.00	1	06/05/2019 23:57	WG1291609
Fluoride	0.183	B	0.100	1	06/05/2019 23:57	WG1291609
Nitrate	1.07		0.100	1	06/05/2019 23:57	WG1291609
Sulfate	219		25.0	5	06/06/2019 00:26	WG1291609

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/06/2019 18:06	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:29	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/07/2019 17:56	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:26	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.178		0.100	1	06/11/2019 21:10	WG1291740
Aluminum,Dissolved	0.147		0.100	1	06/11/2019 19:07	WG1293088
Antimony	ND		0.00200	1	06/11/2019 21:10	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 19:07	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 21:10	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Barium	0.0584		0.00500	1	06/11/2019 21:10	WG1291740
Barium,Dissolved	0.0599		0.00500	1	06/11/2019 19:07	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 21:10	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Cadmium	0.0292		0.00100	1	06/11/2019 21:10	WG1291740
Cadmium,Dissolved	0.0297		0.00100	1	06/11/2019 19:07	WG1293088
Calcium	56.4		1.00	1	06/11/2019 21:10	WG1291740
Calcium,Dissolved	57.1		1.00	1	06/11/2019 19:07	WG1293088
Chromium	0.00402	B	0.00200	1	06/11/2019 21:10	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Cobalt	0.00398		0.00200	1	06/11/2019 21:10	WG1291740
Cobalt,Dissolved	0.00382		0.00200	1	06/11/2019 19:07	WG1293088
Copper	ND		0.00500	1	06/11/2019 21:10	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 19:07	WG1293088
Iron	0.141		0.100	1	06/11/2019 21:10	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 19:07	WG1293088
Lead	ND		0.00200	1	06/11/2019 21:10	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Magnesium	20.8		1.00	1	06/11/2019 21:10	WG1291740
Magnesium,Dissolved	22.3		1.00	1	06/11/2019 19:07	WG1293088
Manganese	1.27		0.00500	1	06/11/2019 21:10	WG1291740
Manganese,Dissolved	1.32		0.00500	1	06/11/2019 19:07	WG1293088
Nickel	0.0397		0.00200	1	06/11/2019 21:10	WG1291740
Nickel,Dissolved	0.0403		0.00200	1	06/11/2019 19:07	WG1293088
Potassium	7.52		1.00	1	06/11/2019 21:10	WG1291740
Potassium,Dissolved	7.43		1.00	1	06/11/2019 19:07	WG1293088
Selenium	ND		0.00200	1	06/11/2019 21:10	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Silver	ND		0.00200	1	06/11/2019 21:10	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Sodium	9.62		1.00	1	06/11/2019 21:10	WG1291740
Sodium,Dissolved	9.82		1.00	1	06/13/2019 12:26	WG1293088
Thallium	ND		0.00200	1	06/11/2019 21:10	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 19:07	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 21:10	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 19:07	WG1293088
Zinc	0.197		0.0250	1	06/11/2019 21:10	WG1291740
Zinc,Dissolved	0.200		0.0250	1	06/11/2019 19:07	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 21:02	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 21:02	WG1293258
Benzene	ND		0.00100	1	06/08/2019 21:02	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 21:02	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 21:02	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 21:02	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 21:02	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 21:02	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 21:02	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 21:02	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 21:02	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 21:02	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:02	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 21:02	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 21:02	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:02	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 21:02	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:02	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:02	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 21:02	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 21:02	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 21:02	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 21:02	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 21:02	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 21:02	WG1293258
Styrene	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 21:02	WG1293258
Toluene	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 21:02	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 21:02	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 21:02	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 21:02	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 21:02	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 21:02	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 21:02	WG1293258
(S) Toluene-d8	*99.3*		*80.0-120*		*06/08/2019 21:02*	WG1293258
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*06/08/2019 21:02*	WG1293258
(S) 1,2-Dichloroethane-d4	*107*		*70.0-130*		*06/08/2019 21:02*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 18:10	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 18:10	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	06/10/2019 16:51	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 14:56	WG1293367

Sample Narrative:
L1105572-03 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 13:57	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:11	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/06/2019 00:46	WG1291609
Chloride	8.40		1.00	1	06/06/2019 00:46	WG1291609
Fluoride	ND		0.100	1	06/06/2019 00:46	WG1291609
Nitrate	0.616		0.100	1	06/06/2019 00:46	WG1291609
Sulfate	ND		5.00	1	06/06/2019 00:46	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:09	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:31	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:19	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:29	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/11/2019 21:17	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 19:11	WG1293088
Antimony	ND		0.00200	1	06/11/2019 21:17	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 19:11	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 21:17	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Barium	0.00921		0.00500	1	06/11/2019 21:17	WG1291740
Barium,Dissolved	0.00832		0.00500	1	06/11/2019 19:11	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 21:17	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 21:17	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 19:11	WG1293088
Calcium	5.19		1.00	1	06/11/2019 21:17	WG1291740
Calcium,Dissolved	4.94		1.00	1	06/11/2019 19:11	WG1293088
Chromium	ND		0.00200	1	06/11/2019 21:17	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Cobalt	ND		0.00200	1	06/11/2019 21:17	WG1291740
Cobalt,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Copper	ND		0.00500	1	06/11/2019 21:17	WG1291740
Copper,Dissolved	ND		0.00500	1	06/13/2019 12:31	WG1293088
Iron	0.583		0.100	1	06/11/2019 21:17	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 19:11	WG1293088
Lead	ND		0.00200	1	06/11/2019 21:17	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Magnesium	2.88		1.00	1	06/11/2019 21:17	WG1291740
Magnesium,Dissolved	2.81		1.00	1	06/11/2019 19:11	WG1293088
Manganese	0.0415		0.00500	1	06/11/2019 21:17	WG1291740
Manganese,Dissolved	0.0355		0.00500	1	06/11/2019 19:11	WG1293088
Nickel	ND		0.00200	1	06/11/2019 21:17	WG1291740
Nickel,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Potassium	ND		1.00	1	06/11/2019 21:17	WG1291740
Potassium,Dissolved	ND		1.00	1	06/11/2019 19:11	WG1293088
Selenium	ND		0.00200	1	06/11/2019 21:17	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Silver	ND		0.00200	1	06/11/2019 21:17	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Sodium	3.75		1.00	1	06/11/2019 21:17	WG1291740
Sodium,Dissolved	3.90		1.00	1	06/13/2019 12:31	WG1293088
Thallium	ND		0.00200	1	06/11/2019 21:17	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 19:11	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 21:17	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 19:11	WG1293088
Zinc	ND		0.0250	1	06/11/2019 21:17	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 19:11	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 21:21	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 21:21	WG1293258
Benzene	ND		0.00100	1	06/08/2019 21:21	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 21:21	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 21:21	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 21:21	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 21:21	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 21:21	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 21:21	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 21:21	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 21:21	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 21:21	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:21	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 21:21	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 21:21	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:21	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 21:21	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:21	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:21	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 21:21	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 21:21	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 21:21	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 21:21	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 21:21	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 21:21	WG1293258
Styrene	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 21:21	WG1293258
Toluene	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 21:21	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 21:21	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 21:21	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 21:21	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 21:21	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 21:21	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 21:21	WG1293258
(S) Toluene-d8	*98.8*		*80.0-120*		*06/08/2019 21:21*	WG1293258
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*06/08/2019 21:21*	WG1293258
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*06/08/2019 21:21*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 18:47	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 18:47	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	104		30.0	1	06/10/2019 16:52	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 15:02	WG1293367

Sample Narrative:
L1105572-04 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 13:58	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:12	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/05/2019 21:24	WG1291609
Chloride	83.5		1.00	1	06/05/2019 21:24	WG1291609
Fluoride	ND		0.100	1	06/05/2019 21:24	WG1291609
Nitrate	1.33		0.100	1	06/05/2019 21:24	WG1291609
Sulfate	6.48		5.00	1	06/05/2019 21:24	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:11	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:33	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:37	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:21	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/11/2019 19:14	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 21:38	WG1293088
Antimony	ND		0.00200	1	06/11/2019 19:14	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 21:38	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 19:14	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Barium	0.0493		0.00500	1	06/11/2019 19:14	WG1291740
Barium,Dissolved	0.0482		0.00500	1	06/11/2019 21:38	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 19:14	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 19:14	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 21:38	WG1293088
Calcium	18.3		1.00	1	06/11/2019 19:14	WG1291740
Calcium,Dissolved	18.4		1.00	1	06/11/2019 21:38	WG1293088
Chromium	0.00415	B	0.00200	1	06/11/2019 19:14	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Cobalt	0.00248		0.00200	1	06/11/2019 19:14	WG1291740
Cobalt,Dissolved	0.00240		0.00200	1	06/11/2019 21:38	WG1293088
Copper	ND		0.00500	1	06/11/2019 19:14	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 21:38	WG1293088
Iron	ND		0.100	1	06/11/2019 19:14	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 21:38	WG1293088
Lead	ND		0.00200	1	06/11/2019 19:14	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Magnesium	12.9		1.00	1	06/11/2019 19:14	WG1291740
Magnesium,Dissolved	12.7		1.00	1	06/11/2019 21:38	WG1293088
Manganese	0.193		0.00500	1	06/11/2019 19:14	WG1291740
Manganese,Dissolved	0.183		0.00500	1	06/11/2019 21:38	WG1293088
Nickel	0.00767		0.00200	1	06/11/2019 19:14	WG1291740
Nickel,Dissolved	0.00799		0.00200	1	06/11/2019 21:38	WG1293088
Potassium	1.45		1.00	1	06/11/2019 19:14	WG1291740
Potassium,Dissolved	1.46		1.00	1	06/11/2019 21:38	WG1293088
Selenium	ND		0.00200	1	06/11/2019 19:14	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Silver	ND		0.00200	1	06/11/2019 19:14	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Sodium	20.5		1.00	1	06/13/2019 12:37	WG1291740
Sodium,Dissolved	19.8		1.00	1	06/11/2019 21:38	WG1293088
Thallium	ND		0.00200	1	06/11/2019 19:14	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 21:38	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 19:14	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 21:38	WG1293088
Zinc	ND		0.0250	1	06/11/2019 19:14	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 21:38	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 21:40	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 21:40	WG1293258
Benzene	ND		0.00100	1	06/08/2019 21:40	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 21:40	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 21:40	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 21:40	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 21:40	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 21:40	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 21:40	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 21:40	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 21:40	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 21:40	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:40	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 21:40	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 21:40	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:40	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 21:40	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:40	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:40	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 21:40	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 21:40	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 21:40	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 21:40	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 21:40	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 21:40	WG1293258
Styrene	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 21:40	WG1293258
Toluene	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 21:40	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 21:40	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 21:40	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 21:40	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 21:40	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 21:40	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 21:40	WG1293258
(S) Toluene-d8	*104*		*80.0-120*		*06/08/2019 21:40*	WG1293258
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*06/08/2019 21:40*	WG1293258
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*06/08/2019 21:40*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 18:59	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 18:59	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	33.9	B	30.0	1	06/10/2019 16:53	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 15:09	WG1293367

Sample Narrative:
L1105572-05 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 14:00	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:12	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/06/2019 01:42	WG1291609
Chloride	16.7		1.00	1	06/06/2019 01:42	WG1291609
Fluoride	ND		0.100	1	06/06/2019 01:42	WG1291609
Nitrate	1.76		0.100	1	06/06/2019 01:42	WG1291609
Sulfate	ND		5.00	1	06/06/2019 01:42	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:14	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:36	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:24	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:40	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.238		0.100	1	06/11/2019 21:46	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 19:26	WG1293088
Antimony	ND		0.00200	1	06/11/2019 21:46	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 19:26	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 21:46	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Barium	0.0165		0.00500	1	06/11/2019 21:46	WG1291740
Barium,Dissolved	0.0150		0.00500	1	06/11/2019 19:26	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 21:46	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 21:46	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 19:26	WG1293088
Calcium	9.59		1.00	1	06/11/2019 21:46	WG1291740
Calcium,Dissolved	9.52		1.00	1	06/11/2019 19:26	WG1293088
Chromium	ND		0.00200	1	06/11/2019 21:46	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Cobalt	ND		0.00200	1	06/11/2019 21:46	WG1291740
Cobalt,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Copper	ND		0.00500	1	06/11/2019 21:46	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 19:26	WG1293088
Iron	0.377		0.100	1	06/11/2019 21:46	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 19:26	WG1293088
Lead	ND		0.00200	1	06/11/2019 21:46	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Magnesium	2.84		1.00	1	06/11/2019 21:46	WG1291740
Magnesium,Dissolved	2.80		1.00	1	06/11/2019 19:26	WG1293088
Manganese	0.0593		0.00500	1	06/11/2019 21:46	WG1291740
Manganese,Dissolved	0.0497		0.00500	1	06/11/2019 19:26	WG1293088
Nickel	ND		0.00200	1	06/11/2019 21:46	WG1291740
Nickel,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Potassium	1.01		1.00	1	06/11/2019 21:46	WG1291740
Potassium,Dissolved	ND		1.00	1	06/11/2019 19:26	WG1293088
Selenium	ND		0.00200	1	06/11/2019 21:46	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Silver	ND		0.00200	1	06/11/2019 21:46	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Sodium	3.74		1.00	1	06/11/2019 21:46	WG1291740
Sodium,Dissolved	3.67		1.00	1	06/13/2019 12:42	WG1293088
Thallium	ND		0.00200	1	06/11/2019 21:46	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 19:26	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 21:46	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 19:26	WG1293088
Zinc	ND		0.0250	1	06/11/2019 21:46	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 19:26	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 21:58	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 21:58	WG1293258
Benzene	ND		0.00100	1	06/08/2019 21:58	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 21:58	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 21:58	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 21:58	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 21:58	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 21:58	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 21:58	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 21:58	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 21:58	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 21:58	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 21:58	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 21:58	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 21:58	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:58	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 21:58	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:58	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 21:58	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 21:58	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 21:58	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 21:58	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 21:58	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 21:58	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 21:58	WG1293258
Styrene	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 21:58	WG1293258
Toluene	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 21:58	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 21:58	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 21:58	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 21:58	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 21:58	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 21:58	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 21:58	WG1293258
(S) Toluene-d8	*102*		*80.0-120*		*06/08/2019 21:58*	WG1293258
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*06/08/2019 21:58*	WG1293258
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*06/08/2019 21:58*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 19:11	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 19:11	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	31.3	B	30.0	1	06/10/2019 16:54	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	06/09/2019 15:15	WG1293367

Sample Narrative:
L1105572-06 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/07/2019 14:06	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/13/2019 17:12	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/05/2019 22:29	WG1291609
Chloride	19.6		1.00	1	06/05/2019 22:29	WG1291609
Fluoride	ND		0.100	1	06/05/2019 22:29	WG1291609
Nitrate	0.646		0.100	1	06/05/2019 22:29	WG1291609
Sulfate	ND		5.00	1	06/05/2019 22:29	WG1291609

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/06/2019 18:21	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:38	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/07/2019 18:43	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:26	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.436		0.100	1	06/11/2019 19:30	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 21:53	WG1293088
Antimony	ND		0.00200	1	06/11/2019 19:30	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 21:53	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 19:30	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Barium	0.0279		0.00500	1	06/11/2019 19:30	WG1291740
Barium,Dissolved	0.0234		0.00500	1	06/11/2019 21:53	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 19:30	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 19:30	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 21:53	WG1293088
Calcium	8.38		1.00	1	06/11/2019 19:30	WG1291740
Calcium,Dissolved	8.58		1.00	1	06/11/2019 21:53	WG1293088
Chromium	ND		0.00200	1	06/11/2019 19:30	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Cobalt	ND		0.00200	1	06/11/2019 19:30	WG1291740
Cobalt,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Copper	ND		0.00500	1	06/11/2019 19:30	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 21:53	WG1293088
Iron	0.642		0.100	1	06/11/2019 19:30	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 21:53	WG1293088
Lead	ND		0.00200	1	06/11/2019 19:30	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Magnesium	3.08		1.00	1	06/11/2019 19:30	WG1291740
Magnesium,Dissolved	3.05		1.00	1	06/11/2019 21:53	WG1293088
Manganese	0.0112		0.00500	1	06/11/2019 19:30	WG1291740
Manganese,Dissolved	ND		0.00500	1	06/11/2019 21:53	WG1293088
Nickel	ND		0.00200	1	06/11/2019 19:30	WG1291740
Nickel,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Potassium	ND		1.00	1	06/11/2019 19:30	WG1291740
Potassium,Dissolved	ND		1.00	1	06/11/2019 21:53	WG1293088
Selenium	ND		0.00200	1	06/11/2019 19:30	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Silver	ND		0.00200	1	06/11/2019 19:30	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Sodium	3.85		1.00	1	06/13/2019 12:47	WG1291740
Sodium,Dissolved	3.72		1.00	1	06/11/2019 21:53	WG1293088
Thallium	ND		0.00200	1	06/11/2019 19:30	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 21:53	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 19:30	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 21:53	WG1293088
Zinc	ND		0.0250	1	06/11/2019 19:30	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 21:53	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 22:17	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 22:17	WG1293258
Benzene	ND		0.00100	1	06/08/2019 22:17	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 22:17	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 22:17	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 22:17	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 22:17	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 22:17	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 22:17	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 22:17	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 22:17	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 22:17	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:17	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 22:17	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 22:17	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:17	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 22:17	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:17	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:17	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 22:17	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 22:17	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 22:17	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 22:17	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 22:17	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 22:17	WG1293258
Styrene	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 22:17	WG1293258
Toluene	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 22:17	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 22:17	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 22:17	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 22:17	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 22:17	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 22:17	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 22:17	WG1293258
(S) Toluene-d8	*100*		*80.0-120*		*06/08/2019 22:17*	WG1293258
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*06/08/2019 22:17*	WG1293258
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*06/08/2019 22:17*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 19:24	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 19:24	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	84.5		30.0	1	06/10/2019 16:55	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 15:31	WG1293367

Sample Narrative:
L1105572-07 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 14:08	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:12	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/05/2019 22:40	WG1291609
Chloride	59.4		1.00	1	06/05/2019 22:40	WG1291609
Fluoride	ND		0.100	1	06/05/2019 22:40	WG1291609
Nitrate	4.99		0.100	1	06/05/2019 22:40	WG1291609
Sulfate	ND		5.00	1	06/05/2019 22:40	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:23	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:41	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:46	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:29	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/11/2019 19:34	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 22:00	WG1293088
Antimony	ND		0.00200	1	06/11/2019 19:34	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 22:00	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 19:34	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Barium	0.0440		0.00500	1	06/11/2019 19:34	WG1291740
Barium,Dissolved	0.0433		0.00500	1	06/11/2019 22:00	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 19:34	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Cadmium	ND		0.00100	1	06/11/2019 19:34	WG1291740
Cadmium,Dissolved	ND		0.00100	1	06/11/2019 22:00	WG1293088
Calcium	20.6		1.00	1	06/11/2019 19:34	WG1291740
Calcium,Dissolved	20.4		1.00	1	06/11/2019 22:00	WG1293088
Chromium	ND		0.00200	1	06/11/2019 19:34	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Cobalt	ND		0.00200	1	06/11/2019 19:34	WG1291740
Cobalt,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Copper	0.00505	B	0.00500	1	06/11/2019 19:34	WG1291740
Copper,Dissolved	ND		0.00500	1	06/11/2019 22:00	WG1293088
Iron	0.128		0.100	1	06/11/2019 19:34	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 22:00	WG1293088
Lead	ND		0.00200	1	06/11/2019 19:34	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Magnesium	6.76		1.00	1	06/11/2019 19:34	WG1291740
Magnesium,Dissolved	6.75		1.00	1	06/11/2019 22:00	WG1293088
Manganese	0.0150		0.00500	1	06/11/2019 19:34	WG1291740
Manganese,Dissolved	0.0114		0.00500	1	06/11/2019 22:00	WG1293088
Nickel	ND		0.00200	1	06/11/2019 19:34	WG1291740
Nickel,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Potassium	1.74		1.00	1	06/11/2019 19:34	WG1291740
Potassium,Dissolved	1.77		1.00	1	06/11/2019 22:00	WG1293088
Selenium	ND		0.00200	1	06/11/2019 19:34	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Silver	ND		0.00200	1	06/11/2019 19:34	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Sodium	12.9		1.00	1	06/13/2019 12:53	WG1291740
Sodium,Dissolved	12.4		1.00	1	06/11/2019 22:00	WG1293088
Thallium	ND		0.00200	1	06/11/2019 19:34	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 22:00	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 19:34	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 22:00	WG1293088
Zinc	ND		0.0250	1	06/11/2019 19:34	WG1291740
Zinc,Dissolved	ND		0.0250	1	06/11/2019 22:00	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 22:35	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 22:35	WG1293258
Benzene	ND		0.00100	1	06/08/2019 22:35	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 22:35	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 22:35	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 22:35	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 22:35	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 22:35	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 22:35	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 22:35	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 22:35	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 22:35	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:35	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 22:35	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 22:35	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:35	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 22:35	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:35	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:35	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 22:35	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 22:35	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 22:35	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 22:35	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 22:35	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 22:35	WG1293258
Styrene	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 22:35	WG1293258
Toluene	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 22:35	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 22:35	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 22:35	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 22:35	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 22:35	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 22:35	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 22:35	WG1293258
(S) Toluene-d8	*97.6*		*80.0-120*		*06/08/2019 22:35*	WG1293258
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*06/08/2019 22:35*	WG1293258
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*06/08/2019 22:35*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 19:36	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 19:36	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	238		150	5	06/10/2019 17:07	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 15:37	WG1293367

Sample Narrative:
L1105572-08 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 14:09	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:13	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/05/2019 23:13	WG1291609
Chloride	24.0		1.00	1	06/05/2019 23:13	WG1291609
Fluoride	0.185	B	0.100	1	06/05/2019 23:13	WG1291609
Nitrate	1.05		0.100	1	06/05/2019 23:13	WG1291609
Sulfate	213		25.0	5	06/06/2019 00:57	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:26	WG1291601
Mercury,Dissolved	ND		0.000200	1	06/06/2019 21:43	WG1291603

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:31	WG1291830
Boron,Dissolved	ND		0.200	1	06/07/2019 18:48	WG1291742

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.166		0.100	1	06/11/2019 22:07	WG1291740
Aluminum,Dissolved	0.142		0.100	1	06/11/2019 19:38	WG1293088
Antimony	ND		0.00200	1	06/11/2019 22:07	WG1291740
Antimony,Dissolved	ND	J4	0.00200	1	06/11/2019 19:38	WG1293088
Arsenic	ND		0.00200	1	06/11/2019 22:07	WG1291740
Arsenic,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Barium	0.0588		0.00500	1	06/11/2019 22:07	WG1291740
Barium,Dissolved	0.0600		0.00500	1	06/11/2019 19:38	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	06/11/2019 22:07	WG1291740
Beryllium,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Cadmium	0.0288		0.00100	1	06/11/2019 22:07	WG1291740
Cadmium,Dissolved	0.0296		0.00100	1	06/11/2019 19:38	WG1293088
Calcium	56.4		1.00	1	06/11/2019 22:07	WG1291740
Calcium,Dissolved	57.3		1.00	1	06/11/2019 19:38	WG1293088
Chromium	0.00325	B	0.00200	1	06/11/2019 22:07	WG1291740
Chromium,Dissolved	0.00637		0.00200	1	06/11/2019 19:38	WG1293088
Cobalt	0.00371		0.00200	1	06/11/2019 22:07	WG1291740
Cobalt,Dissolved	0.00392		0.00200	1	06/11/2019 19:38	WG1293088
Copper	ND		0.00500	1	06/11/2019 22:07	WG1291740
Copper,Dissolved	0.00558	B	0.00500	1	06/13/2019 12:58	WG1293088
Iron	ND		0.100	1	06/11/2019 22:07	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 19:38	WG1293088
Lead	ND		0.00200	1	06/11/2019 22:07	WG1291740
Lead,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Magnesium	21.4		1.00	1	06/11/2019 22:07	WG1291740
Magnesium,Dissolved	22.1		1.00	1	06/11/2019 19:38	WG1293088
Manganese	1.29		0.00500	1	06/11/2019 22:07	WG1291740
Manganese,Dissolved	1.32		0.00500	1	06/11/2019 19:38	WG1293088
Nickel	0.0397		0.00200	1	06/11/2019 22:07	WG1291740
Nickel,Dissolved	0.0436		0.00200	1	06/11/2019 19:38	WG1293088
Potassium	7.63		1.00	1	06/11/2019 22:07	WG1291740
Potassium,Dissolved	7.47		1.00	1	06/11/2019 19:38	WG1293088
Selenium	ND		0.00200	1	06/11/2019 22:07	WG1291740
Selenium,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Silver	ND		0.00200	1	06/11/2019 22:07	WG1291740
Silver,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Sodium	9.88		1.00	1	06/11/2019 22:07	WG1291740
Sodium,Dissolved	9.92		1.00	1	06/13/2019 12:58	WG1293088
Thallium	ND		0.00200	1	06/11/2019 22:07	WG1291740
Thallium,Dissolved	ND		0.00200	1	06/11/2019 19:38	WG1293088
Vanadium	ND		0.00500	1	06/11/2019 22:07	WG1291740
Vanadium,Dissolved	ND		0.00500	1	06/11/2019 19:38	WG1293088
Zinc	0.198		0.0250	1	06/11/2019 22:07	WG1291740
Zinc,Dissolved	0.201		0.0250	1	06/11/2019 19:38	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 22:54	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 22:54	WG1293258
Benzene	ND		0.00100	1	06/08/2019 22:54	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 22:54	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 22:54	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 22:54	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 22:54	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 22:54	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 22:54	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 22:54	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 22:54	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 22:54	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 22:54	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 22:54	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 22:54	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:54	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 22:54	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:54	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 22:54	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 22:54	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 22:54	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 22:54	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 22:54	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 22:54	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 22:54	WG1293258
Styrene	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 22:54	WG1293258
Toluene	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 22:54	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 22:54	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 22:54	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 22:54	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 22:54	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 22:54	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 22:54	WG1293258
(S) Toluene-d8	*98.1*		*80.0-120*		*06/08/2019 22:54*	WG1293258
(S) 4-Bromofluorobenzene	*102*		*77.0-126*		*06/08/2019 22:54*	WG1293258
(S) 1,2-Dichloroethane-d4	*108*		*70.0-130*		*06/08/2019 22:54*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 19:48	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 19:48	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	06/10/2019 16:58	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/09/2019 15:43	WG1293367

Sample Narrative:
L1105572-09 WG1293367: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/07/2019 14:11	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	06/13/2019 17:13	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/05/2019 23:24	WG1291609
Chloride	ND		1.00	1	06/05/2019 23:24	WG1291609
Fluoride	ND		0.100	1	06/05/2019 23:24	WG1291609
Nitrate	ND		0.100	1	06/05/2019 23:24	WG1291609
Sulfate	ND		5.00	1	06/05/2019 23:24	WG1291609

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 18:28	WG1291601

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/07/2019 18:34	WG1291830

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/11/2019 22:14	WG1291740
Antimony	ND		0.00200	1	06/11/2019 22:14	WG1291740
Arsenic	ND		0.00200	1	06/11/2019 22:14	WG1291740
Barium	ND		0.00500	1	06/11/2019 22:14	WG1291740
Beryllium	ND		0.00200	1	06/11/2019 22:14	WG1291740
Cadmium	ND		0.00100	1	06/11/2019 22:14	WG1291740
Calcium	ND		1.00	1	06/11/2019 22:14	WG1291740
Chromium	ND		0.00200	1	06/11/2019 22:14	WG1291740
Cobalt	ND		0.00200	1	06/11/2019 22:14	WG1291740
Copper	ND		0.00500	1	06/11/2019 22:14	WG1291740

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	ND		0.100	1	06/11/2019 22:14	WG1291740
Lead	ND		0.00200	1	06/11/2019 22:14	WG1291740
Magnesium	ND		1.00	1	06/11/2019 22:14	WG1291740
Manganese	ND		0.00500	1	06/21/2019 00:53	WG1299538
Nickel	ND		0.00200	1	06/11/2019 22:14	WG1291740
Potassium	ND		1.00	1	06/11/2019 22:14	WG1291740
Selenium	ND		0.00200	1	06/11/2019 22:14	WG1291740
Silver	ND		0.00200	1	06/11/2019 22:14	WG1291740
Sodium	ND		1.00	1	06/11/2019 22:14	WG1291740
Thallium	ND		0.00200	1	06/11/2019 22:14	WG1291740
Vanadium	ND		0.00500	1	06/11/2019 22:14	WG1291740
Zinc	ND		0.0250	1	06/11/2019 22:14	WG1291740

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 18:50	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 18:50	WG1293258
Benzene	ND		0.00100	1	06/08/2019 18:50	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 18:50	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 18:50	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 18:50	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 18:50	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 18:50	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 18:50	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 18:50	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 18:50	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 18:50	WG1293258
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 18:50	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 18:50	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 18:50	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 18:50	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 18:50	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 18:50	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 18:50	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 18:50	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 18:50	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 18:50	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 18:50	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 18:50	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 18:50	WG1293258
Styrene	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 18:50	WG1293258
Toluene	ND		0.00100	1	06/08/2019 18:50	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 18:50	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 18:50	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 18:50	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 18:50	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 18:50	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 18:50	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 18:50	WG1293258
(S) Toluene-d8	*102*		*80.0-120*		*06/08/2019 18:50*	WG1293258
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*06/08/2019 18:50*	WG1293258
(S) 1,2-Dichloroethane-d4	*103*		*70.0-130*		*06/08/2019 18:50*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 20:01	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 20:01	WG1291822

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/08/2019 18:32	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 18:32	WG1293258
Benzene	ND		0.00100	1	06/08/2019 18:32	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 18:32	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 18:32	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 18:32	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 18:32	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 18:32	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 18:32	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 18:32	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 18:32	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 18:32	WG1293258
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 18:32	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 18:32	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 18:32	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 18:32	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 18:32	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 18:32	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 18:32	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 18:32	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 18:32	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 18:32	WG1293258
2-Butanone (MEK)	ND		0.0100	1	06/08/2019 18:32	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 18:32	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 18:32	WG1293258
Styrene	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 18:32	WG1293258
Toluene	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 18:32	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 18:32	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 18:32	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 18:32	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 18:32	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 18:32	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 18:32	WG1293258
(S) Toluene-d8	*100*		*80.0-120*		*06/08/2019 18:32*	WG1293258
(S) 4-Bromofluorobenzene	*104*		*77.0-126*		*06/08/2019 18:32*	WG1293258
(S) 1,2-Dichloroethane-d4	*109*		*70.0-130*		*06/08/2019 18:32*	WG1293258

Method Blank (MB)

(MB) R3419652-1 06/10/19 16:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.76	J	1.43	30.0

L1105457-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105457-01 06/10/19 16:43 • (DUP) R3419652-5 06/10/19 16:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	110	110	1	0.000		20

L1105625-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1105625-02 06/10/19 17:01 • (DUP) R3419652-6 06/10/19 17:02

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	61.6	60.8	1	1.31		20

Laboratory Control Sample (LCS)

(LCS) R3419652-2 06/10/19 16:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	150	153	102	85.0-115	

L1105353-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105353-01 06/10/19 16:40 • (MS) R3419652-3 06/10/19 16:41 • (MSD) R3419652-4 06/10/19 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	152	231	232	52.7	53.3	1	80.0-120	E J6	E J6	0.432	20

Method Blank (MB)

(MB) R3419303-1 06/09/19 14:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	7.65	J	2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1105688-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1105688-02 06/09/19 14:19 • (DUP) R3419303-2 06/09/19 14:27

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	357	357	1	0.125		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

L1105679-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1105679-03 06/09/19 16:59 • (DUP) R3419303-4 06/09/19 17:06

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	6.92	6.86	1	0.911	J	20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3419303-3 06/09/19 15:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	104	104	85.0-115	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3418972-1 06/07/19 13:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1105572-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105572-01 06/07/19 13:49 • (DUP) R3418972-3 06/07/19 13:50

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

L1105805-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105805-01 06/07/19 14:32 • (DUP) R3418972-6 06/07/19 14:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3418972-2 06/07/19 13:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.38	98.4	90.0-110	

L1105572-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-02 06/07/19 13:52 • (MS) R3418972-4 06/07/19 13:54 • (MSD) R3418972-5 06/07/19 13:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	ND	5.29	4.86	106	97.2	1	90.0-110			8.38	10

L1105974-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1105974-01 06/07/19 14:35 • (MS) R3418972-7 06/07/19 14:36

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	U	4.82	96.4	1	90.0-110	

Method Blank (MB)

(MB) R3420883-1 06/13/19 17:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3.00	10.0

L1103527-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1103527-01 06/13/19 17:10 • (DUP) R3420883-3 06/13/19 17:10

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	32.8	32.6	1	0.813		20

L1105725-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105725-01 06/13/19 17:17 • (DUP) R3420883-6 06/13/19 17:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	9.56	10.8	1	12.6		20

Laboratory Control Sample (LCS)

(LCS) R3420883-2 06/13/19 17:09

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	222	215	96.9	90.0-110	

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/13/19 17:11 • (MS) R3420883-4 06/13/19 17:11 • (MSD) R3420883-5 06/13/19 17:11

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	410	411	102	103	1	80.0-120			0.380	20

Method Blank (MB)

(MB) R3418217-1 06/05/19 17:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	0.0606	J	0.00990	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L1105572-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1105572-05 06/06/19 01:42 • (DUP) R3418217-3 06/05/19 21:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	16.7	16.5	1	1.14		15
Fluoride	ND	0.000	1	0.000		15
Nitrate	1.76	1.75	1	0.803		15
Sulfate	ND	0.483	1	9.24	J	15

Laboratory Control Sample (LCS)

(LCS) R3418217-2 06/05/19 17:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	40.7	102	80.0-120	
Chloride	40.0	40.2	100	80.0-120	
Fluoride	8.00	8.23	103	80.0-120	
Nitrate	8.00	8.68	108	80.0-120	
Sulfate	40.0	40.9	102	80.0-120	

L1105572-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-05 06/06/19 01:42 • (MS) R3418217-4 06/05/19 22:08 • (MSD) R3418217-5 06/05/19 22:18

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	50.7	51.6	101	103	1	80.0-120			1.81	15
Chloride	50.0	16.7	65.9	67.0	98.5	101	1	80.0-120			1.69	15
Fluoride	5.00	ND	5.12	5.23	102	105	1	80.0-120			2.12	15
Nitrate	5.00	1.76	7.20	7.30	109	111	1	80.0-120			1.45	15
Sulfate	50.0	ND	51.0	51.9	101	103	1	80.0-120			1.79	15

Method Blank (MB)

(MB) R3418601-1 06/06/19 17:52

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3418601-2 06/06/19 17:54 • (LCSD) R3418601-3 06/06/19 17:57

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00282	0.00285	94.1	94.9	80.0-120			0.843	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/06/19 17:59 • (MS) R3418601-4 06/06/19 18:02 • (MSD) R3418601-5 06/06/19 18:04

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.000889	0.00377	0.00363	96.0	91.2	1	75.0-125			3.83	20

Method Blank (MB)

(MB) R3418605-1 06/06/19 20:33

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3418605-2 06/06/19 20:35 • (LCSD) R3418605-3 06/06/19 20:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00280	0.00281	93.3	93.6	80.0-120			0.339	20

L1105238-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105238-01 06/06/19 20:40 • (MS) R3418605-4 06/06/19 20:47 • (MSD) R3418605-5 06/06/19 20:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	U	0.00287	0.00286	95.6	95.3	1	75.0-125			0.353	20

Method Blank (MB)

(MB) R3419078-1 06/07/19 17:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419078-2 06/07/19 17:33 • (LCSD) R3419078-3 06/07/19 17:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.974	0.955	97.4	95.5	80.0-120			1.95	20

L1105347-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105347-01 06/07/19 17:39 • (MS) R3419078-5 06/07/19 17:44 • (MSD) R3419078-6 06/07/19 17:47

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.185	1.17	1.17	98.5	98.3	1	75.0-125			0.122	20

Method Blank (MB)

(MB) R3419120-1 06/08/19 07:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419120-2 06/08/19 07:32 • (LCSD) R3419120-3 06/08/19 07:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.960	0.960	96.0	96.0	80.0-120			0.0271	20

L1105572-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-02 06/07/19 17:56 • (MS) R3419125-5 06/07/19 18:01 • (MSD) R3419125-6 06/07/19 18:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	1.06	1.06	101	100	1	75.0-125			0.177	20

Method Blank (MB)

(MB) R3420145-1 06/11/19 20:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	0.00615	J	0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	U		0.0460	1.00
Chromium	0.000911	J	0.000540	0.00200
Copper	0.00240	J	0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	0.000321	J	0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	0.000364	J	0.000250	0.00500
Nickel	0.000546	J	0.000350	0.00200
Potassium	0.0545	J	0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	0.182	J	0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	U		0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420145-2 06/11/19 20:19 • (LCSD) R3420145-3 06/11/19 20:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.93	5.01	98.5	100	80.0-120			1.67	20
Antimony	0.0500	0.0566	0.0563	113	113	80.0-120			0.474	20
Arsenic	0.0500	0.0496	0.0510	99.1	102	80.0-120			2.95	20
Barium	0.0500	0.0494	0.0483	98.9	96.6	80.0-120			2.36	20
Beryllium	0.0500	0.0450	0.0475	89.9	95.0	80.0-120			5.50	20
Cadmium	0.0500	0.0491	0.0509	98.2	102	80.0-120			3.64	20
Calcium	5.00	5.00	4.97	100	99.3	80.0-120			0.626	20
Chromium	0.0500	0.0504	0.0515	101	103	80.0-120			2.09	20
Copper	0.0500	0.0504	0.0506	101	101	80.0-120			0.494	20
Cobalt	0.0500	0.0504	0.0509	101	102	80.0-120			0.962	20
Iron	5.00	5.07	5.13	101	103	80.0-120			1.26	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420145-2 06/11/19 20:19 • (LCSD) R3420145-3 06/11/19 20:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0494	0.0509	98.9	102	80.0-120			2.94	20
Magnesium	5.00	4.90	4.97	98.0	99.5	80.0-120			1.48	20
Manganese	0.0500	0.0497	0.0512	99.3	102	80.0-120			3.02	20
Nickel	0.0500	0.0503	0.0510	101	102	80.0-120			1.32	20
Potassium	5.00	4.96	5.03	99.1	101	80.0-120			1.43	20
Selenium	0.0500	0.0494	0.0490	98.7	98.0	80.0-120			0.802	20
Silver	0.0500	0.0505	0.0515	101	103	80.0-120			1.96	20
Sodium	5.00	5.06	5.08	101	102	80.0-120			0.377	20
Thallium	0.0500	0.0487	0.0495	97.3	98.9	80.0-120			1.61	20
Vanadium	0.0500	0.0500	0.0500	100	100	80.0-120			0.0226	20
Zinc	0.0500	0.0526	0.0510	105	102	80.0-120			3.03	20

L1105661-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105661-02 06/11/19 20:34 • (MS) R3420145-5 06/11/19 20:48 • (MSD) R3420145-6 06/11/19 20:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.01	4.95	99.6	98.4	1	75.0-125			1.21	20
Antimony	0.0500	ND	0.0576	0.0593	115	119	1	75.0-125			2.93	20
Arsenic	0.0500	0.0278	0.0755	0.0760	95.3	96.4	1	75.0-125			0.680	20
Barium	0.0500	0.256	0.299	0.301	86.8	89.1	1	75.0-125			0.390	20
Beryllium	0.0500	ND	0.0472	0.0466	93.8	92.7	1	75.0-125			1.25	20
Cadmium	0.0500	ND	0.0509	0.0501	102	100	1	75.0-125			1.61	20
Calcium	5.00	60.0	63.3	63.4	65.7	67.8	1	75.0-125	V	V	0.170	20
Chromium	0.0500	ND	0.0486	0.0504	95.8	99.4	1	75.0-125			3.64	20
Copper	0.0500	ND	0.0502	0.0507	97.8	98.7	1	75.0-125			0.909	20
Cobalt	0.0500	0.186	0.231	0.235	90.3	99.7	1	75.0-125			2.01	20
Potassium	5.00	ND	5.60	5.55	99.4	98.3	1	75.0-125			0.941	20
Lead	0.0500	ND	0.0507	0.0494	100	97.7	1	75.0-125			2.64	20
Magnesium	5.00	11.5	15.9	16.0	87.2	90.0	1	75.0-125			0.900	20
Nickel	0.0500	0.489	0.525	0.530	73.1	83.4	1	75.0-125	V		0.979	20
Selenium	0.0500	ND	0.0512	0.0517	102	103	1	75.0-125			1.09	20
Silver	0.0500	ND	0.0523	0.0521	105	104	1	75.0-125			0.395	20
Sodium	5.00	3.28	8.11	8.01	96.6	94.4	1	75.0-125			1.36	20
Thallium	0.0500	ND	0.0482	0.0495	95.9	98.4	1	75.0-125			2.54	20
Vanadium	0.0500	ND	0.0501	0.0493	99.6	98.1	1	75.0-125			1.55	20
Zinc	0.0500	ND	0.0529	0.0530	96.4	96.6	1	75.0-125			0.173	20

Method Blank (MB)

(MB) R3420631-1 06/11/19 18:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	U		0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.000250	0.00200
Barium,Dissolved	U		0.000360	0.00500
Beryllium,Dissolved	U		0.000120	0.00200
Cadmium,Dissolved	U		0.000160	0.00100
Calcium,Dissolved	U		0.0460	1.00
Chromium,Dissolved	U		0.000540	0.00200
Copper,Dissolved	0.000834	J	0.000520	0.00500
Cobalt,Dissolved	U		0.000260	0.00200
Iron,Dissolved	U		0.0150	0.100
Lead,Dissolved	U		0.000240	0.00200
Magnesium,Dissolved	U		0.100	1.00
Manganese,Dissolved	U		0.000250	0.00500
Nickel,Dissolved	U		0.000350	0.00200
Potassium,Dissolved	U		0.0370	1.00
Selenium,Dissolved	U		0.000380	0.00200
Silver,Dissolved	U		0.000310	0.00200
Thallium,Dissolved	U		0.000190	0.00200
Vanadium,Dissolved	U		0.000180	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Method Blank (MB)

(MB) R3420979-1 06/13/19 10:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sodium,Dissolved	0.112	J	0.110	1.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420631-2 06/11/19 18:44 • (LCSD) R3420631-3 06/11/19 18:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.04	5.05	101	101	80.0-120			0.0988	20
Antimony,Dissolved	0.0500	0.0665	0.0658	133	132	80.0-120	J4	J4	1.10	20
Arsenic,Dissolved	0.0500	0.0516	0.0511	103	102	80.0-120			0.963	20
Barium,Dissolved	0.0500	0.0507	0.0501	101	100	80.0-120			1.28	20
Beryllium,Dissolved	0.0500	0.0496	0.0499	99.2	99.8	80.0-120			0.606	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420631-2 06/11/19 18:44 • (LCSD) R3420631-3 06/11/19 18:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Cadmium,Dissolved	0.0500	0.0506	0.0509	101	102	80.0-120			0.622	20
Calcium,Dissolved	5.00	5.07	5.03	101	101	80.0-120			0.836	20
Chromium,Dissolved	0.0500	0.0521	0.0518	104	104	80.0-120			0.586	20
Copper,Dissolved	0.0500	0.0517	0.0552	103	110	80.0-120			6.55	20
Cobalt,Dissolved	0.0500	0.0518	0.0511	104	102	80.0-120			1.27	20
Iron,Dissolved	5.00	5.12	5.12	102	102	80.0-120			0.0226	20
Lead,Dissolved	0.0500	0.0509	0.0512	102	102	80.0-120			0.577	20
Magnesium,Dissolved	5.00	5.04	5.04	101	101	80.0-120			0.00649	20
Manganese,Dissolved	0.0500	0.0516	0.0513	103	103	80.0-120			0.472	20
Nickel,Dissolved	0.0500	0.0517	0.0516	103	103	80.0-120			0.190	20
Potassium,Dissolved	5.00	4.95	4.93	99.0	98.7	80.0-120			0.296	20
Selenium,Dissolved	0.0500	0.0512	0.0530	102	106	80.0-120			3.40	20
Silver,Dissolved	0.0500	0.0541	0.0532	108	106	80.0-120			1.82	20
Thallium,Dissolved	0.0500	0.0508	0.0504	102	101	80.0-120			0.834	20
Vanadium,Dissolved	0.0500	0.0512	0.0511	102	102	80.0-120			0.115	20
Zinc,Dissolved	0.0500	0.0522	0.0539	104	108	80.0-120			3.11	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420979-2 06/13/19 10:58 • (LCSD) R3420979-3 06/13/19 11:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sodium,Dissolved	5.00	5.22	5.33	104	107	80.0-120			2.13	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/11/19 18:52 • (MS) R3420631-5 06/11/19 18:59 • (MSD) R3420631-6 06/11/19 19:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	ND	5.10	5.04	102	101	1	75.0-125			1.19	20
Antimony,Dissolved	0.0500	ND	0.0657	0.0657	131	131	1	75.0-125	J5	J5	0.0979	20
Arsenic,Dissolved	0.0500	0.0204	0.0706	0.0699	100	98.9	1	75.0-125			1.05	20
Barium,Dissolved	0.0500	0.0196	0.0699	0.0693	101	99.4	1	75.0-125			0.848	20
Beryllium,Dissolved	0.0500	ND	0.0505	0.0505	101	101	1	75.0-125			0.00789	20
Cadmium,Dissolved	0.0500	ND	0.0508	0.0509	102	102	1	75.0-125			0.146	20
Calcium,Dissolved	5.00	3.77	8.75	8.78	99.5	100	1	75.0-125			0.383	20
Chromium,Dissolved	0.0500	ND	0.0509	0.0500	102	100	1	75.0-125			1.78	20
Copper,Dissolved	0.0500	ND	0.0533	0.0512	101	96.7	1	75.0-125			3.92	20
Cobalt,Dissolved	0.0500	0.0419	0.0916	0.0912	99.4	98.5	1	75.0-125			0.488	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/11/19 18:52 • (MS) R3420631-5 06/11/19 18:59 • (MSD) R3420631-6 06/11/19 19:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Potassium,Dissolved	5.00	1.11	6.11	6.04	100	98.5	1	75.0-125			1.21	20
Iron,Dissolved	5.00	13.4	18.2	18.2	96.7	97.0	1	75.0-125			0.0996	20
Lead,Dissolved	0.0500	ND	0.0508	0.0512	102	102	1	75.0-125			0.865	20
Magnesium,Dissolved	5.00	2.77	7.79	7.77	100	99.9	1	75.0-125			0.209	20
Manganese,Dissolved	0.0500	0.837	0.887	0.885	100	97.0	1	75.0-125			0.183	20
Nickel,Dissolved	0.0500	0.00631	0.0570	0.0561	101	99.6	1	75.0-125			1.52	20
Selenium,Dissolved	0.0500	ND	0.0534	0.0535	107	107	1	75.0-125			0.240	20
Silver,Dissolved	0.0500	ND	0.0536	0.0531	107	106	1	75.0-125			0.902	20
Thallium,Dissolved	0.0500	ND	0.0511	0.0512	102	102	1	75.0-125			0.203	20
Vanadium,Dissolved	0.0500	ND	0.0499	0.0491	99.8	98.2	1	75.0-125			1.70	20
Zinc,Dissolved	0.0500	ND	0.0635	0.0626	98.2	96.5	1	75.0-125			1.36	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/13/19 11:09 • (MS) R3420979-5 06/13/19 11:20 • (MSD) R3420979-6 06/13/19 11:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sodium,Dissolved	5.00	3.06	8.20	8.16	103	102	1	75.0-125			0.488	20

Method Blank (MB)

(MB) R3423234-1 06/21/19 00:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Manganese	0.000255	J	0.000250	0.00500

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423234-2 06/21/19 00:26 • (LCSD) R3423234-3 06/21/19 00:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Manganese	0.0500	0.0510	0.0482	102	96.3	80.0-120			5.67	20

Method Blank (MB)

(MB) R3419985-3 06/08/19 14:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3419985-3 06/08/19 14:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*98.9*			*80.0-120*
(S) 4-Bromofluorobenzene	*100*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419985-1 06/08/19 13:11 • (LCSD) R3419985-2 06/08/19 13:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.158	0.159	127	127	19.0-160			0.121	27
Acrylonitrile	0.125	0.141	0.138	113	110	55.0-149			2.42	20
Benzene	0.0250	0.0240	0.0247	95.8	98.8	70.0-123			3.00	20
Bromodichloromethane	0.0250	0.0249	0.0250	99.6	100	75.0-120			0.426	20
Bromochloromethane	0.0250	0.0269	0.0270	107	108	76.0-122			0.712	20
Bromoform	0.0250	0.0266	0.0266	107	106	68.0-132			0.293	20
Bromomethane	0.0250	0.0250	0.0257	100	103	10.0-160			2.67	25
Carbon disulfide	0.0250	0.0241	0.0244	96.5	97.4	61.0-128			0.948	20
Carbon tetrachloride	0.0250	0.0264	0.0272	106	109	68.0-126			2.71	20
Chlorobenzene	0.0250	0.0251	0.0252	100	101	80.0-121			0.625	20
Chlorodibromomethane	0.0250	0.0248	0.0262	99.2	105	77.0-125			5.36	20
Chloroethane	0.0250	0.0254	0.0259	101	103	47.0-150			1.98	20
Chloroform	0.0250	0.0254	0.0259	101	104	73.0-120			2.27	20
Chloromethane	0.0250	0.0229	0.0248	91.8	99.2	41.0-142			7.77	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0252	0.0251	101	100	58.0-134			0.384	20
1,2-Dibromoethane	0.0250	0.0270	0.0268	108	107	80.0-122			0.836	20
Dibromomethane	0.0250	0.0270	0.0272	108	109	80.0-120			0.778	20
1,2-Dichlorobenzene	0.0250	0.0241	0.0251	96.3	100	79.0-121			4.02	20
1,4-Dichlorobenzene	0.0250	0.0233	0.0237	93.3	94.8	79.0-120			1.66	20
trans-1,4-Dichloro-2-butene	0.0250	0.0204	0.0220	81.8	88.1	33.0-144			7.37	20
1,1-Dichloroethane	0.0250	0.0241	0.0250	96.5	100	70.0-126			3.50	20
1,2-Dichloroethane	0.0250	0.0254	0.0264	101	106	70.0-128			4.13	20
1,1-Dichloroethene	0.0250	0.0244	0.0244	97.5	97.7	71.0-124			0.143	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419985-1 06/08/19 13:11 • (LCSD) R3419985-2 06/08/19 13:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.0250	0.0251	0.0259	101	104	73.0-120			3.13	20
trans-1,2-Dichloroethene	0.0250	0.0239	0.0242	95.5	96.9	73.0-120			1.50	20
1,2-Dichloropropane	0.0250	0.0255	0.0260	102	104	77.0-125			1.84	20
cis-1,3-Dichloropropene	0.0250	0.0248	0.0254	99.1	102	80.0-123			2.43	20
trans-1,3-Dichloropropene	0.0250	0.0253	0.0260	101	104	78.0-124			2.52	20
Ethylbenzene	0.0250	0.0243	0.0251	97.2	100	79.0-123			3.11	20
2-Hexanone	0.125	0.137	0.135	109	108	67.0-149			0.968	20
Iodomethane	0.125	0.123	0.124	98.2	99.3	33.0-147			1.10	26
2-Butanone (MEK)	0.125	0.142	0.143	113	114	44.0-160			0.685	20
Methylene Chloride	0.0250	0.0247	0.0246	99.0	98.3	67.0-120			0.643	20
4-Methyl-2-pentanone (MIBK)	0.125	0.136	0.138	109	110	68.0-142			1.34	20
Styrene	0.0250	0.0265	0.0273	106	109	73.0-130			3.23	20
1,1,1,2-Tetrachloroethane	0.0250	0.0258	0.0267	103	107	75.0-125			3.17	20
1,1,2,2-Tetrachloroethane	0.0250	0.0225	0.0229	90.1	91.8	65.0-130			1.85	20
Tetrachloroethene	0.0250	0.0239	0.0249	95.8	99.5	72.0-132			3.83	20
Toluene	0.0250	0.0229	0.0239	91.8	95.5	79.0-120			3.94	20
1,1,1-Trichloroethane	0.0250	0.0247	0.0257	98.6	103	73.0-124			4.16	20
1,1,2-Trichloroethane	0.0250	0.0260	0.0251	104	100	80.0-120			3.52	20
Trichloroethene	0.0250	0.0248	0.0251	99.0	101	78.0-124			1.54	20
Trichlorofluoromethane	0.0250	0.0251	0.0248	101	99.1	59.0-147			1.37	20
1,2,3-Trichloropropane	0.0250	0.0227	0.0230	90.8	91.9	73.0-130			1.25	20
Vinyl acetate	0.125	0.141	0.140	113	112	11.0-160			1.27	20
Vinyl chloride	0.0250	0.0239	0.0247	95.7	98.7	67.0-131			3.13	20
Xylenes, Total	0.0750	0.0741	0.0758	98.8	101	79.0-123			2.27	20
(S) Toluene-d8				*100*	*101*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*105*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*108*	*115*	*70.0-130*				

Method Blank (MB)

(MB) R3418816-1 06/06/19 15:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L1105484-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105484-01 06/06/19 16:31 • (DUP) R3418816-3 06/06/19 16:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	ND	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3418816-4 06/06/19 18:34 • (LCSD) R3418816-5 06/06/19 21:01

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000247	0.000237	98.8	94.8	60.0-140			4.13	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000227	0.000228	90.8	91.2	60.0-140			0.440	20

L1105484-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1105484-03 06/06/19 16:07 • (MS) R3418816-2 06/06/19 15:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	ND	0.0000990	99.0	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000804	80.4	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: pcampbell@cecinc.com; kclayton@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364 . 0005

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Philip Campbell / Brandon Solanka

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip for Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4 <2	Diss. Metals-FF 250mlHDPE-HNO3 <2	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3 <2	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
MW-1	Grab	GW	–	6-4-19	12:10	11	X	X	X	X	X	X	X					-01
MW-3		GW	–		15:15	11	X	X	X	X	X	X	X					02
MW-4		GW	–		14:05	11	X	X	X	X	X	X	X					03
MW-5		GW	–		13:05	11	X	X	X	X	X	X	X					04
TMW-1		GW	–		12:15	11	X	X	X	X	X	X	X					05
TMW-2		GW	–		14:05	11	X	X	X	X	X	X	X					06
TMW-3		GW	–		16:10	11	X	X	X	X	X	X	X					07
DUPLICATE		GW	–		–	11	X	X	X	X	X	X	X					08
FIELD BLANK	↓	GW	–	↓	15:50	10	X	X	X		X	X	X					09
~~EQUIPMENT BLANK~~		GW				10	X	X	X		X	X	X				PC 6-4-19	

Chain of Custody Page 1 of 2

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 1106572

G141

Acctnum: CEC
Template: T133579
Prelogin: P711878
TSR: 526 - Chris McCord
PB: 5/31/19 MB
Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: **WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE,ALK
Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).
Nitrate = Short Hold. Please prep ASAP

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx X Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: ✓Y __N
Preservation Correct/Checked: ✓Y __N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Philip for Campbell	6-5-19	10:00	
Relinquished by: (Signature)	6/5/19	15:45	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
X2 HCL / MeoH
TBR

Temp: 1.6 +1.7 °C Bottles Received: 98

Date: 6/5/19 Time: 1545

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: Philip Campbell

Email To: pcampbell@cecinc.com; kclayton@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364, 0005

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Brandon Solomon / Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip A-Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
TRIP BLANK	—	GW	—	—	—	~~2~~ 1								X				10

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 1105572

Table #

Acctnum: CEC
Template: T133579
Prelogin: P711878
TSR: 526 - Chris McCord
PB: 5/31/19 MG

Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:**WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE,ALK
Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx X Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP __Y __N
COC Signed/Accurate: Y __N
Bottles arrive intact: Y __N
Correct bottles used: Y __N
Sufficient volume sent: Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No, HCl / MeoH, TBR
Philip A-Campbell	6-5-19	1000		x2
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
	6/5/19	15:45		1.6, 1.7 15 98
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
				6/5/19 1545

If preservation required by Login: Date/Time

Hold:

Condition: NCF 10 OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 23, 2019

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1105578
Samples Received:	06/05/2019
Project Number:	181-364.0005
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

IWC-L L1105578-01 GW

Collected by: Philip Campbell
Collected date/time: 06/04/19 16:45
Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	500	06/10/19 17:25	06/10/19 17:25	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1292490	1	06/12/19 18:28	06/12/19 18:28	MCG	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	100	06/07/19 14:50	06/07/19 14:50	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	10	06/13/19 14:06	06/13/19 17:16	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291823	10	06/06/19 11:24	06/06/19 11:24	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291823	100	06/07/19 02:51	06/07/19 02:51	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291823	1000	06/06/19 11:37	06/06/19 11:37	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1291600	1	06/06/19 10:41	06/06/19 19:27	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1292422	1	06/07/19 09:45	06/09/19 22:23	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	5	06/07/19 08:56	06/08/19 07:52	RDS	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1292527	10	06/11/19 10:04	06/11/19 23:27	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	100	06/11/19 09:25	06/13/19 14:26	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	100	06/11/19 09:25	06/19/19 12:59	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	10	06/11/19 08:55	06/11/19 19:56	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	20	06/11/19 08:55	06/13/19 13:55	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	200	06/11/19 08:55	06/11/19 20:02	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	200	06/11/19 08:55	06/13/19 22:01	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	5	06/11/19 08:55	06/11/19 19:42	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	50	06/11/19 08:55	06/13/19 14:00	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 23:13	06/08/19 23:13	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1294335	10	06/12/19 00:43	06/12/19 00:43	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 20:13	HMH	Mt. Juliet, TN

APWC-L L1105578-02 GW

Collected by: Philip Campbell
Collected date/time: 06/04/19 16:10
Received date/time: 06/05/19 15:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1292289	1	06/10/19 17:10	06/10/19 17:10	JER	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1292490	10	06/13/19 08:17	06/13/19 08:17	MCG	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1292278	1000	06/07/19 14:51	06/07/19 14:51	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1295379	50	06/13/19 14:06	06/13/19 17:17	MJA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291823	100	06/06/19 11:52	06/06/19 11:52	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1291823	10000	06/07/19 03:20	06/07/19 03:20	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1291600	1	06/06/19 10:41	06/06/19 19:29	TCT	Mt. Juliet, TN
Mercury by Method 7470A	WG1292422	1	06/07/19 09:45	06/09/19 22:31	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1291830	1	06/07/19 08:56	06/07/19 18:41	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1292527	1	06/11/19 10:04	06/11/19 21:19	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	100	06/11/19 09:25	06/13/19 14:32	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	100	06/11/19 09:25	06/19/19 13:04	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1291740	200	06/11/19 09:25	06/19/19 13:09	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	1	06/11/19 08:55	06/11/19 19:45	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	200	06/11/19 08:55	06/11/19 20:09	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	200	06/11/19 08:55	06/13/19 22:06	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1293088	5	06/11/19 08:55	06/13/19 14:11	JDG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1295691	100	06/13/19 15:17	06/17/19 20:32	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1293258	1	06/08/19 23:32	06/08/19 23:32	BMB	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1291822	1	06/06/19 08:54	06/06/19 20:25	HMH	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Sample Handling and Receiving

The following analysis were performed from an unpreserved, insufficiently or inadequately preserved sample.

Lab Sample ID	Project Sample ID	Method
L1105578-02	APWC-L	350.1, 6010B, 130.1, 6020A

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	29900		15000	500	06/10/2019 17:25	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/12/2019 18:28	WG1292490

Sample Narrative:

L1105578-01 WG1292490: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	909		10.0	100	06/07/2019 14:50	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	6910		100	10	06/13/2019 17:16	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		100	100	06/07/2019 02:51	WG1291823
Chloride	57200		1000	1000	06/06/2019 11:37	WG1291823
Fluoride	3.33		1.00	10	06/06/2019 11:24	WG1291823
Nitrate	ND		1.00	10	06/06/2019 11:24	WG1291823
Sulfate	1760		500	100	06/07/2019 02:51	WG1291823

Sample Narrative:

L1105578-01 WG1291823: Reporting Br @ dilution due to matrix: high sulfate content

L1105578-01 WG1291823: report NO3 @ dilution due to matrix interference.

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	0.000209		0.000200	1	06/06/2019 19:27	WG1291600
Mercury,Dissolved	ND		0.000200	1	06/09/2019 22:23	WG1292422

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		1.00	5	06/08/2019 07:52	WG1291830
Boron,Dissolved	ND		2.00	10	06/11/2019 23:27	WG1292527

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	231		10.0	100	06/13/2019 14:26	WG1291740
Aluminum,Dissolved	229		0.500	5	06/11/2019 19:42	WG1293088
Antimony	ND		0.200	100	06/13/2019 14:26	WG1291740
Antimony,Dissolved	ND	J4	0.0100	5	06/11/2019 19:42	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Arsenic	0.335		0.200	100	06/13/2019 14:26	WG1291740
Arsenic,Dissolved	ND		0.400	200	06/13/2019 22:01	WG1293088
Barium	1.82		0.500	100	06/13/2019 14:26	WG1291740
Barium,Dissolved	2.02		0.0250	5	06/11/2019 19:42	WG1293088
Beryllium	ND		0.200	100	06/13/2019 14:26	WG1291740
Beryllium,Dissolved	0.0472		0.0100	5	06/11/2019 19:42	WG1293088
Cadmium	31.3		0.100	100	06/13/2019 14:26	WG1291740
Cadmium,Dissolved	34.4		0.00500	5	06/11/2019 19:42	WG1293088
Calcium	9300		100	100	06/13/2019 14:26	WG1291740
Calcium,Dissolved	9300		10.0	10	06/11/2019 19:56	WG1293088
Chromium	ND		0.200	100	06/13/2019 14:26	WG1291740
Chromium,Dissolved	ND		0.400	200	06/11/2019 20:02	WG1293088
Cobalt	0.494		0.200	100	06/13/2019 14:26	WG1291740
Cobalt,Dissolved	0.543		0.400	200	06/13/2019 22:01	WG1293088
Copper	2.62		0.500	100	06/13/2019 14:26	WG1291740
Copper,Dissolved	2.45		0.100	20	06/13/2019 13:55	WG1293088
Iron	411		10.0	100	06/13/2019 14:26	WG1291740
Iron,Dissolved	404		20.0	200	06/13/2019 22:01	WG1293088
Lead	0.471		0.200	100	06/13/2019 14:26	WG1291740
Lead,Dissolved	0.487		0.0100	5	06/11/2019 19:42	WG1293088
Magnesium	1030		100	100	06/13/2019 14:26	WG1291740
Magnesium,Dissolved	975		5.00	5	06/11/2019 19:42	WG1293088
Manganese	66.5		0.500	100	06/13/2019 14:26	WG1291740
Manganese,Dissolved	68.0		1.00	200	06/13/2019 22:01	WG1293088
Nickel	0.594		0.200	100	06/13/2019 14:26	WG1291740
Nickel,Dissolved	0.638		0.400	200	06/13/2019 22:01	WG1293088
Potassium	8570		100	100	06/13/2019 14:26	WG1291740
Potassium,Dissolved	9040		200	200	06/11/2019 20:02	WG1293088
Selenium	0.292		0.200	100	06/19/2019 12:59	WG1291740
Selenium,Dissolved	0.753		0.0100	5	06/11/2019 19:42	WG1293088
Silver	ND		0.200	100	06/13/2019 14:26	WG1291740
Silver,Dissolved	ND		0.0100	5	06/11/2019 19:42	WG1293088
Sodium	16100		100	100	06/13/2019 14:26	WG1291740
Sodium,Dissolved	16500		50.0	50	06/13/2019 14:00	WG1293088
Thallium	ND		0.200	100	06/13/2019 14:26	WG1291740
Thallium,Dissolved	0.0167		0.0100	5	06/11/2019 19:42	WG1293088
Vanadium	ND		0.500	100	06/13/2019 14:26	WG1291740
Vanadium,Dissolved	ND		1.00	200	06/13/2019 22:01	WG1293088
Zinc	336		2.50	100	06/13/2019 14:26	WG1291740
Zinc,Dissolved	359		5.00	200	06/11/2019 20:02	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	1.22		0.500	10	06/12/2019 00:43	WG1294335
Acrylonitrile	ND		0.0100	1	06/08/2019 23:13	WG1293258
Benzene	ND		0.00100	1	06/08/2019 23:13	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 23:13	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 23:13	WG1293258
Carbon disulfide	0.00140		0.00100	1	06/08/2019 23:13	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 23:13	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 23:13	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 23:13	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloroform	ND		0.00500	1	06/08/2019 23:13	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 23:13	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 23:13	WG1293258
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 23:13	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 23:13	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 23:13	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 23:13	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 23:13	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 23:13	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 23:13	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 23:13	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 23:13	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 23:13	WG1293258
2-Butanone (MEK)	0.142		0.0100	1	06/08/2019 23:13	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 23:13	WG1293258
4-Methyl-2-pentanone (MIBK)	0.0295		0.0100	1	06/08/2019 23:13	WG1293258
Styrene	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 23:13	WG1293258
Toluene	0.00129		0.00100	1	06/08/2019 23:13	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 23:13	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 23:13	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 23:13	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 23:13	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 23:13	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 23:13	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 23:13	WG1293258
(S) Toluene-d8	*103*		*80.0-120*		*06/08/2019 23:13*	WG1293258
(S) Toluene-d8	*101*		*80.0-120*		*06/12/2019 00:43*	WG1294335
(S) 4-Bromofluorobenzene	*99.6*		*77.0-126*		*06/08/2019 23:13*	WG1293258
(S) 4-Bromofluorobenzene	*90.7*		*77.0-126*		*06/12/2019 00:43*	WG1294335
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*06/08/2019 23:13*	WG1293258
(S) 1,2-Dichloroethane-d4	*107*		*70.0-130*		*06/12/2019 00:43*	WG1294335

EDB / DBCP by Method 8011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ethylene Dibromide	0.000275		0.0000100	1	06/06/2019 20:13	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 20:13	WG1291822

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	161		30.0	1	06/10/2019 17:10	WG1292289

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	9120		200	10	06/13/2019 08:17	WG1292490

Sample Narrative:

L1105578-02 WG1292490: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	4740		100	1000	06/07/2019 14:51	WG1292278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	9070		500	50	06/13/2019 17:17	WG1295379

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		100	100	06/06/2019 11:52	WG1291823
Chloride	122000		10000	10000	06/07/2019 03:20	WG1291823
Fluoride	20.9		10.0	100	06/06/2019 11:52	WG1291823
Nitrate	63.4		10.0	100	06/06/2019 11:52	WG1291823
Sulfate	1000		500	100	06/06/2019 11:52	WG1291823

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/06/2019 19:29	WG1291600
Mercury,Dissolved	0.000671		0.000200	1	06/09/2019 22:31	WG1292422

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	9.75		0.200	1	06/07/2019 18:41	WG1291830
Boron,Dissolved	9.92		0.200	1	06/11/2019 21:19	WG1292527

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		10.0	100	06/13/2019 14:32	WG1291740
Aluminum,Dissolved	ND		0.100	1	06/11/2019 19:45	WG1293088
Antimony	ND		0.200	100	06/13/2019 14:32	WG1291740
Antimony,Dissolved	ND		0.200	100	06/17/2019 20:32	WG1295691
Arsenic	ND		0.200	100	06/13/2019 14:32	WG1291740
Arsenic,Dissolved	0.0207		0.00200	1	06/11/2019 19:45	WG1293088
Barium	1.00		0.500	100	06/13/2019 14:32	WG1291740
Barium,Dissolved	1.09		0.0250	5	06/13/2019 14:11	WG1293088

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.200	100	06/13/2019 14:32	WG1291740
Beryllium,Dissolved	ND		0.0100	5	06/13/2019 14:11	WG1293088
Cadmium	ND		0.100	100	06/13/2019 14:32	WG1291740
Cadmium,Dissolved	0.0929		0.00500	5	06/13/2019 14:11	WG1293088
Calcium	ND		100	100	06/13/2019 14:32	WG1291740
Calcium,Dissolved	58.1		1.00	1	06/11/2019 19:45	WG1293088
Chromium	ND		0.200	100	06/13/2019 14:32	WG1291740
Chromium,Dissolved	ND		0.00200	1	06/11/2019 19:45	WG1293088
Cobalt	ND		0.200	100	06/13/2019 14:32	WG1291740
Cobalt,Dissolved	0.00896		0.00200	1	06/11/2019 19:45	WG1293088
Copper	27.3		1.00	200	06/19/2019 13:09	WG1291740
Copper,Dissolved	28.7		1.00	200	06/13/2019 22:06	WG1293088
Iron	ND		10.0	100	06/13/2019 14:32	WG1291740
Iron,Dissolved	ND		0.100	1	06/11/2019 19:45	WG1293088
Lead	ND		0.200	100	06/13/2019 14:32	WG1291740
Lead,Dissolved	ND		0.0100	5	06/13/2019 14:11	WG1293088
Magnesium	ND		100	100	06/13/2019 14:32	WG1291740
Magnesium,Dissolved	ND		1.00	1	06/11/2019 19:45	WG1293088
Manganese	ND		0.500	100	06/13/2019 14:32	WG1291740
Manganese,Dissolved	0.0273		0.00500	1	06/11/2019 19:45	WG1293088
Nickel	ND		0.200	100	06/13/2019 14:32	WG1291740
Nickel,Dissolved	0.0424		0.00200	1	06/11/2019 19:45	WG1293088
Potassium	30800		100	100	06/13/2019 14:32	WG1291740
Potassium,Dissolved	31800		200	200	06/11/2019 20:09	WG1293088
Selenium	ND		0.200	100	06/19/2019 13:04	WG1291740
Selenium,Dissolved	ND		0.400	200	06/11/2019 20:09	WG1293088
Silver	ND		0.200	100	06/13/2019 14:32	WG1291740
Silver,Dissolved	0.0247		0.0100	5	06/13/2019 14:11	WG1293088
Sodium	45200		100	100	06/19/2019 13:04	WG1291740
Sodium,Dissolved	54200		200	200	06/13/2019 22:06	WG1293088
Thallium	ND		0.200	100	06/13/2019 14:32	WG1291740
Thallium,Dissolved	ND		0.0100	5	06/13/2019 14:11	WG1293088
Vanadium	ND		0.500	100	06/13/2019 14:32	WG1291740
Vanadium,Dissolved	0.0437		0.00500	1	06/11/2019 19:45	WG1293088
Zinc	3.77		2.50	100	06/13/2019 14:32	WG1291740
Zinc,Dissolved	2.04		0.0250	1	06/11/2019 19:45	WG1293088

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.713		0.0500	1	06/08/2019 23:32	WG1293258
Acrylonitrile	ND		0.0100	1	06/08/2019 23:32	WG1293258
Benzene	ND		0.00100	1	06/08/2019 23:32	WG1293258
Bromochloromethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
Bromodichloromethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
Bromoform	ND		0.00100	1	06/08/2019 23:32	WG1293258
Bromomethane	ND		0.00500	1	06/08/2019 23:32	WG1293258
Carbon disulfide	ND		0.00100	1	06/08/2019 23:32	WG1293258
Carbon tetrachloride	ND		0.00100	1	06/08/2019 23:32	WG1293258
Chlorobenzene	ND		0.00100	1	06/08/2019 23:32	WG1293258
Chlorodibromomethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
Chloroethane	ND		0.00500	1	06/08/2019 23:32	WG1293258
Chloroform	ND		0.00500	1	06/08/2019 23:32	WG1293258
Chloromethane	ND		0.00250	1	06/08/2019 23:32	WG1293258
Dibromomethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/08/2019 23:32	WG1293258

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,2-Dichlorobenzene	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,4-Dichlorobenzene	ND		0.00100	1	06/08/2019 23:32	WG1293258
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/08/2019 23:32	WG1293258
1,1-Dichloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,2-Dichloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,1-Dichloroethene	ND		0.00100	1	06/08/2019 23:32	WG1293258
cis-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 23:32	WG1293258
trans-1,2-Dichloroethene	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,2-Dichloropropane	ND		0.00100	1	06/08/2019 23:32	WG1293258
cis-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 23:32	WG1293258
trans-1,3-Dichloropropene	ND		0.00100	1	06/08/2019 23:32	WG1293258
Ethylbenzene	ND		0.00100	1	06/08/2019 23:32	WG1293258
2-Hexanone	ND		0.0100	1	06/08/2019 23:32	WG1293258
Iodomethane	ND		0.0100	1	06/08/2019 23:32	WG1293258
2-Butanone (MEK)	0.0211		0.0100	1	06/08/2019 23:32	WG1293258
Methylene Chloride	ND		0.00500	1	06/08/2019 23:32	WG1293258
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/08/2019 23:32	WG1293258
Styrene	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
Tetrachloroethene	ND		0.00100	1	06/08/2019 23:32	WG1293258
Toluene	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,1,1-Trichloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
1,1,2-Trichloroethane	ND		0.00100	1	06/08/2019 23:32	WG1293258
Trichloroethene	ND		0.00100	1	06/08/2019 23:32	WG1293258
Trichlorofluoromethane	ND		0.00500	1	06/08/2019 23:32	WG1293258
1,2,3-Trichloropropane	ND		0.00250	1	06/08/2019 23:32	WG1293258
Vinyl acetate	ND		0.0100	1	06/08/2019 23:32	WG1293258
Vinyl chloride	ND		0.00100	1	06/08/2019 23:32	WG1293258
Xylenes, Total	ND		0.00300	1	06/08/2019 23:32	WG1293258
(S) Toluene-d8	*105*		*80.0-120*		*06/08/2019 23:32*	WG1293258
(S) 4-Bromofluorobenzene	*97.2*		*77.0-126*		*06/08/2019 23:32*	WG1293258
(S) 1,2-Dichloroethane-d4	*107*		*70.0-130*		*06/08/2019 23:32*	WG1293258

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/06/2019 20:25	WG1291822
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/06/2019 20:25	WG1291822

Method Blank (MB)

(MB) R3419652-1 06/10/19 16:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.76	J	1.43	30.0

L1105457-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105457-01 06/10/19 16:43 • (DUP) R3419652-5 06/10/19 16:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	110	110	1	0.000		20

L1105625-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1105625-02 06/10/19 17:01 • (DUP) R3419652-6 06/10/19 17:02

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	61.6	60.8	1	1.31		20

Laboratory Control Sample (LCS)

(LCS) R3419652-2 06/10/19 16:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	150	153	102	85.0-115	

L1105353-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105353-01 06/10/19 16:40 • (MS) R3419652-3 06/10/19 16:41 • (MSD) R3419652-4 06/10/19 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	152	231	232	52.7	53.3	1	80.0-120	E J6	E J6	0.432	20

Method Blank (MB)

(MB) R3420560-1 06/12/19 15:49

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	2.94	J	2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1105502-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105502-01 06/12/19 16:27 • (DUP) R3420560-2 06/12/19 16:35

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	184	170	1	8.08		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L1105502-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1105502-12 06/12/19 18:11 • (DUP) R3420560-4 06/12/19 18:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	88.3	87.8	1	0.568		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3420560-3 06/12/19 17:26

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	99.2	99.2	85.0-115	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3418972-1 06/07/19 13:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1105572-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105572-01 06/07/19 13:49 • (DUP) R3418972-3 06/07/19 13:50

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

L1105805-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105805-01 06/07/19 14:32 • (DUP) R3418972-6 06/07/19 14:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3418972-2 06/07/19 13:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.38	98.4	90.0-110	

L1105572-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-02 06/07/19 13:52 • (MS) R3418972-4 06/07/19 13:54 • (MSD) R3418972-5 06/07/19 13:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	ND	5.29	4.86	106	97.2	1	90.0-110			8.38	10

L1105974-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1105974-01 06/07/19 14:35 • (MS) R3418972-7 06/07/19 14:36

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	U	4.82	96.4	1	90.0-110	

Method Blank (MB)

(MB) R3420883-1 06/13/19 17:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3.00	10.0

L1103527-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1103527-01 06/13/19 17:10 • (DUP) R3420883-3 06/13/19 17:10

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	32.8	32.6	1	0.813		20

L1105725-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105725-01 06/13/19 17:17 • (DUP) R3420883-6 06/13/19 17:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	9.56	10.8	1	12.6		20

Laboratory Control Sample (LCS)

(LCS) R3420883-2 06/13/19 17:09

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	222	215	96.9	90.0-110	

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/13/19 17:11 • (MS) R3420883-4 06/13/19 17:11 • (MSD) R3420883-5 06/13/19 17:11

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	410	411	102	103	1	80.0-120			0.380	20

Method Blank (MB)

(MB) R3418617-1 06/06/19 09:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L1105758-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105758-01 06/06/19 15:29 • (DUP) R3418617-3 06/06/19 15:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	7.07	7.05	1	0.228		15
Fluoride	0.102	0.0927	1	9.55	J	15
Nitrate	0.353	0.359	1	1.66		15
Sulfate	4.46	4.33	1	2.91	J	15

L1105825-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105825-01 06/06/19 20:09 • (DUP) R3418617-6 06/06/19 20:24

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	161	162	1	0.306	E	15
Fluoride	0.158	0.165	1	4.27		15
Nitrate	0.245	0.256	1	4.71		15
Sulfate	56.4	56.4	1	0.0812		15

Laboratory Control Sample (LCS)

(LCS) R3418617-2 06/06/19 09:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	40.5	101	80.0-120	
Chloride	40.0	40.4	101	80.0-120	
Fluoride	8.00	8.19	102	80.0-120	
Nitrate	8.00	8.36	105	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3418617-2 06/06/19 09:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Sulfate	40.0	41.1	103	80.0-120	

L1105750-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105750-01 06/06/19 16:05 • (MS) R3418617-4 06/06/19 16:19 • (MSD) R3418617-5 06/06/19 16:33

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	0.322	46.1	46.3	91.6	91.9	1	80.0-120			0.354	15
Chloride	50.0	36.6	85.3	85.5	97.4	97.8	1	80.0-120			0.244	15
Fluoride	5.00	2.97	7.79	7.81	96.3	96.8	1	80.0-120			0.337	15
Nitrate	5.00	5.25	10.1	10.1	96.4	97.1	1	80.0-120	E	E	0.312	15
Sulfate	50.0	138	180	180	83.2	83.7	1	80.0-120	E	E	0.121	15

L1105825-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1105825-01 06/06/19 20:09 • (MS) R3418617-7 06/06/19 20:38

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	49.0	98.0	1	80.0-120	
Chloride	50.0	161	204	84.7	1	80.0-120	E
Fluoride	5.00	0.158	5.28	102	1	80.0-120	
Nitrate	5.00	0.245	5.31	101	1	80.0-120	
Sulfate	50.0	56.4	103	94.0	1	80.0-120	E

Method Blank (MB)

(MB) R3418603-1 06/06/19 18:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3418603-2 06/06/19 18:33 • (LCSD) R3418603-3 06/06/19 18:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00278	0.00278	92.8	92.5	80.0-120			0.309	20

L1105453-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105453-01 06/06/19 18:38 • (MS) R3418603-4 06/06/19 18:40 • (MSD) R3418603-5 06/06/19 18:43

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00290	0.00315	96.7	105	1	75.0-125			8.20	20

Method Blank (MB)

(MB) R3419326-1 06/09/19 22:16

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419326-2 06/09/19 22:18 • (LCSD) R3419326-3 06/09/19 22:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00256	0.00280	85.4	93.5	80.0-120			9.06	20

L1105578-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105578-01 06/09/19 22:23 • (MS) R3419326-4 06/09/19 22:26 • (MSD) R3419326-5 06/09/19 22:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00297	0.00304	92.9	95.1	1	75.0-125			2.25	20

Method Blank (MB)

(MB) R3419120-1 06/08/19 07:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419120-2 06/08/19 07:32 • (LCSD) R3419120-3 06/08/19 07:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.960	0.960	96.0	96.0	80.0-120			0.0271	20

L1105572-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-02 06/07/19 17:56 • (MS) R3419125-5 06/07/19 18:01 • (MSD) R3419125-6 06/07/19 18:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	1.06	1.06	101	100	1	75.0-125			0.177	20

Method Blank (MB)

(MB) R3420137-1 06/11/19 20:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420137-2 06/11/19 20:40 • (LCSD) R3420137-3 06/11/19 20:43

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.978	1.02	97.8	102	80.0-120			3.83	20

L1105502-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105502-08 06/11/19 20:45 • (MS) R3420137-5 06/11/19 20:50 • (MSD) R3420137-6 06/11/19 20:52

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.525	1.49	1.53	96.9	100	1	75.0-125			2.31	20

Method Blank (MB)

(MB) R3420145-1 06/11/19 20:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	0.00615	J	0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	U		0.0460	1.00
Chromium	0.000911	J	0.000540	0.00200
Copper	0.00240	J	0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	0.000321	J	0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	0.000364	J	0.000250	0.00500
Nickel	0.000546	J	0.000350	0.00200
Potassium	0.0545	J	0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	0.182	J	0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	U		0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420145-2 06/11/19 20:19 • (LCSD) R3420145-3 06/11/19 20:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.93	5.01	98.5	100	80.0-120			1.67	20
Antimony	0.0500	0.0566	0.0563	113	113	80.0-120			0.474	20
Arsenic	0.0500	0.0496	0.0510	99.1	102	80.0-120			2.95	20
Barium	0.0500	0.0494	0.0483	98.9	96.6	80.0-120			2.36	20
Beryllium	0.0500	0.0450	0.0475	89.9	95.0	80.0-120			5.50	20
Cadmium	0.0500	0.0491	0.0509	98.2	102	80.0-120			3.64	20
Calcium	5.00	5.00	4.97	100	99.3	80.0-120			0.626	20
Chromium	0.0500	0.0504	0.0515	101	103	80.0-120			2.09	20
Copper	0.0500	0.0504	0.0506	101	101	80.0-120			0.494	20
Cobalt	0.0500	0.0504	0.0509	101	102	80.0-120			0.962	20
Iron	5.00	5.07	5.13	101	103	80.0-120			1.26	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420145-2 06/11/19 20:19 • (LCSD) R3420145-3 06/11/19 20:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0494	0.0509	98.9	102	80.0-120			2.94	20
Magnesium	5.00	4.90	4.97	98.0	99.5	80.0-120			1.48	20
Manganese	0.0500	0.0497	0.0512	99.3	102	80.0-120			3.02	20
Nickel	0.0500	0.0503	0.0510	101	102	80.0-120			1.32	20
Potassium	5.00	4.96	5.03	99.1	101	80.0-120			1.43	20
Selenium	0.0500	0.0494	0.0490	98.7	98.0	80.0-120			0.802	20
Silver	0.0500	0.0505	0.0515	101	103	80.0-120			1.96	20
Sodium	5.00	5.06	5.08	101	102	80.0-120			0.377	20
Thallium	0.0500	0.0487	0.0495	97.3	98.9	80.0-120			1.61	20
Vanadium	0.0500	0.0500	0.0500	100	100	80.0-120			0.0226	20
Zinc	0.0500	0.0526	0.0510	105	102	80.0-120			3.03	20

L1105661-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105661-02 06/11/19 20:34 • (MS) R3420145-5 06/11/19 20:48 • (MSD) R3420145-6 06/11/19 20:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.01	4.95	99.6	98.4	1	75.0-125			1.21	20
Antimony	0.0500	ND	0.0576	0.0593	115	119	1	75.0-125			2.93	20
Arsenic	0.0500	0.0278	0.0755	0.0760	95.3	96.4	1	75.0-125			0.680	20
Barium	0.0500	0.256	0.299	0.301	86.8	89.1	1	75.0-125			0.390	20
Beryllium	0.0500	ND	0.0472	0.0466	93.8	92.7	1	75.0-125			1.25	20
Cadmium	0.0500	ND	0.0509	0.0501	102	100	1	75.0-125			1.61	20
Calcium	5.00	60.0	63.3	63.4	65.7	67.8	1	75.0-125	V	V	0.170	20
Chromium	0.0500	ND	0.0486	0.0504	95.8	99.4	1	75.0-125			3.64	20
Copper	0.0500	ND	0.0502	0.0507	97.8	98.7	1	75.0-125			0.909	20
Cobalt	0.0500	0.186	0.231	0.235	90.3	99.7	1	75.0-125			2.01	20
Potassium	5.00	ND	5.60	5.55	99.4	98.3	1	75.0-125			0.941	20
Lead	0.0500	ND	0.0507	0.0494	100	97.7	1	75.0-125			2.64	20
Magnesium	5.00	11.5	15.9	16.0	87.2	90.0	1	75.0-125			0.900	20
Nickel	0.0500	0.489	0.525	0.530	73.1	83.4	1	75.0-125	V		0.979	20
Selenium	0.0500	ND	0.0512	0.0517	102	103	1	75.0-125			1.09	20
Silver	0.0500	ND	0.0523	0.0521	105	104	1	75.0-125			0.395	20
Sodium	5.00	3.28	8.11	8.01	96.6	94.4	1	75.0-125			1.36	20
Thallium	0.0500	ND	0.0482	0.0495	95.9	98.4	1	75.0-125			2.54	20
Vanadium	0.0500	ND	0.0501	0.0493	99.6	98.1	1	75.0-125			1.55	20
Zinc	0.0500	ND	0.0529	0.0530	96.4	96.6	1	75.0-125			0.173	20

Method Blank (MB)

(MB) R3420631-1 06/11/19 18:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	U		0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.000250	0.00200
Barium,Dissolved	U		0.000360	0.00500
Beryllium,Dissolved	U		0.000120	0.00200
Cadmium,Dissolved	U		0.000160	0.00100
Calcium,Dissolved	U		0.0460	1.00
Chromium,Dissolved	U		0.000540	0.00200
Copper,Dissolved	0.000834	J	0.000520	0.00500
Cobalt,Dissolved	U		0.000260	0.00200
Iron,Dissolved	U		0.0150	0.100
Lead,Dissolved	U		0.000240	0.00200
Magnesium,Dissolved	U		0.100	1.00
Manganese,Dissolved	U		0.000250	0.00500
Nickel,Dissolved	U		0.000350	0.00200
Potassium,Dissolved	U		0.0370	1.00
Selenium,Dissolved	U		0.000380	0.00200
Silver,Dissolved	U		0.000310	0.00200
Thallium,Dissolved	U		0.000190	0.00200
Vanadium,Dissolved	U		0.000180	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Method Blank (MB)

(MB) R3420979-1 06/13/19 10:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sodium,Dissolved	0.112	J	0.110	1.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420631-2 06/11/19 18:44 • (LCSD) R3420631-3 06/11/19 18:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.04	5.05	101	101	80.0-120			0.0988	20
Antimony,Dissolved	0.0500	0.0665	0.0658	133	132	80.0-120	J4	J4	1.10	20
Arsenic,Dissolved	0.0500	0.0516	0.0511	103	102	80.0-120			0.963	20
Barium,Dissolved	0.0500	0.0507	0.0501	101	100	80.0-120			1.28	20
Beryllium,Dissolved	0.0500	0.0496	0.0499	99.2	99.8	80.0-120			0.606	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420631-2 06/11/19 18:44 • (LCSD) R3420631-3 06/11/19 18:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Cadmium,Dissolved	0.0500	0.0506	0.0509	101	102	80.0-120			0.622	20
Calcium,Dissolved	5.00	5.07	5.03	101	101	80.0-120			0.836	20
Chromium,Dissolved	0.0500	0.0521	0.0518	104	104	80.0-120			0.586	20
Copper,Dissolved	0.0500	0.0517	0.0552	103	110	80.0-120			6.55	20
Cobalt,Dissolved	0.0500	0.0518	0.0511	104	102	80.0-120			1.27	20
Iron,Dissolved	5.00	5.12	5.12	102	102	80.0-120			0.0226	20
Lead,Dissolved	0.0500	0.0509	0.0512	102	102	80.0-120			0.577	20
Magnesium,Dissolved	5.00	5.04	5.04	101	101	80.0-120			0.00649	20
Manganese,Dissolved	0.0500	0.0516	0.0513	103	103	80.0-120			0.472	20
Nickel,Dissolved	0.0500	0.0517	0.0516	103	103	80.0-120			0.190	20
Potassium,Dissolved	5.00	4.95	4.93	99.0	98.7	80.0-120			0.296	20
Selenium,Dissolved	0.0500	0.0512	0.0530	102	106	80.0-120			3.40	20
Silver,Dissolved	0.0500	0.0541	0.0532	108	106	80.0-120			1.82	20
Thallium,Dissolved	0.0500	0.0508	0.0504	102	101	80.0-120			0.834	20
Vanadium,Dissolved	0.0500	0.0512	0.0511	102	102	80.0-120			0.115	20
Zinc,Dissolved	0.0500	0.0522	0.0539	104	108	80.0-120			3.11	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420979-2 06/13/19 10:58 • (LCSD) R3420979-3 06/13/19 11:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sodium,Dissolved	5.00	5.22	5.33	104	107	80.0-120			2.13	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/11/19 18:52 • (MS) R3420631-5 06/11/19 18:59 • (MSD) R3420631-6 06/11/19 19:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	ND	5.10	5.04	102	101	1	75.0-125			1.19	20
Antimony,Dissolved	0.0500	ND	0.0657	0.0657	131	131	1	75.0-125	J5	J5	0.0979	20
Arsenic,Dissolved	0.0500	0.0204	0.0706	0.0699	100	98.9	1	75.0-125			1.05	20
Barium,Dissolved	0.0500	0.0196	0.0699	0.0693	101	99.4	1	75.0-125			0.848	20
Beryllium,Dissolved	0.0500	ND	0.0505	0.0505	101	101	1	75.0-125			0.00789	20
Cadmium,Dissolved	0.0500	ND	0.0508	0.0509	102	102	1	75.0-125			0.146	20
Calcium,Dissolved	5.00	3.77	8.75	8.78	99.5	100	1	75.0-125			0.383	20
Chromium,Dissolved	0.0500	ND	0.0509	0.0500	102	100	1	75.0-125			1.78	20
Copper,Dissolved	0.0500	ND	0.0533	0.0512	101	96.7	1	75.0-125			3.92	20
Cobalt,Dissolved	0.0500	0.0419	0.0916	0.0912	99.4	98.5	1	75.0-125			0.488	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/11/19 18:52 • (MS) R3420631-5 06/11/19 18:59 • (MSD) R3420631-6 06/11/19 19:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Potassium,Dissolved	5.00	1.11	6.11	6.04	100	98.5	1	75.0-125			1.21	20
Iron,Dissolved	5.00	13.4	18.2	18.2	96.7	97.0	1	75.0-125			0.0996	20
Lead,Dissolved	0.0500	ND	0.0508	0.0512	102	102	1	75.0-125			0.865	20
Magnesium,Dissolved	5.00	2.77	7.79	7.77	100	99.9	1	75.0-125			0.209	20
Manganese,Dissolved	0.0500	0.837	0.887	0.885	100	97.0	1	75.0-125			0.183	20
Nickel,Dissolved	0.0500	0.00631	0.0570	0.0561	101	99.6	1	75.0-125			1.52	20
Selenium,Dissolved	0.0500	ND	0.0534	0.0535	107	107	1	75.0-125			0.240	20
Silver,Dissolved	0.0500	ND	0.0536	0.0531	107	106	1	75.0-125			0.902	20
Thallium,Dissolved	0.0500	ND	0.0511	0.0512	102	102	1	75.0-125			0.203	20
Vanadium,Dissolved	0.0500	ND	0.0499	0.0491	99.8	98.2	1	75.0-125			1.70	20
Zinc,Dissolved	0.0500	ND	0.0635	0.0626	98.2	96.5	1	75.0-125			1.36	20

L1105572-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1105572-01 06/13/19 11:09 • (MS) R3420979-5 06/13/19 11:20 • (MSD) R3420979-6 06/13/19 11:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sodium,Dissolved	5.00	3.06	8.20	8.16	103	102	1	75.0-125			0.488	20

Method Blank (MB)

(MB) R3421257-1 06/14/19 14:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Antimony,Dissolved	U		0.000754	0.00200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3421257-2 06/14/19 14:09 • (LCSD) R3421257-3 06/14/19 14:14

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Antimony,Dissolved	0.0500	0.0498	0.0488	99.7	97.6	80.0-120			2.12	20

L1108252-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1108252-01 06/14/19 14:18 • (MS) R3421257-4 06/14/19 14:27 • (MSD) R3421257-5 06/14/19 14:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Antimony,Dissolved	0.0500	ND	0.0485	0.0477	97.0	95.3	1	75.0-125			1.77	20

Method Blank (MB)

(MB) R3419985-3 06/08/19 14:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3419985-3 06/08/19 14:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*98.9*			*80.0-120*
(S) 4-Bromofluorobenzene	*100*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419985-1 06/08/19 13:11 • (LCSD) R3419985-2 06/08/19 13:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.158	0.159	127	127	19.0-160			0.121	27
Acrylonitrile	0.125	0.141	0.138	113	110	55.0-149			2.42	20
Benzene	0.0250	0.0240	0.0247	95.8	98.8	70.0-123			3.00	20
Bromodichloromethane	0.0250	0.0249	0.0250	99.6	100	75.0-120			0.426	20
Bromochloromethane	0.0250	0.0269	0.0270	107	108	76.0-122			0.712	20
Bromoform	0.0250	0.0266	0.0266	107	106	68.0-132			0.293	20
Bromomethane	0.0250	0.0250	0.0257	100	103	10.0-160			2.67	25
Carbon disulfide	0.0250	0.0241	0.0244	96.5	97.4	61.0-128			0.948	20
Carbon tetrachloride	0.0250	0.0264	0.0272	106	109	68.0-126			2.71	20
Chlorobenzene	0.0250	0.0251	0.0252	100	101	80.0-121			0.625	20
Chlorodibromomethane	0.0250	0.0248	0.0262	99.2	105	77.0-125			5.36	20
Chloroethane	0.0250	0.0254	0.0259	101	103	47.0-150			1.98	20
Chloroform	0.0250	0.0254	0.0259	101	104	73.0-120			2.27	20
Chloromethane	0.0250	0.0229	0.0248	91.8	99.2	41.0-142			7.77	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0252	0.0251	101	100	58.0-134			0.384	20
1,2-Dibromoethane	0.0250	0.0270	0.0268	108	107	80.0-122			0.836	20
Dibromomethane	0.0250	0.0270	0.0272	108	109	80.0-120			0.778	20
1,2-Dichlorobenzene	0.0250	0.0241	0.0251	96.3	100	79.0-121			4.02	20
1,4-Dichlorobenzene	0.0250	0.0233	0.0237	93.3	94.8	79.0-120			1.66	20
trans-1,4-Dichloro-2-butene	0.0250	0.0204	0.0220	81.8	88.1	33.0-144			7.37	20
1,1-Dichloroethane	0.0250	0.0241	0.0250	96.5	100	70.0-126			3.50	20
1,2-Dichloroethane	0.0250	0.0254	0.0264	101	106	70.0-128			4.13	20
1,1-Dichloroethene	0.0250	0.0244	0.0244	97.5	97.7	71.0-124			0.143	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3419985-1 06/08/19 13:11 • (LCSD) R3419985-2 06/08/19 13:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.0250	0.0251	0.0259	101	104	73.0-120			3.13	20
trans-1,2-Dichloroethene	0.0250	0.0239	0.0242	95.5	96.9	73.0-120			1.50	20
1,2-Dichloropropane	0.0250	0.0255	0.0260	102	104	77.0-125			1.84	20
cis-1,3-Dichloropropene	0.0250	0.0248	0.0254	99.1	102	80.0-123			2.43	20
trans-1,3-Dichloropropene	0.0250	0.0253	0.0260	101	104	78.0-124			2.52	20
Ethylbenzene	0.0250	0.0243	0.0251	97.2	100	79.0-123			3.11	20
2-Hexanone	0.125	0.137	0.135	109	108	67.0-149			0.968	20
Iodomethane	0.125	0.123	0.124	98.2	99.3	33.0-147			1.10	26
2-Butanone (MEK)	0.125	0.142	0.143	113	114	44.0-160			0.685	20
Methylene Chloride	0.0250	0.0247	0.0246	99.0	98.3	67.0-120			0.643	20
4-Methyl-2-pentanone (MIBK)	0.125	0.136	0.138	109	110	68.0-142			1.34	20
Styrene	0.0250	0.0265	0.0273	106	109	73.0-130			3.23	20
1,1,1,2-Tetrachloroethane	0.0250	0.0258	0.0267	103	107	75.0-125			3.17	20
1,1,2,2-Tetrachloroethane	0.0250	0.0225	0.0229	90.1	91.8	65.0-130			1.85	20
Tetrachloroethene	0.0250	0.0239	0.0249	95.8	99.5	72.0-132			3.83	20
Toluene	0.0250	0.0229	0.0239	91.8	95.5	79.0-120			3.94	20
1,1,1-Trichloroethane	0.0250	0.0247	0.0257	98.6	103	73.0-124			4.16	20
1,1,2-Trichloroethane	0.0250	0.0260	0.0251	104	100	80.0-120			3.52	20
Trichloroethene	0.0250	0.0248	0.0251	99.0	101	78.0-124			1.54	20
Trichlorofluoromethane	0.0250	0.0251	0.0248	101	99.1	59.0-147			1.37	20
1,2,3-Trichloropropane	0.0250	0.0227	0.0230	90.8	91.9	73.0-130			1.25	20
Vinyl acetate	0.125	0.141	0.140	113	112	11.0-160			1.27	20
Vinyl chloride	0.0250	0.0239	0.0247	95.7	98.7	67.0-131			3.13	20
Xylenes, Total	0.0750	0.0741	0.0758	98.8	101	79.0-123			2.27	20
(S) Toluene-d8				*100*	*101*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*105*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*108*	*115*	*70.0-130*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3420243-3 06/11/19 22:23

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
(S) Toluene-d8	*105*			*80.0-120*
(S) 4-Bromofluorobenzene	*93.0*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3420243-1 06/11/19 21:18 • (LCSD) R3420243-2 06/11/19 21:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.112	0.115	89.3	92.4	19.0-160			3.45	27
(S) Toluene-d8				*93.8*	*93.7*	*80.0-120*				
(S) 4-Bromofluorobenzene				*88.6*	*87.4*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*107*	*106*	*70.0-130*				

Method Blank (MB)

(MB) R3418816-1 06/06/19 15:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L1105484-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1105484-01 06/06/19 16:31 • (DUP) R3418816-3 06/06/19 16:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	ND	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3418816-4 06/06/19 18:34 • (LCSD) R3418816-5 06/06/19 21:01

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000247	0.000237	98.8	94.8	60.0-140			4.13	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000227	0.000228	90.8	91.2	60.0-140			0.440	20

L1105484-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1105484-03 06/06/19 16:07 • (MS) R3418816-2 06/06/19 15:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	ND	0.0000990	99.0	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000804	80.4	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364, 0005

Lab Project # CEC-181364

Collected by (print): Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip A. Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss.Metals 250mlHDPE-NoPres	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl				Remarks	Sample # (lab only)
IWC-L	Grab	GW	-	6-4-19	16:45	11	X	X	X	X	X	X	X					-01
APWC-L	Grab	GW	-	6-4-19	16:10	11	X	X	X	X	X	X	X					-02

Chain of Custody Page ___ of ___

Pace Analytical
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1105578

D093

Acctnum: CEC
Template: T133582
Prelogin: P711887
TSR: 526 - Chris McCord
PB: TB 5-31-19

Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: **WetChem** = *NITRATE, CHLORIDE, BROMIDE, SULFATE, FLUORIDE, ALK
Tot/Diss Metals=M6020AP1 + Al,Ca,Fe,K,Mg,Mn,Na,B(6010)
*Nitrate = Short hold. Analyze ASAP Prepare

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _X_

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip A. Campbell	6-5-19	10:00		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.2+.1=1.3 °C Bottles Received: 22
	6/5/19	15:45		If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 6/5/19 Time: 1545 Hold: Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 25, 2019

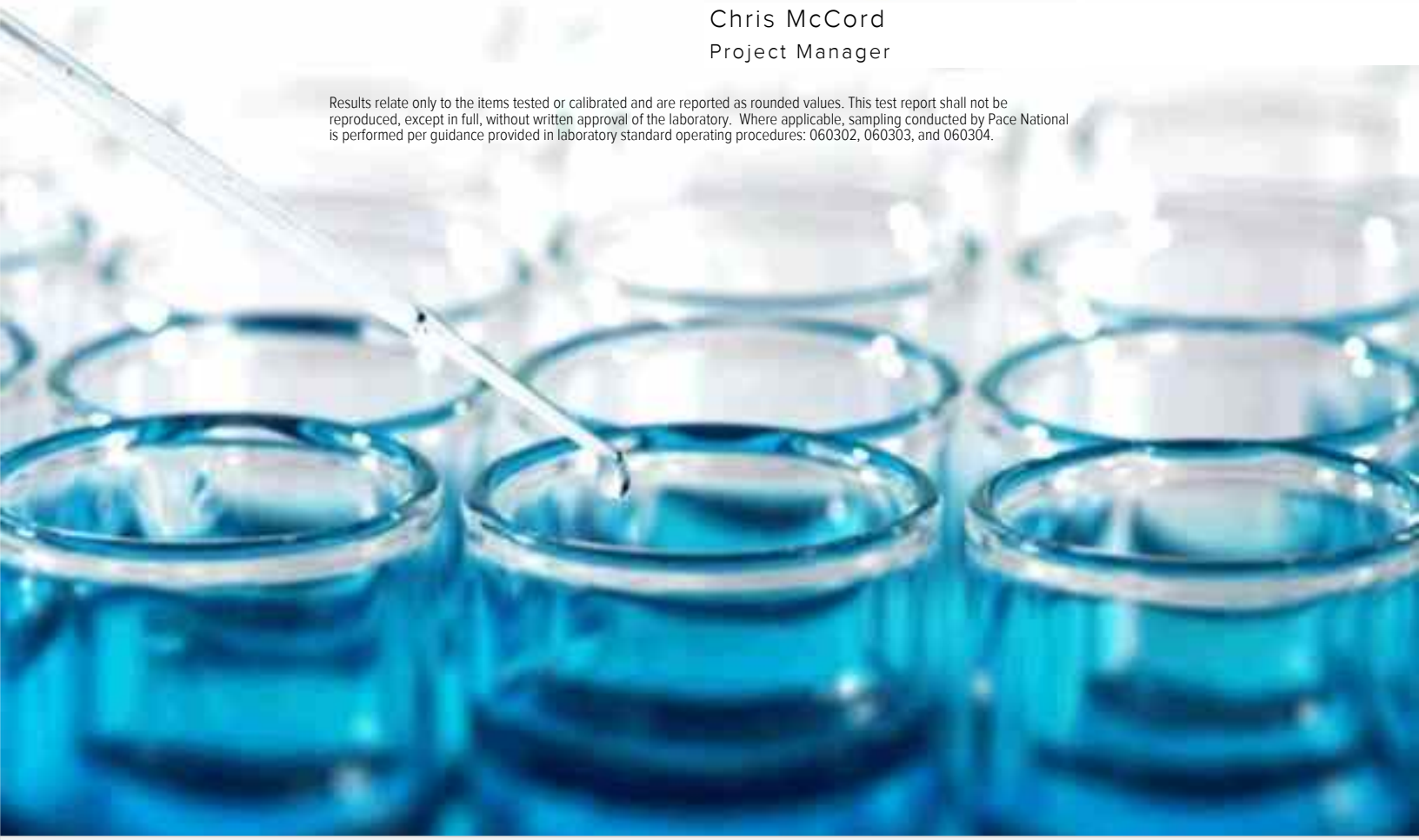
Civil & Environmental Consultants - TN

Sample Delivery Group:	L1109838
Samples Received:	06/17/2019
Project Number:	181-364
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



CHARLIE CREEK US L1109838-01 GW

Collected by: Caleb Duke | Collected date/time: 06/14/19 12:00 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1297794	1	06/19/19 16:52	06/19/19 16:52	JER	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1297406	1	06/21/19 12:14	06/21/19 12:14	BRJ	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1299739	1	06/22/19 21:14	06/22/19 21:14	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1297475	1	06/23/19 20:00	06/25/19 13:08	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1297478	1	06/18/19 20:11	06/23/19 23:29	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1297093	1	06/20/19 10:44	06/21/19 08:53	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298245	1	06/20/19 10:26	06/20/19 22:16	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1296992	1	06/19/19 13:24	06/20/19 22:29	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1297076	1	06/20/19 07:34	06/20/19 16:13	JPD	Mt. Juliet, TN

CHARLIE CREEK MS L1109838-02 GW

Collected by: Caleb Duke | Collected date/time: 06/14/19 11:15 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1297794	1	06/19/19 16:54	06/19/19 16:54	JER	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1297406	1	06/21/19 12:15	06/21/19 12:15	BRJ	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1299743	1	06/23/19 20:27	06/23/19 20:27	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1297475	1	06/23/19 20:00	06/25/19 13:11	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1297478	1	06/18/19 20:11	06/23/19 23:32	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1297093	1	06/20/19 10:44	06/21/19 08:56	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298245	1	06/20/19 10:26	06/20/19 22:18	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1296992	1	06/19/19 13:24	06/20/19 22:33	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1297076	1	06/20/19 07:34	06/20/19 16:17	JPD	Mt. Juliet, TN

CANE CREEK US L1109838-03 GW

Collected by: Caleb Duke | Collected date/time: 06/14/19 11:40 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1297794	1	06/19/19 16:55	06/19/19 16:55	JER	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1297406	1	06/21/19 12:17	06/21/19 12:17	BRJ	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1299743	1	06/23/19 20:44	06/23/19 20:44	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1297475	1	06/23/19 20:00	06/25/19 13:13	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1297478	1	06/18/19 20:11	06/23/19 23:34	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1297093	1	06/20/19 10:44	06/21/19 08:58	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298245	1	06/20/19 10:26	06/20/19 22:21	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1296992	1	06/19/19 13:24	06/20/19 22:38	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1297076	1	06/20/19 07:34	06/20/19 16:20	JPD	Mt. Juliet, TN

CANE CREEK MS L1109838-04 GW

Collected by: Caleb Duke | Collected date/time: 06/14/19 10:45 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1297794	1	06/19/19 16:56	06/19/19 16:56	JER	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1297406	1	06/21/19 12:18	06/21/19 12:18	BRJ	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1299743	1	06/23/19 21:02	06/23/19 21:02	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1297475	1	06/23/19 20:00	06/25/19 13:15	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1297478	1	06/18/19 20:11	06/23/19 23:37	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1297093	1	06/20/19 10:44	06/21/19 09:01	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298245	1	06/20/19 10:26	06/20/19 22:23	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1296992	1	06/19/19 13:24	06/20/19 22:43	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1297076	1	06/20/19 07:34	06/20/19 16:23	JPD	Mt. Juliet, TN

CANE CREEK DS-1 L1109838-05 GW

Collected by: Caleb Duke | Collected date/time: 06/14/19 10:15 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1297794	1	06/19/19 16:57	06/19/19 16:57	JER	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1297406	1	06/21/19 12:20	06/21/19 12:20	BRJ	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1299743	1	06/23/19 21:20	06/23/19 21:20	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1297475	1	06/23/19 20:00	06/25/19 13:18	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1297478	1	06/18/19 20:11	06/23/19 23:39	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1297093	1	06/20/19 10:44	06/21/19 09:04	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298245	1	06/20/19 10:26	06/20/19 22:26	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1296992	1	06/19/19 13:24	06/20/19 20:48	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1297076	1	06/20/19 07:34	06/20/19 16:27	JPD	Mt. Juliet, TN

CHARLIE CREEK US L1109838-06 Solid

Collected by: Caleb Duke | Collected date/time: 06/14/19 12:00 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1299020	1	06/20/19 09:30	06/22/19 16:45	ST	Mt. Juliet, TN
Mercury by Method 7471B	WG1297757	1	06/18/19 12:13	06/18/19 19:46	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298047	1	06/18/19 17:05	06/19/19 06:45	EL	Mt. Juliet, TN

CHARLIE CREEK MS L1109838-07 Solid

Collected by: Caleb Duke | Collected date/time: 06/14/19 11:15 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1299020	1	06/20/19 09:30	06/22/19 16:58	ST	Mt. Juliet, TN
Mercury by Method 7471B	WG1297757	1	06/18/19 12:13	06/18/19 19:48	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298047	1	06/18/19 17:05	06/19/19 06:47	EL	Mt. Juliet, TN

CANE CREEK US L1109838-08 Solid

Collected by: Caleb Duke | Collected date/time: 06/14/19 11:40 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1299020	1	06/20/19 09:30	06/22/19 17:11	ST	Mt. Juliet, TN
Mercury by Method 7471B	WG1297757	1	06/18/19 12:13	06/18/19 19:55	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298047	1	06/18/19 17:05	06/19/19 06:55	EL	Mt. Juliet, TN

CANE CREEK MS L1109838-09 Solid

Collected by: Caleb Duke | Collected date/time: 06/14/19 10:45 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1299020	1	06/20/19 09:30	06/22/19 17:50	ST	Mt. Juliet, TN
Mercury by Method 7471B	WG1297757	1	06/18/19 12:13	06/18/19 19:57	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298047	1	06/18/19 17:05	06/19/19 06:57	EL	Mt. Juliet, TN

CANE CREEK DS-1 L1109838-10 Solid

Collected by: Caleb Duke | Collected date/time: 06/14/19 10:15 | Received date/time: 06/17/19 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1299020	1	06/20/19 09:30	06/22/19 18:03	ST	Mt. Juliet, TN
Mercury by Method 7471B	WG1297757	1	06/18/19 12:13	06/18/19 19:59	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1298047	1	06/18/19 17:05	06/19/19 07:00	EL	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	46.6		30.0	1	06/19/2019 16:52	WG1297794

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/21/2019 12:14	WG1297406

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/22/2019 21:14	WG1299739
Chloride	7.84		1.00	1	06/22/2019 21:14	WG1299739
Fluoride	ND		0.100	1	06/22/2019 21:14	WG1299739

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/25/2019 13:08	WG1297475
Mercury,Dissolved	ND		0.000200	1	06/23/2019 23:29	WG1297478

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/21/2019 08:53	WG1297093
Boron,Dissolved	ND		0.200	1	06/20/2019 22:16	WG1298245

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/20/2019 22:29	WG1296992
Aluminum,Dissolved	ND		0.100	1	06/20/2019 16:13	WG1297076
Antimony	ND	J4	0.00200	1	06/20/2019 22:29	WG1296992
Antimony,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Arsenic	ND		0.00200	1	06/20/2019 22:29	WG1296992
Arsenic,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Barium	0.0289		0.00500	1	06/20/2019 22:29	WG1296992
Barium,Dissolved	0.0263		0.00500	1	06/20/2019 16:13	WG1297076
Beryllium	ND		0.00200	1	06/20/2019 22:29	WG1296992
Beryllium,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Cadmium	ND		0.00100	1	06/20/2019 22:29	WG1296992
Cadmium,Dissolved	ND		0.00100	1	06/20/2019 16:13	WG1297076
Calcium	14.0		1.00	1	06/20/2019 22:29	WG1296992
Calcium,Dissolved	14.0		1.00	1	06/20/2019 16:13	WG1297076
Chromium	ND		0.00200	1	06/20/2019 22:29	WG1296992
Chromium,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Cobalt	ND		0.00200	1	06/20/2019 22:29	WG1296992
Cobalt,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Copper	ND		0.00500	1	06/20/2019 22:29	WG1296992
Copper,Dissolved	ND		0.00500	1	06/20/2019 16:13	WG1297076
Iron	0.208		0.100	1	06/20/2019 22:29	WG1296992
Iron,Dissolved	ND		0.100	1	06/20/2019 16:13	WG1297076
Lead	ND		0.00200	1	06/20/2019 22:29	WG1296992
Lead,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.36		1.00	1	06/20/2019 22:29	WG1296992
Magnesium,Dissolved	2.34		1.00	1	06/20/2019 16:13	WG1297076
Manganese	0.0888		0.00500	1	06/20/2019 22:29	WG1296992
Manganese,Dissolved	0.0233		0.00500	1	06/20/2019 16:13	WG1297076
Nickel	ND		0.00200	1	06/20/2019 22:29	WG1296992
Nickel,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Potassium	1.22		1.00	1	06/20/2019 22:29	WG1296992
Potassium,Dissolved	1.25		1.00	1	06/20/2019 16:13	WG1297076
Selenium	ND		0.00200	1	06/20/2019 22:29	WG1296992
Selenium,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Silver	ND		0.00200	1	06/20/2019 22:29	WG1296992
Silver,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Sodium	5.54		1.00	1	06/20/2019 22:29	WG1296992
Sodium,Dissolved	6.08		1.00	1	06/20/2019 16:13	WG1297076
Thallium	ND		0.00200	1	06/20/2019 22:29	WG1296992
Thallium,Dissolved	ND		0.00200	1	06/20/2019 16:13	WG1297076
Vanadium	ND		0.00500	1	06/20/2019 22:29	WG1296992
Vanadium,Dissolved	ND		0.00500	1	06/20/2019 16:13	WG1297076
Zinc	ND		0.0250	1	06/20/2019 22:29	WG1296992
Zinc,Dissolved	ND		0.0250	1	06/20/2019 16:13	WG1297076

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	56.8		30.0	1	06/19/2019 16:54	WG1297794

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/21/2019 12:15	WG1297406

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/23/2019 20:27	WG1299743
Chloride	11.2		1.00	1	06/23/2019 20:27	WG1299743
Fluoride	ND		0.100	1	06/23/2019 20:27	WG1299743

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/25/2019 13:11	WG1297475
Mercury,Dissolved	ND		0.000200	1	06/23/2019 23:32	WG1297478

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/21/2019 08:56	WG1297093
Boron,Dissolved	ND		0.200	1	06/20/2019 22:18	WG1298245

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.209		0.100	1	06/20/2019 22:33	WG1296992
Aluminum,Dissolved	ND		0.100	1	06/20/2019 16:17	WG1297076
Antimony	ND	J4	0.00200	1	06/20/2019 22:33	WG1296992
Antimony,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Arsenic	ND		0.00200	1	06/20/2019 22:33	WG1296992
Arsenic,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Barium	0.0343		0.00500	1	06/20/2019 22:33	WG1296992
Barium,Dissolved	0.0315		0.00500	1	06/20/2019 16:17	WG1297076
Beryllium	ND		0.00200	1	06/20/2019 22:33	WG1296992
Beryllium,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Cadmium	ND		0.00100	1	06/20/2019 22:33	WG1296992
Cadmium,Dissolved	ND		0.00100	1	06/20/2019 16:17	WG1297076
Calcium	16.4		1.00	1	06/20/2019 22:33	WG1296992
Calcium,Dissolved	16.5		1.00	1	06/20/2019 16:17	WG1297076
Chromium	ND		0.00200	1	06/20/2019 22:33	WG1296992
Chromium,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Cobalt	ND		0.00200	1	06/20/2019 22:33	WG1296992
Cobalt,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Copper	ND		0.00500	1	06/20/2019 22:33	WG1296992
Copper,Dissolved	ND		0.00500	1	06/20/2019 16:17	WG1297076
Iron	0.412		0.100	1	06/20/2019 22:33	WG1296992
Iron,Dissolved	ND		0.100	1	06/20/2019 16:17	WG1297076
Lead	ND		0.00200	1	06/20/2019 22:33	WG1296992
Lead,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.92		1.00	1	06/20/2019 22:33	WG1296992
Magnesium,Dissolved	2.90		1.00	1	06/20/2019 16:17	WG1297076
Manganese	0.171		0.00500	1	06/20/2019 22:33	WG1296992
Manganese,Dissolved	0.0671		0.00500	1	06/20/2019 16:17	WG1297076
Nickel	ND		0.00200	1	06/20/2019 22:33	WG1296992
Nickel,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Potassium	1.54		1.00	1	06/20/2019 22:33	WG1296992
Potassium,Dissolved	1.55		1.00	1	06/20/2019 16:17	WG1297076
Selenium	ND		0.00200	1	06/20/2019 22:33	WG1296992
Selenium,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Silver	ND		0.00200	1	06/20/2019 22:33	WG1296992
Silver,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Sodium	5.88		1.00	1	06/20/2019 22:33	WG1296992
Sodium,Dissolved	6.52		1.00	1	06/20/2019 16:17	WG1297076
Thallium	ND		0.00200	1	06/20/2019 22:33	WG1296992
Thallium,Dissolved	ND		0.00200	1	06/20/2019 16:17	WG1297076
Vanadium	ND		0.00500	1	06/20/2019 22:33	WG1296992
Vanadium,Dissolved	ND		0.00500	1	06/20/2019 16:17	WG1297076
Zinc	ND		0.0250	1	06/20/2019 22:33	WG1296992
Zinc,Dissolved	ND		0.0250	1	06/20/2019 16:17	WG1297076

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	92.2		30.0	1	06/19/2019 16:55	WG1297794

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/21/2019 12:17	WG1297406

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/23/2019 20:44	WG1299743
Chloride	13.1		1.00	1	06/23/2019 20:44	WG1299743
Fluoride	0.153		0.100	1	06/23/2019 20:44	WG1299743

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/25/2019 13:13	WG1297475
Mercury,Dissolved	ND		0.000200	1	06/23/2019 23:34	WG1297478

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/21/2019 08:58	WG1297093
Boron,Dissolved	ND		0.200	1	06/20/2019 22:21	WG1298245

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.103		0.100	1	06/20/2019 22:38	WG1296992
Aluminum,Dissolved	ND		0.100	1	06/20/2019 16:20	WG1297076
Antimony	ND	J4	0.00200	1	06/20/2019 22:38	WG1296992
Antimony,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Arsenic	ND		0.00200	1	06/20/2019 22:38	WG1296992
Arsenic,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Barium	0.0319		0.00500	1	06/20/2019 22:38	WG1296992
Barium,Dissolved	0.0271		0.00500	1	06/20/2019 16:20	WG1297076
Beryllium	ND		0.00200	1	06/20/2019 22:38	WG1296992
Beryllium,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Cadmium	ND		0.00100	1	06/20/2019 22:38	WG1296992
Cadmium,Dissolved	ND		0.00100	1	06/20/2019 16:20	WG1297076
Calcium	24.1		1.00	1	06/20/2019 22:38	WG1296992
Calcium,Dissolved	24.0		1.00	1	06/20/2019 16:20	WG1297076
Chromium	ND		0.00200	1	06/20/2019 22:38	WG1296992
Chromium,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Cobalt	ND		0.00200	1	06/20/2019 22:38	WG1296992
Cobalt,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Copper	ND		0.00500	1	06/20/2019 22:38	WG1296992
Copper,Dissolved	ND		0.00500	1	06/20/2019 16:20	WG1297076
Iron	0.731		0.100	1	06/20/2019 22:38	WG1296992
Iron,Dissolved	ND		0.100	1	06/20/2019 16:20	WG1297076
Lead	ND		0.00200	1	06/20/2019 22:38	WG1296992
Lead,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	5.68		1.00	1	06/20/2019 22:38	WG1296992
Magnesium,Dissolved	5.71		1.00	1	06/20/2019 16:20	WG1297076
Manganese	0.287		0.00500	1	06/20/2019 22:38	WG1296992
Manganese,Dissolved	0.0255		0.00500	1	06/20/2019 16:20	WG1297076
Nickel	ND		0.00200	1	06/20/2019 22:38	WG1296992
Nickel,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Potassium	2.37		1.00	1	06/20/2019 22:38	WG1296992
Potassium,Dissolved	2.34		1.00	1	06/20/2019 16:20	WG1297076
Selenium	ND		0.00200	1	06/20/2019 22:38	WG1296992
Selenium,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Silver	ND		0.00200	1	06/20/2019 22:38	WG1296992
Silver,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Sodium	8.34		1.00	1	06/20/2019 22:38	WG1296992
Sodium,Dissolved	9.21		1.00	1	06/20/2019 16:20	WG1297076
Thallium	ND		0.00200	1	06/20/2019 22:38	WG1296992
Thallium,Dissolved	ND		0.00200	1	06/20/2019 16:20	WG1297076
Vanadium	ND		0.00500	1	06/20/2019 22:38	WG1296992
Vanadium,Dissolved	ND		0.00500	1	06/20/2019 16:20	WG1297076
Zinc	ND		0.0250	1	06/20/2019 22:38	WG1296992
Zinc,Dissolved	ND		0.0250	1	06/20/2019 16:20	WG1297076

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	81.4		30.0	1	06/19/2019 16:56	WG1297794

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	06/21/2019 12:18	WG1297406

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/23/2019 21:02	WG1299743
Chloride	12.4		1.00	1	06/23/2019 21:02	WG1299743
Fluoride	0.129		0.100	1	06/23/2019 21:02	WG1299743

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/25/2019 13:15	WG1297475
Mercury,Dissolved	ND		0.000200	1	06/23/2019 23:37	WG1297478

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/21/2019 09:01	WG1297093
Boron,Dissolved	ND		0.200	1	06/20/2019 22:23	WG1298245

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/20/2019 22:43	WG1296992
Aluminum,Dissolved	ND		0.100	1	06/20/2019 16:23	WG1297076
Antimony	ND	J4	0.00200	1	06/20/2019 22:43	WG1296992
Antimony,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Arsenic	ND		0.00200	1	06/20/2019 22:43	WG1296992
Arsenic,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Barium	0.0289		0.00500	1	06/20/2019 22:43	WG1296992
Barium,Dissolved	0.0276		0.00500	1	06/20/2019 16:23	WG1297076
Beryllium	ND		0.00200	1	06/20/2019 22:43	WG1296992
Beryllium,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Cadmium	ND		0.00100	1	06/20/2019 22:43	WG1296992
Cadmium,Dissolved	ND		0.00100	1	06/20/2019 16:23	WG1297076
Calcium	22.1		1.00	1	06/20/2019 22:43	WG1296992
Calcium,Dissolved	22.2		1.00	1	06/20/2019 16:23	WG1297076
Chromium	ND		0.00200	1	06/20/2019 22:43	WG1296992
Chromium,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Cobalt	ND		0.00200	1	06/20/2019 22:43	WG1296992
Cobalt,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Copper	ND		0.00500	1	06/20/2019 22:43	WG1296992
Copper,Dissolved	ND		0.00500	1	06/20/2019 16:23	WG1297076
Iron	0.383		0.100	1	06/20/2019 22:43	WG1296992
Iron,Dissolved	ND		0.100	1	06/20/2019 16:23	WG1297076
Lead	ND		0.00200	1	06/20/2019 22:43	WG1296992
Lead,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	4.72		1.00	1	06/20/2019 22:43	WG1296992
Magnesium,Dissolved	4.77		1.00	1	06/20/2019 16:23	WG1297076
Manganese	0.144		0.00500	1	06/20/2019 22:43	WG1296992
Manganese,Dissolved	0.0379		0.00500	1	06/20/2019 16:23	WG1297076
Nickel	ND		0.00200	1	06/20/2019 22:43	WG1296992
Nickel,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Potassium	2.20		1.00	1	06/20/2019 22:43	WG1296992
Potassium,Dissolved	2.17		1.00	1	06/20/2019 16:23	WG1297076
Selenium	ND		0.00200	1	06/20/2019 22:43	WG1296992
Selenium,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Silver	ND		0.00200	1	06/20/2019 22:43	WG1296992
Silver,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Sodium	7.33		1.00	1	06/20/2019 22:43	WG1296992
Sodium,Dissolved	8.05		1.00	1	06/20/2019 16:23	WG1297076
Thallium	ND		0.00200	1	06/20/2019 22:43	WG1296992
Thallium,Dissolved	ND		0.00200	1	06/20/2019 16:23	WG1297076
Vanadium	ND		0.00500	1	06/20/2019 22:43	WG1296992
Vanadium,Dissolved	ND		0.00500	1	06/20/2019 16:23	WG1297076
Zinc	ND		0.0250	1	06/20/2019 22:43	WG1296992
Zinc,Dissolved	ND		0.0250	1	06/20/2019 16:23	WG1297076

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	83.8		30.0	1	06/19/2019 16:57	WG1297794

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	0.116		0.100	1	06/21/2019 12:20	WG1297406

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/23/2019 21:20	WG1299743
Chloride	20.0		1.00	1	06/23/2019 21:20	WG1299743
Fluoride	0.131		0.100	1	06/23/2019 21:20	WG1299743

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/25/2019 13:18	WG1297475
Mercury,Dissolved	ND		0.000200	1	06/23/2019 23:39	WG1297478

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/21/2019 09:04	WG1297093
Boron,Dissolved	ND		0.200	1	06/20/2019 22:26	WG1298245

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/20/2019 20:48	WG1296992
Aluminum,Dissolved	ND		0.100	1	06/20/2019 16:27	WG1297076
Antimony	ND	J4 J5	0.00200	1	06/20/2019 20:48	WG1296992
Antimony,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Arsenic	ND	J3 J6	0.00200	1	06/20/2019 20:48	WG1296992
Arsenic,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Barium	0.0416	J6	0.00500	1	06/20/2019 20:48	WG1296992
Barium,Dissolved	0.0391		0.00500	1	06/20/2019 16:27	WG1297076
Beryllium	ND	J3 J6	0.00200	1	06/20/2019 20:48	WG1296992
Beryllium,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Cadmium	ND		0.00100	1	06/20/2019 20:48	WG1296992
Cadmium,Dissolved	ND		0.00100	1	06/20/2019 16:27	WG1297076
Calcium	22.1		1.00	1	06/20/2019 20:48	WG1296992
Calcium,Dissolved	22.5		1.00	1	06/20/2019 16:27	WG1297076
Chromium	ND	J3	0.00200	1	06/20/2019 20:48	WG1296992
Chromium,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Cobalt	ND		0.00200	1	06/20/2019 20:48	WG1296992
Cobalt,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Copper	ND		0.00500	1	06/20/2019 20:48	WG1296992
Copper,Dissolved	ND		0.00500	1	06/20/2019 16:27	WG1297076
Iron	0.692	O1	0.100	1	06/20/2019 20:48	WG1296992
Iron,Dissolved	0.106		0.100	1	06/20/2019 16:27	WG1297076
Lead	ND	J3	0.00200	1	06/20/2019 20:48	WG1296992
Lead,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	4.94		1.00	1	06/20/2019 20:48	WG1296992
Magnesium,Dissolved	5.08		1.00	1	06/20/2019 16:27	WG1297076
Manganese	0.251	V	0.00500	1	06/20/2019 20:48	WG1296992
Manganese,Dissolved	0.145		0.00500	1	06/20/2019 16:27	WG1297076
Nickel	ND		0.00200	1	06/20/2019 20:48	WG1296992
Nickel,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Potassium	3.27		1.00	1	06/20/2019 20:48	WG1296992
Potassium,Dissolved	3.33		1.00	1	06/20/2019 16:27	WG1297076
Selenium	ND		0.00200	1	06/20/2019 20:48	WG1296992
Selenium,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Silver	ND	J3	0.00200	1	06/20/2019 20:48	WG1296992
Silver,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Sodium	10.1	J6	1.00	1	06/20/2019 20:48	WG1296992
Sodium,Dissolved	12.2		1.00	1	06/20/2019 16:27	WG1297076
Thallium	ND	J3	0.00200	1	06/20/2019 20:48	WG1296992
Thallium,Dissolved	ND		0.00200	1	06/20/2019 16:27	WG1297076
Vanadium	ND	J3	0.00500	1	06/20/2019 20:48	WG1296992
Vanadium,Dissolved	ND		0.00500	1	06/20/2019 16:27	WG1297076
Zinc	ND		0.0250	1	06/20/2019 20:48	WG1296992
Zinc,Dissolved	ND		0.0250	1	06/20/2019 16:27	WG1297076

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	06/22/2019 16:45	WG1299020
Chloride	26.7		10.0	1	06/22/2019 16:45	WG1299020
Fluoride	1.57		1.00	1	06/22/2019 16:45	WG1299020

Mercury by Method 7471B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/18/2019 19:46	WG1297757

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	775		10.0	1	06/19/2019 06:45	WG1298047
Antimony	ND		2.00	1	06/19/2019 06:45	WG1298047
Arsenic	ND		2.00	1	06/19/2019 06:45	WG1298047
Barium	6.28		0.500	1	06/19/2019 06:45	WG1298047
Beryllium	ND		0.200	1	06/19/2019 06:45	WG1298047
Boron	ND		10.0	1	06/19/2019 06:45	WG1298047
Cadmium	ND		0.500	1	06/19/2019 06:45	WG1298047
Calcium	ND		100	1	06/19/2019 06:45	WG1298047
Chromium	3.48		1.00	1	06/19/2019 06:45	WG1298047
Cobalt	ND		1.00	1	06/19/2019 06:45	WG1298047
Copper	ND		2.00	1	06/19/2019 06:45	WG1298047
Iron	1850		10.0	1	06/19/2019 06:45	WG1298047
Lead	2.28	B	0.500	1	06/19/2019 06:45	WG1298047
Magnesium	ND		100	1	06/19/2019 06:45	WG1298047
Manganese	18.6		1.00	1	06/19/2019 06:45	WG1298047
Nickel	ND		2.00	1	06/19/2019 06:45	WG1298047
Potassium	116	B	100	1	06/19/2019 06:45	WG1298047
Selenium	ND		2.00	1	06/19/2019 06:45	WG1298047
Silver	ND		1.00	1	06/19/2019 06:45	WG1298047
Sodium	ND		100	1	06/19/2019 06:45	WG1298047
Thallium	ND		2.00	1	06/19/2019 06:45	WG1298047
Vanadium	3.90		2.00	1	06/19/2019 06:45	WG1298047
Zinc	5.16	B	5.00	1	06/19/2019 06:45	WG1298047

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	06/22/2019 16:58	WG1299020
Chloride	46.1		10.0	1	06/22/2019 16:58	WG1299020
Fluoride	2.10		1.00	1	06/22/2019 16:58	WG1299020

Mercury by Method 7471B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/18/2019 19:48	WG1297757

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1470		10.0	1	06/19/2019 06:47	WG1298047
Antimony	ND		2.00	1	06/19/2019 06:47	WG1298047
Arsenic	ND		2.00	1	06/19/2019 06:47	WG1298047
Barium	8.84		0.500	1	06/19/2019 06:47	WG1298047
Beryllium	ND		0.200	1	06/19/2019 06:47	WG1298047
Boron	ND		10.0	1	06/19/2019 06:47	WG1298047
Cadmium	ND		0.500	1	06/19/2019 06:47	WG1298047
Calcium	176	B	100	1	06/19/2019 06:47	WG1298047
Chromium	4.10		1.00	1	06/19/2019 06:47	WG1298047
Cobalt	1.31		1.00	1	06/19/2019 06:47	WG1298047
Copper	ND		2.00	1	06/19/2019 06:47	WG1298047
Iron	3230		10.0	1	06/19/2019 06:47	WG1298047
Lead	2.71	B	0.500	1	06/19/2019 06:47	WG1298047
Magnesium	123		100	1	06/19/2019 06:47	WG1298047
Manganese	102		1.00	1	06/19/2019 06:47	WG1298047
Nickel	ND		2.00	1	06/19/2019 06:47	WG1298047
Potassium	167	B	100	1	06/19/2019 06:47	WG1298047
Selenium	ND		2.00	1	06/19/2019 06:47	WG1298047
Silver	ND		1.00	1	06/19/2019 06:47	WG1298047
Sodium	ND		100	1	06/19/2019 06:47	WG1298047
Thallium	ND		2.00	1	06/19/2019 06:47	WG1298047
Vanadium	5.30		2.00	1	06/19/2019 06:47	WG1298047
Zinc	9.55	B	5.00	1	06/19/2019 06:47	WG1298047

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	06/22/2019 17:11	WG1299020
Chloride	37.9		10.0	1	06/22/2019 17:11	WG1299020
Fluoride	2.32		1.00	1	06/22/2019 17:11	WG1299020

Mercury by Method 7471B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/18/2019 19:55	WG1297757

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	2140		10.0	1	06/19/2019 06:55	WG1298047
Antimony	ND		2.00	1	06/19/2019 06:55	WG1298047
Arsenic	ND		2.00	1	06/19/2019 06:55	WG1298047
Barium	27.0		0.500	1	06/19/2019 06:55	WG1298047
Beryllium	ND		0.200	1	06/19/2019 06:55	WG1298047
Boron	ND		10.0	1	06/19/2019 06:55	WG1298047
Cadmium	ND		0.500	1	06/19/2019 06:55	WG1298047
Calcium	5810		100	1	06/19/2019 06:55	WG1298047
Chromium	4.93		1.00	1	06/19/2019 06:55	WG1298047
Cobalt	1.39		1.00	1	06/19/2019 06:55	WG1298047
Copper	ND		2.00	1	06/19/2019 06:55	WG1298047
Iron	3970		10.0	1	06/19/2019 06:55	WG1298047
Lead	5.73		0.500	1	06/19/2019 06:55	WG1298047
Magnesium	616		100	1	06/19/2019 06:55	WG1298047
Manganese	241		1.00	1	06/19/2019 06:55	WG1298047
Nickel	2.03		2.00	1	06/19/2019 06:55	WG1298047
Potassium	337		100	1	06/19/2019 06:55	WG1298047
Selenium	ND		2.00	1	06/19/2019 06:55	WG1298047
Silver	ND		1.00	1	06/19/2019 06:55	WG1298047
Sodium	ND		100	1	06/19/2019 06:55	WG1298047
Thallium	ND		2.00	1	06/19/2019 06:55	WG1298047
Vanadium	6.77		2.00	1	06/19/2019 06:55	WG1298047
Zinc	10.6	B	5.00	1	06/19/2019 06:55	WG1298047

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	06/22/2019 17:50	WG1299020
Chloride	18.5		10.0	1	06/22/2019 17:50	WG1299020
Fluoride	1.35		1.00	1	06/22/2019 17:50	WG1299020

Mercury by Method 7471B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/18/2019 19:57	WG1297757

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1060		10.0	1	06/19/2019 06:57	WG1298047
Antimony	ND		2.00	1	06/19/2019 06:57	WG1298047
Arsenic	ND		2.00	1	06/19/2019 06:57	WG1298047
Barium	11.6		0.500	1	06/19/2019 06:57	WG1298047
Beryllium	ND		0.200	1	06/19/2019 06:57	WG1298047
Boron	ND		10.0	1	06/19/2019 06:57	WG1298047
Cadmium	ND		0.500	1	06/19/2019 06:57	WG1298047
Calcium	186	B	100	1	06/19/2019 06:57	WG1298047
Chromium	5.05		1.00	1	06/19/2019 06:57	WG1298047
Cobalt	1.54		1.00	1	06/19/2019 06:57	WG1298047
Copper	ND		2.00	1	06/19/2019 06:57	WG1298047
Iron	3730		10.0	1	06/19/2019 06:57	WG1298047
Lead	2.09	B	0.500	1	06/19/2019 06:57	WG1298047
Magnesium	ND		100	1	06/19/2019 06:57	WG1298047
Manganese	249		1.00	1	06/19/2019 06:57	WG1298047
Nickel	ND		2.00	1	06/19/2019 06:57	WG1298047
Potassium	122	B	100	1	06/19/2019 06:57	WG1298047
Selenium	ND		2.00	1	06/19/2019 06:57	WG1298047
Silver	ND		1.00	1	06/19/2019 06:57	WG1298047
Sodium	ND		100	1	06/19/2019 06:57	WG1298047
Thallium	ND		2.00	1	06/19/2019 06:57	WG1298047
Vanadium	5.97		2.00	1	06/19/2019 06:57	WG1298047
Zinc	9.45	B	5.00	1	06/19/2019 06:57	WG1298047

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	06/22/2019 18:03	WG1299020
Chloride	33.6		10.0	1	06/22/2019 18:03	WG1299020
Fluoride	1.13		1.00	1	06/22/2019 18:03	WG1299020

Mercury by Method 7471B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/18/2019 19:59	WG1297757

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	746		10.0	1	06/19/2019 07:00	WG1298047
Antimony	ND		2.00	1	06/19/2019 07:00	WG1298047
Arsenic	ND		2.00	1	06/19/2019 07:00	WG1298047
Barium	12.0		0.500	1	06/19/2019 07:00	WG1298047
Beryllium	ND		0.200	1	06/19/2019 07:00	WG1298047
Boron	ND		10.0	1	06/19/2019 07:00	WG1298047
Cadmium	ND		0.500	1	06/19/2019 07:00	WG1298047
Calcium	ND		100	1	06/19/2019 07:00	WG1298047
Chromium	3.79		1.00	1	06/19/2019 07:00	WG1298047
Cobalt	1.40		1.00	1	06/19/2019 07:00	WG1298047
Copper	ND		2.00	1	06/19/2019 07:00	WG1298047
Iron	2790		10.0	1	06/19/2019 07:00	WG1298047
Lead	2.08	B	0.500	1	06/19/2019 07:00	WG1298047
Magnesium	ND		100	1	06/19/2019 07:00	WG1298047
Manganese	193		1.00	1	06/19/2019 07:00	WG1298047
Nickel	ND		2.00	1	06/19/2019 07:00	WG1298047
Potassium	110	B	100	1	06/19/2019 07:00	WG1298047
Selenium	ND		2.00	1	06/19/2019 07:00	WG1298047
Silver	ND		1.00	1	06/19/2019 07:00	WG1298047
Sodium	ND		100	1	06/19/2019 07:00	WG1298047
Thallium	ND		2.00	1	06/19/2019 07:00	WG1298047
Vanadium	4.08		2.00	1	06/19/2019 07:00	WG1298047
Zinc	6.56	B	5.00	1	06/19/2019 07:00	WG1298047

Method Blank (MB)

(MB) R3422629-1 06/19/19 16:44

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.63	J	1.43	30.0

L1109707-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1109707-02 06/19/19 16:48 • (DUP) R3422629-5 06/19/19 16:49

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	57.8	56.8	1	1.75		20

L1109952-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1109952-01 06/19/19 17:08 • (DUP) R3422629-6 06/19/19 17:08

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	5.50	1	1.98	J	20

Laboratory Control Sample (LCS)

(LCS) R3422629-2 06/19/19 16:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	150	154	103	85.0-115	

L1109707-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109707-01 06/19/19 16:46 • (MS) R3422629-3 06/19/19 16:47 • (MSD) R3422629-4 06/19/19 16:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	56.2	191	188	89.9	87.9	1	80.0-120			1.58	20

Method Blank (MB)

(MB) R3423411-1 06/21/19 11:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1109432-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1109432-01 06/21/19 11:40 • (DUP) R3423411-3 06/21/19 11:42

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	1.09	1.09	1	0.000		10

L1109455-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1109455-04 06/21/19 11:58 • (DUP) R3423411-6 06/21/19 11:59

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3423411-2 06/21/19 11:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	6.79	90.6	90.0-110	

L1109433-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109433-01 06/21/19 11:43 • (MS) R3423411-4 06/21/19 11:50 • (MSD) R3423411-5 06/21/19 11:51

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.250	5.03	5.06	95.6	96.1	1	90.0-110			0.535	10

L1109455-06 Original Sample (OS) • Matrix Spike (MS)

(OS) L1109455-06 06/21/19 12:01 • (MS) R3423411-7 06/21/19 12:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	4.67	93.5	1	90.0-110	

Method Blank (MB)

(MB) R3423915-1 06/22/19 15:02

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Bromide	U		0.133	10.0
Chloride	U		0.795	10.0
Fluoride	U		0.261	1.00

L1109644-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1109644-02 06/22/19 15:53 • (DUP) R3423915-3 06/22/19 16:06

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	156	159	1	1.80		15
Fluoride	4.05	4.61	1	13.1		15

L1110272-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1110272-01 06/22/19 18:42 • (DUP) R3423915-4 06/22/19 18:55

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	427	446	1	4.26		15
Fluoride	9.17	11.2	1	19.8	J3	15

Laboratory Control Sample (LCS)

(LCS) R3423915-2 06/22/19 15:15

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	200	217	108	80.0-120	
Chloride	200	220	110	80.0-120	
Fluoride	20.0	21.9	110	80.0-120	

L1110590-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1110590-01 06/22/19 21:17 • (MS) R3423915-6 06/22/19 21:30 • (MSD) R3423915-7 06/22/19 21:43

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	619	4.11	611	648	98.1	104	1	80.0-120			5.82	15
Chloride	619	150	793	835	104	111	1	80.0-120			5.16	15
Fluoride	61.9	15.3	57.7	49.3	68.4	54.9	1	80.0-120	J6	J3 J6	15.6	15

Method Blank (MB)

(MB) R3423830-1 06/22/19 11:00

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100

L1109534-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1109534-09 06/22/19 14:24 • (DUP) R3423830-3 06/22/19 14:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	U	0.000	1	0.000		15
Fluoride	U	0.000	1	0.000		15

L1109838-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1109838-01 06/22/19 21:14 • (DUP) R3423830-6 06/22/19 21:30

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	7.84	7.92	1	1.02		15
Fluoride	ND	0.0951	1	0.315	J	15

Laboratory Control Sample (LCS)

(LCS) R3423830-2 06/22/19 11:16

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	38.5	96.2	80.0-120	
Chloride	40.0	38.8	96.9	80.0-120	
Fluoride	8.00	8.08	101	80.0-120	

L1109534-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109534-09 06/22/19 14:24 • (MS) R3423830-4 06/22/19 14:56 • (MSD) R3423830-5 06/22/19 15:13

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	U	49.3	49.5	98.5	98.9	1	80.0-120			0.411	15
Chloride	50.0	U	49.7	49.9	99.4	99.7	1	80.0-120			0.309	15
Fluoride	5.00	U	5.00	5.02	99.9	100	1	80.0-120			0.403	15

L1109838-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1109838-01 06/22/19 21:14 • (MS) R3423830-7 06/22/19 21:47

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	50.0	99.9	1	80.0-120	
Chloride	50.0	7.84	58.7	102	1	80.0-120	
Fluoride	5.00	ND	5.10	100	1	80.0-120	

Method Blank (MB)

(MB) R3423923-1 06/23/19 16:02

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100

L1108419-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1108419-01 06/23/19 16:55 • (DUP) R3423923-3 06/23/19 17:13

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	12.4	12.4	1	0.549		15
Fluoride	0.524	0.518	1	1.09		15

L1109853-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1109853-07 06/23/19 23:58 • (DUP) R3423923-6 06/24/19 00:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	8.45	8.44	1	0.206		15
Fluoride	0.292	0.292	1	0.137		15

Laboratory Control Sample (LCS)

(LCS) R3423923-2 06/23/19 16:20

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	40.0	100	80.0-120	
Chloride	40.0	40.2	101	80.0-120	
Fluoride	8.00	8.15	102	80.0-120	

L1108419-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1108419-01 06/23/19 16:55 • (MS) R3423923-4 06/23/19 17:31 • (MSD) R3423923-5 06/23/19 17:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	51.4	50.8	103	102	1	80.0-120			1.16	15
Chloride	50.0	12.4	65.3	64.9	106	105	1	80.0-120			0.698	15
Fluoride	5.00	0.524	5.89	5.84	107	106	1	80.0-120			0.720	15

L1109853-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L1109853-07 06/23/19 23:58 • (MS) R3423923-7 06/24/19 00:33

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	39.3	78.7	1	80.0-120	J6
Chloride	50.0	8.45	59.0	101	1	80.0-120	
Fluoride	5.00	0.292	5.35	101	1	80.0-120	

Method Blank (MB)

(MB) R3424515-1 06/25/19 12:22

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3424515-2 06/25/19 12:29 • (LCSD) R3424515-3 06/25/19 12:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00283	0.00294	94.2	98.0	80.0-120			3.97	20

L1109503-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109503-04 06/25/19 12:34 • (MS) R3424515-4 06/25/19 12:36 • (MSD) R3424515-5 06/25/19 12:39

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	U	0.00291	0.00292	96.9	97.5	1	75.0-125			0.610	20

Method Blank (MB)

(MB) R3423860-1 06/23/19 22:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423860-2 06/23/19 22:40 • (LCSD) R3423860-3 06/23/19 22:43

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00288	0.00283	95.9	94.3	80.0-120			1.66	20

L1109164-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109164-01 06/23/19 22:45 • (MS) R3423860-4 06/23/19 22:48 • (MSD) R3423860-5 06/23/19 22:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	U	0.00293	0.00285	97.8	95.1	1	75.0-125			2.81	20

Method Blank (MB)

(MB) R3422198-1 06/18/19 19:04

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	U		0.00280	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3422198-2 06/18/19 19:06 • (LCSD) R3422198-3 06/18/19 19:09

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.266	0.271	88.6	90.4	80.0-120			2.05	20

L1109762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109762-01 06/18/19 19:11 • (MS) R3422198-4 06/18/19 19:13 • (MSD) R3422198-5 06/18/19 19:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.0572	0.274	0.248	72.3	63.7	1	75.0-125	J6	J6	9.89	20

Method Blank (MB)

(MB) R3423333-1 06/21/19 08:13

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423333-2 06/21/19 08:16 • (LCSD) R3423333-3 06/21/19 08:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.993	0.998	99.3	99.8	80.0-120			0.458	20

L1109719-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109719-01 06/21/19 08:21 • (MS) R3423333-5 06/21/19 08:27 • (MSD) R3423333-6 06/21/19 08:30

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	1.13	1.09	103	99.6	1	75.0-125			2.80	20

Method Blank (MB)

(MB) R3423226-1 06/20/19 21:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423226-2 06/20/19 21:48 • (LCSD) R3423226-3 06/20/19 21:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.973	0.984	97.3	98.4	80.0-120			1.17	20

L1110158-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1110158-14 06/20/19 21:53 • (MS) R3423226-5 06/20/19 21:58 • (MSD) R3423226-6 06/20/19 22:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	U	0.969	0.965	96.9	96.5	1	75.0-125			0.472	20

L1110158-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1110158-15 06/20/19 22:03 • (MS) R3423226-7 06/20/19 22:06 • (MSD) R3423226-8 06/20/19 22:08

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	U	0.936	0.951	93.6	95.1	1	75.0-125			1.63	20

Method Blank (MB)

(MB) R3422248-1 06/19/19 05:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aluminum	4.11	J	3.50	10.0
Antimony	U		0.750	2.00
Arsenic	U		0.460	2.00
Barium	U		0.170	0.500
Beryllium	U		0.0700	0.200
Boron	U		1.26	10.0
Cadmium	U		0.0700	0.500
Calcium	22.9	J	4.63	100
Chromium	U		0.140	1.00
Cobalt	U		0.230	1.00
Copper	U		0.530	2.00
Iron	U		1.41	10.0
Magnesium	2.03	J	1.11	100
Manganese	0.442	J	0.120	1.00
Nickel	U		0.490	2.00
Potassium	21.4	J	10.2	100
Selenium	U		0.620	2.00
Silver	U		0.120	1.00
Sodium	66.1	J	9.85	100
Thallium	U		0.650	2.00
Vanadium	U		0.240	2.00
Zinc	1.08	J	0.590	5.00

Method Blank (MB)

(MB) R3422869-1 06/20/19 08:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Lead	0.338	J	0.190	0.500

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3422248-2 06/19/19 05:56 • (LCSD) R3422248-3 06/19/19 05:59

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	1010	1010	101	101	80.0-120			0.0935	20
Antimony	100	98.0	98.2	98.0	98.2	80.0-120			0.189	20
Arsenic	100	95.5	95.6	95.5	95.6	80.0-120			0.0286	20
Barium	100	101	102	101	102	80.0-120			1.08	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3422248-2 06/19/19 05:56 • (LCSD) R3422248-3 06/19/19 05:59

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Beryllium	100	100	101	100	101	80.0-120			0.988	20
Boron	100	99.9	100	99.9	100	80.0-120			0.280	20
Cadmium	100	96.0	96.2	96.0	96.2	80.0-120			0.198	20
Calcium	1000	1010	1010	101	101	80.0-120			0.459	20
Chromium	100	100	100	100	100	80.0-120			0.399	20
Cobalt	100	100	100	100	100	80.0-120			0.0890	20
Copper	100	97.8	98.6	97.8	98.6	80.0-120			0.760	20
Iron	1000	1000	1010	100	101	80.0-120			0.265	20
Magnesium	1000	1030	1030	103	103	80.0-120			0.196	20
Manganese	100	99.0	98.8	99.0	98.8	80.0-120			0.174	20
Nickel	100	98.9	98.6	98.9	98.6	80.0-120			0.315	20
Potassium	1000	1000	1010	100	101	80.0-120			0.431	20
Selenium	100	96.4	96.1	96.4	96.1	80.0-120			0.375	20
Silver	20.0	18.2	18.2	90.8	90.9	80.0-120			0.112	20
Sodium	1000	1060	1070	106	107	80.0-120			1.16	20
Thallium	100	96.7	97.1	96.7	97.1	80.0-120			0.339	20
Vanadium	100	100	101	100	101	80.0-120			0.936	20
Zinc	100	97.1	96.7	97.1	96.7	80.0-120			0.409	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3422869-2 06/20/19 08:08 • (LCSD) R3422869-3 06/20/19 08:11

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	100	94.3	95.0	94.3	95.0	80.0-120			0.715	20

L1109267-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109267-01 06/19/19 06:01 • (MS) R3422248-6 06/19/19 06:09 • (MSD) R3422248-7 06/19/19 06:12

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	1040	8730	8360	8860	0.000	12.2	1	75.0-125	V	V	5.78	20
Antimony	104	13.6	69.9	67.9	53.9	52.0	1	75.0-125	J6	J6	2.91	20
Arsenic	104	14.3	100	104	82.3	85.6	1	75.0-125			3.42	20
Barium	104	84.7	167	172	79.3	83.6	1	75.0-125			2.65	20
Beryllium	104	0.129	94.8	95.6	90.7	91.5	1	75.0-125			0.892	20
Boron	104	2.71	96.1	95.4	89.5	88.8	1	75.0-125			0.718	20
Cadmium	104	U	96.4	98.5	92.4	94.4	1	75.0-125			2.22	20

L1109267-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109267-01 06/19/19 06:01 • (MS) R3422248-6 06/19/19 06:09 • (MSD) R3422248-7 06/19/19 06:12

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	1040	13700	10900	11300	0.000	0.000	1	75.0-125	V	V	3.61	20
Chromium	104	201	332	339	126	132	1	75.0-125	J5	J5	1.96	20
Cobalt	104	49.0	177	176	122	122	1	75.0-125			0.261	20
Copper	104	669	922	920	242	240	1	75.0-125	V	V	0.234	20
Iron	1040	279000	342000	327000	6070	4570	1	75.0-125	E V	E V	4.67	20
Lead	104	41.1	158	156	112	110	1	75.0-125			1.64	20
Magnesium	1040	5930	6760	6560	79.5	60.8	1	75.0-125		V	2.94	20
Manganese	104	1300	1590	1650	273	328	1	75.0-125	V	V	3.53	20
Nickel	104	338	543	547	197	201	1	75.0-125	J5	J5	0.676	20
Potassium	1040	856	1500	1530	61.3	64.3	1	75.0-125	J6	J6	2.07	20
Selenium	104	1.66	88.0	91.7	82.7	86.3	1	75.0-125			4.17	20
Silver	20.9	U	18.8	18.9	90.0	90.4	1	75.0-125			0.498	20
Sodium	1040	210	1180	1180	92.7	92.6	1	75.0-125			0.0477	20
Thallium	104	U	71.8	73.0	68.8	70.0	1	75.0-125	J6	J6	1.72	20
Vanadium	104	51.1	145	148	90.3	92.7	1	75.0-125			1.73	20
Zinc	104	2970	2300	2250	0.000	0.000	1	75.0-125	E V	E V	2.21	20

Method Blank (MB)

(MB) R3423231-1 06/20/19 20:34

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	U		0.0460	1.00
Chromium	U		0.000540	0.00200
Copper	U		0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	U		0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	U		0.000250	0.00500
Nickel	U		0.000350	0.00200
Potassium	U		0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	U		0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	U		0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423231-2 06/20/19 20:39 • (LCSD) R3423231-3 06/20/19 20:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.87	4.89	97.4	97.7	80.0-120			0.339	20
Antimony	0.0500	0.0728	0.0724	146	145	80.0-120	J4	J4	0.556	20
Arsenic	0.0500	0.0482	0.0456	96.4	91.3	80.0-120			5.50	20
Barium	0.0500	0.0483	0.0465	96.6	93.0	80.0-120			3.73	20
Beryllium	0.0500	0.0470	0.0468	93.9	93.5	80.0-120			0.427	20
Cadmium	0.0500	0.0491	0.0496	98.2	99.3	80.0-120			1.11	20
Calcium	5.00	4.88	4.84	97.7	96.8	80.0-120			0.875	20
Chromium	0.0500	0.0486	0.0466	97.2	93.1	80.0-120			4.26	20
Copper	0.0500	0.0481	0.0478	96.1	95.6	80.0-120			0.576	20
Cobalt	0.0500	0.0489	0.0475	97.7	95.0	80.0-120			2.87	20
Iron	5.00	4.80	4.76	96.0	95.2	80.0-120			0.799	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423231-2 06/20/19 20:39 • (LCSD) R3423231-3 06/20/19 20:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0485	0.0476	96.9	95.1	80.0-120			1.87	20
Magnesium	5.00	4.93	4.97	98.6	99.4	80.0-120			0.832	20
Manganese	0.0500	0.0479	0.0463	95.8	92.6	80.0-120			3.39	20
Nickel	0.0500	0.0489	0.0474	97.8	94.8	80.0-120			3.11	20
Potassium	5.00	4.87	4.90	97.5	98.0	80.0-120			0.554	20
Selenium	0.0500	0.0513	0.0477	103	95.3	80.0-120			7.35	20
Silver	0.0500	0.0501	0.0494	100	98.8	80.0-120			1.36	20
Sodium	5.00	4.52	4.50	90.3	90.0	80.0-120			0.316	20
Thallium	0.0500	0.0476	0.0469	95.2	93.9	80.0-120			1.41	20
Vanadium	0.0500	0.0481	0.0465	96.2	93.0	80.0-120			3.34	20
Zinc	0.0500	0.0491	0.0483	98.1	96.6	80.0-120			1.53	20

L1109838-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109838-05 06/20/19 20:48 • (MS) R3423231-5 06/20/19 20:57 • (MSD) R3423231-7 06/20/19 23:00

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.07	4.18	99.7	81.9	1	75.0-125			19.3	20
Antimony	0.0500	ND	0.0727	0.0729	145	146	1	75.0-125	J5	J5	0.380	20
Arsenic	0.0500	ND	0.0471	0.0372	93.3	73.5	1	75.0-125		J3 J6	23.6	20
Barium	0.0500	0.0416	0.0905	0.0788	97.7	74.3	1	75.0-125		J6	13.8	20
Beryllium	0.0500	ND	0.0480	0.0371	96.0	74.2	1	75.0-125		J3 J6	25.6	20
Cadmium	0.0500	ND	0.0497	0.0422	99.4	84.3	1	75.0-125			16.4	20
Calcium	5.00	22.1	27.1	26.1	100	80.2	1	75.0-125			3.77	20
Chromium	0.0500	ND	0.0473	0.0383	94.7	76.6	1	75.0-125		J3	21.1	20
Copper	0.0500	ND	0.0485	0.0395	95.7	77.8	1	75.0-125		J3	20.3	20
Cobalt	0.0500	ND	0.0477	0.0392	94.4	77.5	1	75.0-125			19.5	20
Potassium	5.00	3.27	8.27	7.33	100	81.3	1	75.0-125			12.1	20
Iron	5.00	0.692	5.24	4.57	90.9	77.6	1	75.0-125			13.6	20
Lead	0.0500	ND	0.0497	0.0400	98.7	79.4	1	75.0-125		J3	21.5	20
Magnesium	5.00	4.94	9.83	9.04	97.9	82.0	1	75.0-125			8.44	20
Manganese	0.0500	0.251	0.301	0.289	100	74.4	1	75.0-125		V	4.36	20
Nickel	0.0500	ND	0.0485	0.0402	95.3	78.7	1	75.0-125			18.7	20
Selenium	0.0500	ND	0.0497	0.0422	99.5	84.5	1	75.0-125			16.3	20
Silver	0.0500	ND	0.0502	0.0409	100	81.9	1	75.0-125		J3	20.3	20
Sodium	5.00	10.1	14.6	13.8	90.3	74.7	1	75.0-125		J6	5.50	20
Thallium	0.0500	ND	0.0495	0.0394	99.0	78.7	1	75.0-125		J3	22.8	20
Vanadium	0.0500	ND	0.0471	0.0379	93.7	75.2	1	75.0-125		J3	21.7	20
Zinc	0.0500	ND	0.0463	0.0401	92.5	80.3	1	75.0-125			14.2	20

Method Blank (MB)

(MB) R3423129-1 06/20/19 15:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	U		0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.000250	0.00200
Barium,Dissolved	U		0.000360	0.00500
Beryllium,Dissolved	U		0.000120	0.00200
Cadmium,Dissolved	U		0.000160	0.00100
Calcium,Dissolved	U		0.0460	1.00
Chromium,Dissolved	U		0.000540	0.00200
Copper,Dissolved	U		0.000520	0.00500
Cobalt,Dissolved	U		0.000260	0.00200
Iron,Dissolved	U		0.0150	0.100
Lead,Dissolved	U		0.000240	0.00200
Magnesium,Dissolved	U		0.100	1.00
Manganese,Dissolved	U		0.000250	0.00500
Nickel,Dissolved	U		0.000350	0.00200
Potassium,Dissolved	U		0.0370	1.00
Selenium,Dissolved	U		0.000380	0.00200
Silver,Dissolved	U		0.000310	0.00200
Sodium,Dissolved	U		0.110	1.00
Thallium,Dissolved	U		0.000190	0.00200
Vanadium,Dissolved	U		0.000180	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423129-2 06/20/19 15:16 • (LCSD) R3423129-3 06/20/19 15:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.01	5.07	100	101	80.0-120			1.20	20
Antimony,Dissolved	0.0500	0.0591	0.0598	118	120	80.0-120			1.16	20
Arsenic,Dissolved	0.0500	0.0523	0.0520	105	104	80.0-120			0.605	20
Barium,Dissolved	0.0500	0.0497	0.0503	99.4	101	80.0-120			1.31	20
Beryllium,Dissolved	0.0500	0.0484	0.0486	96.9	97.2	80.0-120			0.359	20
Cadmium,Dissolved	0.0500	0.0513	0.0507	103	101	80.0-120			1.06	20
Calcium,Dissolved	5.00	5.13	5.23	103	105	80.0-120			1.80	20
Chromium,Dissolved	0.0500	0.0525	0.0525	105	105	80.0-120			0.0742	20
Copper,Dissolved	0.0500	0.0509	0.0511	102	102	80.0-120			0.536	20
Cobalt,Dissolved	0.0500	0.0529	0.0526	106	105	80.0-120			0.472	20
Iron,Dissolved	5.00	5.30	5.33	106	107	80.0-120			0.639	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3423129-2 06/20/19 15:16 • (LCSD) R3423129-3 06/20/19 15:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead,Dissolved	0.0500	0.0517	0.0508	103	102	80.0-120			1.64	20
Magnesium,Dissolved	5.00	5.11	5.18	102	104	80.0-120			1.37	20
Manganese,Dissolved	0.0500	0.0518	0.0521	104	104	80.0-120			0.538	20
Nickel,Dissolved	0.0500	0.0525	0.0526	105	105	80.0-120			0.0558	20
Potassium,Dissolved	5.00	5.06	5.11	101	102	80.0-120			0.936	20
Selenium,Dissolved	0.0500	0.0523	0.0533	105	107	80.0-120			1.89	20
Silver,Dissolved	0.0500	0.0500	0.0500	100	100	80.0-120			0.0188	20
Sodium,Dissolved	5.00	5.11	5.17	102	103	80.0-120			1.31	20
Thallium,Dissolved	0.0500	0.0513	0.0515	103	103	80.0-120			0.399	20
Vanadium,Dissolved	0.0500	0.0521	0.0516	104	103	80.0-120			1.10	20
Zinc,Dissolved	0.0500	0.0532	0.0525	106	105	80.0-120			1.25	20

L1109164-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1109164-01 06/20/19 15:22 • (MS) R3423129-5 06/20/19 15:29 • (MSD) R3423129-6 06/20/19 15:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	0.0238	5.07	5.00	101	99.6	1	75.0-125			1.33	20
Antimony,Dissolved	0.0500	U	0.0611	0.0603	122	121	1	75.0-125			1.29	20
Arsenic,Dissolved	0.0500	0.000519	0.0524	0.0506	104	100	1	75.0-125			3.37	20
Barium,Dissolved	0.0500	0.114	0.162	0.164	95.7	101	1	75.0-125			1.50	20
Beryllium,Dissolved	0.0500	U	0.0498	0.0506	99.5	101	1	75.0-125			1.61	20
Cadmium,Dissolved	0.0500	U	0.0509	0.0503	102	101	1	75.0-125			1.28	20
Calcium,Dissolved	5.00	88.6	93.8	91.7	103	60.9	1	75.0-125		V	2.27	20
Chromium,Dissolved	0.0500	U	0.0516	0.0490	103	98.1	1	75.0-125			5.06	20
Copper,Dissolved	0.0500	0.000650	0.0518	0.0498	102	98.2	1	75.0-125			4.09	20
Cobalt,Dissolved	0.0500	0.00170	0.0525	0.0506	102	97.8	1	75.0-125			3.73	20
Potassium,Dissolved	5.00	9.30	14.4	14.2	103	97.3	1	75.0-125			1.96	20
Iron,Dissolved	5.00	0.110	5.26	5.03	103	98.5	1	75.0-125			4.46	20
Lead,Dissolved	0.0500	U	0.0513	0.0505	103	101	1	75.0-125			1.69	20
Magnesium,Dissolved	5.00	88.7	94.7	91.1	121	48.0	1	75.0-125		V	3.93	20
Manganese,Dissolved	0.0500	0.469	0.529	0.509	120	80.4	1	75.0-125			3.81	20
Nickel,Dissolved	0.0500	0.00267	0.0536	0.0509	102	96.5	1	75.0-125			5.09	20
Selenium,Dissolved	0.0500	0.000964	0.0552	0.0524	108	103	1	75.0-125			5.24	20
Silver,Dissolved	0.0500	U	0.0502	0.0499	100	99.8	1	75.0-125			0.636	20
Sodium,Dissolved	5.00	59.7	65.7	64.0	119	86.3	1	75.0-125			2.49	20
Thallium,Dissolved	0.0500	U	0.0515	0.0514	103	103	1	75.0-125			0.122	20
Vanadium,Dissolved	0.0500	0.00116	0.0525	0.0505	103	98.7	1	75.0-125			3.93	20
Zinc,Dissolved	0.0500	0.00272	0.0529	0.0508	100	96.2	1	75.0-125			3.99	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden TN

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Caleb Duke

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Caleb Duke

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 1169828

H208

Acctnum: CEC
Template: T133580
Prelogin: P711884
TSR: 526 - Chris McCord
PB: TB 5-31-19
Shipped Via: Courier

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Anions(Br,Cl,FI) 125mlHDPE-NoPres	Br, Cl, FI 4ozClr-NoPres	Diss. Metals-LF 250mlHDPE-NoPres	NH3 250mlHDPE-H2SO4	Total Metals 2ozClr-NoPres	Total Metals,HARD 250mlHDPE-HNO3	Remarks	Sample # (lab only)
CHARLIE CREEK US	G	GW	–	6/14/19	12:00	4	X		X	X		X		01
CHARLIE CREEK MS	G	GW	–		11:15	4	X		X	X		X		02
CANE CREEK US	G	GW	–		11:40	4	X		X	X		X		03
CANE CREEK MS	G	GW	–		10:45	4	X		X	X		X		04
CANE CREEK DS-1	G	GW	–		10:15	4	X		X	X		X		05
CHARLIE CREEK US	G	SS	–		12:00	2		X			X			06
CHARLIE CREEK MS	G	SS	–		11:16	2		X			X			07
CANE CREEK US	G	SS	–		11:40	2		X			X			08
CANE CREEK MS	G	SS	–		10:45	2		X			X			09
CANE CREEK DS-1	G	SS	–		10:15	2		X			X			10

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ____

Remarks: Tot/Diss.Metals = M6020AP1 + Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470)
Soil Total Metals = M6010AP1+Al,Ca,Fe,K,Mg,Mn,Na

pH ____ Temp ____
Flow ____ Other ____

Samples returned via: ___ UPS ___ FedEx ___ Courier X

Tracking # Courier

Sample Receipt Checklist
COC Seal Present/Intact: NP ___ Y ___ N
COC Signed/Accurate: ___ X ___ N
Bottles arrive intact: ___ X ___ N
Correct bottles used: ___ X ___ N
Sufficient volume sent: ___ Y ___ N
If Applicable
VOA Zero Headspace: ___ Y ___ N
Preservation Correct/Checked: ___ X ___ N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Caleb Duke	6/17/19	8:00	Dasher
Dasher	6/17/19	14:35	
			Received for lab by: (Signature)

Trip Blank Received: Yes / (No) HCL / MeoH TBR

Temp: ~~TBR~~ °C Bottles Received: 3.4 - 1 = 3.3 30

Date: 6/17/19 Time: 14:35

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Cloudy, 70's
DATE & TIME	6-4-19 / 11:15	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	30.5 0	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump – Dedicated
DEPTH TO WATER (feet)	22.25	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	8.25	**FIELD BLANK COLLECTED?**	NO
PURGE VOLUME (gallons)	1 vol ≈ 3.35 gallons 3 vol ≈ 4.01 gallons	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	specific conductance
0.25	11:29	22.38	15.6	4.96	41.4	3.41	311.6	62.6	~~50.1~~
0.50	11:33	22.38	15.5	4.83	59.9	3.48	882.3	15.3	
1.0	11:37	22.38	15.4	5.01	53.7	2.01	159.7	10.3	71.0
1.25	11:41	22.38	15.3	5.21	62.1	1.71	121.9	6.08	77.5
1.50	11:45	22.38	15.3	5.34	68.0	1.60	104.3	5.95	84.4
1.90	11:49	22.38	15.3	5.48	79.8	1.17	85.7	4.04	98.2
2.40	11:53	22.38	15.3	5.53	82.9	1.05	79.3	4.12	101.7
2.80	11:57	22.38	15.3	5.55	84.7	1.01	76.0	3.81	104.3
3.20	12:01	22.38	15.3	5.57	86.9	0.92	73.2	2.89	106.8

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.20	12:10	22.38	15.3	5.57	86.9	0.92	73.2	2.89

Sample Charateristics (Odor, Color)	Clear, No Odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH, None
Number of Containers	11	**Sampler Signature**	Philip Campbell

(µs/cm) specific conductance

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes / yes
Well Clear of Weeds/Accessible?	yes / yes	**Fittings/Well Head Condition**	good / good
Pad/Casing Quality	good / good	**Lock Condition**	good /

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 80's
DATE & TIME	6-4-19	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	10	**SAMPLING EQUIPMENT**	YSI 600 pro plus
DEPTH TO WATER (feet)	5.26	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	
WATER COLUMN (feet)	4.74	**FIELD BLANK COLLECTED?**	
PURGE VOLUME (gallons)	1.0	**EQUIPMENT BLANK COLLECTED?**	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.0	16:35	5.26	21.3	6.18	319.7	1.70	79.3	2.50

Sample Charateristics (Odor, Color)	—	**Preservatives Used**	
Number of Containers	NA/VS	**Sampler Signature**	Phil Campbell

WELL DATA

Number of Baffles	4 *	**Well Cap Dedicated/In Place?**	Yes / Yes
Well Clear of Weeds/Accessible?	yes / yes	**Fittings/Well Head Condition**	OK / OK
Pad/Casing Quality	OK / OK	**Lock Condition**	good.

* One of the baffles has been knocked over since March 2019 event

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 · 800-763-2326 · www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 80's
DATE & TIME	6-4-19 / 14:40	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Dedicated bladder pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	19.65	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	Yes -
WATER COLUMN (feet)	7.35	**FIELD BLANK COLLECTED?**	Yes - 15:50
PURGE VOLUME (gallons)	1 vol ≈ 1.15 gallons 3 vol ≈ 3.6 gallons	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	sp. cond. (us/cm)
0	1445	19.73	19.3	5.40	283.3	3.48	309.8	185.	485.4
0.25	1449	19.74	18.5	5.07	471.9	0.53	324.2	29.6	539.6
0.50	1453	19.74	18.7	5.08	502.0	0.38	328.6	8.00	574
0.75	1457	19.74	18.8	5.11	524	0.35	329.3	5.07	594
1.0	15:01	19.74	18.9	5.11	529	0.33	330.3	4.98	598
1.25	15:05	19.74	18.9	5.11	529	0.33	331.8	3.71	599
1.50	15:09	19.74	18.9	5.11	529	0.34	332.9	3.01	599
								2.98 - dup metals	

NTU = 0.78 after filter

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.50	1515	19.74	18.9	5.11	529	0.34	332.9	2.98

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, NaOH, H_2SO_4, None
Number of Containers	11	**Sampler Signature**	Philip J-Campbell

599 (sp. cond. us/cm)

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	weeds & tall grass/Accessible	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	OK / OK	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 · 800-763-2326 · www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-4
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Cloudy, 70's
DATE & TIME	5-4-19 / 13:30	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Low-Flow	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	23.1	**SAMPLING EQUIPMENT**	~~Bailer~~ Ded. Bladder pump
DEPTH TO WATER (feet)	11.45	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	11.65	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1 Vol = 1.9 gallons	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	Sp. Cond. (µs/cm)
0	13:39	11.68	15.1	5.73	66.1	2.64	245.6	>1000	
0.~~5~~0	13:43	11.68	15.0	5.60	65.5	2.52	248.8	>1000	
1.0	13:47	11.68	14.9	5.60	65.0	2.59	247.2	8.60	81.3
1.4	13:51	11.68	14.9	5.65	64.8	2.56	238.5	6.97	80.3
1.8	13:55	11.68	14.9	5.70	64.4	2.51	229.2	2.81	79.9
2.2	13:59	11.68	14.8	5.73	64.2	2.54	224.8	2.80	79.5
2.6	14:03	11.68	14.8	5.75	63.9	2.54	222.8	2.67	78.2

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	(µs/cm) spec. cond.
2.6	1405	11.68	14.8	5.75	63.9	2.54	222.8	2.67	78.2

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, NaThio, None, H_2SO_4
Number of Containers	11	**Sampler Signature**	Philip J. Campbell

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
[illegible]/Casing Quality	good/good	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-5
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Cloudy, spotty rain
DATE & TIME	6-4-19/12:25	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	33.85	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	9.99	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	23.86	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1 vol = 4 gallons 3 vol = 12 gallons	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP (mV)	NTU	sp. cond (µs/cm)
0	12:30	10.55	16.6	5.15	337.9	0.64	171.0	28.2	404.2
0.5	12:34	10.58	16.5	5.11	330.8	0.55	204.6	46.7	393.2
0.75	12:38	10.61	16.5	5.15	327.1	0.61	219.8	41.6	390.8
1.0	12:42	10.61	16.4	5.16	322.1	0.64	232.0	32.9	383.2
1.40	12:46	10.63	16.6	5.17	319.6	0.75	244.5	31.4	380.1
1.80	12:50	10.63	16.6	5.19	318.2	0.77	252.0	27.7	378.7
2.25	12:54	10.63	16.6	5.18	318.6	0.75	259.2	23.5	378.5
2.60	12:58	10.63	16.6	5.18	315.5	0.74	264.5	21.3	376.9
2.95	13:02	10.64	16.7	5.17	315.6	0.77	265.8	18.2	375.3
								14.4 ~~F~~	

14.4 - Metals

NTU = 1.30 after filtering. sp. cond. 375.3

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP (mV)	NTU
2.95	13:05	10.64	16.7	5.17	315.6	0.77	265.8	14.4

Sample Charateristics (Odor, Color)	Clear, no odor	**Preservatives Used**	HCl, HNO_3, NaThio, H_2SO_4, None
Number of Containers		**Sampler Signature**	Philip A. Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/good	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	66° F & Raining
DATE & TIME	6-4-2019 @ 1044	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	7.15	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	25.35	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)		**EQUIPMENT BLANK COLLECTED?**	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	1050	9.60	16.9	6.72	119.9/145.1	5.53	141.5	QR
1.2	1100	10.00	15.9	5.13	92.3/111.9	4.49	132.1	QR
2.0	1110	10.22	15.8	5.22	91.3/110.7	4.42	124.5	750
3.0	1120	10.40	16.1	5.27	91.5/110.6	4.23	121.5	264
3.5	1130	10.51	16.0	5.32	91.9/111.0	4.63	119.0	172
4.0	1140	10.25	16.0	5.32	92.3/111.4	4.64	116.5	107
4.5	1150	10.25	16.0	5.31	92.9/112.1	4.39	115.3	56.0
5.0	1200	10.25	16.0	5.32	93.2/112.6	4.32	108.4	28.2
5.5	1210	10.25	16.10	5.34	93.3/113.2	4.35	103.1	13.6

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
5.5	1215	10.25	16.10	5.34	93.3/ 113.2	4.35	103.1	13.6

Sample Charateristics (Odor, Color)	No ODOR / Slightly Cloudy	**Preservatives Used**	See CoC
Number of Containers	4	**Sampler Signature**	

WELL DATA

Number of Baffles	Jersey Bottom	**Well Cap Dedicated/In Place?**	Yes / No Steel Cap
Well Clear of Weeds/Accessible?	Yes	**Fittings/Well Head Condition**	Good
Pad/Casing Quality	No PAD PVC CA	**Lock Condition**	Good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	73°F & Cloudy
DATE & TIME	6-4-2019 @ 1240	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.5	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	11.36	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	16.14	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)		**EQUIPMENT BLANK COLLECTED?**	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm) Sp	DO (mg/L)	ORP	NTU
0	1250	16.25	15.0	5.47	83.4/102.1	6.37	94.7	903
1.5	1300	16.20	16.3	4.86	89.2/106.3	5.86	119.0	OR
2.0	1310	16.89	15.7	6.03	87.9/106.0	5.57	106.2	568
2.5	1320	16.81	15.7	5.11	89.5/109.1	5.94	102.1	158
3.0	1330	16.81	15.7	5.18	89.1/108.4	5.64	97.5	69.7
3.5	1340	16.81	15.6	5.24	89.2/108.3	5.65	94.0	48.0
4.0	1350	16.81	15.7	5.25	89.1/108.3	5.69	93.0	34.4
4.5	1400	16.81	15.7	5.25	89.2/108.5	5.70	101.9	36.6

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.5	1405	16.81	15.7	5.25	89.2/108.5	5.70	101.9	36.6
Sample Charateristics (Odor, Color)	No odor, Cloudy		**Preservatives Used**			Ice, ccc		
Number of Containers	11		**Sampler Signature**					

After Purge Metals: TDS

WELL DATA

Number of Baffles	None / Jersey Barriers	**Well Cap Dedicated/In Place?**	Yes
Well Clear of Weeds/Accessible?	Yes	**Fittings/Well Head Condition**	OK
Pad/Casing Quality	Good / PVC	**Lock Condition**	OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	77°F & Cloudy
DATE & TIME	8-4-2019 @ 1442	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	28	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	9.68	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	~~12~~ 1	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)		**FIELD BLANK COLLECTED?**	NO
PURGE VOLUME (gallons)		**EQUIPMENT BLANK COLLECTED?**	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
6	1455	12.10	15.9	6.05	267.9/323.1	0.92	91.6	CL
2.0	1505	12.10	16.7	4.76	242.5/291.1	1.01	103.9	CL
3.0	1515	11.75	16.6	4.93	247.0/293.2	1.11	93.5	689
3.8	1525	11.75	16.7	4.97	243.2/288.5	1.13	92.2	261
4.4	1535	11.75	16.7	5.00	243.5/288.7	1.14	90.7	133
4.8	1545	11.75	16.6	5.03	242.8/289.2	1.15	89.4	51.7
5.3	1555	11.75	16.6	5.03	243.3/288.3	1.12	89.1	34.7
5.6	1605	11.75	16.8	5.04	242.9/289.9	1.12	87.9	32.2

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Water Level	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
5.6	1610	11.75	16.8	5.04	242.9/289.9	1.12	87.9	32.2

Sample Charateristics (Odor, Color)	No odor / Cloudy	**Preservatives Used**	See COC
Number of Containers	11	**Sampler Signature**	

6.63 After Filter

WELL DATA

Number of Baffles	Jersey Barrier	**Well Cap Dedicated/In Place?**	Yes
Well Clear of Weeds/Accessible?	Yes	**Fittings/Well Head Condition**	Good
Pad/Casing Quality	No PAD PVC ok	**Lock Condition**	OK

GW + SS — C. Dulee, M. Skelton

EWS 6/14/19 Sampling

Cane Creek DS-1 — photos 1+2 — Time 10:15

pH	6.66
DO	4.82 mg/L
Cond	221.9
ORP	57.8
TEMP	19 C
Turb	9.0

Cane Creek MS — photos 3-4 — Time 10:45

pH	6.78
DO	5.68
Cond	192.9
ORP	66.1
Temp	18.6 C
Turb	7.81

Charlie Creek MS — photos 5-6 — Time 11:15

pH	6.61	ORP	70.4
DO	7.53	Temp	19.2
Cond	145.8	Turb	9.60

GW+SS sampling
C. Dulle
M. Shelton

EW5 6/14/19

Cane Creek US Photos Time

pH	6.85	7.8	11:40
DO	6.67		
Cond	228.7		
ORP	64.3		
Temp	20.6		
Turb	6.25		

Chisolic Creek US Photos Time

pH	6.67	9/10	12:00
DO	9.14		
cond	125.2		
ORP	70.2		
Temp	19.2 C		
Turb			

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 EQUIPMENT BLANKS

I. SCOPE AND APPLICABILITY: Equipment blanks are collected to assess the adequacy of decontamination procedures and to determine whether sampling equipment and methods are contributing contaminants to samples.

II. PROJECT-SPECIFIC REQUIREMENTS:

WATER TYPES TO BE USED FOR BLANKS: *[distilled water, deionized water, HPLC-grade water, etc.]*

III. METHODOLOGY

A. Review the SOP for the medium sampled to establish the frequency for collection of blanks.

B. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

C. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket.

D. Fill a complete set of sample bottles.

E. Assign the blank a sample number of the same format as the other samples in the series.

F. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock solution depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- ≅ Source of blank water
- ≅ Time and sequence within the sampling event when the blanks were prepared
- ≅ Description of the procedure for preparing the blanks
- ≅ Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY: Trip blanks are prepared to evaluate whether volatile constituents have migrated into samples from the air on-site, during shipping, or at the laboratory.

II. PROJECT-SPECIFIC REQUIREMENTS:

A. Frequency:

B. Other Criteria:

III. METHODOLOGY

A. When ordering bottles from the laboratory for the sampling event, request that trip blanks be sent also.

B. Keep the supplied blanks with the samples being collected throughout the sampling event. Handle the blanks in the same manner as the filled sample vials.

C. Assign the trip blank a sample number of the format used for the sampling event.

D. Return the trip blanks to the laboratory with the samples. Include the samples on the Chain-of-Custody form (SOP 07-02-02). Analysis is typically performed for volatile organic compounds only.

IV. PRECAUTIONS AND COMMON PROBLEMS: None.

V. DOCUMENTATION: Describe handling on the trip blanks in the Trip Report (SOP 07-02-04). Include the sample numbers assigned.

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-02-01 LIQUID DUPLICATES

I. SCOPE AND APPLICABILITY: Duplicate samples are collected to evaluate the precision involved in the sampling effort. Duplicate samples must be collected to be as similar as possible to the original sample. This procedure is applicable of collection of duplicate samples of all liquids and flowable sludges.

II. PROJECT-SPECIFIC REQUIREMENTS:

NUMBER/FREQUENCY OF DUPLICATE SAMPLING:

DUPLICATE NUMBERING SYSTEM: *[Indicate how sample numbers are to be assigned to duplicates, and whether "blind" numbers should be assigned.]*

III. METHODOLOGY

A. Prepare sample bottles for the target sample and its duplicate.

B. Collect the liquid sample in accordance with the appropriate SOP.

C. When filling sample bottles, fill each type of bottle for the sample and duplicate in sequence. Fill both VOA vials, then both metals bottles, etc. This will assure that the duplicate is as similar to the original sample as possible.

D. Preserve the sample and duplicate identically.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Failure to fill bottles alternately between the sample and duplicate may result in poor reproducibility between analyses.

B. Samples with free product or multiple phases present special problems. The phase distribution must be the same in both aliquots.

V. DOCUMENTATION: List the sample and duplicate on the Groundwater Monitoring Data Sheet as separate samples, describing the duplicate in the "Comments" column. If a Groundwater Monitoring Data Sheet is not appropriate, incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-01-01 WATER-LEVEL MEASUREMENT IN MONITORING WELLS

I. SCOPE AND APPLICABILITY: This procedure is applicable to the measurement of water levels in monitoring wells and open boreholes.

II. PROJECT-SPECIFIC REQUIREMENTS

A. REQUIRED READINGS:

B. APPLICABLE METHODS:

III. METHODOLOGY: Water levels should always be recorded to ±0.01 foot. Measurements should be made from a marked point on the inner casing for monitoring wells, and from the ground surface for open boreholes. Equipment should be decontaminated in accordance with SOP 01-01-00 after each measurement. The following methods may be used:

A. CHALKED-TAPE METHOD

1. Check records for historic water levels in the well, if available.

2. Rub the first five feet of a steel surveyor's chain or fiberglass tape with carpenter's chalk.

3. Lower the tape into the well until the end of the tape enters the water.

4. Record the tape footing at the wellhead to within 0.01 feet.

5. Pull the tape out of the well and read the tape footage of the water mark to within 0.01 feet. The difference between the readings is the water level.

B. SOUNDING

1. Attach a small float or hollow-bottom weight or sounder to the end of a tape measure.

2. Lower the sounder into the well and listen for the sound of the weight hitting the water surface.

3. When this is heard, pull the sounder back a few inches and redrop it by 1/4-inch increments until the sound is heard again.

4. Subsequent smaller increments of lowering the sounder will allow water-level measurements to within 0.01 feet.

5. Measure the length from the zero mark on the tape measure to the bottom of the weight. Add this value to all field measurements made with the sounder.

C. ELECTRIC-WATER LEVEL METER (Solinst)

1. Turn the Solinst on by turning the knob clockwise. This knob is also the volume control. Test the Solinst to see if the battery is dead by pushing the button next to the volume knob.If the battery is charged the Solinst will emit an audible tone and the red indicator light will illuminate.
2. Lower the end of the probe into the well or borehole. The probe will cause the unit to emit the tone and illuminate the light when it contacts water.

3. Pull the probe back a few inches and lower the probe in smaller increments until the water level is measured to within 0.01 feet.

4. The water level is read directly from the Solinst tape, and already includes a correction for the length of the probe on the bottom of the tape.

D. INTERFACE PROBE: This is the only reliable method for wells with floating free product.

1. Push the On/Off button to turn unit on. Lower the probe into the liquid. The horn will sound a steady tone and the yellow light will illuminate when the probe contacts an oil product. Slowly raise probe until sound stops, lower until sound is heard again to refine the oil level.

2. Read the tape marking and note as the surface level of product.

3. Slowly lower the probe through the oil product, searching for the oil-water interface. When the probe reaches water the tone will switch from steady to a beeping tone and the red light will illuminate. Slowly move probe up and down to refine the oil/water interface to within 0.01 feet. Read the water level directly from the tape. The length of the probe is already considered.

NOTE: Auto Shutoff Feature: After approximately five minutes of power on, the unit will auto-shut off. A chirping sound will be heard, warning impending shut off. Press

<POWER ON/RENEW> to continue operation. During five minute interval, short "alive" beep is heard.

IV. PRECAUTIONS AND COMMON PROBLEMS:

1. Be sure to allow sufficient time after development, purging or pumping to allow the well to recover to static conditions.

2. Sounding may be difficult with very deep water levels or in noisy conditions because the sound is hard to hear.

3. Measurement of water levels in pumping wells or wells/boreholes with cascading water can be difficult. Installing a narrow PVC access tube inside the well casing can make obtaining accurate readings easier.

4. Free product floating on the water table depresses the natural water level. If a true water level is required, the product of the oil thickness and the oil specific gravity must be added to the oil/water interface elevation.

5. If there is no measurement mark on the well riser, add one in indelible ink.

V. DOCUMENTATION

1. Record water levels in a field notebook or Groundwater Monitoring Data Sheet (SOP 07-02-01). Be sure to record the date and time of the measurement.

2. Data should be incorporated into the Trip Report (SOP 07-02-04). Method of measurement should be reported.

VI. REFERENCES: None

07-01-01 MAINTAINING SAMPLE CHAIN OF CUSTODY

I. SCOPE AND APPLICABILITY: This procedure is to be employed whenever samples are collected for laboratory analysis, and is designed to ensure that sample integrity is maintained. These procedures are necessary to assure that samples are defensible.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

A. SAMPLE CUSTODY: The sampling personnel must maintain custody of the samples until they are delivered to the laboratory, at which time the laboratory takes over the custody record. A sample is considered to be in custody if:

- it is in the investigator's actual possession
- it is in view of the investigator
- it has been placed in a secure area
- a signed custody seal has been placed on the sample container such that the seal would be destroyed if the container was opened.

B. CUSTODY RECORD

1. Complete a Chain-of-Custody Form for each shipping container of samples as described in SOP 07-02-02. Place the white copy of the completed form in the shipping container with the samples, as discussed in SOP 07-01-03.

2. Affix a signed custody seal to secure all samples. Seals may be placed across the lids of individual sample bottles, or on each shipping container of samples. If seals are placed on shipping containers, at least two seals must be used, and they must be placed such that the container cannot be opened without breaking the seals.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. It may be necessary to cover custody seals with clear postal tape to prevent them from falling off.

B. Deliver or fax a copy of the custody form to the Project Manager within 24 hours of shipping the samples so that any errors can be corrected before the laboratory begins processing the samples.

V. DOCUMENTATION

A. The pink copy of the Chain-of-Custody Form should be submitted to the Project Manager as soon as possible after the samples are shipped.

B. The Project Manager or a designee must review the form for completeness and correctness. Any errors should be flagged, and the laboratory should be contacted if errors could affect analysis. The reviewer should initial and date the form, then place it in the Project File.

C. Compliance or problems with custody procedures should be documented in the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA Region IV; 1991. Environmental Compliance Branch, Standard Operating Procedures and Quality Assurance Manual. Athens, Georgia.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.