FIRST QUARTER 2018 GROUNDWATER ASSESSMENT MONITORING REPORT MARCH 2018 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.
325 SEABOARD LANE, SUITE 170
FRANKLIN, TENNESSEE 37067

CEC PROJECT 181-364

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Philip Campbell, P.G.
Project Manager

Kevin B. Wolfe
Vice-President

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EXECUTIVE SUMMARY

This report documents the first quarter 2018 assessment-monitoring event, which was performed at the former Environmental Waste Solutions, LLC (EWS) Camden Class II Landfill on March 21-22, 2018.

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. 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.

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. In addition, the annual storm water sample collected for Sector L National Pollutant Discharge Elimination System (NPDES) compliance now includes the analysis of total cadmium.

The First Quarter 2018 sampling event at the facility included the following sampling activities:

Groundwater samples were collected by CEC on March 21-22, 2018 from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Leachate samples were collected by CEC on March 22, 2018 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" locations. On March 21, 2018, during the first quarter 2018 assessment-monitoring event, surface water and sediment samples were collected from Cane Creek and Charlie Creek by Civil & Environmental Consultants, Inc. (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).

ESC Lab Sciences (ESC) was the laboratory sub-contracted to perform the chemical analyses. Laboratory reports from the surface water, sediment, and groundwater analysis were prepared by ESC and reported to CEC on March 29, 2018. Laboratory reports for the leachate analysis were prepared by ESC and reported to CEC on March 31, 2018.

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 are summarized in the following paragraphs.

Total cadmium was detected above the MCL (0.005 mg/L) at MW-3 during the March 22, 2018 monitoring event (total cadmium at MW-3 = 0.00671 mg/l) and was the only cadmium detection 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. The reported total cadmium concentration during this event was similar to the previous December 14, 2017 monitoring event where total cadmium at MW-3= 0.00659 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), which has remained the highest reported total cadmium detection to date.

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 of limited areal extent as there have been no detections of cadmium, 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 in the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during the March 21, 2018 monitoring event.

In addition, three SSIs were identified over background for barium (MW-3), chloride (MW-3, MW-4, and MW-5), and sulfate (MW-3). The barium, chloride, 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
EPA	Environmental Protection Agency
ESC	ESC Lab Sciences
EWS	Environmental Waste Solutions
GW	Groundwater
HDPE	High Density Polyethylene
HI	Hydrogeologic Investigation
MCL	Maximum Contaminant Level
µS•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 with construction activities currently underway. The final closure activities being implemented at the facility are intended to protect the environment and human health. Final closure activities currently underway include leachate treatment, leachate trucking and disposal, storm water management activities, and landfill cap design and construction. The former EWS Camden Class II landfill previously received secondary aluminum smelter waste for disposal including aluminum dross, salt cakes, and other industrial wastes.

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 significantly 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 Science and Ecosystem Support Division (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-one (21) feet below the top of casing at the up-gradient monitor well MW-1 to approximately ten (10) feet below the top of casing at monitor well MW-4. The potentiometric gradient calculated from groundwater elevation data collected on March 21, 2018 is approximately 1.28 %.

The potentiometric gradient is calculated according to the following formula:

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

$$\frac{(395.55') - (371.04')}{1{,}910'} * 100 = 1.28\%$$

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 US Environmental Protection Agency's Issue Paper EPA/540/S-95/504: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, April 1996. Additionally, groundwater-sampling activities were completed during this sampling event in accordance with the United States Environmental Protection Agency (USEPA) Science and Ecosystem Support Division (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 (air-line 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 Region 4 U.S. EPA 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 initial purging using the dedicated bladder pumps in the temporary monitoring wells (TMW-1, TMW-2, and TMW-3) on March 21, 2018, the turbidity values remained above 1,000 NTU, which was not an acceptable or representative turbidity value for sampling. Since an acceptable turbidity value could not be obtained from each of the temporary wells, the dedicated bladder pumps were removed from each of the temporary wells, and purging activities continued on March 21, 2018 utilizing a peristaltic pump at each of the temporary monitoring well locations. According to the 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. When the peristaltic pump was utilized, a more acceptable turbidity value was obtained from TMW-1 (NTU=19.8), TMW-2 (NTU=38.5), and TMW-3(NTU=25.3).

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 ground water 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 either 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); or

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 multiple 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 – Groundwater Field 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, and
- 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 Appendix A: Table 2b. 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 sample was collected prior to the collection of the sediment sample at approximately the same dedicated sampling location 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.

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 SESD - Field Equipment Cleaning and Decontamination procedures.

3.5 LEACHATE SAMPLING PROCEDURES

Leachate samples were collected by CEC on March 22, 2018 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 secondary containment area before the leachate entered the IWC leachate collection tank. Laboratory reports from the leachate analysis were prepared by ESC and reported to CEC on March 31, 2018. 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 TMW-3 and a duplicate sample was collected from MW-4. An equipment (rinsate) blank was also collected during this event by attaching new tubing to the peristaltic pump and pumping deionized water through the new tubing and pump head. 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-4 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 ESC for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

ESC reported the groundwater laboratory analytical results to CEC on March 29, 2018. Laboratory analytical testing of the field blank and equipment (rinsate) blank presented in the analytical report revealed that none of the tested constituents were above the PQL. The results for the duplicate sample collected from MW-4 were similar to the original MW-4 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 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 ESC to the former EWS Class II Landfill site and back to ESC for the March 2018 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 first quarter 2018 groundwater assessment-monitoring event were completed by ESC Lab Sciences. 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

First quarter groundwater samples were collected by CEC on March 21, 2018 and March 22, 2018 (MW-3 and MW-4 only). ESC performed the groundwater analysis and reported the results on March 29, 2018. First quarter leachate samples were collected by CEC on March 22, 2018 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" leachate sample locations. ESC performed the leachate analysis and reported the results on March 31, 2018. First quarter stream (surface water and sediment) samples were collected from the Cane Creek and Charlie Creek by CEC on March 21, 2018, and ESC reported the results on March 29, 2018.

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 Results in Appendix A. Constituent values from all inorganic laboratory analyses for stream and sediment samples are presented in Table 2b – Stream and Sediment Analytical Results 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 March 22, 2018 monitoring event (total cadmium at MW-3 = 0.00671 mg/l), which was similar to the previous December 14, 2017 monitoring event (total cadmium at MW-3=0.00659 mg/L). Total cadmium was first detected above the laboratory PQL in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016 (total cadmium at MW-3=0.00177), which was below the MCL. 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), which has remained the highest reported total cadmium detection to date. The turbidity results for MW-3 on March 22, 2018 (24.3 NTUs), December 14, 2017 (23 NTUs), and September 28, 2017 (18.9 NTUs) at the time of sample collection were slightly above the recommended goal of 10 NTUs. The sampling results from the March 22, 2018 event and the previous two sampling events (December 14, 2017 and September 28, 2017) 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. 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 temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.

During the previous December 11, 2017 sampling event, total cadmium was detected at Charlie Creek US (upstream-total cadmium=0.00375 mg/l) and Charlie Creek MS (midstream-total cadmium=0.002 mg/l). However, the detections were not verified, as total cadmium was not detected above the laboratory PQL in the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during this March 21, 2018 event. The Charlie Creek US sample location is approximately 2,500 ft. Northwest and up-gradient of Charlie Creek MS. With the limited amount of surface water sampling data collected to date, it is difficult to draw any firm

conclusions concerning this total cadmium detection observed upstream during the previous December 2017 event.

Total Arsenic was detected in up-gradient MW-1 (0.0101 mg/l) during this March 2018 monitoring event. The MCL for arsenic is 0.01 mg/l. Arsenic has historically been detected at concentrations exceeding the primary drinking water MCL prior to the disposal of waste in the landfill. Laboratory analytical testing of groundwater samples taken from MW-1 during background testing of the groundwater prior to waste placement in the landfill revealed concentrations of arsenic ranging from 0.024 mg/L to 0.072 mg/L.

Arsenic was previously detected above the MCL in down-gradient temporary well TMW-2 (0.0131 mg/l) during the December 2017 event, but was not detected above the laboratory PQL for Arsenic (<0.002 mg/L) during this March 2018 monitoring event. The presence of arsenic 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 Lead was not detected above the MCL (0.015 mg/L) during this March 2018 monitoring event. During the previous fourth quarter 2017 sampling event, total lead was detected in TMW-1 and TMW-2 at concentrations that exceeded the EPA MCLs. The MCL exceedances at TMW-1 and TMW-2 were not confirmed in the dissolved lead analysis from the fourth quarter 2017 sampling event, and the elevated lead concentrations were likely affected by the elevated turbidity at TMW-1 (315 NTU) and TMW-2 (>1000 NTU) at the time of sampling. However, during this March 2018 event, diligent efforts were made to reduce the NTU values to representative levels at TMW-1 (19.8 NTUs) and TMW-2 (38.5 NTUs).

Total Cobalt was detected in up-gradient well MW-1 (0.0425 mg/L). Cobalt does not have an MCL; however, TDEC-DSWM uses the EPA regional screening level (RSL) of 0.006 mg/L as the groundwater protection standard for this constituent. The reported detection at up-gradient MW-1 is above the RSL. 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 at a similar concentration during the previous December 2017 event at MW-1 (0.0411 mg/L). 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.

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

Laboratory analytical results for the groundwater samples collected in March of 2018 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 which exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters include iron and manganese in up-gradient well MW-1, aluminum and iron in down-gradient wells MW-3, MW-5, TMW-1, TMW-2, and TMW-3, and manganese in down-gradient well MW-5.

Total Aluminum concentrations observed in MW-3 (0.846 mg/L), MW-5 (0.432 mg/L), TMW-1 (0.442 mg/L), TMW-2 (1.28 mg/L), and TMW-3 (0.236 mg/L) during the March 2018 sampling event were above the 2DWS (0.2 mg/L). However, the aluminum concentrations observed at MW-5, MW-3, TMW-1, and TMW-3 remain less than the highest concentrations observed in up-gradient well MW-1 (1.2 mg/L) and down-gradient well MW-3 (1.8 mg/L) prior to accepting waste within the landfill.

Sampling data suggests that total aluminum concentrations are sensitive to turbidity values, given that the dissolved aluminum concentrations at MW-3, MW-5, TMW-1, and TMW-3 were less than the laboratory PQL (<0.1 mg/L). The total aluminum detection at TMW-2 was also likely affected by the turbidity at the time of sampling (turbidity at TMW-2=38.5 NTU), and is supported by the fact that the dissolved aluminum at TMW-2 (dissolved aluminum=0.409 mg/l) was significantly lower in concentration than the total aluminum concentration. Each dissolved metals sample was field-filtered using a 0.45 micron filter before sample collection, and the turbidity in the field-filtered samples at MW-3 (2.21 NTU), MW-5 (3.24 NTU), TMW-1 (1.88 NTU) and TMW-3 (2.32 NTU) were below the recommended 10 NTUs. It should also be noted that although each sample was field-filtered using a 0.45-micron filter before sample collection, the turbidity at TMW-2 (28.5 NTU) remained elevated after field filtering, indicating that very small (<0.45 micron) colloidal clay particles were able to pass through the filter and remain in the water column.

The **Chloride** concentration reported at MW-3 was 65.2 mg/L during this March 2018 event. This concentration was below the 2DWS for chloride concentrations (250 mg/l), and was less than the concentrations reported during the previous five sampling events in December 14, 2017 (104 mg/L), September 2017 (112 mg/l), June 2017 (163 mg/l), March 2017 (164 mg/l), and August 2016 (218 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 concentrations.

Total Iron was detected above the 2DWS (0.3 mg/L) in up-gradient well MW-1 (8.38 mg/L), and down-gradient wells MW-3 (0.578 mg/L), MW-5 (0.382 mg/L), TMW-1 (0.311 mg/L), TMW-2 (1.24 mg/L), and TMW-3 (1.18 mg/L) during the March 2018 monitoring event. The reported total iron concentrations at MW-1, MW-3, MW-5, TMW-1, and TMW-3 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 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 (0.757 mg/L) and down-gradient site monitoring well MW-5 (0.0919 mg/L) during this March 2018 sampling event. The presence of total manganese in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden.

The **Sulfate** concentration reported at MW-3 during this sampling event was 22.3 mg/L. This concentration was below the 2DWS for sulfate (250 mg/L) and less than the concentrations reported during the previous 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. The reported sulfate concentrations have remained below the 2DWS for sulfate (250 mg/l) for all sampling events to date. Sulfate was not detected above the PQL in any of the other monitoring wells across the site.

4.3 SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

Total cadmium was not detected above the laboratory PQL in the surface water or sediment samples collected from nearby Charlie Creek and Cane Creek during the March 2018 event. During the previous December 2017 sampling event, total cadmium was detected at Charlie Creek US (upstream-total cadmium=0.00375 mg/l) and Charlie Creek MS (midstream-total cadmium=0.002 mg/l). The Charlie Creek US sample location is approximately 2,500 ft. from Charlie Creek MS. No other parameters were detected at levels above regulatory limits in the surface water samples.

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. ESC complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. A total of eleven QC qualifier codes (B, E, J, J3, J4, J6, O1, T8, P1, Q, and V) were indicated during the laboratory analysis of groundwater samples collected in March 2018. Seven QC qualifier codes (B, J, J3, O1, P1, Q, and V) were indicated during the laboratory analysis of groundwater samples. Eight QC qualifier codes (B, E, J, J4, J6, P1, Q, and V) were indicated during the laboratory analysis of leachate samples. Five QC qualifier code (B, E, J, J6, and P1) 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, and MW-5. Due to limited representative water-quality data acquired at the temporary monitoring wells (TMW-1, TMW-2, and TMW-3), statistical analyses using data from these wells have not been performed.

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 influence 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 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 for statistical evaluations.

After the non-representative background sample data was 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 detection limit. Data determined to be normally distributed were evaluated using parametric prediction limit (PPL) analysis. Data that were not normally distributed were evaluated using non-parametric statistical methods. Inter-well and intra-well PPL analysis and non-parametric statistical methods were appropriately utilized to determine statistically significant trends in data.

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. 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.

Arsenic and cobalt data at up-gradient well MW-1 were normally distributed and were evaluated using PPL intra-well analysis. Chloride data from all up-gradient and down-gradient monitoring wells was normally distributed when the data was log-transformed and non-detects were replaced by half of the corresponding detection limit. Therefore, the chloride data at MW-3, MW-4, and MW-5 was evaluated using PPL inter-well analysis.

Barium, nickel, and mercury data at MW-1 were not normally distributed and were evaluated using intra-well non-parametric statistical methods. Aluminum, barium, total cadmium, cobalt, 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 analyses were conducted on the data. For this site, based on the high amount of left-censored data (>50% of non-detects), non-parametric inter-well prediction limit analyses were conducted for most of the 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 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 SSIs in reported concentrations were identified in up-gradient well MW-1 using intra-well non-parametric analysis. SSIs over background identified for the current monitoring event include total barium at MW-3, total cadmium at MW-3, chloride at MW-3, MW-4, and MW-5, fluoride at MW-3, sulfate at MW-3, and zinc at MW-3. Trend analyses revealed a statistically significant upward trend in total barium, total cadmium, chloride, fluoride, sulfate, and zinc concentrations reported at MW-3; and a statistically significant upward trend in chloride concentrations reported at MW-5.

The total barium, chloride, sulfate, and total zinc concentrations reported at MW-3 are lower than the previous monitoring event. However, trend analyses revealed a statistically significant downward trend in total aluminum and nickel concentrations reported at MW-3. Also, trend analysis revealed a downward trend in total barium concentrations at MW-4, and no distinct statistically significant trend in chloride detections at MW-4.

The total barium concentration at MW-3 was 0.102 mg/L during this sampling event, which was less than the previous December 2017 sample event (0.119 mg/L) and is less than the previous ten sample results collected at MW-3 since November 21, 2014. Total barium also remains below the MCL for the primary drinking water standard for barium (2 mg/L).

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. In contrast, Wilcoxon group comparisons, comparing background data to MW-3 data, do not draw any firm conclusions as to whether the increase in total cadmium at MW-3 is statistically significant. However, the results of the group tests have low Power (< 0.8). As a result, obtaining more groundwater samples from MW-3 for total cadmium, as well as the other measured constituents, should improve the validity of the use of the Wilcoxon group test and its ability to detect differences in the group medians.

The chloride concentration observed at MW-3 (65.2 mg/L), MW-4 (6.83 mg/L), and MW-5 (60.9 mg/L) produced an SSI over background during this event. The chloride detections at MW-3, MW-4, and MW-5 are consistent with previous data and are below the 2DWS for chloride concentrations (250 mg/L). When considering all MW-4 chloride data to date, the data did 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 and MW-5 indicated an upward trend in chloride concentrations using the Mann-Kendall trend analyses at the 95% confidence level.

Similar to the total cadmium and zinc trend analysis, the statistical trend analysis for total fluoride at MW-3 during this March 2018 event (Fluoride=0.274 mg/L) confirmed an increasing trend having statistical significance.

An 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 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 at MW-3 during this sampling event was 22.3 mg/L, which is below the 2DWS for sulfate concentrations (250 mg/L).

The statistical trend analysis for total zinc at MW-3 during this March 2018 event (total zinc at MW-3= 0.0499 mg/l) confirmed an increasing trend having statistical significance. 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 also detected during the September 2017 event (total zinc= 0.0439 mg/l) and December 2017 event (total zinc = 0.159 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 are above the PQL, the levels are still well below the secondary drinking water standard 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 first quarter assessment-monitoring event of 2018 are summarized as follows:

- The arsenic concentration at up-gradient MW-1 exceeded the MCL. However, the presence of arsenic 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.
- The total cadmium concentration at MW-3 during this event was just above the MCL and similar to the dissolved cadmium detection at MW-3 during this event. Also, the statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance when analyzing the data with Mann-Kendall. The cadmium detections observed during this event are similar to the cadmium detections observed during the previous December 2017 monitoring event. The source of the cadmium detections above the MCL in MW-3 has not been determined at this point. Based on current data, the impact location appears to be limited to the MW-3 location, since there have been no detections from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3. However, the detections of total cadmium and dissolved cadmium at MW-3 remain at levels slightly above the MCL, and the accompanying statistically significant trend analysis for cadmium in MW-3 remains an area of concern.
- Total cadmium was not detected above the laboratory PQL in any of the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during this event.
- The statistical trend analysis for total zinc data at MW-3 confirms an increasing trend having statistical significance and identifies an SSI based on non-parametric prediction limits. Zinc was first detected above the laboratory PQL at MW-3 during the June 2017 groundwater event. Before June 2017, zinc had remained below the current laboratory detection limit of 0.025 mg/l since July of 2010. Although zinc levels have been above the PQL since June 2017, the zinc concentration observed during this event was less than the previous December 2017 event. Also, total zinc concentrations have remained well below the 2DWS of 5 mg/L.
- An SSI was identified for the reported chloride concentration at MW-3, MW-4, and MW-5 during this event. Additionally, the chloride concentrations at MW-3 and MW-5 exhibited a statistically significant increasing trend per the Mann-Kendall non-parametric trend procedure. However, the chloride concentration reported at MW-3 during this event (65.2 mg/L) was the lowest chloride concentration reported at MW-3 since May 28, 2015 (92.8 mg/L). Also, the chloride concentrations at MW-3 have remained below the 250 mg/L 2DWS since the monitoring event in November 2015 (458 mg/L) and the supplemental re-sampling event (360 mg/L) in December 2015. The chloride detection at MW-4 is consistent with previous data and, when considering

all MW-4 chloride data to date, did not show an upward or downward trend in chloride concentrations. The chloride concentration observed at MW-5 indicated an upward trend in chloride concentrations for the second time using the Mann-Kendall trend analyses at the 95% confidence level. The chloride concentrations at MW-4 and MW-5 are still well below the 250 mg/L 2DWS. Although the chloride concentrations at MW-5 appear to have an increasing trend, there is still a limited amount of data that has been collected (seven total events at MW-5) since MW-5 was installed in April 2016.

- A SSI was identified for the reported sulfate concentration at MW-3 during this event. In addition, the sulfate concentration at MW-3 exhibited a statistically significant increasing trend. The sulfate concentration reported at MW-3 was below the 250 mg/L 2DWS for sulfate concentrations and was less than the concentration reported during the previous fourth quarter 2017 sampling event. It is worth noting that sulfate has not consistently been detected above the PQL (5 mg/l) at any of the other permanent monitoring wells or temporary monitoring wells.
- Time series graphs prepared for MW-3 indicate a recent decreasing trend since the June 2017 quarterly event for chloride, total calcium, total magnesium, total potassium, total sodium, and sulfate.
- No VOCs were detected above their respective laboratory PQL during the monitoring event.
- No constituents were detected above regulatory limits at any of the stream (surface water and sediment) samples. Sediment samples do not have an MCL and surface water is compared to general water quality criteria, not just the MCL.

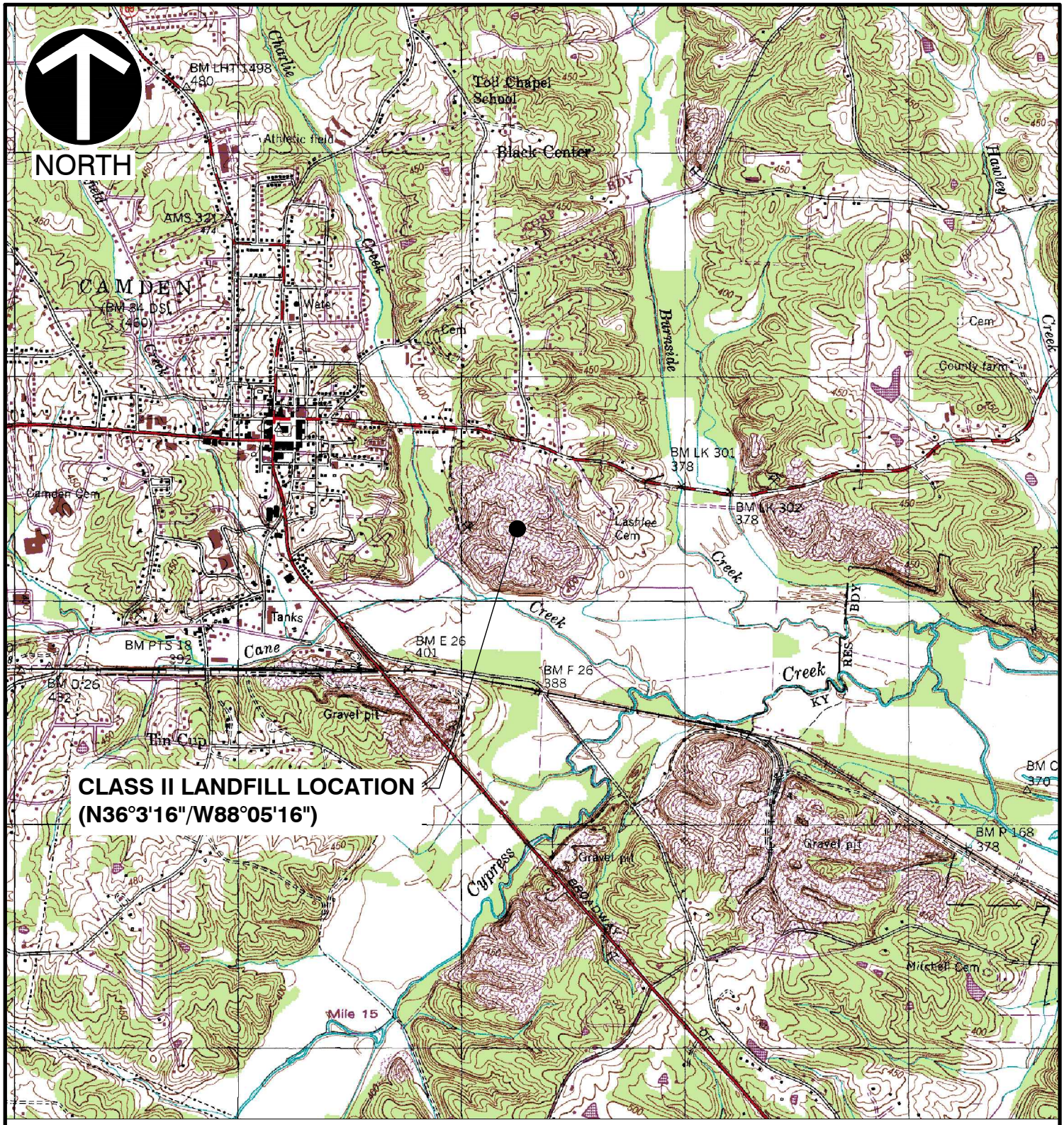
The second quarter 2018 assessment monitoring event is tentatively scheduled for June 2018 and will consist of collecting groundwater samples from up-gradient well MW-1 and down-gradient wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Also, surface water and sediment samples will be collected from selected locations along Charlie Creek and Cane Creek. Leachate samples will be collected from the APWC and IWC.

7.0 RECOMMENDATIONS

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

1. Although dedicated bladder pumps have been installed within temporary monitoring wells TMW-1, TMW-2, and TMW-3 for low-flow sampling purposes, it appears that an alternative purging and sampling procedure may be more suitable for obtaining representative groundwater samples. During this event, a peristaltic pump was used to obtain more representative groundwater samples with lower turbidity values in each temporary monitoring well. Therefore, it is recommended that TMW-1, TMW-2, and TMW-3 be purged and sampled by utilizing a peristaltic pump as described in Section 3.2 and 3.3.
2. 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. In addition, surface water samples and sediment samples will continue to be collected at selected locations along Charlie Creek and Cane Creek and analyzed for total and dissolved metals during future quarterly assessment monitoring activities.
3. It is recommended that the chosen analytical laboratory (ESC) continue to analyze for total and dissolved metal constituents, using methods that will produce the lowest reporting limit. In addition to providing results for dissolved metals in the case where certain groundwater samples have turbidities that are above 10 NTUs, having a growing database of dissolved metal constituents is essential, if there is a future need for groundwater modeling.
4. It is recommended that sample data will continue to be removed from the background data set for statistical evaluations if elevated turbidity values >150 NTU were 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.

325 Seaboard Lane, Suite 170 - 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:	April 2018	DWG SCALE:	1"=2000'	PROJECT NO:	181-364		

P:\2018\181-364\-CADD\Dwg\181-364_ SITE LOCATION MAP.dwg{LAYOUT1} LS:(3/30/2018 - pcampbell) - LP: 6/4/2018 12:52 PM

NORTH

LEGEND

- MW1 3□5□55 — GROUND WATER MONITORING WELL / GROUND WATER ELEVATION (FMSL)
- TMW□1 3□5□□ — 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

MW-1 395.55

SW OUTFALL 001 (LOCATION APPROXIMATE)

IWC LEACHATE SAMPLING LOCATION

APPROXIMATE LOCATION (NOT AS-BUILTED DURING CONSTRUCTION)

(RIP RAP) EMERGENCY SPILL WAY

RIP-RAP

EXISTING PHASE 4A

INDUSTRIAL WASTE CELL (IWC)

EXISTING PHASE 3B

ALUMINUM PROCESSING WASTE CELL (APWC)

EXISTING PHASE 3A

EXISTING PHASE 2A

POND

AIR RELEASE VALVE

AIR RELEASE VALVE

MW□5 3□6□3

MW□3 3□□□5

TMW□1 3□5□□

TMW□□ 3□□□6

TMW□3 3□3□5

MW□□ 3□5□5

MW□□ 3□1□□

MH2

MH-1

APWC LEACHATE SAMPLING LOCATION

SW OUTFALL 002 (LOCATION APPROXIMATE)

BENCHMARK
N=632030.54
E=1352175.74
SPIKE IN POWER POLE EL=389.0

NOTE:

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

$$i = \frac{395.55' \text{ (MW−1)} - 371.04' \text{ (MW−4)}}{1{,}910'} = 0.0128 \text{ ft/ft}$$

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.
325 Seaboard Lane, Suite 170 - Franklin, TN 37067
615-333-7797 · 800-763-2326
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ENVIRONMENTAL WASTE SOLUTIONS
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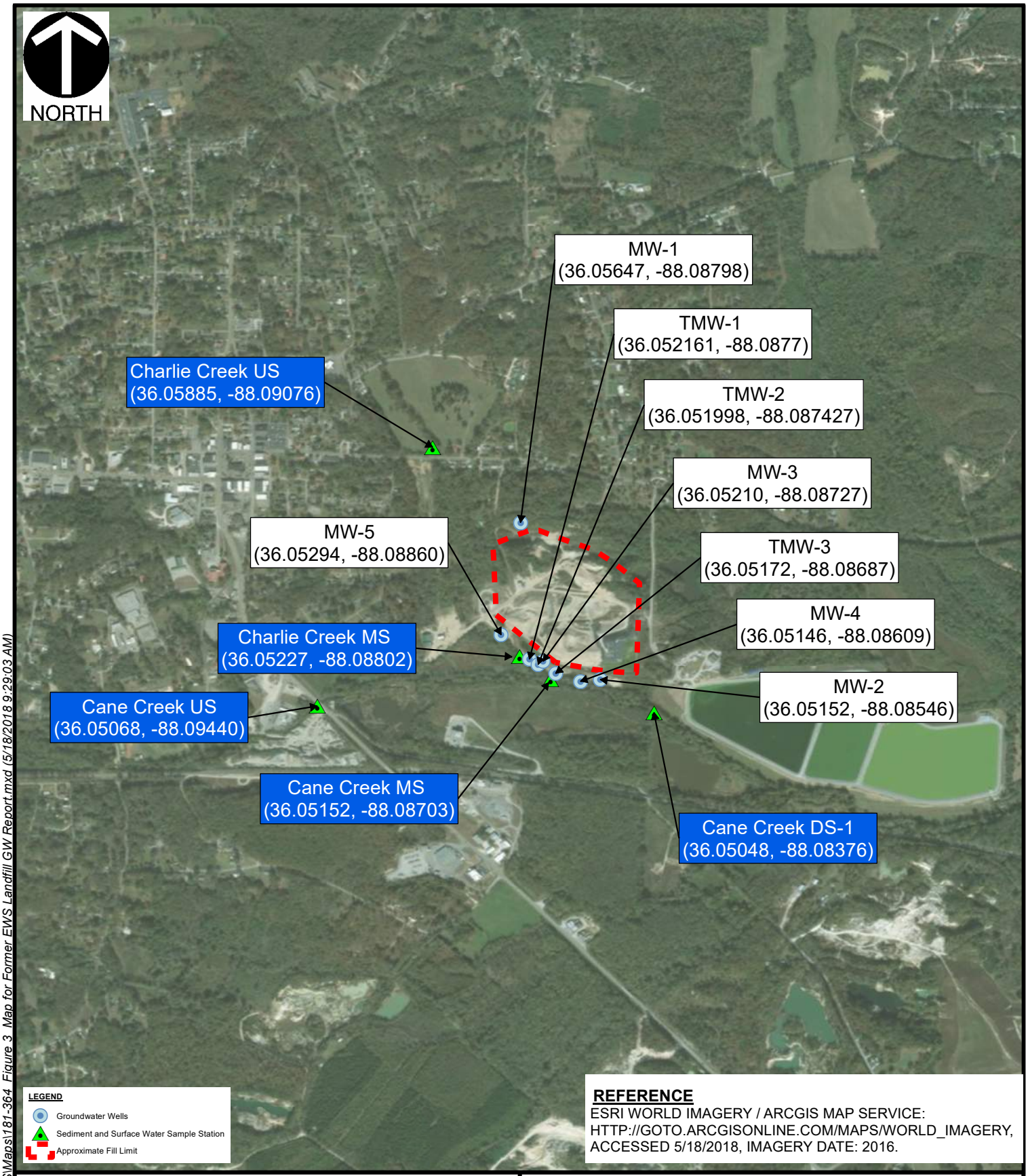
CAMDEN, TENNESSEE

MARCH 2018
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	AB	CHECKED BY:	PC	APPROVED BY:	MJ*
DATE:	APRIL 2018	DWG SCALE:	1" = 200'	PROJECT NO:	181-364

FIGURE NO.: 2

P:\2018\181-364\-CADD\DWG\181-364_ GROUNDWATER MAP MARCH 2018.DWG;FIG 2 (2);LS:(PCAMPBELL - 5/15/2018) - LP: 5/18/2018_2:32:56_PM



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

GROUNDWATER AND STREAM SAMPLE LOCATIONS

DRAWN BY:	RLP	CHECKED BY:	PJC	APPROVED BY:	KBW* * Hand signature on file	FIGURE NO:	3
DATE:	MAY 2018	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 (5/18/2018 9:29:03 AM)

Table 1

Former Environmental Waste Solutions Camden Class II Landfill

Field Parameters and Potentiometric Data - March 2018

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	3/21/2018	10:10	416.47	385.97	0.17	1.6	20.92	395.55	14.2	94.7	5.58	1.67	74.4	6.14
MW-2*	3/22/2018	11:25	380.35	367.70	0.17	1.3	5.20	375.15	11.7	229.7	6.19	0.44	65.5	9.08
MW-3	3/22/2018	10:30	392.90	365.10	0.17	2.1	15.65	377.25	12.2	275.3	5.92	0.27	87.3	24.3
MW-4	3/22/2018	8:20	381.47	358.37	0.17	2.2	10.43	371.04	13.4	57.7	5.93	2.97	37.0	4.98
MW-5	3/21/2018	10:30	385.25	351.40	0.17	4.3	8.42	376.83	14.1	238.4	5.32	0.89	71.7	21.7
TMW-1	3/21/2018	12:05	381.19	348.99	0.085	1.1	5.65	375.54	14.5	77.5	5.73	6.14	98.9	19.8
TMW-2	3/21/2018	15:20	384.27	356.77	0.085	0.7	10.11	374.16	12.2	75.4	5.64	8.41	91.3	38.5
TMW-3	3/21/2018	17:00	381.37	353.37	0.085	0.8	8.32	373.05	12.4	193.3	5.35	2.15	103.8	25.3
Charlie Creek US	3/21/2018	12:15	NA	NA	NA	NA	NA	NA	9.7	72.0	6.75	14.83	134.0	1.60
Cane Creek US	3/21/2018	11:45	NA	NA	NA	NA	NA	NA	9.3	126.0	6.71	14.28	111.0	2.60
Charlie Creek MS	3/21/2018	11:30	NA	NA	NA	NA	NA	NA	5.6	86.0	6.59	14.58	137.0	1.50
Cane Creek MS	3/21/2018	10:30	NA	NA	NA	NA	NA	NA	8.6	111.0	6.52	14.63	142.0	2.50
Cane Creek DS-1	3/21/2018	10:00	NA	NA	NA	NA	NA	NA	4.2	118.0	6.47	14.10	150.0	2.40
Leachate (IWC-L)	3/22/2018	12:00	NA	NA	NA	NA	NA	NA	17.8	98,196	3.40	2.34	282.5	13.1
Leachate (APWC-L)	3/22/2018	12:45	NA	NA	NA	NA	NA	NA	23.1	312,624	9.95	0.03	-160.1	20.7

[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 21, 2018.

* - 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)
Inorganic Analytical Data -March 2018

		MW-1		MW-3		MW-4		Duplicate (MW-4)		MW-5		TMW-1		TMW-2		TMW-3		Field Blank		Leachate IWC-L		Leachate-APWC-L	
Sample Date		3/21/2018		3/22/2018		3/22/2018		3/22/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/22/2018		3/22/2018	
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	-	**33.2**	B	**67.8**		<30		<30		**80.7**		**32.7**	B	**31.1**	B	**74.8**		<30		**26000**		**770**	
Alkalinity	-	**46.4**		<20		<20		<20		<20		<20		<20		<20		<20		<20		**20,600**	
Ammonia Nitrogen	-	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		**664**		**7,020**	V
COD	-	**43.7**		<10		<10		<10		<10		<10		<10		<10		<10		**3,810**		**28,000**	
Boron	-	<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<2		**8.96**	
Bromide	-	<1		<1		<1		<1		<1		<1		<1		<1		<1		<500		<5000	
Chloride	250 [2]	**2.10**		**65.2**		**6.83**		**6.86**		**60.9**		**11.2**		**14.5**		**48.7**		<1		**44,500**		**193,000**	
Fluoride	2 [2]	<0.1		**0.274**		<0.1		<0.1	P1	<0.1		<0.1		<0.1		<0.1		<0.1		**617**		<500	
Nitrate	10	0.2		**1.93**		**0.460**		**0.488**	J3 Q	**1.31**		**1.58**		**0.767**		**4.03**		<0.1		<50	Q	<500	Q
Sulfate	250 [2]	<5		**22.3**		<5		<5		5.1		<5		<5		<5		<5		**5,520**		<25000	
Aluminum	0.2 [2]	<0.1		**0.846**	O1	<0.1		<0.1		**0.432**		**0.442**		**1.28**		**0.236**		<0.1		**423.0**		<0.9	
Aluminum, Dissolved	0.2 [2]	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		**0.409**		<0.1		<0.1		**438.0**		<0.5	
Antimony	0.006	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.04		**0.0459**	
Arsenic	0.01	**0.0101**		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.368**		**0.0273**	B
Arsenic, Dissolved	0.01	**0.0109**		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.403**		**0.0288**	
Barium	-	**0.0212**		**0.102**		**0.00701**		**0.00705**		**0.0323**		**0.0104**		**0.038**		**0.0389**		<0.005		**1.67**		**1.49**	
Barium, Dissolved	-	**0.0215**		**0.0954**		**0.00675**		**0.00798**		**0.0304**		**0.00874**		**0.0267**		**0.0366**		<0.005		**1.8**		**1.71**	
Beryllium	0.004	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.126**		<0.018	
Beryllium, Dissolved	0.004	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.125**		<0.4	
Cadmium	0.005	<0.001		**0.00671**		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		**188**		**0.293**	
Cadmium, Dissolved	0.005	<0.001		**0.00637**		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		**193**		**0.374**	
Calcium	-	**7.76**		**14.5**		**4.22**		**4.30**		**14.1**		**8.33**		**7.40**		**18.1**		<1		**4,980**		**271**	
Calcium, Dissolved	-	**7.58**		**14.5**		**4.26**		**4.31**		**14.0**		**8.37**		**7.09**		**18.0**		<1		**5,180**		**315**	
Chromium	0.1	<0.002		<0.002		<0.002		<0.002		**0.00667**		<0.002		**0.00218**		<0.002		<0.002		**0.040**		<0.018	
Chromium, Dissolved	0.1	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.041**		<0.01	
Cobalt	0.006 [3]	**0.0425**		<0.002		<0.002		<0.002		**0.00264**		<0.002		<0.002		<0.002		<0.002		**1.39**		**0.0214**	
Cobalt, Dissolved	-	**0.0448**		<0.002		<0.002		<0.002		**0.00257**		<0.002		<0.002		<0.002		<0.002		**1.41**		**0.0263**	
Copper	1.3	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		**23.7**		**35.6**	
Copper, Dissolved	1.3	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		**0.00501**	B	<0.005		**26.1**		**38.5**	
Iron	0.3 [2]	**8.38**		**0.578**		<0.1		**0.103**		**0.382**		**0.311**		**1.24**		**1.18**		<0.1		**752**		<0.9	
Iron, Dissolved	0.3 [2]	**8.83**		<0.1		<0.1		<0.1		<0.1		<0.1		**0.498**		<0.1		<0.1		**743**		<0.5	
Lead	0.015	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.404**		<0.018	
Lead, Dissolved	0.015	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.433**		<0.4	
Magnesium	-	**2.79**		**6.88**		**2.65**		**2.70**		**10.1**		**2.36**		**2.73**		**5.95**		<1		**1,890**		<9	
Magnesium, Dissolved	-	**2.83**		**6.89**		**2.71**		**2.76**		**10.1**		**2.36**		**2.62**		**6.16**		<1		**1,920**		<5	
Manganese	0.05 [2]	**0.757**		**0.0496**		**0.0137**		**0.0142**		**0.0919**		**0.017**		**0.0143**		**0.0238**		<0.005		**380**		**0.227**	
Manganese, Dissolved	0.05 [2]	**0.791**	V	**0.0464**		**0.013**		**0.0144**		**0.0916**		**0.00682**		**0.00875**		**0.016**		<0.005		**378**		**0.323**	
Nickel	0.10 [1]	**0.00658**		<0.002		<0.002		<0.002		**0.00927**		<0.002		<0.002		<0.002		<0.002		**1.39**		**0.439**	
Nickel, Dissolved	0.10 [1]	**0.00676**		<0.002		<0.002		<0.002		**0.00974**		<0.002		<0.002		<0.002		<0.002		**1.37**		**0.501**	
Potassium	-	**1.43**		**14.4**		<1		<1		**1.38**		**1.00**		**1.09**		**1.66**		<1		**6,080**		**52,300**	
Potassium, Dissolved	-	**1.28**		**14.5**		<1		<1		**1.31**		<1		<1		**1.65**		<1		**6,210**		**52,500**	
Selenium	0.05	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.402**		**0.0325**	
Selenium, Dissolved	0.05	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.608**		<0.4	
Silver	0.10 [2]	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.04		<0.018	
Sodium	-	**4.86**		**25.4**		**3.77**		**3.86**		**17**		**3.19**		**3.45**		**10.4**		<1		**11,700**		**66,400**	
Sodium, Dissolved	-	**4.68**		**25.6**		**3.86**		**3.97**		**17**		**3.22**		**3.43**		**10.5**		<1		**11,700**		**71,400**	
Thallium	0.002	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.0855**		<0.018	
Vanadium	-	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.1		**0.0613**	B
Vanadium, Dissolved	-	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		**0.0648**		**0.0721**	
Zinc	5 [2]	<0.025		**0.0499**		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		**2,470**		**19**	
Zinc, Dissolved	5 [2]	<0.025		**0.0345**		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		**2,480**		**24**	
Mercury	0.002	**0.000651**		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		**0.0006**		<0.002	
Mercury, Dissolved	0.002	**0.000321**		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.002		<0.002	

Notes:

MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards

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 Cobalt

NA-Not Analyzed by the Laboratory.

Bold text indicates laboratory analytical detections above the practical quantitation level

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

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.

P1 - Reported value not applicable for sample concentrations less than 5 times the reporting limit.

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

Q - Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

Table 2b
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data -March 2018

	Stream Samples (Water)										Sediment Samples (Solids)					
	Charlie Creek US		Charlie Creek MS		Cane Creek US		Cane Creek MS		Cane Creek DS-1		Charlie Creek US		Charlie Creek MS		Cane Creek US		Cane Creek MS		Cane Creek DS-1	
	3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018		3/21/2018	
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	**34.2**	B	**36.1**	B	**59.8**		**52.7**		**56.4**		NA		NA		NA		NA		NA	
Boron	<0.2		<0.2		<0.2		<0.2		<0.2		<10		<10		<10		<10		<10	
Bromide	<1		<1		<1		<1		<1		<10		<10		<10		<10		<10	
Chloride	**5.93**		**7.03**		**7.76**		**8.33**		**8.47**		<10		**34.3**		<10		<10		<10	
Fluoride	<0.1		<0.1	P1	<0.1		<0.1		<0.1		<1		<1		<1		<1		<1	
Aluminum	**0.458**		**0.529**		**0.574**		**0.627**		**0.662**		**1070**		**1480**		**639**		**591**		**721**	
Aluminum (Dissolved-LF)	**0.213**		**0.168**		**0.124**		**0.153**		**0.135**		NA		NA		NA		NA		NA	
Antimony	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Arsenic	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Barium	**0.0331**		**0.0359**		**0.0360**		**0.0360**		**0.0361**		**7.13**		**15.4**		**9.80**		**9.19**		**6.98**	
Barium (Dissolved-LF)	**0.0270**		**0.0295**		**0.0290**		**0.0286**		**0.0302**		NA		NA		NA		NA		NA	
Beryllium	<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.2		<0.2		<0.2		<0.2	
Total Cadmium	<0.001		<0.001		<0.001		<0.001		<0.001		<0.5		<0.5		<0.5		<0.5		<0.5	
Cadmium (Dissolved-LF)	<0.001		<0.001		<0.001		<0.001		<0.001		NA		NA		NA		NA		NA	
Calcium	**8.40**		**10.1**		**14.3**		**13.4**		**13.5**		**626**		**360**		**219**		<100		**130**	
Calcium (Dissolved-LF)	**8.06**		**9.46**		**13.6**		**12.7**		**12.7**		NA		NA		NA		NA		NA	
Chromium	<0.002		<0.002		<0.002		<0.002		<0.002		**3.16**		**4.30**		**2.48**		**3.51**		**4.97**	
Cobalt	<0.002		<0.002		**0.00285**		<0.002		<0.002		<1		**1.85**		<1		<1		**1.06**	
Cobalt (Dissolved-LF)	<0.002		<0.002		<0.002		<0.002		<0.002		NA		NA		NA		NA		NA	
Copper	<0.05		**0.00516**		<0.005		<0.005		<0.005		<2		<2		<2		<2		<2	
Copper, (Dissolved-LF)	<0.005		<0.005		<0.005		<0.005		<0.005		NA		NA		NA		NA		NA	
Iron	**0.771**		**0.890**		**1.56**		**1.32**		**1.36**		**2580**		**3900**		**1890**		**2530**		**3160**	
Iron (Dissolved-LF)	**0.311**		**0.297**		**0.386**		**0.391**		**0.357**		NA		NA		NA		NA		NA	
Lead	<0.002		<0.002		<0.002		<0.002		<0.002		**4.77**		**3.70**		**1.57**		**1.65**		**2.29**	
Magnesium	**2.00**		**2.29**		**4.99**		**4.09**		**4.21**		**172**		**128**		<100		<100		<100	
Magnesium (Dissolved-LF)	**1.99**		**2.22**		**4.89**		**3.97**		**4.08**		NA		NA		NA		NA		NA	
Manganese	**0.127**		**0.207**		**0.549**		**0.411**		**0.425**		**64.5**		**161**		**53.0**		**106**		**95.9**	
Manganese (Dissolved-LF)	**0.0578**		**0.142**		**0.301**		**0.236**		**0.254**		NA		NA		NA		NA		NA	
Nickel	**0.00229**		**0.00234**		**0.00495**		**0.00386**		**0.00392**		<2		**2.12**		<2		<2		<2	
Nickel, (Dissolved-LF)	**0.00227**	B	**0.00217**	B	**0.00446**	B	**0.00708**		**0.00356**	B	NA		NA		NA		NA		NA	
Potassium	**1.08**		**1.23**		**1.61**		**1.61**		**1.66**		**250**		**186**		<100		<100		<100	
Potassium (Dissolved-LF)	**1.15**	B	**1.63**	B	**1.62**	B	**1.77**	B	**1.74**	B	NA		NA		NA		NA		NA	
Selenium	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Silver	<0.002		<0.002		<0.002		<0.002		<0.002		<1		<1		<1		<1		<1	
Sodium	**5.21**		**5.51**		**6.41**		**6.38**		**6.53**		<100		<100		<100		<100		<100	
Sodium (Dissolved-LF)	**4.80**		**5.08**		**6.02**		**5.91**		**6.06**		NA		NA		NA		NA		NA	
Thallium	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Vanadium	<0.005		<0.005		<0.005		<0.005		<0.005		**4.77**		**7.01**		**3.67**		**4.32**		**5.92**	
Zinc	<0.25		<0.025		<0.025		<0.025		<0.025		**7.44**		**15.4**		<5		**8.57**		**9.45**	
Mercury	<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.02		<0.02		<0.02		<0.02		<0.02	

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

P1-RPD value not applicable for sample concentrations less than 5 times the reporting limit.

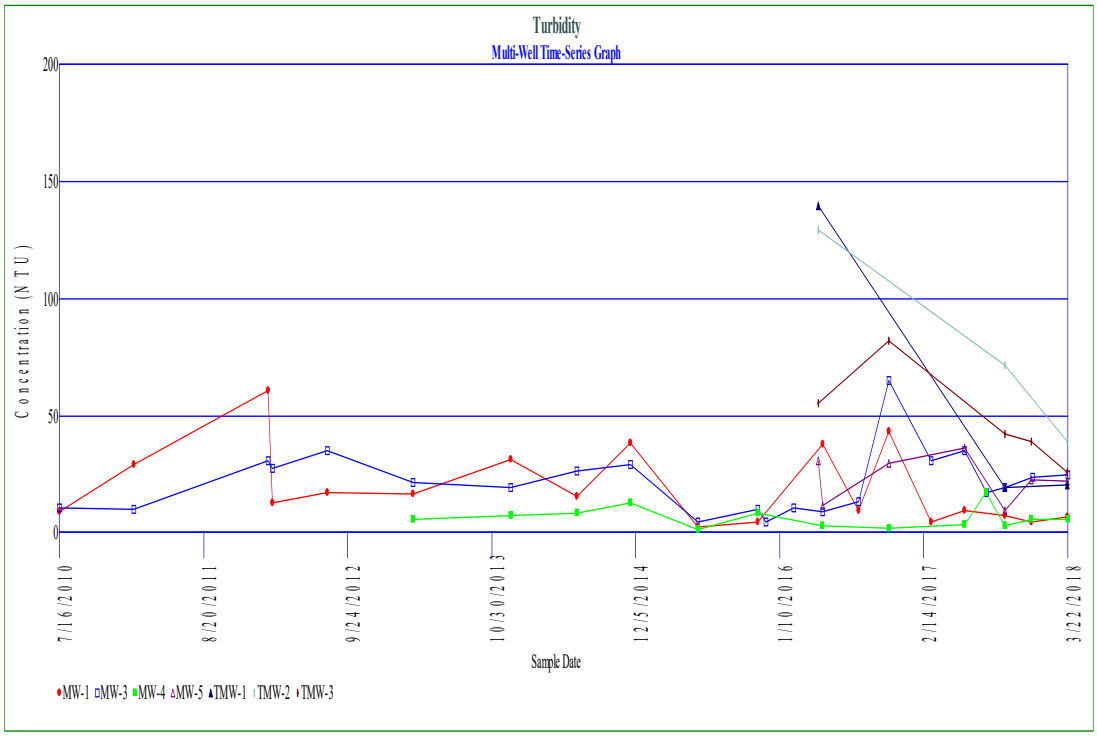
Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data -March 2018

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
Cobalt	MW-1	0.00	parametric	--	Pass	--	--	No
Nickel	MW-1	55.00	non-parametric	Pass	--	--	--	No
Mercury	MW-1	45.00	non-parametric	Pass	--	Pass	--	No

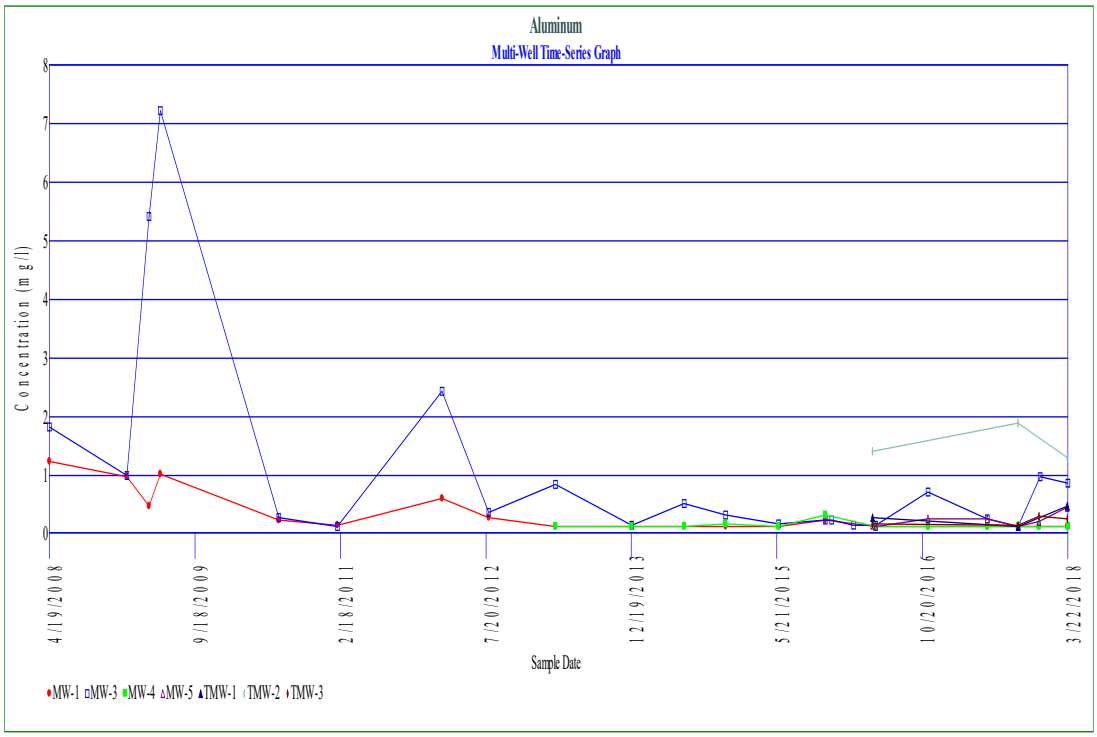
Inter-Well Statistical Summary (Downgradient Compliance Wells)									
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI	Mann-Kendall Trend Analysis
Aluminum	MW-3	38.03	non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Barium	MW-3	0	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
	MW-4		non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Total Cadmium	MW-3	91.3	non-parametric	**Fail**	--	--	N/A*	**Yes**	**Upward Trend**
Chloride	MW-3	0	log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	MW-4		log-normal	--	**Fail**	--	--	**Yes**	No Trend
	MW-5		log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
Chromium	MW-5	90.14	non-parametric	Pass	--	--	--	No	No Trend
Cobalt	MW-5	57.75	non-parametric	Pass	--	--	--	No	No Trend
Fluoride	MW-3	87.23	non-parametric	**Fail**	--	--	N/A*	**Yes**	**Upward Trend**
Nickel	MW-3	69.01	non-parametric	Pass	--	--	--	No	Downward Trend
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Zinc	MW-3	57.75	non-parametric	**Fail**	--	--	N/A*	**Yes**	**Upward Trend**
Sulfate	MW-3	59.72	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	No Trend

Notes:
* N/A due to low Power of Wilcoxin-Rank Sum non-parametric inter-well statistical procedure.
** Only three usable background sampling events, not enough points to determine a statistical trend.

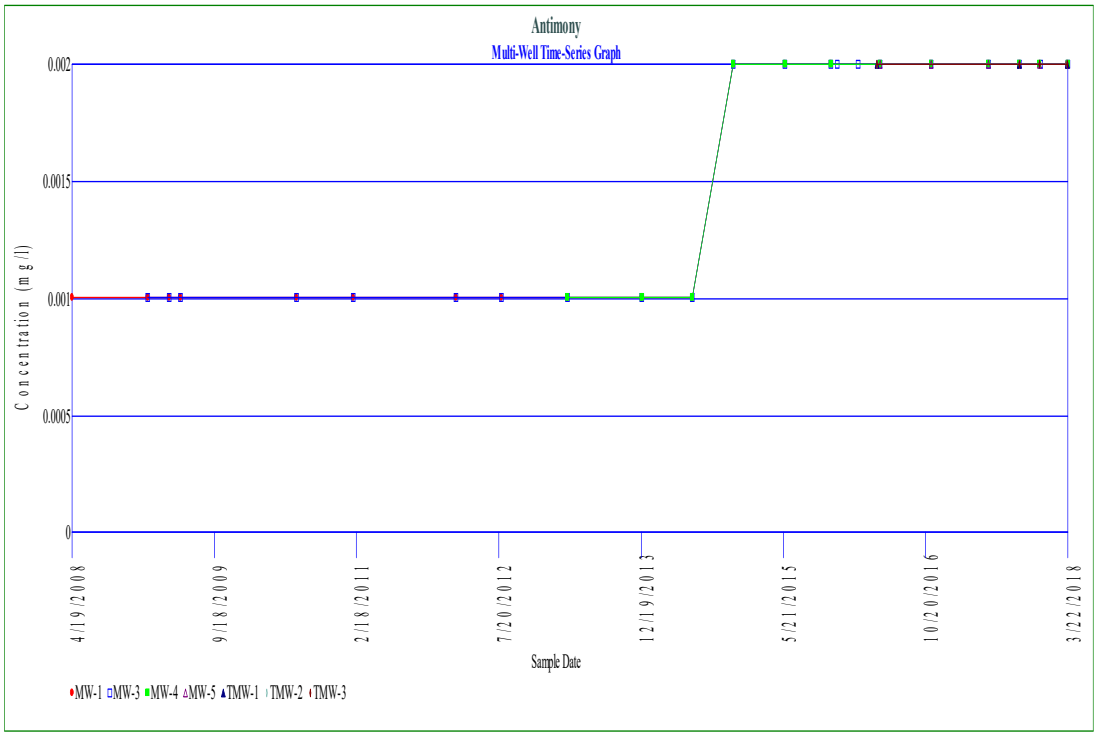
APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS


Turbidity
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (NTU)
7/16/2010
8/20/2011
9/24/2012
10/30/2013
12/5/2014
1/10/2016
2/14/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

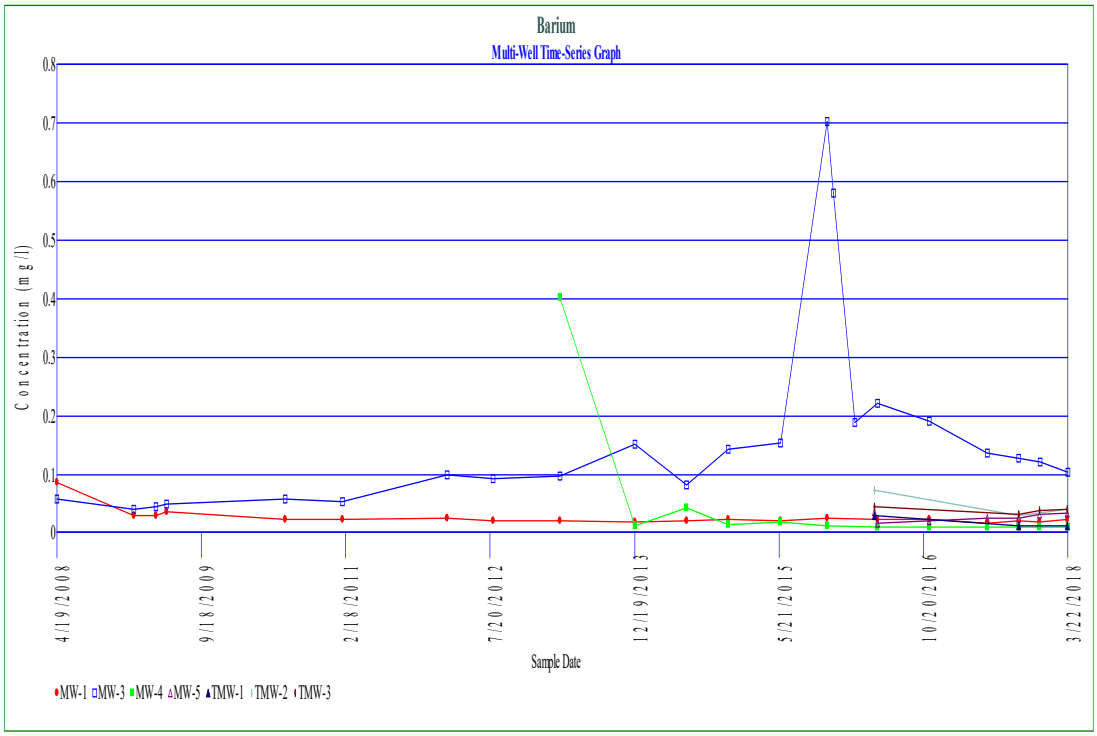
Page 1

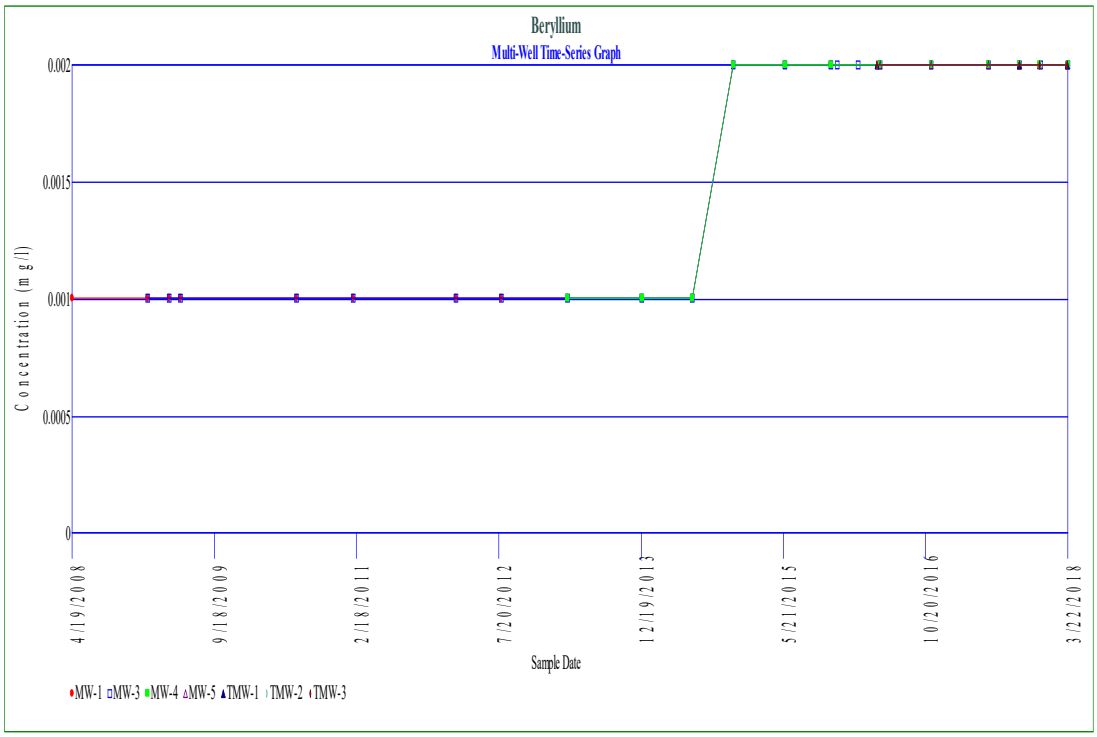

Aluminum
Multi-Well Time-Series Graph
8
7
6
5
4
3
2
1
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

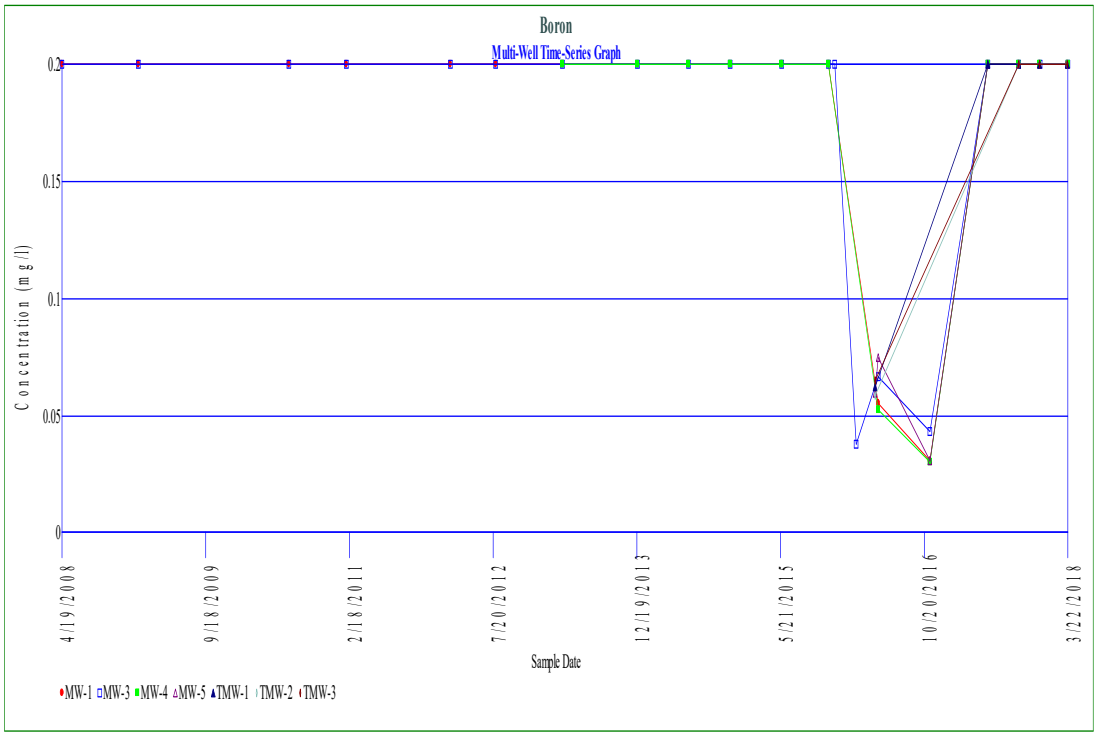
Page 2

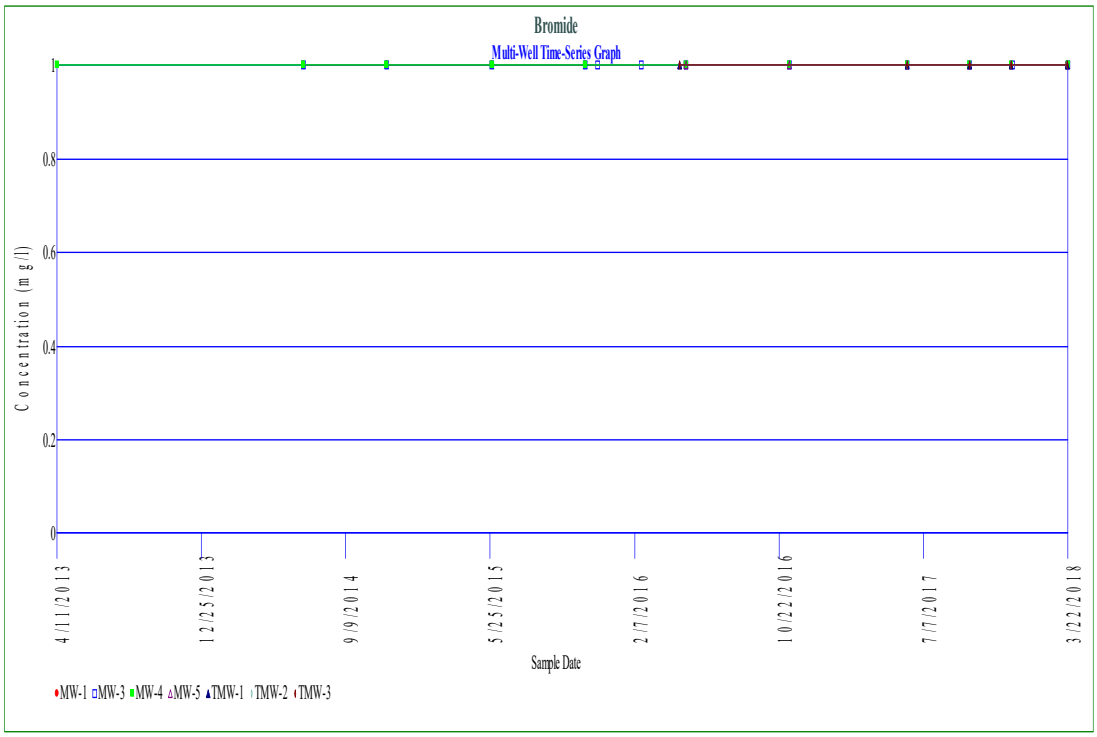

Antimony
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

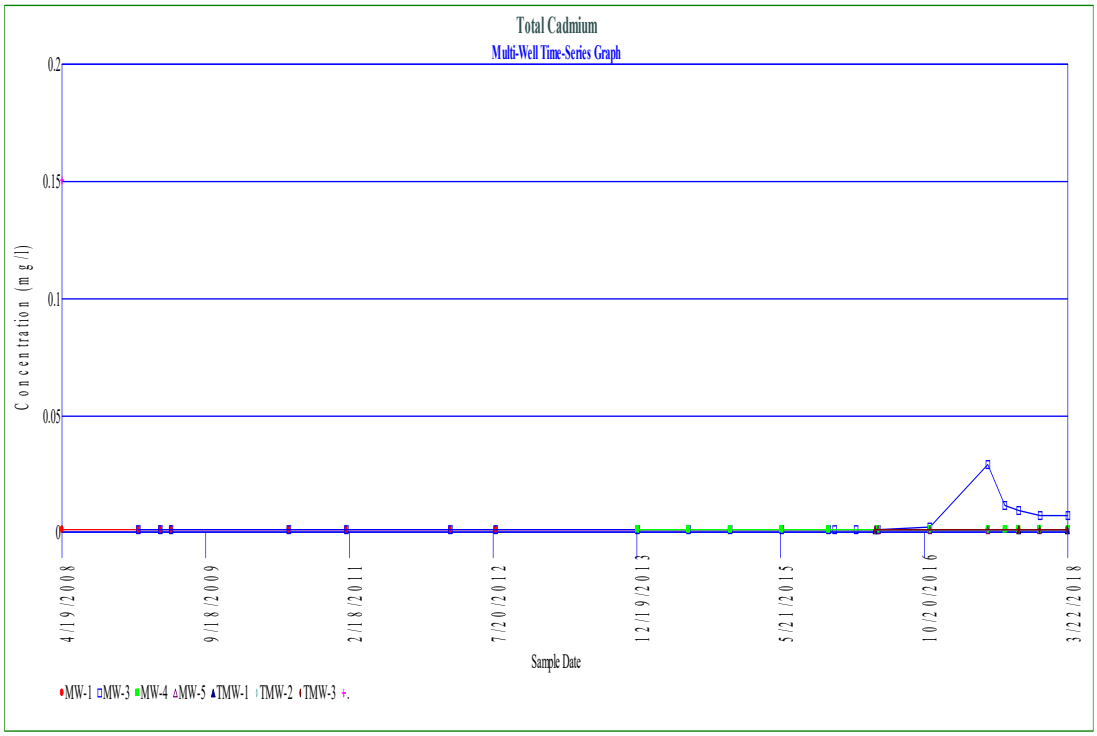

Arsenic
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

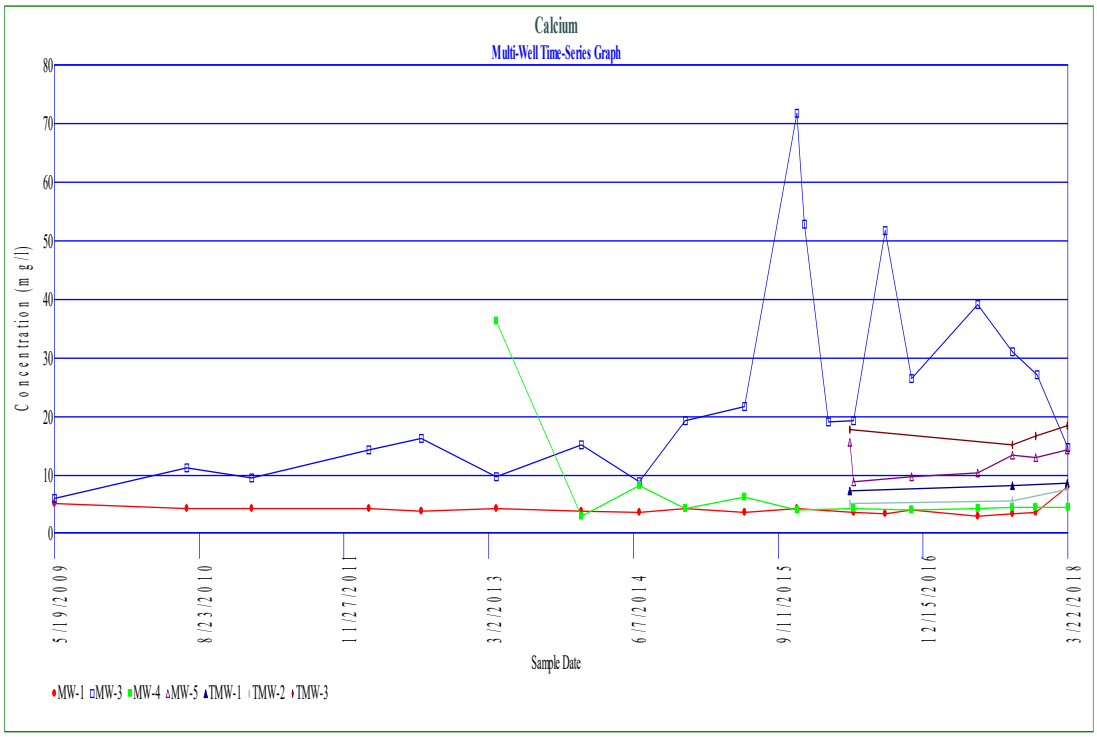

Barium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

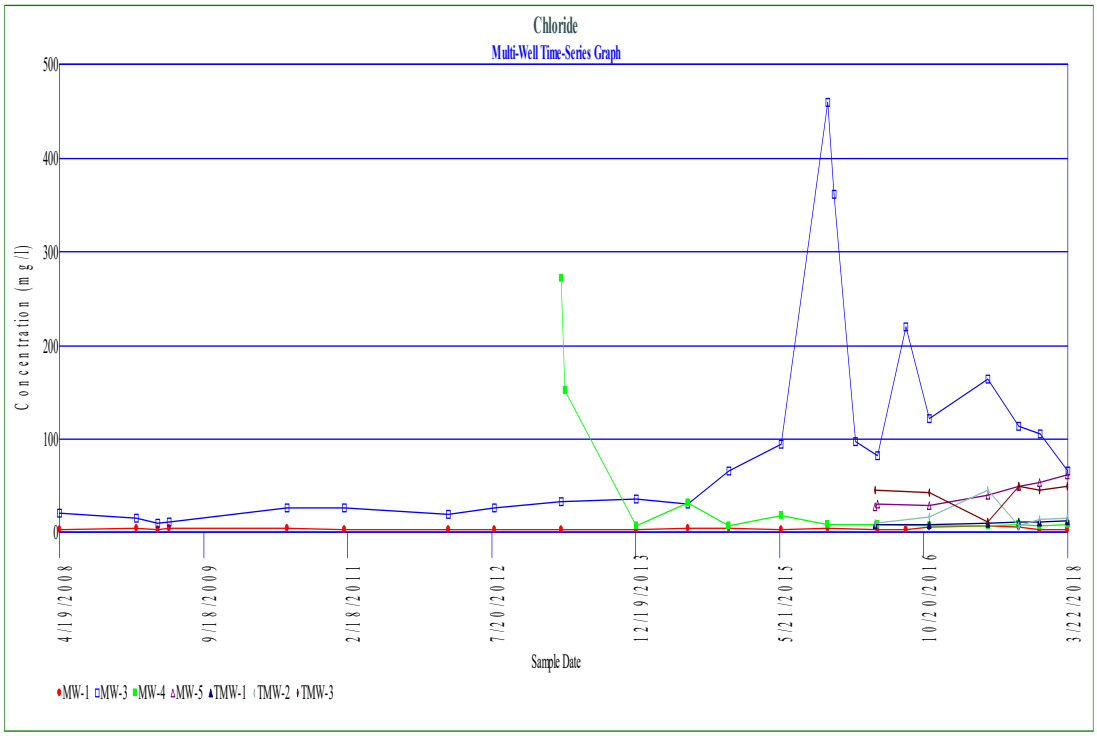

Beryllium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.002
0.0015
0.001
0.0005
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

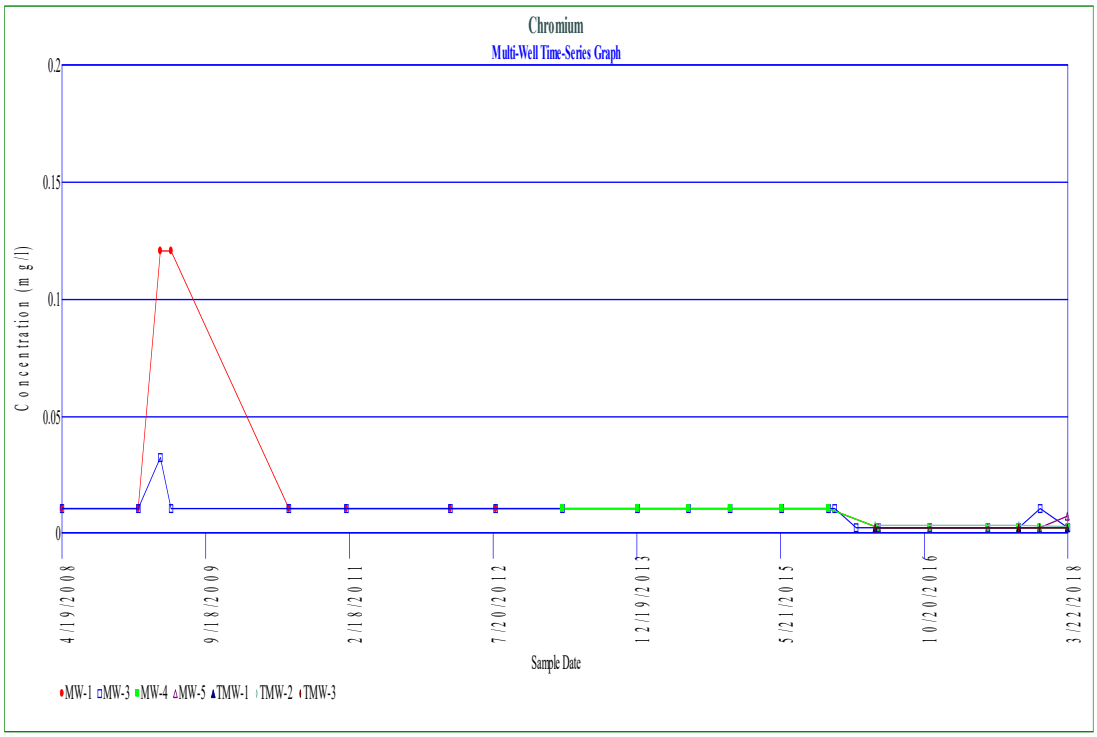

Boron
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

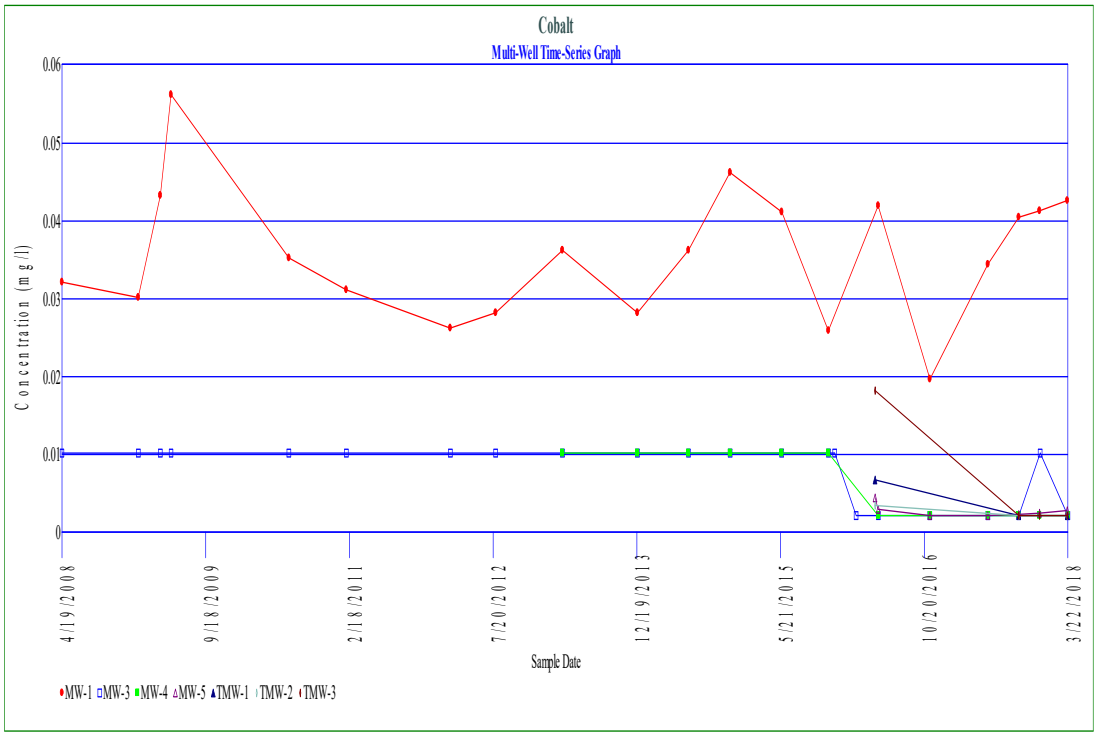

Bromide
Multi-Well Time-Series Graph
1
0.8
0.6
0.4
0.2
0
Concentration (mg/l)
4/11/2013
12/25/2013
9/9/2014
5/25/2015
2/7/2016
10/22/2016
7/7/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

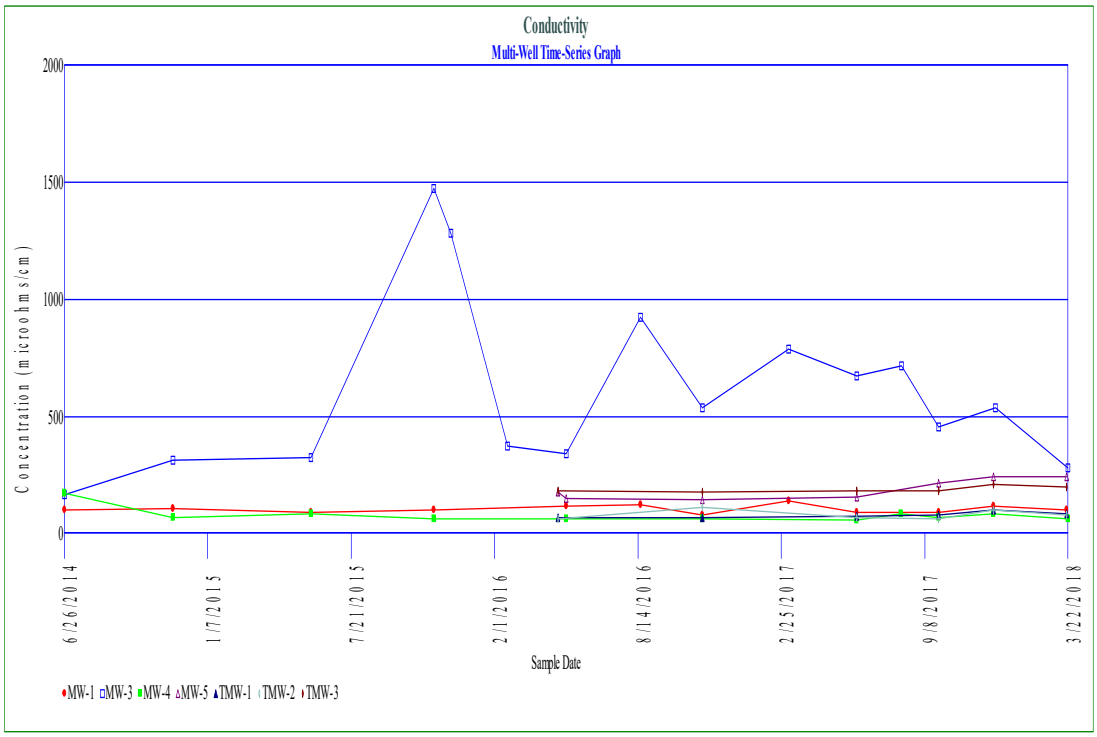

Total Cadmium
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

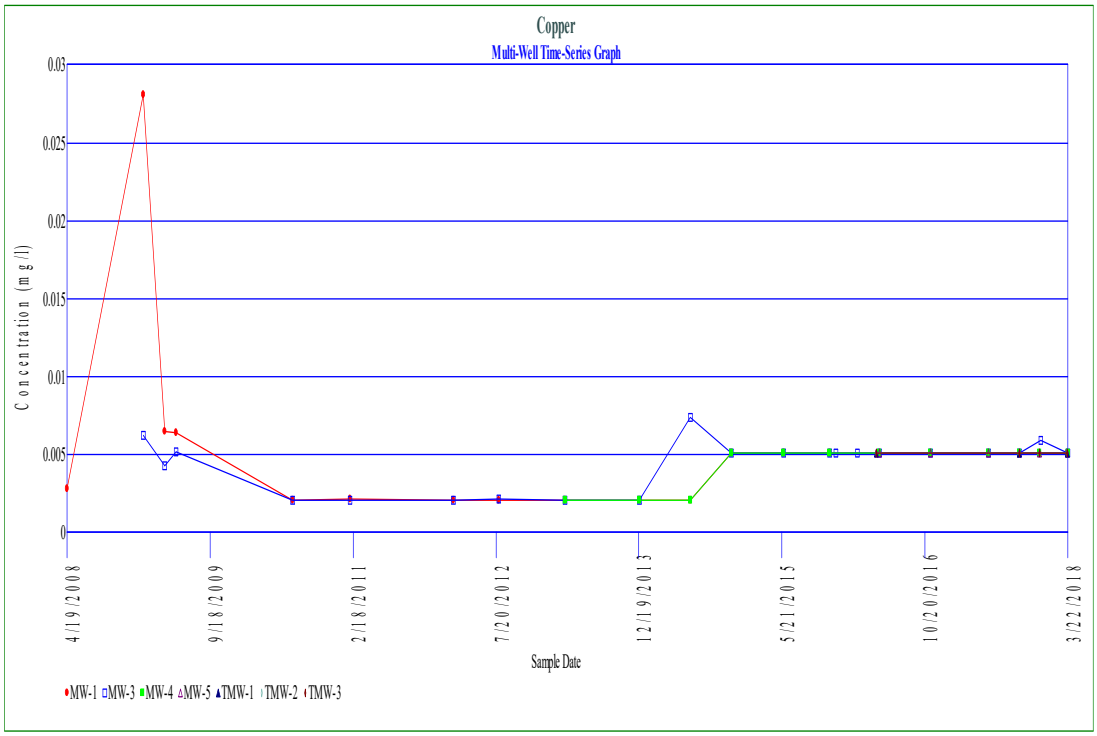

Calcium
Multi-Well Time-Series Graph
80
70
60
50
40
30
20
10
0
Concentration (mg/l)
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

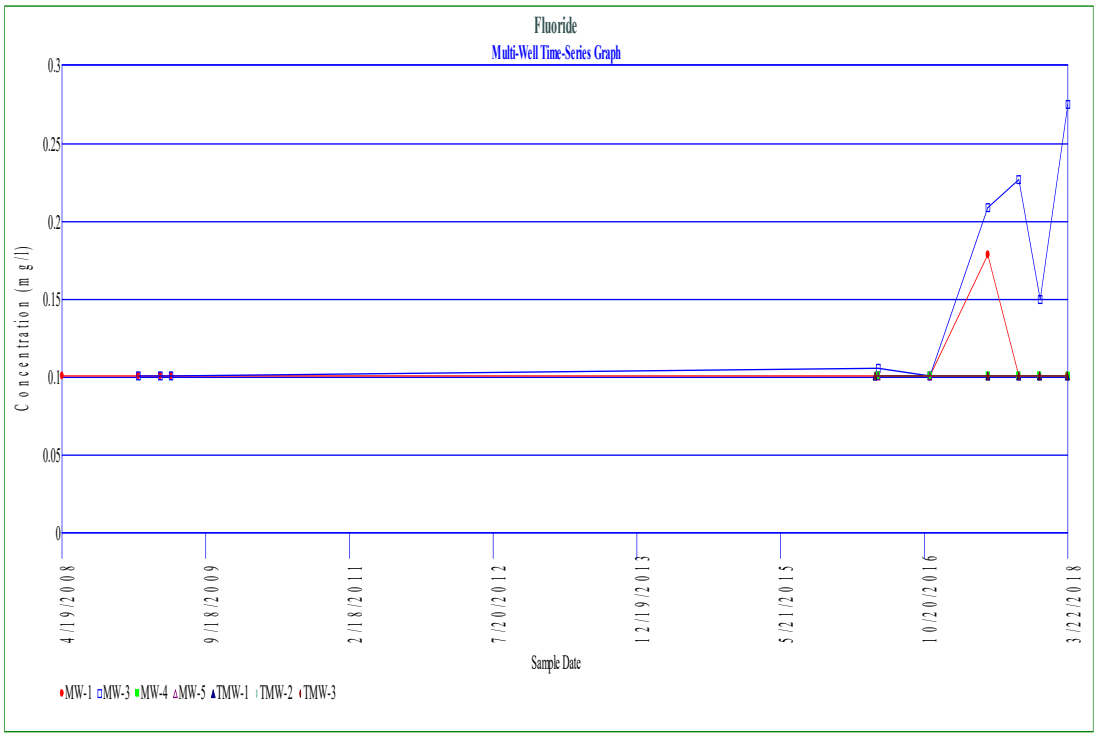

Chloride
Multi-Well Time-Series Graph
Concentration (mg/l)
500
400
300
200
100
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

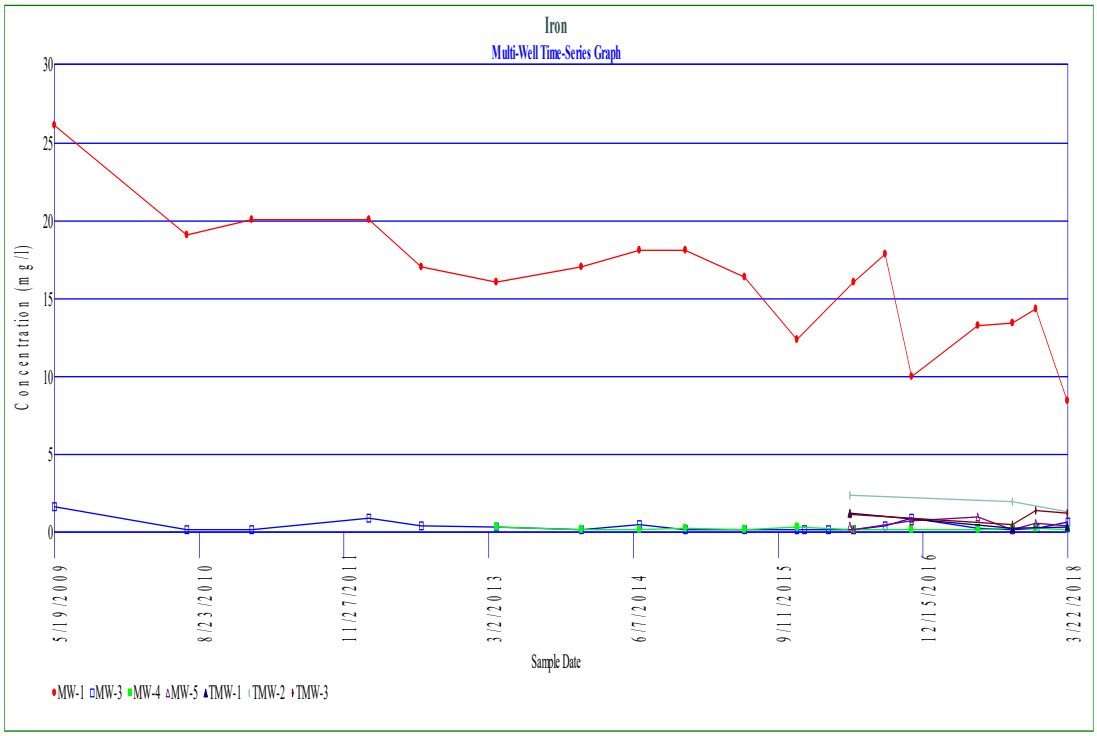

Chromium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.2
0.15
0.1
0.05
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

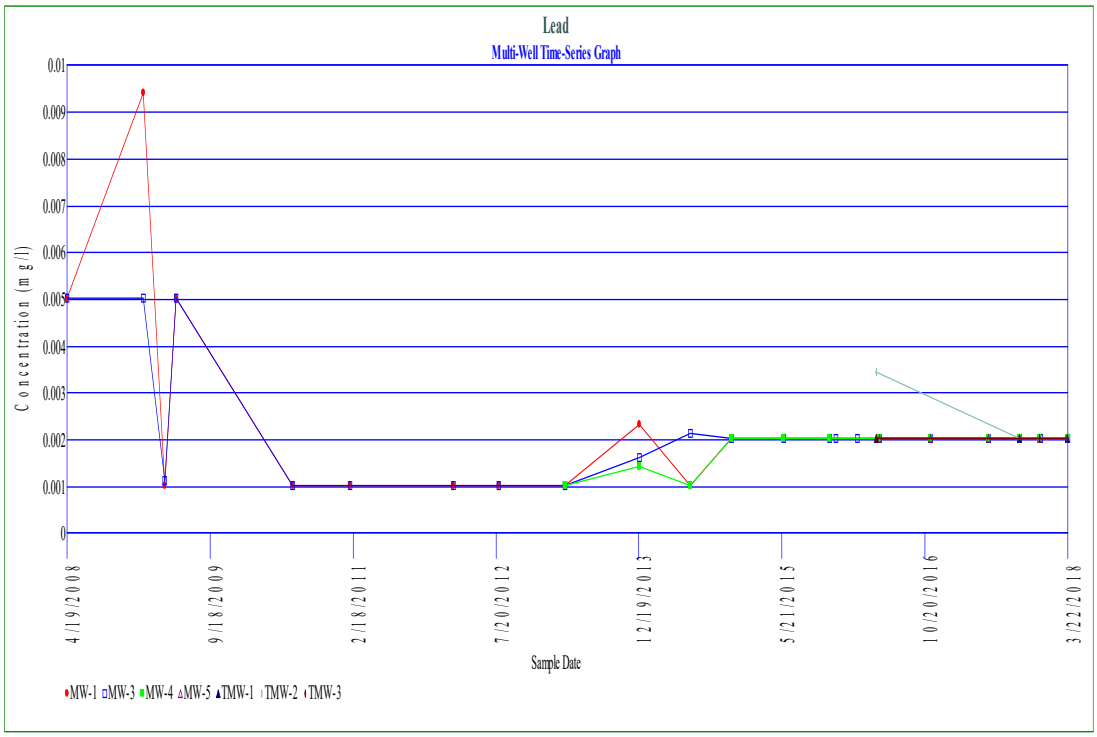

Cobalt
Multi-Well Time-Series Graph
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

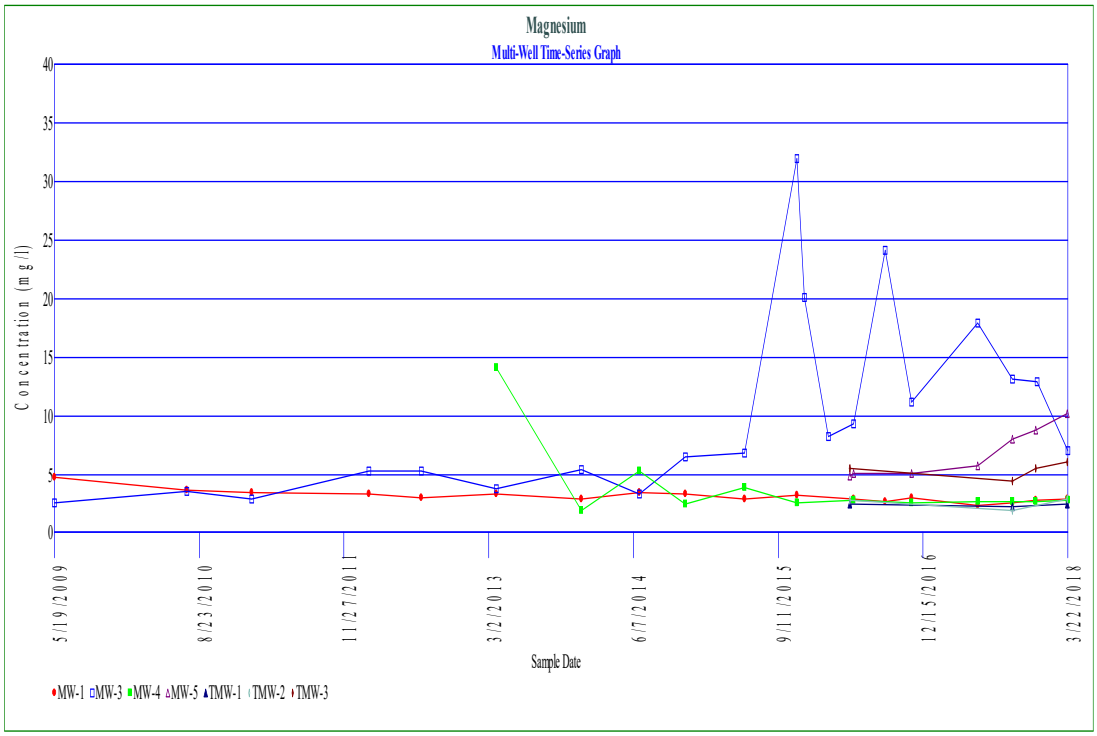

Conductivity
Multi-Well Time-Series Graph
2000
1500
1000
500
0
Concentration (microohms/cm)
6/26/2014
1/7/2015
7/21/2015
2/1/2016
8/14/2016
2/25/2017
9/8/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

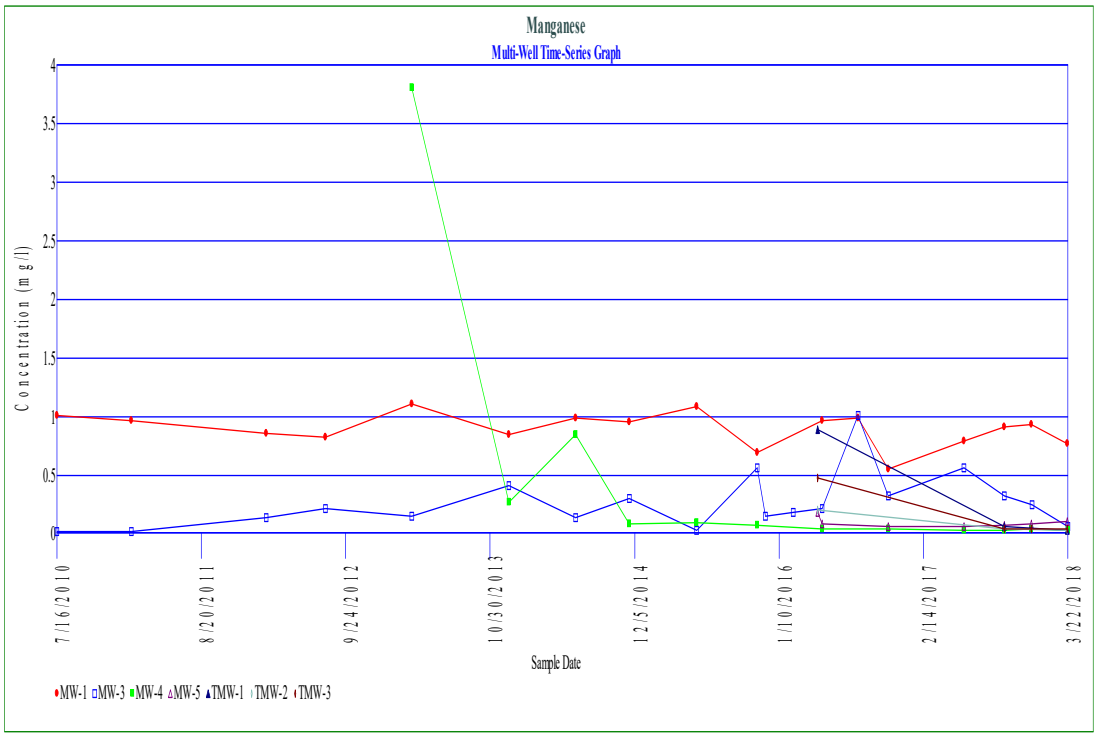

Copper
Multi-Well Time-Series Graph
0.03
0.025
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

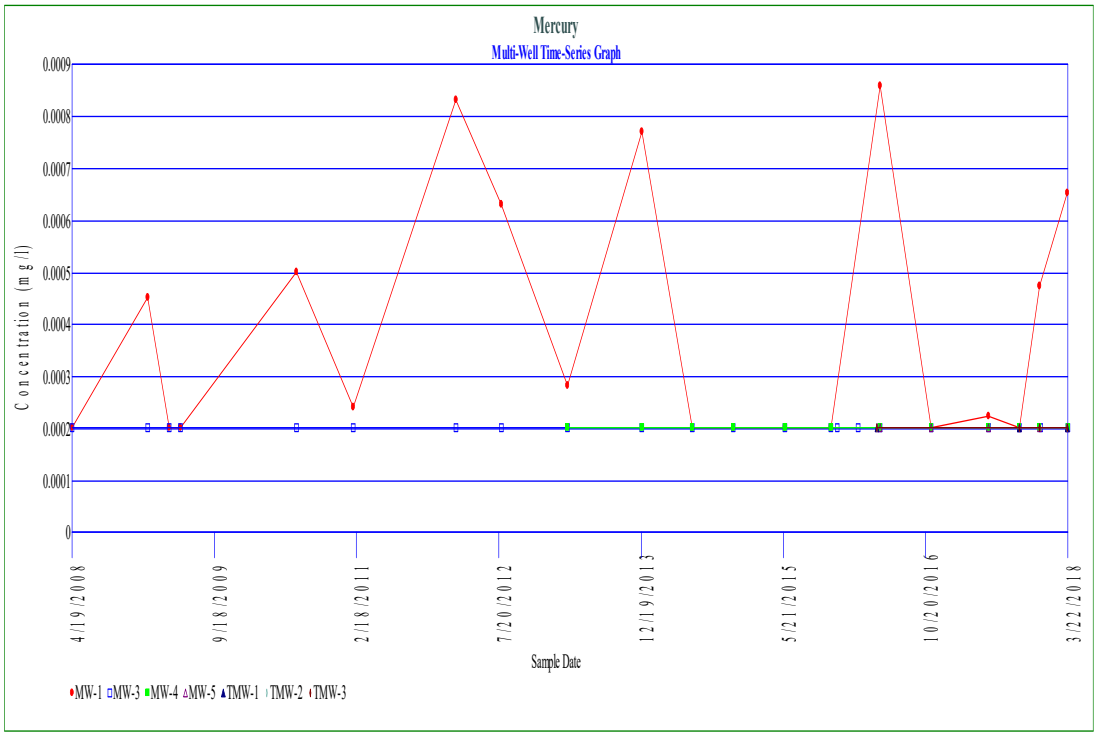

Fluoride
Multi-Well Time-Series Graph
0.3
0.25
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

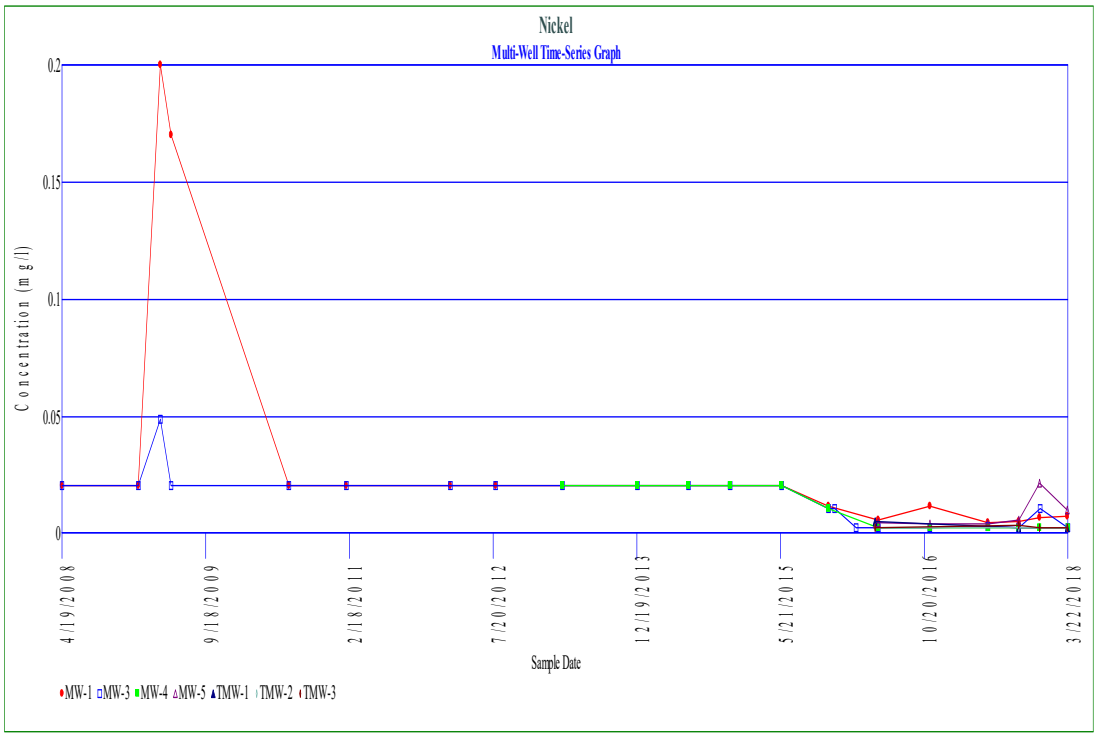

Iron
Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

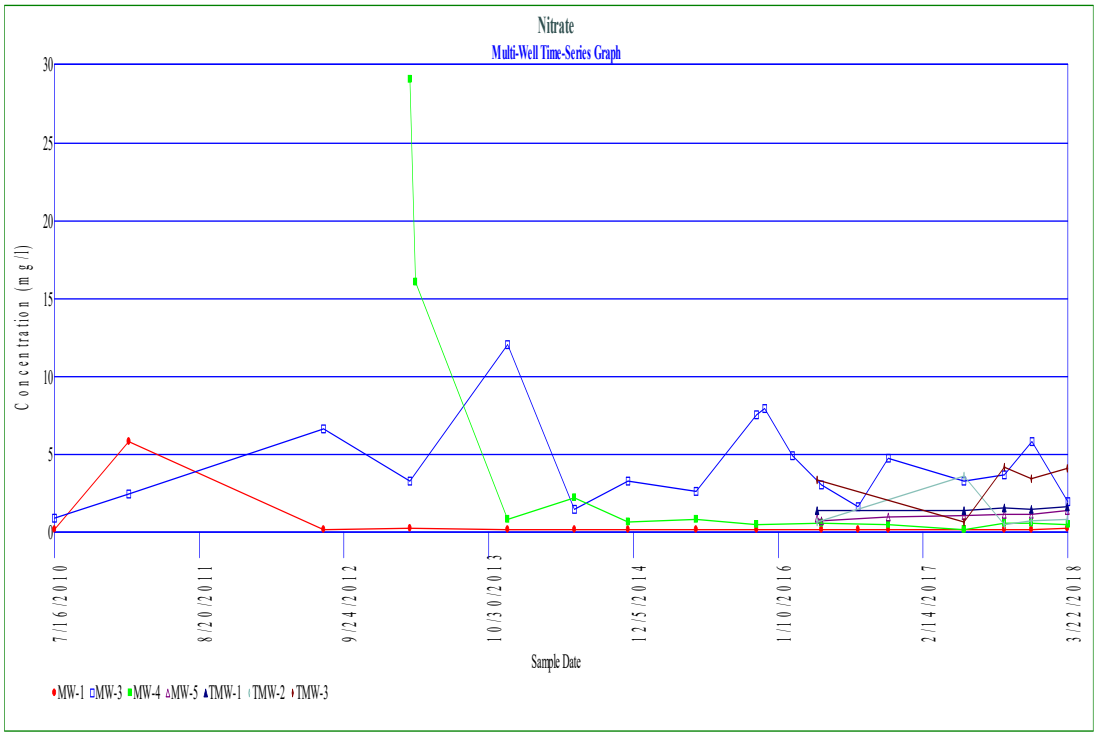

Lead
Multi-Well Time-Series Graph
Concentration (mg/l)
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

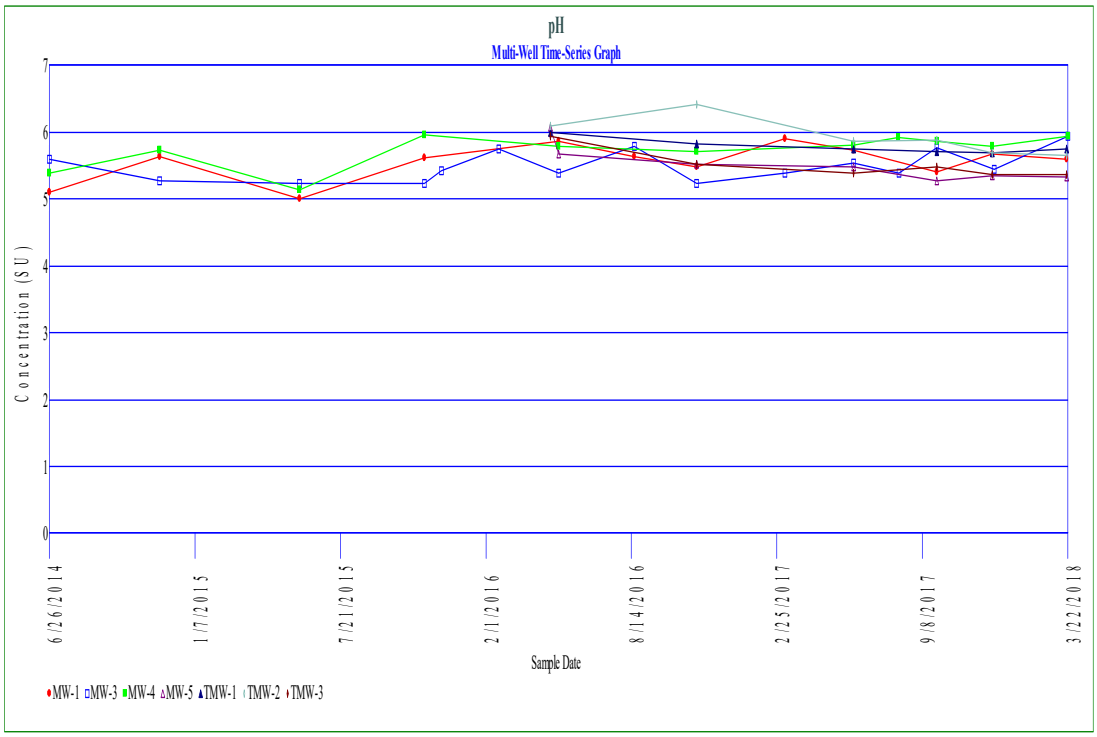

Magnesium
Multi-Well Time-Series Graph
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

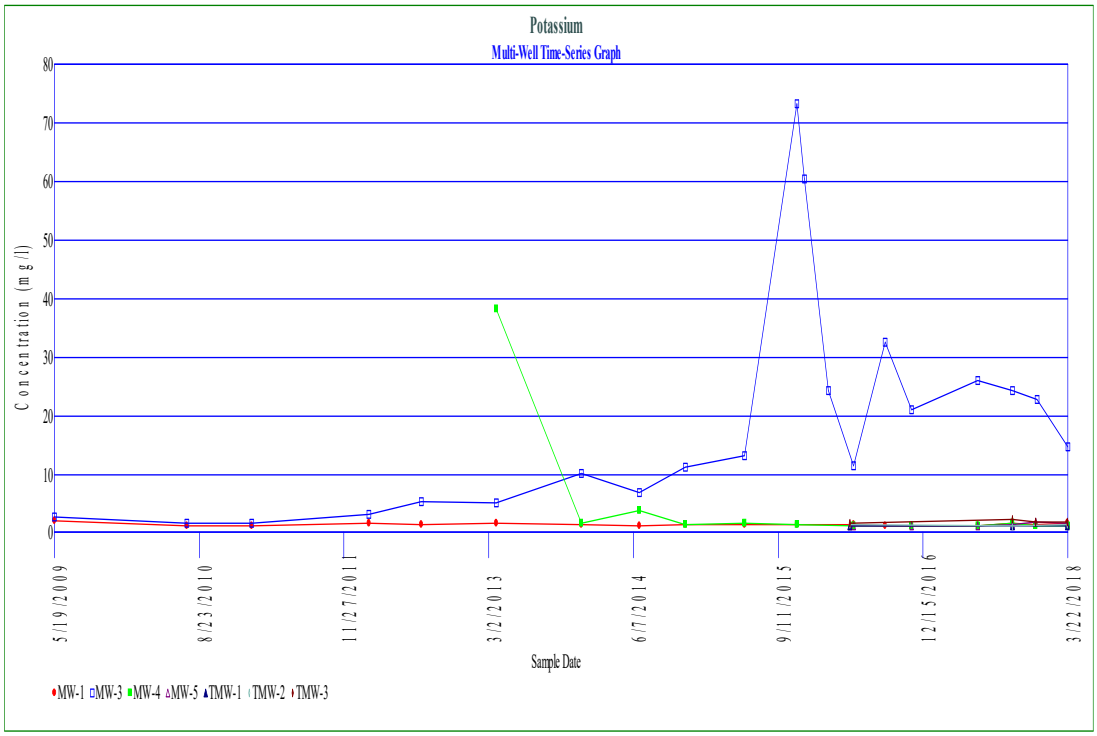

Manganese
Multi-Well Time-Series Graph
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
7/16/2010
8/20/2011
9/24/2012
10/30/2013
12/5/2014
1/10/2016
2/14/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

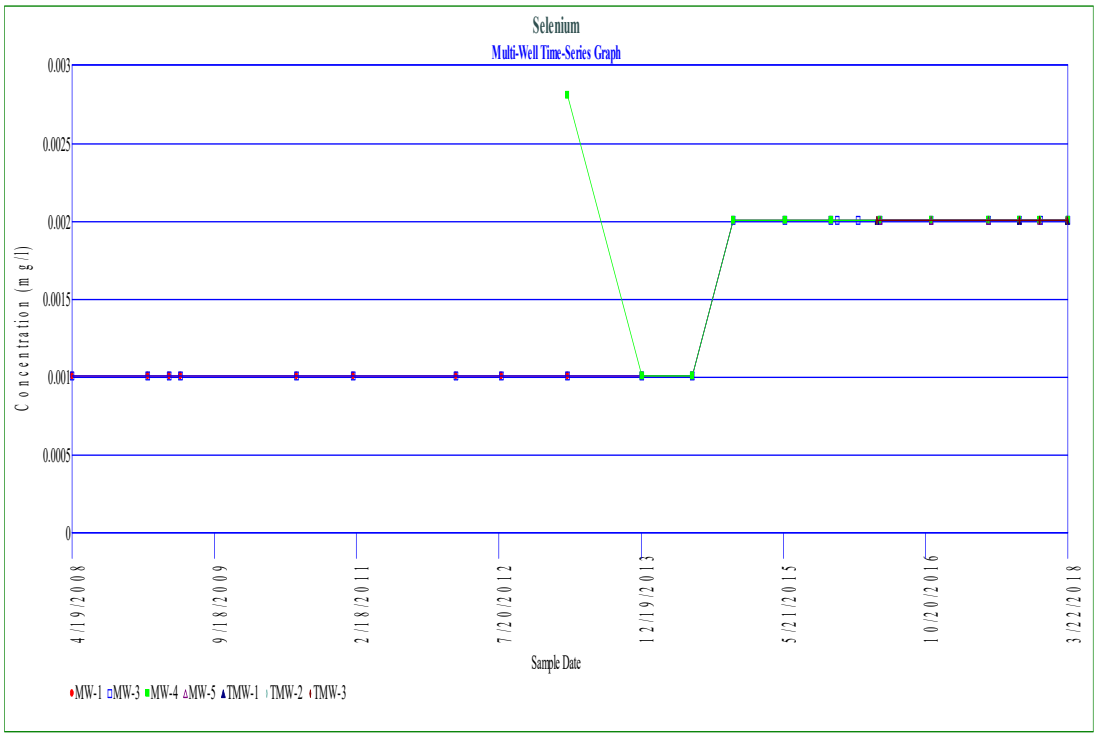

Mercury
Multi-Well Time-Series Graph
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

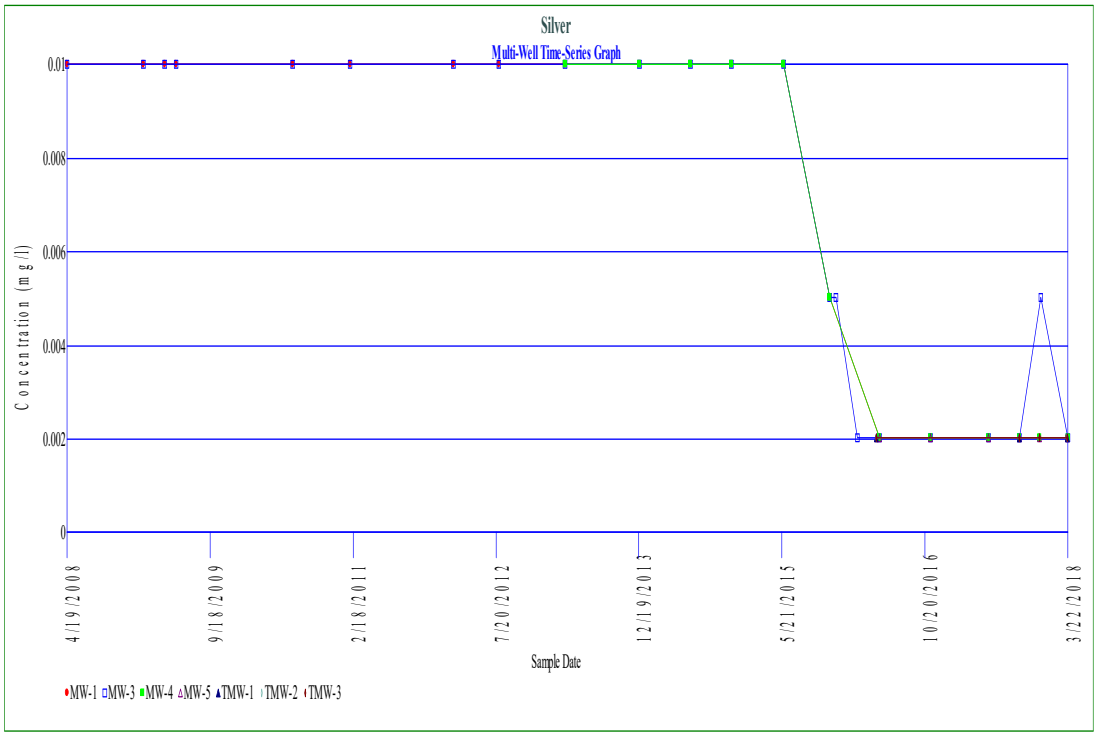

Nickel
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

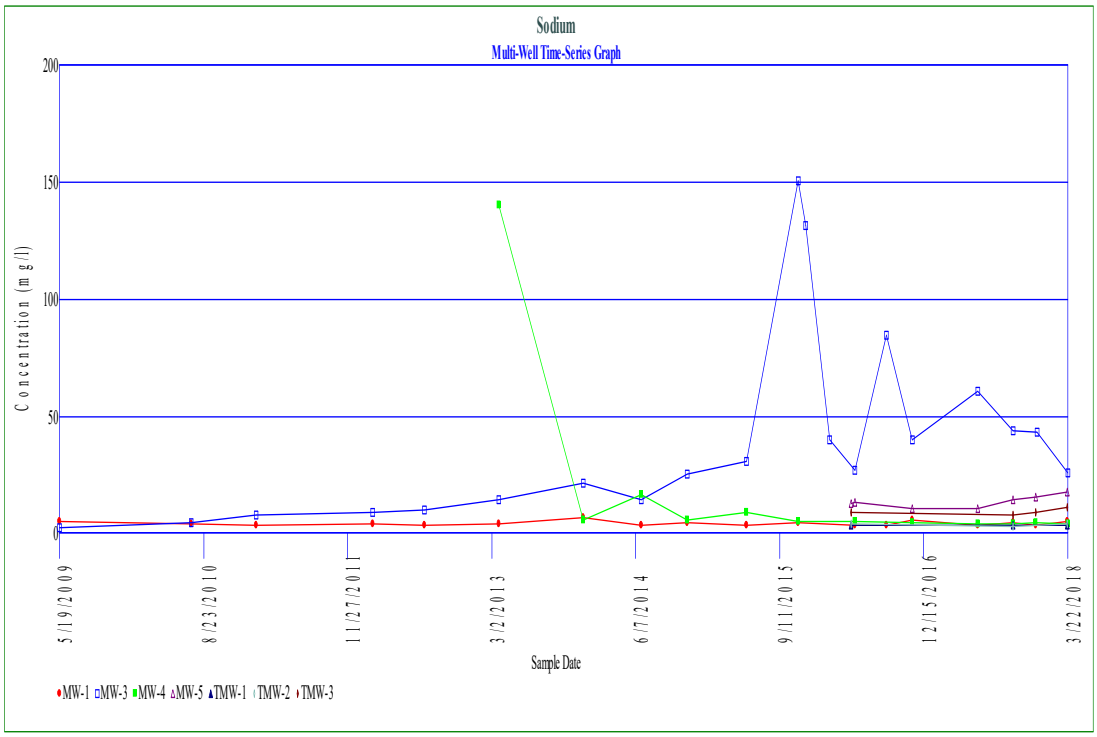

Nitrate
Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
7/16/2010
8/20/2011
9/24/2012
10/30/2013
12/5/2014
1/10/2016
2/14/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

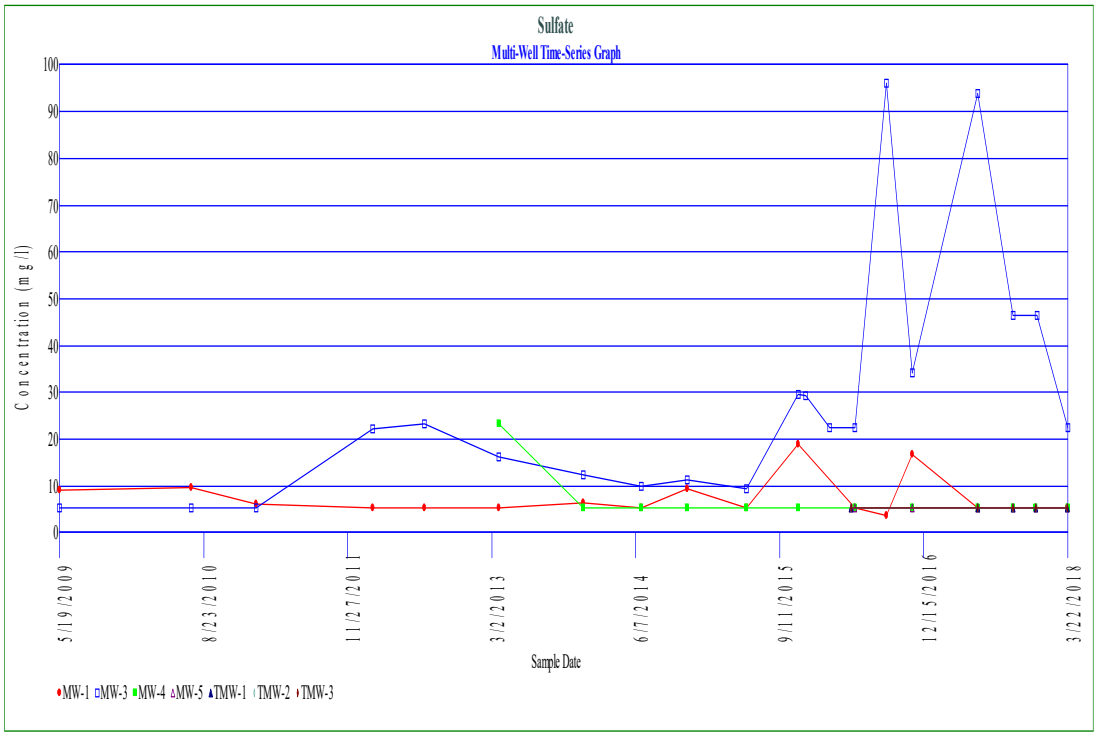

pH
Multi-Well Time-Series Graph
Concentration (SU)
7
6
5
4
3
2
1
0
6/26/2014
1/7/2015
7/21/2015
2/1/2016
8/14/2016
2/25/2017
9/8/2017
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

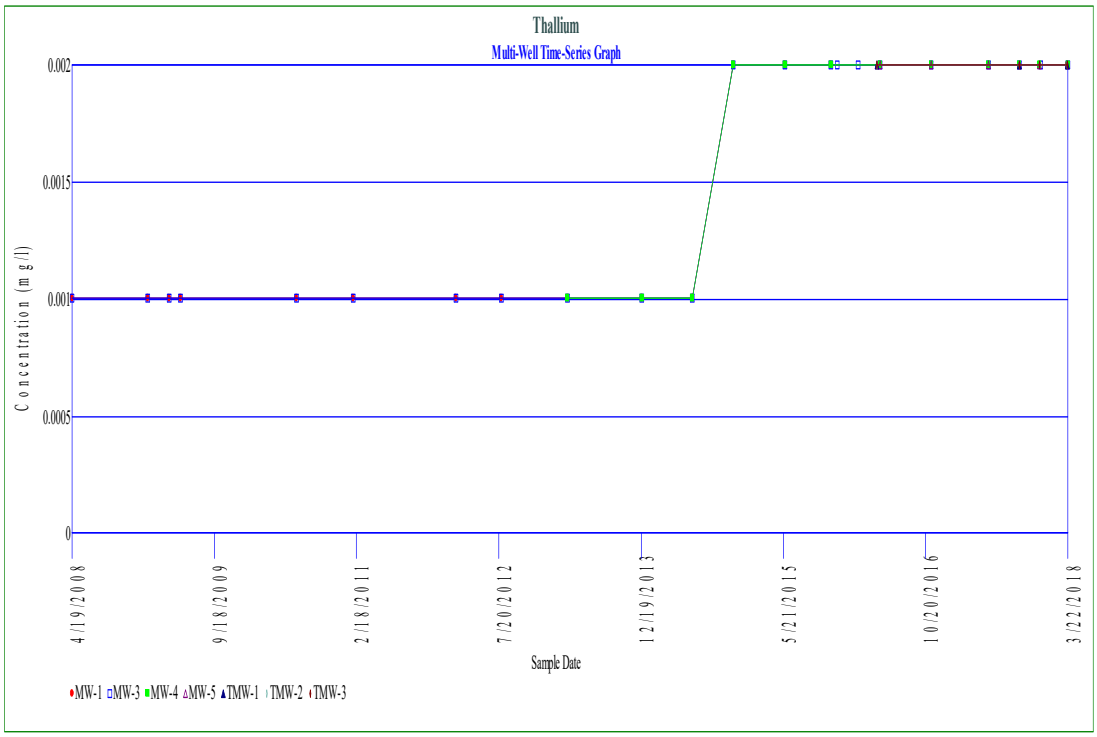

Potassium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

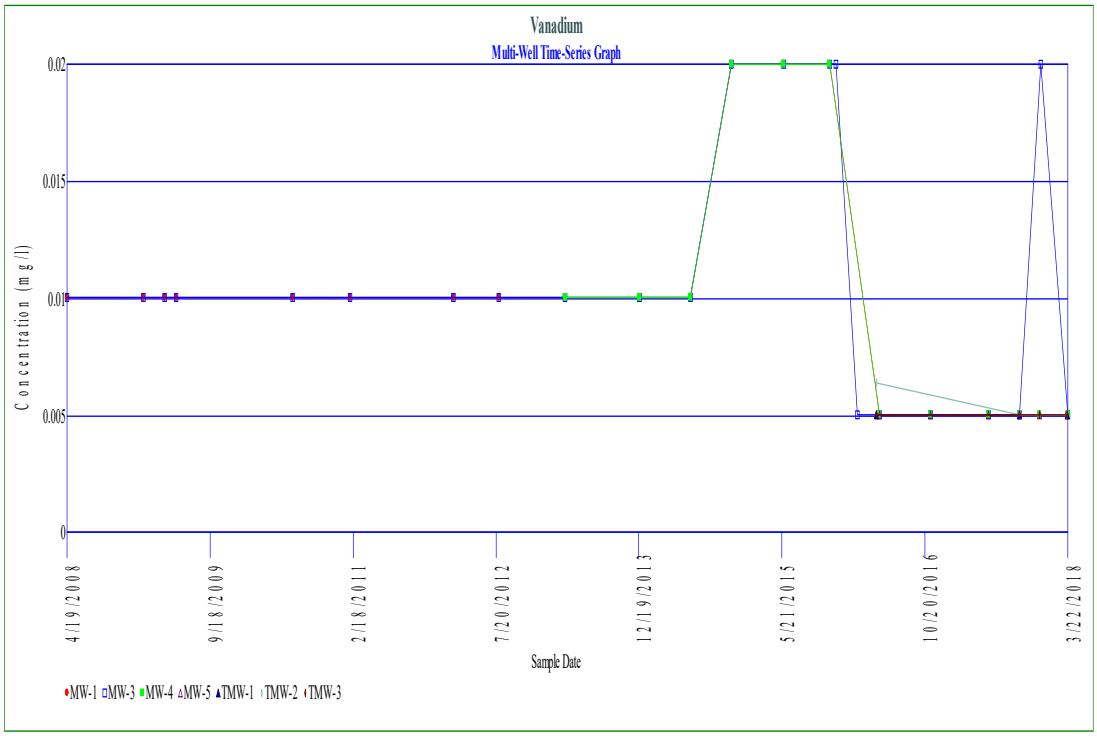

Selenium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

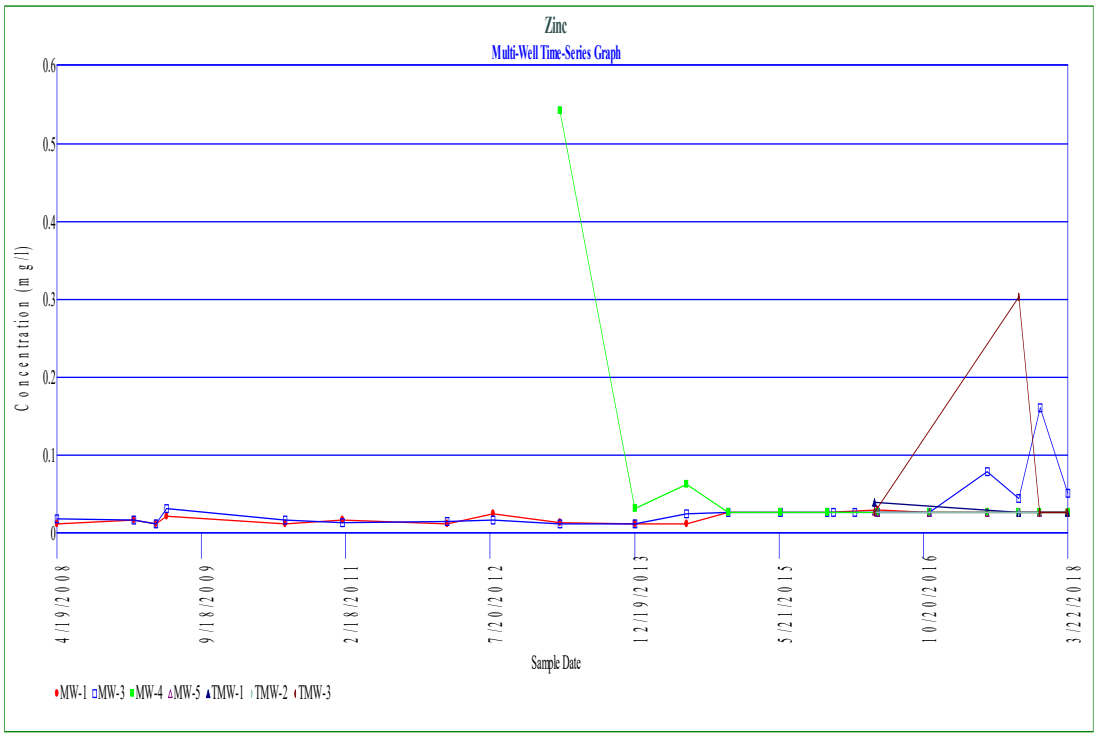

Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Sodium
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Sulfate
Multi-Well Time-Series Graph
Concentration (mg/l)
100
90
80
70
60
50
40
30
20
10
0
5/19/2009
8/23/2010
11/27/2011
3/2/2013
6/7/2014
9/11/2015
12/15/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Thallium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.002
0.0015
0.001
0.0005
0
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Vanadium
Multi-Well Time-Series Graph
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Zinc
Multi-Well Time-Series Graph
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentration (mg/l)
4/19/2008
9/18/2009
2/18/2011
7/20/2012
12/19/2013
5/21/2015
10/20/2016
3/22/2018
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 = 10 for 20 measurements

Sum of b values = 0.104782
Sample Standard Deviation = 0.0244576
W Statistic = 0.966022

5% Critical value of 0.905 is less than 0.966022
Data is normally distributed at 95% level of significance

1% Critical value of 0.868 is less than 0.966022
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 = 10 for 20 measurements

Sum of b values = 0.0450627
Sample Standard Deviation = 0.0147684
W Statistic = 0.49002

5% Critical value of 0.905 exceeds 0.49002
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.49002
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 = 10 for 20 measurements

Sum of b values = 0.0366175
Sample Standard Deviation = 0.00850743
W Statistic = 0.975051

5% Critical value of 0.905 is less than 0.975051
Data is normally distributed at 95% level of significance

1% Critical value of 0.868 is less than 0.975051
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 = 10 for 20 measurements

Sum of b values = 0.156815
Sample Standard Deviation = 0.0529489
W Statistic = 0.461642

5% Critical value of 0.905 exceeds 0.461642
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.461642
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 = 10 for 20 measurements

Sum of b values = 0.000915605
Sample Standard Deviation = 0.000239802
W Statistic = 0.767283

5% Critical value of 0.905 exceeds 0.767283
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.767283
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 = 10 for 20 measurements

Sum of b values = 1.36995
Sample Standard Deviation = 0.370049
W Statistic = 0.721335

5% Critical value of 0.905 exceeds 0.721335
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.721335
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 = 10 for 20 measurements

Sum of b values = 3.385
Sample Standard Deviation = 0.99582
W Statistic = 0.608137

5% Critical value of 0.905 exceeds 0.608137
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.608137
Evidence of non-normality 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 = 10 for 20 measurements

Sum of b values = 3.44515
Sample Standard Deviation = 0.881684
W Statistic = 0.803593

5% Critical value of 0.905 exceeds 0.803593
Evidence of non-normality at 95% level of significance

1% Critical value of 0.868 exceeds 0.803593
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 95% 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

From 19 baseline samples
Baseline mean = 0.0610632
Baseline std Dev = 0.0222336

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 19 (background observations) - 1
t(0.95, 19) = 1.73406

Date	Samples	Mean	Interval	Significant
3/21/2018	1	0.0101	[0, 0.100619]	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 95% 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

From 19 baseline samples
Baseline mean = 0.0352947
Baseline std Dev = 0.00858238

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 19 (background observations) - 1
t(0.95, 19) = 1.73406

Date	Samples	Mean	Interval	Significant
3/21/2018	1	0.0425	[0, 0.0505637	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) = 19
Maximum Baseline Concentration = 0.084
Confidence Level = 95%
False Positive Rate = 5%

Baseline Measurements	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

Date	Count	Mean	Significant
3/21/2018	1	0.0212	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 = 57.8947%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 19
Maximum Baseline Concentration = 0.2
Confidence Level = 95%
False Positive Rate = 5%

Baseline Measurements	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

Date	Count	Mean	Significant
3/21/2018	1	0.00658	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Mercury

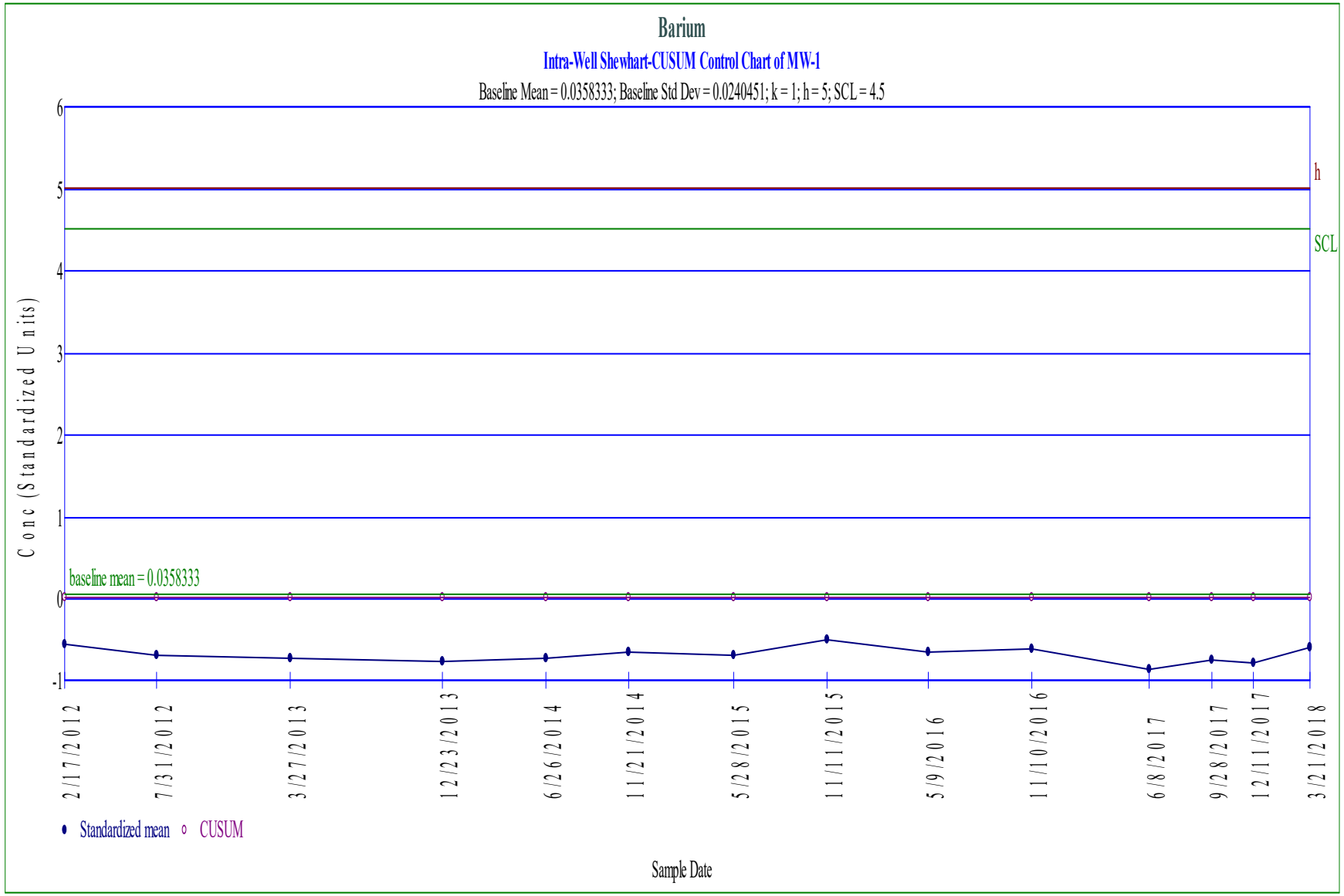
Original Data (Not Transformed)

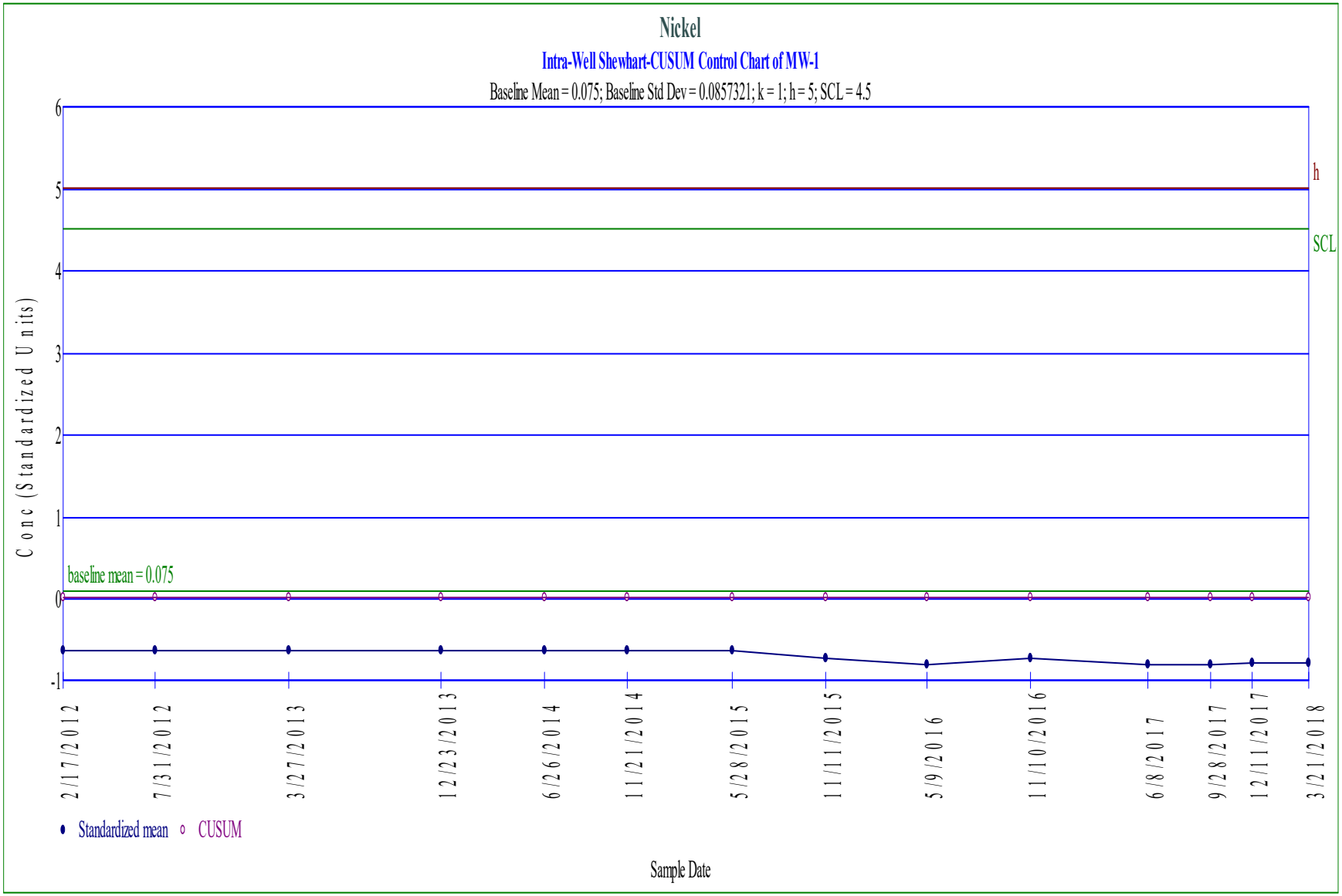
Non-Detects Replaced with Detection Limit

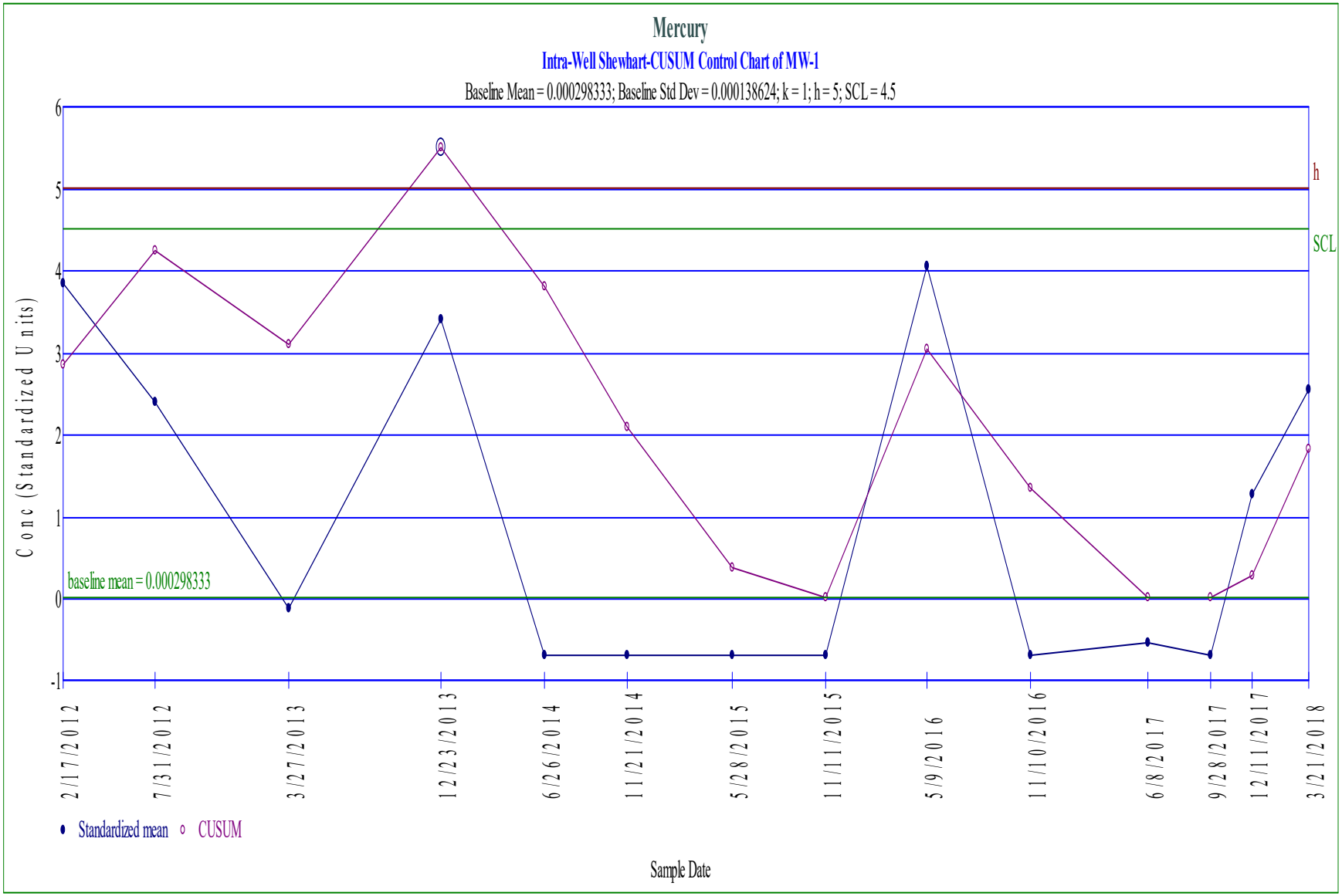
Total Percent Non-Detects = 47.3684%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 19
Maximum Baseline Concentration = 0.000858
Confidence Level = 95%
False Positive Rate = 5%

Baseline Measurements	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

Date	Count	Mean	Significant
3/21/2018	1	0.000651	FALSE


Barium
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.0358333; Baseline Std Dev = 0.0240451; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.0358333
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
Standardized mean
CUSUM
Sample Date


Nickel
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.075; Baseline Std Dev = 0.0857321; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.075
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
Standardized mean
CUSUM
Sample Date


Mercury
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.000298333; Baseline Std Dev = 0.000138624; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.000298333
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
Standardized mean
CUSUM
Sample Date

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 = 71

Data Set Standard Deviation = 1.10483
Numerator = 2250.86
Denominator = 5505.59
W Statistic = 0.408832 = 2250.86 / 5505.59

5% Critical value of 0.967 exceeds 0.408832
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.408832
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 = 71

Data Set Standard Deviation = 0.11731
Numerator = 30.7251
Denominator = 62.0706
W Statistic = 0.495003 = 30.7251 / 62.0706

5% Critical value of 0.967 exceeds 0.495003
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.495003
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 = 69

Data Set Standard Deviation = 0.00374044
Numerator = 0.0127443
Denominator = 0.0592625
W Statistic = 0.215048 = 0.0127443 / 0.0592625

5% Critical value of 0.966 exceeds 0.215048
Evidence of non-normality at 95% level of significance

1% Critical value of 0.951 exceeds 0.215048
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 = 82

Data Set Standard Deviation = 76.0968
Numerator = 1.85147e+007
Denominator = 3.51227e+007
W Statistic = 0.527144 = 1.85147e+007 / 3.51227e+007

5% Critical value of 0.971 exceeds 0.527144
Evidence of non-normality at 95% level of significance

1% Critical value of 0.96 exceeds 0.527144
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 = 71

Data Set Standard Deviation = 0.0195768
Numerator = 0.509701
Denominator = 1.72863
W Statistic = 0.294859 = 0.509701 / 1.72863

5% Critical value of 0.967 exceeds 0.294859
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.294859
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 = 71

Data Set Standard Deviation = 0.0146006
Numerator = 0.766954
Denominator = 0.961517
W Statistic = 0.797651 = 0.766954 / 0.961517

5% Critical value of 0.967 exceeds 0.797651
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.797651
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 23 for 47 measurements

Sum of b values = 0.149976
Sample Standard Deviation = 0.0361524
W Statistic = 0.374122

5% Critical value of 0.946 exceeds 0.374122
Evidence of non-normality at 95% level of significance

1% Critical value of 0.928 exceeds 0.374122
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 = 71

Data Set Standard Deviation = 0.0304271
Numerator = 1.49097
Denominator = 4.17578
W Statistic = 0.357051 = 1.49097 / 4.17578

5% Critical value of 0.967 exceeds 0.357051
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.357051
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 = 71

Data Set Standard Deviation = 0.0714315
Numerator = 5.93459
Denominator = 23.0142
W Statistic = 0.257866 = 5.93459 / 23.0142

5% Critical value of 0.967 exceeds 0.257866
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.257866
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 = 71

Data Set Standard Deviation = 1.31132
Numerator = 6934
Denominator = 7755.96
W Statistic = 0.894023 = 6934 / 7755.96

5% Critical value of 0.967 exceeds 0.894023
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.894023
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 = 71

Data Set Standard Deviation = 1.06239
Numerator = 4847.12
Denominator = 5090.83
W Statistic = 0.952128 = 4847.12 / 5090.83

5% Critical value of 0.967 exceeds 0.952128
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.952128
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 = 69

Data Set Standard Deviation = 0.819344
Numerator = 871.355
Denominator = 2843.59
W Statistic = 0.306428 = 871.355 / 2843.59

5% Critical value of 0.966 exceeds 0.306428
Evidence of non-normality at 95% level of significance

1% Critical value of 0.951 exceeds 0.306428
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 = 82

Data Set Standard Deviation = 1.43509
Numerator = 12172.3
Denominator = 12491.5
W Statistic = 0.974446 = 12172.3 / 12491.5

5% Critical value of 0.971 is less than 0.974446
Data is normally distributed at 95% level of significance

1% Critical value of 0.96 is less than 0.974446
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 = 71

Data Set Standard Deviation = 1.06161
Numerator = 3676.1
Denominator = 5083.35
W Statistic = 0.723165 = 3676.1 / 5083.35

5% Critical value of 0.967 exceeds 0.723165
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.723165
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 = 71

Data Set Standard Deviation = 1.36522
Numerator = 7433.48
Denominator = 8406.67
W Statistic = 0.884236 = 7433.48 / 8406.67

5% Critical value of 0.967 exceeds 0.884236
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.884236
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 23 for 47 measurements

Sum of b values = 1.9589
Sample Standard Deviation = 0.449209
W Statistic = 0.413398

5% Critical value of 0.946 exceeds 0.413398
Evidence of non-normality at 95% level of significance

1% Critical value of 0.928 exceeds 0.413398
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 = 71

Data Set Standard Deviation = 1.1682
Numerator = 5200.22
Denominator = 6155.36
W Statistic = 0.844829 = 5200.22 / 6155.36

5% Critical value of 0.967 exceeds 0.844829
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.844829
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 = 71

Data Set Standard Deviation = 0.806261
Numerator = 2036.24
Denominator = 2932.03
W Statistic = 0.694483 = 2036.24 / 2932.03

5% Critical value of 0.967 exceeds 0.694483
Evidence of non-normality at 95% level of significance

1% Critical value of 0.953 exceeds 0.694483
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

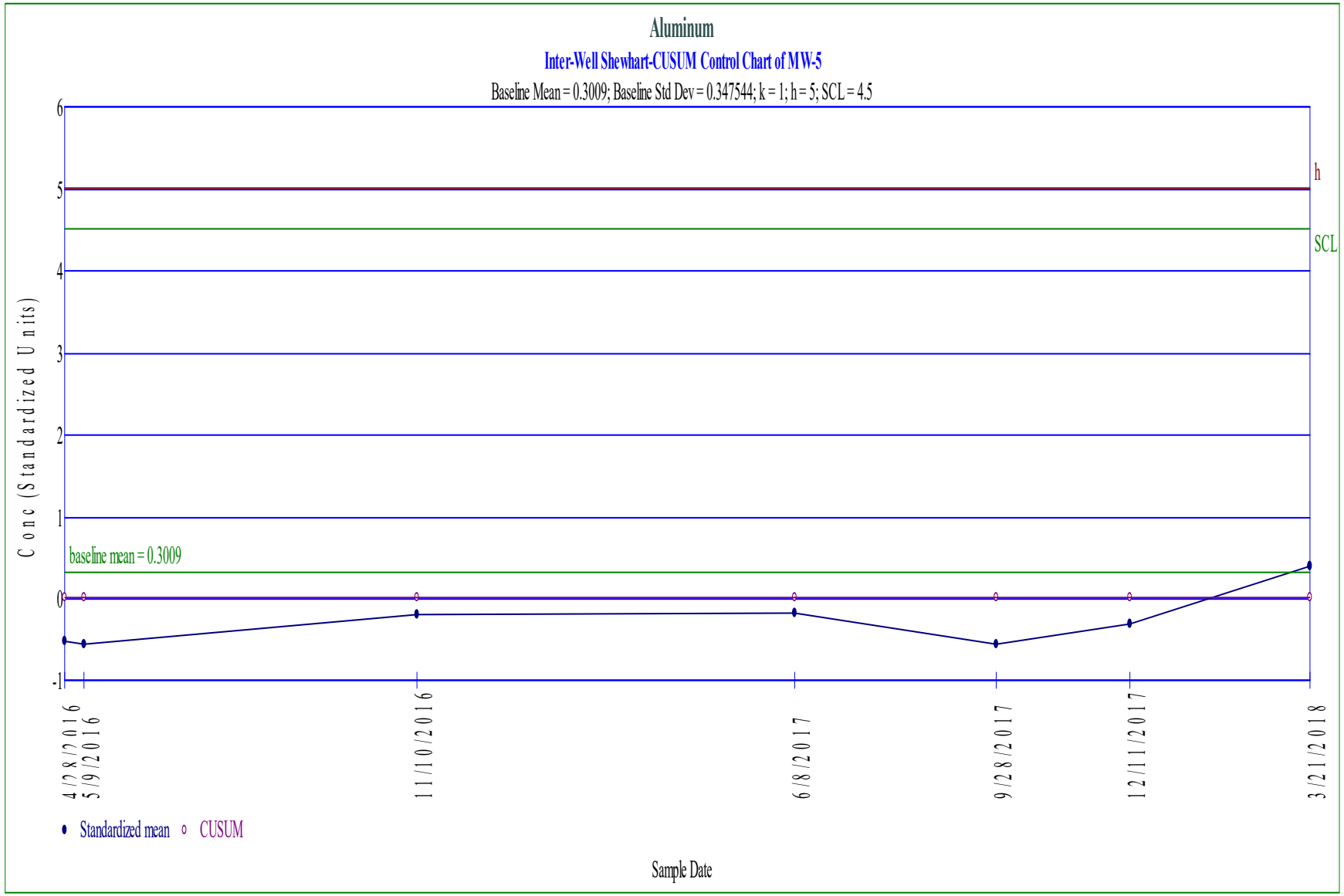
Parameter: Sulfate
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 72

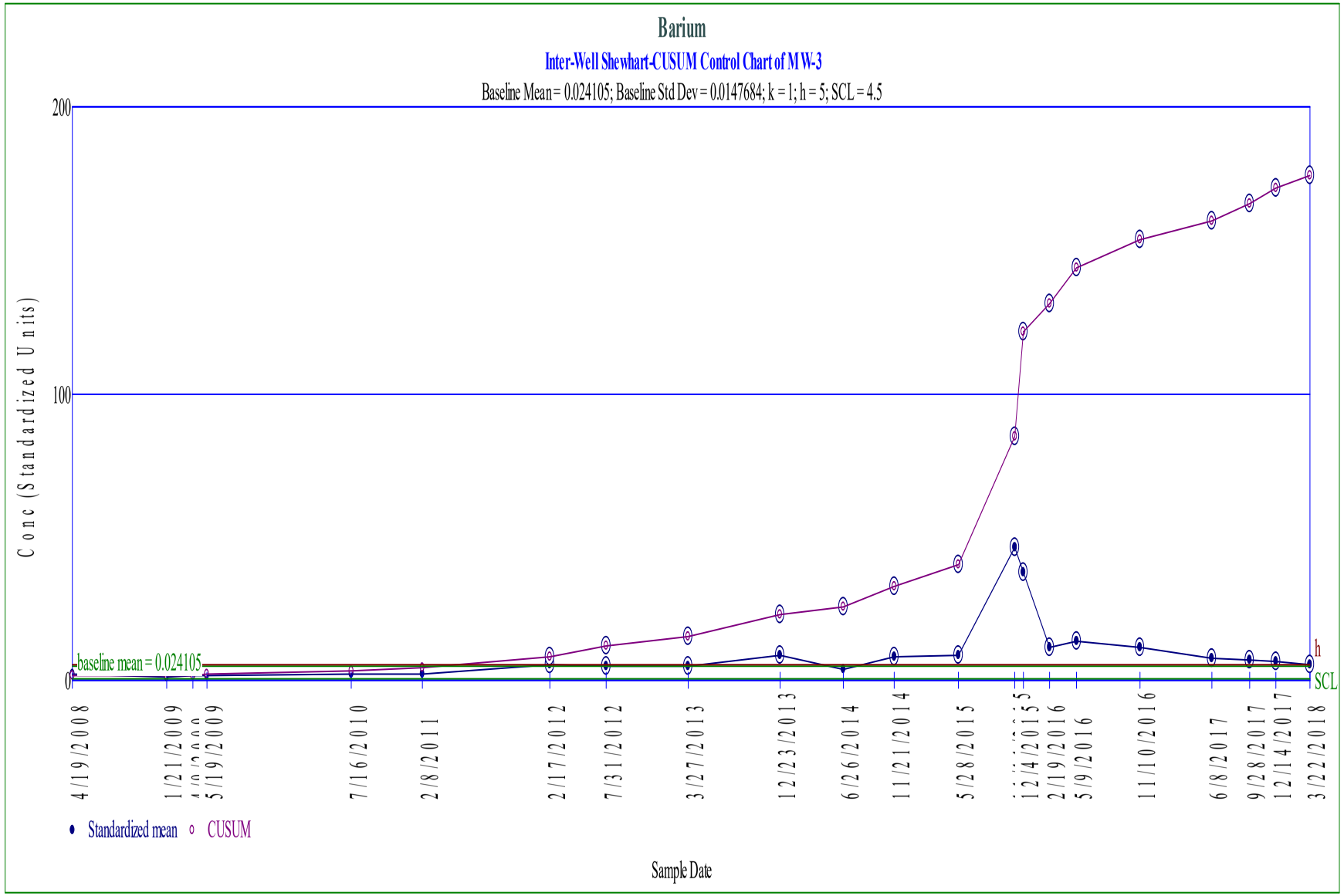
Data Set Standard Deviation = 1.05569
Numerator = 3802.55
Denominator = 5169.5
W Statistic = 0.735573 = 3802.55 / 5169.5

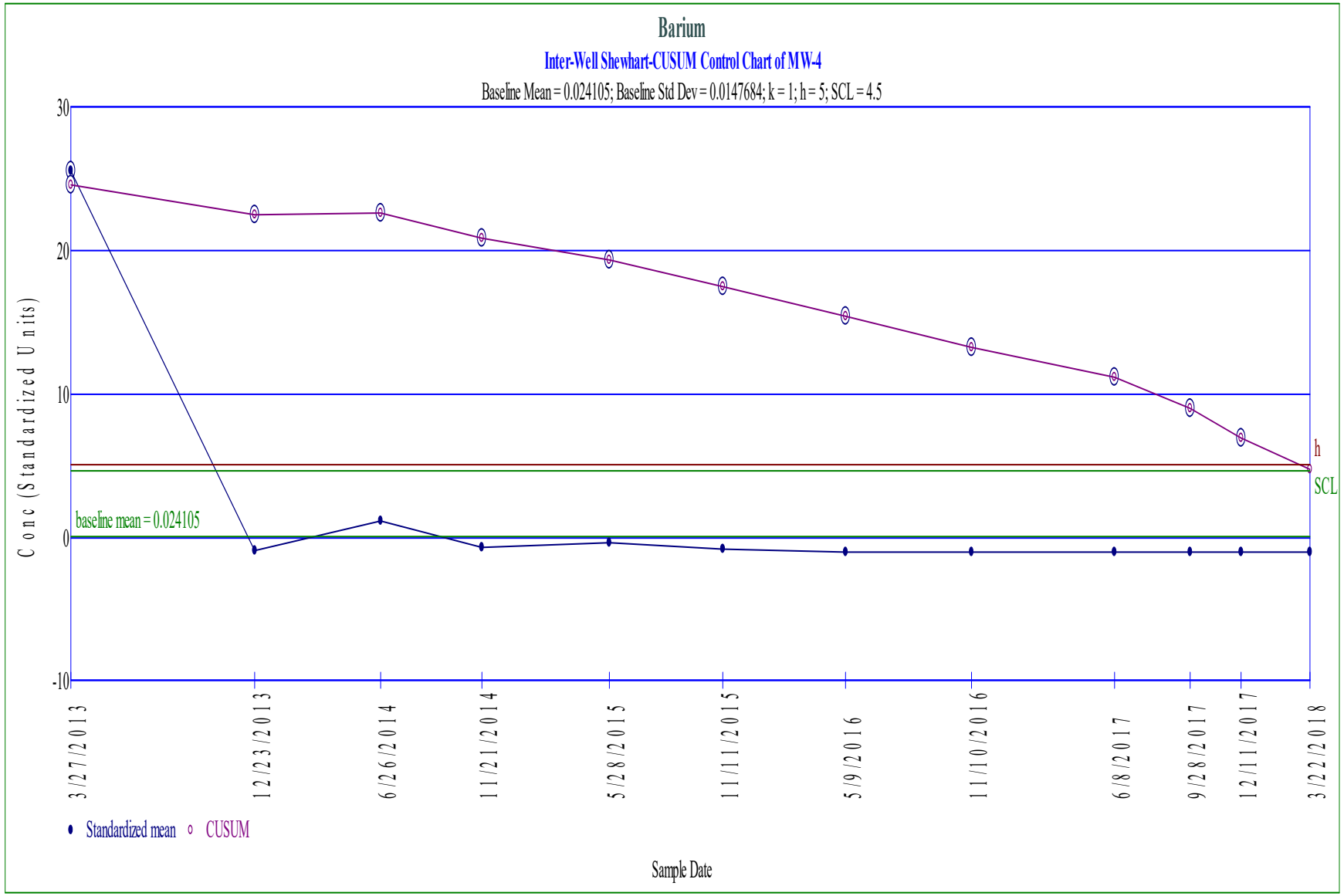
5% Critical value of 0.968 exceeds 0.735573
Evidence of non-normality at 95% level of significance

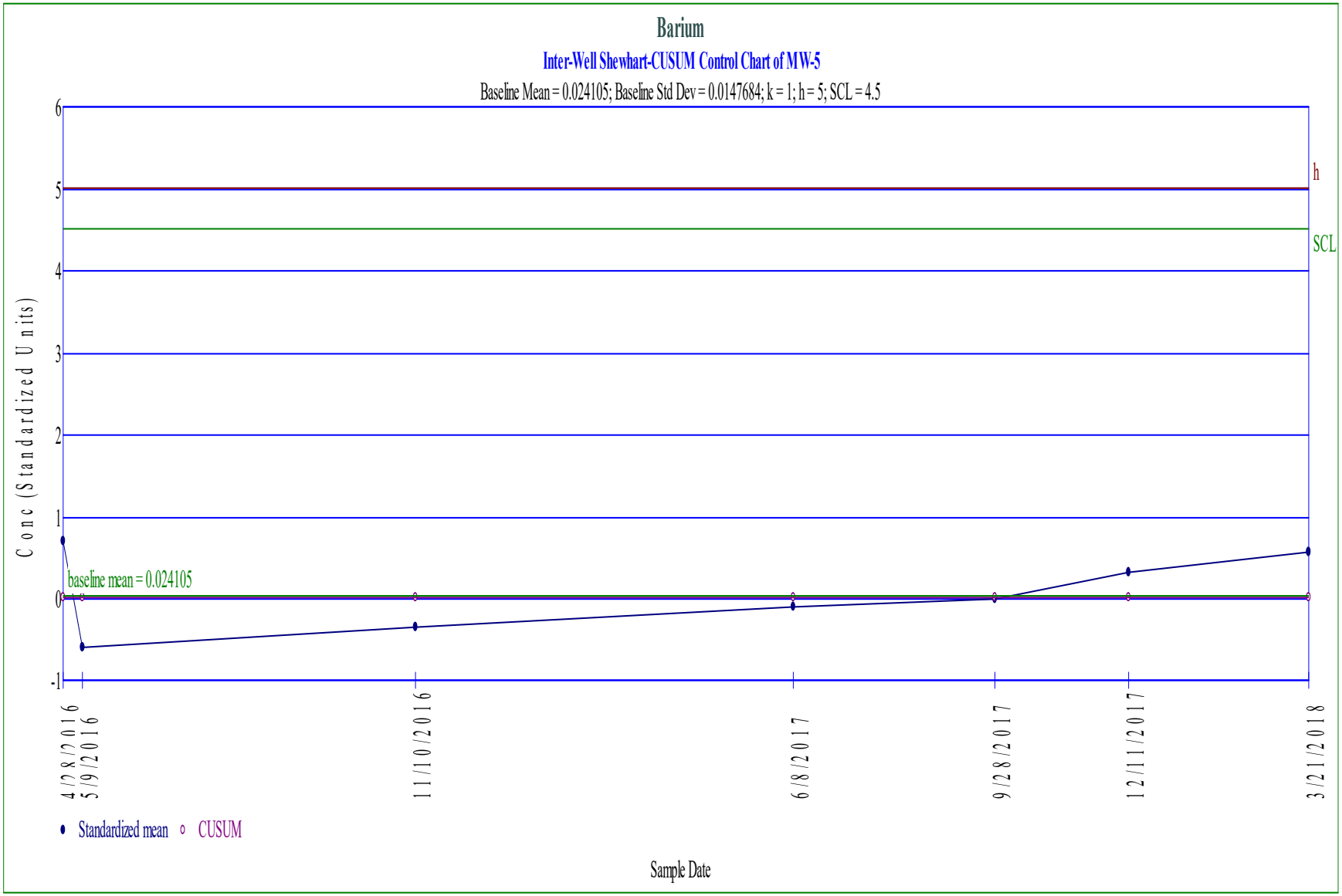
1% Critical value of 0.956 exceeds 0.735573
Evidence of non-normality at 99% level of significance

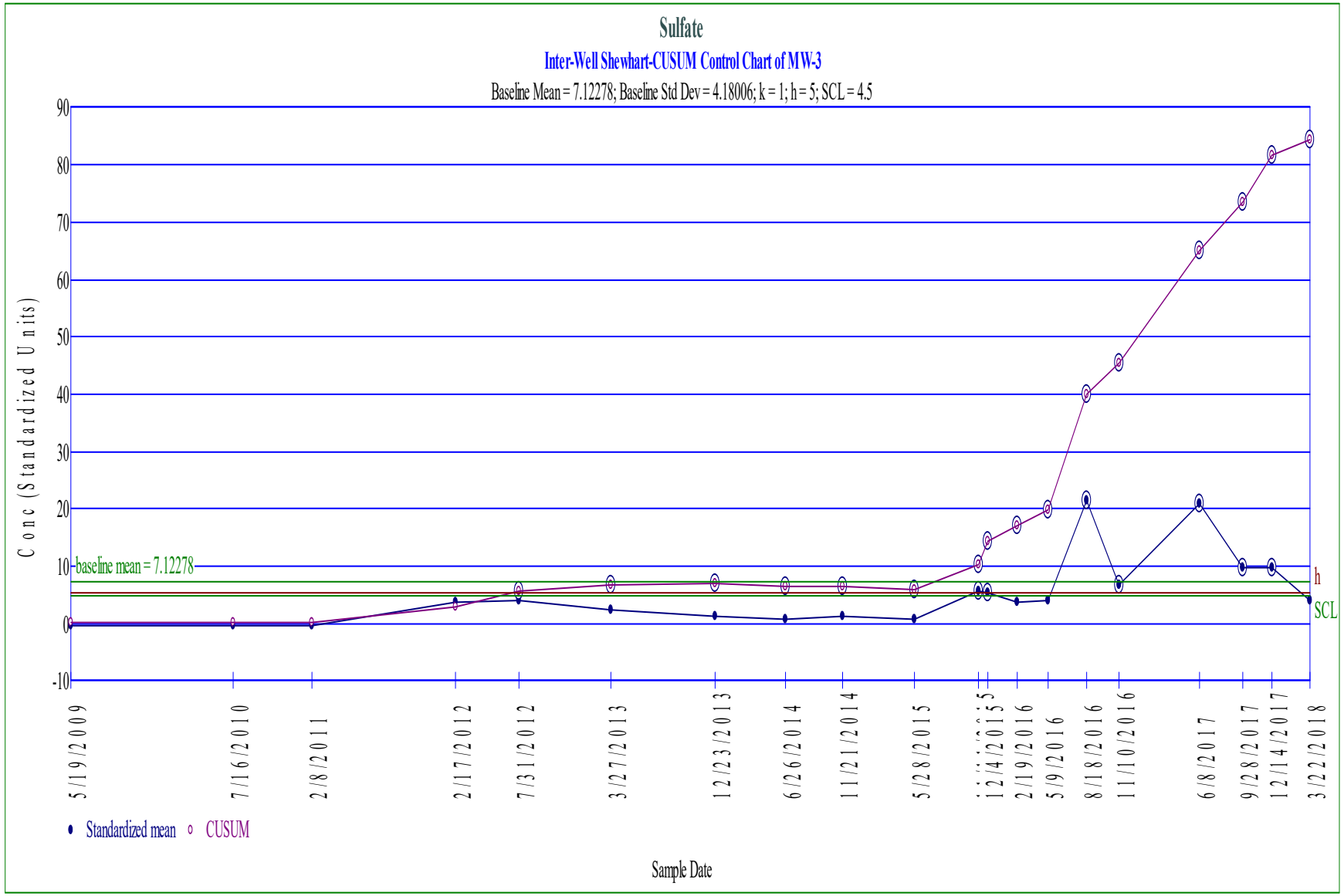

Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.3009; Baseline Std Dev = 0.347544; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
40
30
20
10
0
-10
h
SCL
baseline mean = 0.3009
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
3/22/2018
Standardized mean
CUSUM
Sample Date


Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.3009; Baseline Std Dev = 0.347544; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.3009
4/28/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
Standardized mean
CUSUM
Sample Date


Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.024105; Baseline Std Dev = 0.0147684; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
200
100
0
baseline mean = 0.024105
h
SCL
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
3/22/2018
Standardized mean
CUSUM
Sample Date


Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 0.024105; Baseline Std Dev = 0.0147684; k = 1; h = 5; SCL = 4.5
30
20
10
0
-10
Conc (Standardized Units)
h
SCL
baseline mean = 0.024105
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/22/2018
Standardized mean
CUSUM
Sample Date


Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.024105; Baseline Std Dev = 0.0147684; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.024105
4/28/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
Standardized mean
CUSUM
Sample Date


Sulfate
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 7.12278; Baseline Std Dev = 4.18006; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
90
80
70
60
50
40
30
20
10
0
-10
baseline mean = 7.12278
h
SCL
5/19/2009
7/16/2010
2/8/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
3/22/2018
Standardized mean
CUSUM
Sample Date

Non-Parametric Prediction Interval
Inter-Well Comparison
Parameter: Total Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 91.3043%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 19
Maximum Background Value = 0.001
Confidence Level = 76%
False Positive Rate = 24%

Location	Date	Count	Mean	Significant
MW-3	**3/22/2018**	**1**	**0.00671**	**TRUE**
MW-4	3/22/2018	1	0.001	FALSE
MW-5	3/21/2018	1	0.001	FALSE
TMW-1	3/21/2018	1	0.001	FALSE
TMW-2	3/21/2018	1	0.001	FALSE
TMW-3	3/21/2018	1	0.001	FALSE

Parametric Prediction Interval Analysis
Inter-Well Comparison
Parameter: Chloride
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Inter-Well Unified Guid. Formula 95% One-Sided Comparison

Background Samples = 21
Background Mean = 0.967668
Background Std Dev = 0.344316

Number of comparisons = 6
Future Samples (k) = 6
Actual confidence level is 1.0 - (0.05/6) = 99.1667 %
t is Percentile of Student's T-Test (0.95/6) = 0.991667
Degrees of Freedom = 21 (background observations) - 1
t(0.991667, 21) = 2.63376

Well MW-3

Date	Samples	Mean	Interval	Significant
3/22/2018	**1**	**4.17746**	**[0, 1.89585]**	**TRUE**

Well MW-4

Date	Samples	Mean	Interval	Significant
3/22/2018	**1**	**1.92132**	**[0, 1.89585]**	**TRUE**

Well MW-5

Date	Samples	Mean	Interval	Significant
3/21/2018	**1**	**4.10923**	**[0, 1.89585]**	**TRUE**

Well TMW-1

Date	Samples	Mean	Interval	Significant
3/21/2018	**1**	**2.41591**	**[0, 1.89585]**	**TRUE**

Well TMW-2

Date	Samples	Mean	Interval	Significant
3/21/2018	**1**	**2.67415**	**[0, 1.89585]**	**TRUE**

Well TMW-3

Date	Samples	Mean	Interval	Significant
3/21/2018	**1**	**3.88568**	**[0, 1.89585]**	**TRUE**

Non-Parametric Prediction Interval
Inter-Well Comparison
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 90.1408%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.12
Confidence Level = 76.9%
False Positive Rate = 23.1%

Location	Date	Count	Mean	Significant
MW-3	3/22/2018	1	0.002	FALSE
MW-4	3/22/2018	1	0.002	FALSE
MW-5	3/21/2018	1	0.00667	FALSE
TMW-1	3/21/2018	1	0.002	FALSE
TMW-2	3/21/2018	1	0.00218	FALSE
TMW-3	3/21/2018	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 = 57.7465%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.056
Confidence Level = 76.9%
False Positive Rate = 23.1%

Location	Date	Count	Mean	Significant
MW-3	3/22/2018	1	0.002	FALSE
MW-4	3/22/2018	1	0.002	FALSE
MW-5	3/21/2018	1	0.00264	FALSE
TMW-1	3/21/2018	1	0.002	FALSE
TMW-2	3/21/2018	1	0.002	FALSE
TMW-3	3/21/2018	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.234%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 10
Maximum Background Value = 0.178
Confidence Level = 62.5%
False Positive Rate = 37.5%

Location	Date	Count	Mean	Significant
MW-3	**3/22/2018**	**1**	**0.274**	**TRUE**
MW-4	3/22/2018	1	0.1	FALSE
MW-5	3/21/2018	1	0.1	FALSE
TMW-1	3/21/2018	1	0.1	FALSE
TMW-2	3/21/2018	1	0.1	FALSE
TMW-3	3/21/2018	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 = 69.0141%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.2
Confidence Level = 76.9%
False Positive Rate = 23.1%

Location	Date	Count	Mean	Significant
MW-3	3/22/2018	1	0.002	FALSE
MW-4	3/22/2018	1	0.002	FALSE
MW-5	3/21/2018	1	0.00927	FALSE
TMW-1	3/21/2018	1	0.002	FALSE
TMW-2	3/21/2018	1	0.002	FALSE
TMW-3	3/21/2018	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Zinc
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 57.7465%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.0281
Confidence Level = 76.9%
False Positive Rate = 23.1%

Location	Date	Count	Mean	Significant
MW-3	**3/22/2018**	**1**	**0.0499**	**TRUE**
MW-4	3/22/2018	1	0.025	FALSE
MW-5	3/21/2018	1	0.025	FALSE
TMW-1	3/21/2018	1	0.025	FALSE
TMW-2	3/21/2018	1	0.025	FALSE
TMW-3	3/21/2018	1	0.025	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 59.7222%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 18
Maximum Background Value = 18.8
Confidence Level = 75%
False Positive Rate = 25%

Location	Date	Count	Mean	Significant
MW-3	**3/22/2018**	**1**	**22.3**	**TRUE**
MW-4	3/22/2018	1	5	FALSE
MW-5	3/21/2018	1	5.1	FALSE
TMW-1	3/21/2018	1	5	FALSE
TMW-2	3/21/2018	1	5	FALSE
TMW-3	3/21/2018	1	5	FALSE

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Barium

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 6

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.084	27
	1/21/2009	0.028	17
	4/9/2009	0.028	18
	5/19/2009	0.033	19
	7/16/2010	0.021	12
	2/8/2011	0.021	13
	2/17/2012	0.022	15
	7/31/2012	0.019	8
	3/27/2013	0.018	5
	12/23/2013	0.017	3
	6/26/2014	0.018	6
	11/21/2014	0.02	9
	5/28/2015	0.0188	7
	11/11/2015	0.0237	16
	5/9/2016	0.02	10
	11/10/2016	0.0207	11
	6/8/2017	0.0146	1
	9/28/2017	0.0175	4
	12/11/2017	0.0166	2
	3/21/2018	0.0212	14
MW-3	4/19/2008	0.056	25
	1/21/2009	0.039	20
	4/9/2009	0.043	21
	5/19/2009	0.047	22
	7/16/2010	0.055	24
	2/8/2011	0.052	23
	2/17/2012	0.097	30
	7/31/2012	0.091	28
	3/27/2013	0.094	29
	12/23/2013	0.15	36

6/26/2014	0.079	26
11/21/2014	0.14	35
5/28/2015	0.152	37
11/11/2015	0.701	42
12/4/2015	0.579	41
2/19/2016	0.186	38
5/9/2016	0.218	40
11/10/2016	0.188	39
6/8/2017	0.134	34
9/28/2017	0.125	33
12/14/2017	0.119	32
3/22/2018	0.102	31

The Wilcoxon Statistic is 433
The Expected value is is 220
The Standard Deviation is 39.7073
The Z Score is 5.35167
The Standard Deviation adjusted for ties is 39.7073
The Z Score adjusted for ties is 5.35167
5.35167 > 2.326 indicating statistical significance at 1% level
5.35167 > 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 11

Non detect rank is 6

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/19/2009	8.9	17
	7/16/2010	9.4	20
	2/8/2011	5.8	15
	2/17/2012	ND<5	6
	7/31/2012	ND<5	6
	3/27/2013	5.1	13
	12/23/2013	6.1	16
	6/26/2014	ND<5	6
	11/21/2014	9.1	19
	5/28/2015	ND<5	6
	11/11/2015	18.8	26
	5/9/2016	ND<5	6
	8/18/2016	3.51	12
	11/10/2016	16.5	25
	6/8/2017	ND<5	6
	9/28/2017	ND<5	6
	12/11/2017	ND<5	6
	3/21/2018	ND<5	6
MW-3	5/19/2009	ND<5	6
	7/16/2010	5.1	14
	2/8/2011	ND<5	6
	2/17/2012	22	27
	7/31/2012	23	31
	3/27/2013	16	24
	12/23/2013	12	23
	6/26/2014	9.7	21
	11/21/2014	11	22
	5/28/2015	9.09	18
	11/11/2015	29.3	33
	12/4/2015	29.1	32

2/19/2016	22.2	28
5/9/2016	22.3	29
8/18/2016	95.7	38
11/10/2016	34	34
6/8/2017	93.7	37
9/28/2017	46.2	35
12/14/2017	46.2	36
3/22/2018	22.3	30

The Wilcoxon Statistic is 314
The Expected value is is 180
The Standard Deviation is 34.2053
The Z Score is 3.90291
The Standard Deviation adjusted for ties is 33.791
The Z Score adjusted for ties is 3.95075
3.90291 > 2.326 indicating statistical significance at 1% level
3.95075 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: Aluminum
Location: MW-1
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 18 - 126 = -108

Tied Group	Value	Members
1	0.2	2
2	0.1	10

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
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1

There are 0 time periods with multiple data

A = 2268
B = 0
C = 720
D = 0
E = 92
F = 0

a = 17100
b = 61560
c = 760
Group Variance = 824
Z-Score = -3.72752
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.72752 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 80 - 149 = -69

Tied Group	Value	Members
1	0.1	2
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

There are 0 time periods with multiple data

A = 36
B = 0
C = 0
D = 0

E = 4
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1255.67
Z-Score = -1.91899
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-1.91899 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 14 - 6 = 8
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |8| is 0.31
0.31 >= 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 = 172 - 59 = 113

Tied Group	Value	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

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0

a = 22638
b = 83160
c = 924
Group Variance = 1257.67
Z-Score = 3.15817
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.15817 > 1.65463 indicating an upward 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 = 10 - 56 = -46

Tied Group	Value	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

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 = -3.08576
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.08576 < -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 = 15 - 6 = 9
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |9| is 0.238
0.238 >= 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 = 96 - 9 = 87

Tied Group	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

There are 0 time periods with multiple data

A = 7350
B = 0
C = 2730
D = 0
E = 210
F = 0

a = 19740
b = 71820
c = 840
Group Variance = 688.333
Z-Score = 3.27793
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.27793 > 1.65463 indicating an upward 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 = 204 - 46 = 158

Tied Group	Value	Members
1	25	3

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

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0

E = 6
F = 0
a = 25806
b = 95634
c = 1012
Group Variance = 1430
Z-Score = 4.15175
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.15175 > 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 = 26 - 52 = -26

Tied Group	Value	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

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 4836
b = 15444
c = 312
Group Variance = 268.667
Z-Score = -1.52522
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.52522| <= 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 = 20 - 1 = 19
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= 19 is 0.0014
S > 0 and 0.0014 < 0.05 indicating an upward 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 = 6 - 0 = 6
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |6| is 0.472
0.472 >= 0.025 indicating no evidence of a 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 = 9 - 12 = -3
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |-3| is 0.772
0.772 >= 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 = 27 - 3 = 24
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= 24 is 0.00693
S > 0 and 0.00693 < 0.05 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 = 11 - 145 = -134

Tied Group	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

There are 0 time periods with multiple data

A = 4050
B = 0
C = 1350

D = 0
E = 150
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1032.67
Z-Score = -4.13877
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-4.13877 < -1.65463 indicating a downward 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 = 15 - 6 = 9
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |9| is 0.238
0.238 >= 0.025 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 = 166 - 42 = 124

Tied Group	Value	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

There are 0 time periods with multiple data

A = 834
B = 0
C = 210

D = 0
E = 46
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1211.33
Z-Score = 3.53405
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.53405 > 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 = 146 - 41 = 105

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

There are 0 time periods with multiple data

A = 54
B = 0
C = 0
D = 0
E = 6

F = 0
a = 17100
b = 61560
c = 760
Group Variance = 947
Z-Score = 3.37955
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.37955 > 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 = 6 - 0 = 6
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |6| is 0.472
0.472 >= 0.025 indicating no evidence of a trend

APPENDIX C
LABORATORY ANALYTICAL REPORTS & FIELD INFORMATION LOGS

ANALYTICAL REPORT

March 29, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L979682
Samples Received:	03/22/2018
Project Number:	171-873
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:

Jason Romer
Technical Service Representative

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 ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

MW-1 L979682-01 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/21/18 10:10	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:39	03/26/18 12:39	KK
Wet Chemistry by Method 2320 B-2011	WG1087960	1	03/23/18 10:13	03/23/18 10:13	MCG
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:10	03/23/18 16:10	JER
Wet Chemistry by Method 410.4	WG1090435	1	03/29/18 11:43	03/29/18 14:30	MA
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 01:09	03/23/18 01:09	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:17	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:07	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:41	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:28	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 12:37	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:14	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 16:06	03/24/18 16:06	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 20:26	JNS

MW-3 L979682-02 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/22/18 10:30	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:40	03/26/18 12:40	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 10:57	03/23/18 10:57	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:12	03/23/18 16:12	JER
Wet Chemistry by Method 410.4	WG1089295	1	03/26/18 19:34	03/26/18 22:53	JLJ
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 01:22	03/23/18 01:22	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:19	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:09	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:43	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:31	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 12:55	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 19:56	LD
Metals (ICPMS) by Method 6020	WG1090405	1	03/28/18 11:25	03/28/18 22:28	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 16:25	03/24/18 16:25	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 20:38	JNS

MW-4 L979682-03 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/22/18 08:50	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:42	03/26/18 12:42	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:09	03/23/18 11:09	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:13	03/23/18 16:13	JER
Wet Chemistry by Method 410.4	WG1089295	1	03/26/18 19:34	03/26/18 22:53	JLJ
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 01:34	03/23/18 01:34	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:22	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:11	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:46	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:35	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 12:59	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:18	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 16:44	03/24/18 16:44	JBE
EDB / DBCP by Method 8011	WG1088432	1.01	03/23/18 08:15	03/23/18 20:51	JNS

MW-5 L979682-04 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/21/18 11:06	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:43	03/26/18 12:43	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:15	03/23/18 11:15	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:15	03/23/18 16:15	JER
Wet Chemistry by Method 410.4	WG1089295	1	03/26/18 19:34	03/26/18 22:54	JLJ
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 01:46	03/23/18 01:46	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:24	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:14	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:49	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:38	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 13:03	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:37	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 17:04	03/24/18 17:04	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 21:28	JNS

TMW-1 L979682-05 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/21/18 14:50	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:44	03/26/18 12:44	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:20	03/23/18 11:20	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:16	03/23/18 16:16	JER
Wet Chemistry by Method 410.4	WG1089295	1	03/26/18 19:34	03/26/18 22:54	JLJ
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 01:59	03/23/18 01:59	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:26	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:23	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:51	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:42	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 13:59	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:42	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 17:23	03/24/18 17:23	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 21:41	JNS

TMW-2 L979682-06 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/21/18 19:00	03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:46	03/26/18 12:46	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:26	03/23/18 11:26	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:18	03/23/18 16:18	JER
Wet Chemistry by Method 410.4	WG1089295	1	03/26/18 19:34	03/26/18 22:54	JLJ
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 02:11	03/23/18 02:11	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:28	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:25	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:54	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:45	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 14:04	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:46	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 17:43	03/24/18 17:43	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 21:53	JNS

TMW-3 L979682-07 GW

Collected by: Philip Campbell | Collected date/time: 03/21/18 18:10 | Received date/time: 03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:47	03/26/18 12:47	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:31	03/23/18 11:31	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:19	03/23/18 16:19	JER
Wet Chemistry by Method 410.4	WG1089656	1	03/27/18 10:25	03/27/18 13:37	TH
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 02:24	03/23/18 02:24	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:31	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:27	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:56	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:55	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 14:08	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:50	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 18:02	03/24/18 18:02	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 22:05	JNS

DUPLICATE L979682-08 GW

Collected by: Philip Campbell | Collected date/time: 03/21/18 00:00 | Received date/time: 03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:48	03/26/18 12:48	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:37	03/23/18 11:37	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:21	03/23/18 16:21	JER
Wet Chemistry by Method 410.4	WG1089656	1	03/27/18 10:25	03/27/18 13:37	TH
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 02:36	03/23/18 02:36	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:33	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:29	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 08:59	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 18:59	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 14:12	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:55	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 18:21	03/24/18 18:21	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 22:18	JNS

FIELD BLANK L979682-09 GW

Collected by: Philip Campbell | Collected date/time: 03/21/18 17:42 | Received date/time: 03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:49	03/26/18 12:49	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:43	03/23/18 11:43	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 16:23	03/23/18 16:23	JER
Wet Chemistry by Method 410.4	WG1089656	1	03/27/18 10:25	03/27/18 13:37	TH
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 03:38	03/23/18 03:38	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:35	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:32	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 09:02	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 19:02	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 14:17	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 20:59	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 11:58	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 12:52	03/24/18 12:52	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 22:30	JNS

EQUIPMENT BLANK L979682-10 GW

Collected by: Philip Campbell
Collected date/time: 03/22/18 13:00
Received date/time: 03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:50	03/26/18 12:50	KK
Wet Chemistry by Method 2320 B-2011	WG1088053	1	03/23/18 11:48	03/23/18 11:48	CSU
Wet Chemistry by Method 350.1	WG1088542	1	03/23/18 17:58	03/23/18 17:58	JER
Wet Chemistry by Method 410.4	WG1089656	1	03/27/18 10:25	03/27/18 13:37	TH
Wet Chemistry by Method 9056A	WG1088339	1	03/23/18 03:51	03/23/18 03:51	MAJ
Mercury by Method 7470A	WG1088320	1	03/23/18 02:28	03/23/18 12:42	TRB
Mercury by Method 7470A	WG1088322	1	03/23/18 02:24	03/23/18 10:34	TRB
Metals (ICP) by Method 6010B	WG1088457	1	03/27/18 10:30	03/28/18 09:05	TRB
Metals (ICP) by Method 6010B	WG1088467	1	03/27/18 20:37	03/28/18 19:06	ST
Metals (ICPMS) by Method 6020	WG1087892	1	03/26/18 12:11	03/27/18 14:21	LAT
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:03	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 13:11	03/24/18 13:11	JBE
EDB / DBCP by Method 8011	WG1088432	1	03/23/18 08:15	03/23/18 22:43	JNS

TRIP BLANK L979682-11 GW

Collected by: Philip Campbell
Collected date/time: 03/21/18 00:00
Received date/time: 03/22/18 16:55

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1088881	1	03/24/18 13:31	03/24/18 13:31	JBE

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

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 radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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.

Jason Romer
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	33.2	B	30.0	1	03/26/2018 12:39	WG1088664

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	46.4		20.0	1	03/23/2018 10:13	WG1087960

Sample Narrative:

L979682-01 WG1087960: Endpoint pH 4.5 Headspace

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	03/23/2018 16:10	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	43.7		10.0	1	03/29/2018 14:30	WG1090435

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 01:09	WG1088339
Chloride	2.10		1.00	1	03/23/2018 01:09	WG1088339
Fluoride	ND		0.100	1	03/23/2018 01:09	WG1088339
Nitrate	0.238		0.100	1	03/23/2018 01:09	WG1088339
Sulfate	ND		5.00	1	03/23/2018 01:09	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	0.000651		0.000200	1	03/23/2018 12:17	WG1088320
Mercury,Dissolved	0.000321		0.000200	1	03/23/2018 10:07	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 08:41	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:28	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	03/27/2018 20:14	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 12:37	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:14	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Arsenic	0.0101		0.00200	1	03/27/2018 20:14	WG1088759
Arsenic,Dissolved	0.0109		0.00200	1	03/27/2018 12:37	WG1087892
Barium	0.0212		0.00500	1	03/27/2018 20:14	WG1088759
Barium,Dissolved	0.0215		0.00500	1	03/27/2018 12:37	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:14	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:14	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 12:37	WG1087892
Calcium	7.76		1.00	1	03/27/2018 20:14	WG1088759
Calcium,Dissolved	7.58		1.00	1	03/27/2018 12:37	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:14	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Cobalt	0.0425		0.00200	1	03/27/2018 20:14	WG1088759
Cobalt,Dissolved	0.0448		0.00200	1	03/27/2018 12:37	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:14	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 12:37	WG1087892
Iron	8.38		0.100	1	03/27/2018 20:14	WG1088759
Iron,Dissolved	8.83		0.100	1	03/27/2018 12:37	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:14	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Magnesium	2.79		1.00	1	03/27/2018 20:14	WG1088759
Magnesium,Dissolved	2.83		1.00	1	03/27/2018 12:37	WG1087892
Manganese	0.757		0.00500	1	03/27/2018 20:14	WG1088759
Manganese,Dissolved	0.791	V	0.00500	1	03/27/2018 12:37	WG1087892
Nickel	0.00658		0.00200	1	03/27/2018 20:14	WG1088759
Nickel,Dissolved	0.00676		0.00200	1	03/27/2018 12:37	WG1087892
Potassium	1.43		1.00	1	03/27/2018 20:14	WG1088759
Potassium,Dissolved	1.28		1.00	1	03/27/2018 12:37	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:14	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:14	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Sodium	4.86		1.00	1	03/27/2018 20:14	WG1088759
Sodium,Dissolved	4.68		1.00	1	03/27/2018 12:37	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:14	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 12:37	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:14	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 12:37	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:14	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 12:37	WG1087892

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	03/24/2018 16:06	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 16:06	WG1088881
Benzene	ND		0.00100	1	03/24/2018 16:06	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 16:06	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 16:06	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 16:06	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 16:06	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 16:06	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 16:06	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 16:06	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 16:06	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 16:06	WG1088881

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	03/24/2018 16:06	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:06	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 16:06	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 16:06	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:06	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 16:06	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:06	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:06	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 16:06	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 16:06	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 16:06	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 16:06	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 16:06	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 16:06	WG1088881
Styrene	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 16:06	WG1088881
Toluene	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 16:06	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 16:06	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 16:06	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 16:06	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 16:06	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 16:06	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 16:06	WG1088881
(S) Toluene-d8	*106*		*80.0-120*		*03/24/2018 16:06*	WG1088881
(S) Dibromofluoromethane	*97.7*		*76.0-123*		*03/24/2018 16:06*	WG1088881
(S) a,a,a-Trifluorotoluene	*106*		*80.0-120*		*03/24/2018 16:06*	WG1088881
(S) 4-Bromofluorobenzene	*96.9*		*80.0-120*		*03/24/2018 16:06*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 20:26	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 20:26	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	67.8		30.0	1	03/26/2018 12:40	WG1088664

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	03/23/2018 10:57	WG1088053

Sample Narrative:
L979682-02 WG1088053: 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	03/23/2018 16:12	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/26/2018 22:53	WG1089295

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 01:22	WG1088339
Chloride	65.2		1.00	1	03/23/2018 01:22	WG1088339
Fluoride	0.274		0.100	1	03/23/2018 01:22	WG1088339
Nitrate	1.93		0.100	1	03/23/2018 01:22	WG1088339
Sulfate	22.3		5.00	1	03/23/2018 01:22	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/23/2018 12:19	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:09	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 08:43	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:31	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.846	O1	0.100	1	03/27/2018 19:56	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 12:55	WG1087892
Antimony	ND		0.00200	1	03/27/2018 19:56	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 19:56	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Barium	0.102		0.00500	1	03/27/2018 19:56	WG1088759
Barium,Dissolved	0.0954		0.00500	1	03/27/2018 12:55	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 19:56	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Cadmium	0.00671		0.00100	1	03/27/2018 19:56	WG1088759
Cadmium,Dissolved	0.00637		0.00100	1	03/27/2018 12:55	WG1087892
Calcium	14.5		1.00	1	03/27/2018 19:56	WG1088759
Calcium,Dissolved	14.5		1.00	1	03/27/2018 12:55	WG1087892
Chromium	ND		0.00200	1	03/27/2018 19:56	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 19:56	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Copper	ND		0.00500	1	03/27/2018 19:56	WG1088759
Copper,Dissolved	ND		0.00500	1	03/28/2018 22:28	WG1090405
Iron	0.578		0.100	1	03/27/2018 19:56	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 12:55	WG1087892
Lead	ND		0.00200	1	03/27/2018 19:56	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Magnesium	6.88		1.00	1	03/27/2018 19:56	WG1088759
Magnesium,Dissolved	6.89		1.00	1	03/27/2018 12:55	WG1087892
Manganese	0.0496		0.00500	1	03/27/2018 19:56	WG1088759
Manganese,Dissolved	0.0464		0.00500	1	03/27/2018 12:55	WG1087892
Nickel	ND		0.00200	1	03/27/2018 19:56	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Potassium	14.4		1.00	1	03/27/2018 19:56	WG1088759
Potassium,Dissolved	14.5		1.00	1	03/27/2018 12:55	WG1087892
Selenium	ND		0.00200	1	03/27/2018 19:56	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Silver	ND		0.00200	1	03/27/2018 19:56	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Sodium	25.4		1.00	1	03/27/2018 19:56	WG1088759
Sodium,Dissolved	25.6		1.00	1	03/27/2018 12:55	WG1087892
Thallium	ND		0.00200	1	03/27/2018 19:56	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 12:55	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 19:56	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 12:55	WG1087892
Zinc	0.0499		0.0250	1	03/27/2018 19:56	WG1088759
Zinc,Dissolved	0.0345		0.0250	1	03/27/2018 12:55	WG1087892

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	03/24/2018 16:25	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 16:25	WG1088881
Benzene	ND		0.00100	1	03/24/2018 16:25	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 16:25	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 16:25	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 16:25	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 16:25	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 16:25	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 16:25	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 16:25	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 16:25	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 16:25	WG1088881

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	03/24/2018 16:25	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:25	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 16:25	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 16:25	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:25	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 16:25	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:25	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:25	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 16:25	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 16:25	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 16:25	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 16:25	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 16:25	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 16:25	WG1088881
Styrene	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 16:25	WG1088881
Toluene	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 16:25	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 16:25	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 16:25	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 16:25	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 16:25	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 16:25	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 16:25	WG1088881
(S) Toluene-d8	*105*		*80.0-120*		*03/24/2018 16:25*	WG1088881
(S) Dibromofluoromethane	*97.4*		*76.0-123*		*03/24/2018 16:25*	WG1088881
(S) a,a,a-Trifluorotoluene	*105*		*80.0-120*		*03/24/2018 16:25*	WG1088881
(S) 4-Bromofluorobenzene	*98.8*		*80.0-120*		*03/24/2018 16:25*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 20:38	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 20:38	WG1088432

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	03/26/2018 12:42	WG1088664

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	03/23/2018 11:09	WG1088053

Sample Narrative:
L979682-03 WG1088053: 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	ND		0.100	1	03/23/2018 16:13	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/26/2018 22:53	WG1089295

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 01:34	WG1088339
Chloride	6.83		1.00	1	03/23/2018 01:34	WG1088339
Fluoride	ND		0.100	1	03/23/2018 01:34	WG1088339
Nitrate	0.460		0.100	1	03/23/2018 01:34	WG1088339
Sulfate	ND		5.00	1	03/23/2018 01:34	WG1088339

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/23/2018 12:22	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:11	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/28/2018 08:46	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:35	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	03/27/2018 20:18	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 12:59	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:18	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:18	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Barium	0.00701		0.00500	1	03/27/2018 20:18	WG1088759
Barium,Dissolved	0.00675		0.00500	1	03/27/2018 12:59	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:18	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:18	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 12:59	WG1087892
Calcium	4.22		1.00	1	03/27/2018 20:18	WG1088759
Calcium,Dissolved	4.26		1.00	1	03/27/2018 12:59	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:18	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:18	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:18	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 12:59	WG1087892
Iron	ND		0.100	1	03/27/2018 20:18	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 12:59	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:18	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Magnesium	2.65		1.00	1	03/27/2018 20:18	WG1088759
Magnesium,Dissolved	2.71		1.00	1	03/27/2018 12:59	WG1087892
Manganese	0.0137		0.00500	1	03/27/2018 20:18	WG1088759
Manganese,Dissolved	0.0130		0.00500	1	03/27/2018 12:59	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:18	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Potassium	ND		1.00	1	03/27/2018 20:18	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 12:59	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:18	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:18	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Sodium	3.77		1.00	1	03/27/2018 20:18	WG1088759
Sodium,Dissolved	3.86		1.00	1	03/27/2018 12:59	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:18	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 12:59	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:18	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 12:59	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:18	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 12:59	WG1087892

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	03/24/2018 16:44	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 16:44	WG1088881
Benzene	ND		0.00100	1	03/24/2018 16:44	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 16:44	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 16:44	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 16:44	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 16:44	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 16:44	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 16:44	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 16:44	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 16:44	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 16:44	WG1088881

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	03/24/2018 16:44	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 16:44	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 16:44	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 16:44	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:44	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 16:44	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:44	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 16:44	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 16:44	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 16:44	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 16:44	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 16:44	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 16:44	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 16:44	WG1088881
Styrene	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 16:44	WG1088881
Toluene	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 16:44	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 16:44	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 16:44	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 16:44	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 16:44	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 16:44	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 16:44	WG1088881
(S) Toluene-d8	*107*		*80.0-120*		*03/24/2018 16:44*	WG1088881
(S) Dibromofluoromethane	*98.8*		*76.0-123*		*03/24/2018 16:44*	WG1088881
(S) a,a,a-Trifluorotoluene	*105*		*80.0-120*		*03/24/2018 16:44*	WG1088881
(S) 4-Bromofluorobenzene	*99.4*		*80.0-120*		*03/24/2018 16:44*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000101	1.01	03/23/2018 20:51	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000202	1.01	03/23/2018 20:51	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	80.7		30.0	1	03/26/2018 12:43	WG1088664

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	03/23/2018 11:15	WG1088053

Sample Narrative:
L979682-04 WG1088053: 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	ND		0.100	1	03/23/2018 16:15	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/26/2018 22:54	WG1089295

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 01:46	WG1088339
Chloride	60.9		1.00	1	03/23/2018 01:46	WG1088339
Fluoride	ND		0.100	1	03/23/2018 01:46	WG1088339
Nitrate	1.31		0.100	1	03/23/2018 01:46	WG1088339
Sulfate	5.10		5.00	1	03/23/2018 01:46	WG1088339

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/23/2018 12:24	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:14	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/28/2018 08:49	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:38	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.432		0.100	1	03/27/2018 20:37	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 13:03	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:37	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:37	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Barium	0.0323		0.00500	1	03/27/2018 20:37	WG1088759
Barium,Dissolved	0.0304		0.00500	1	03/27/2018 13:03	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:37	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:37	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 13:03	WG1087892
Calcium	14.1		1.00	1	03/27/2018 20:37	WG1088759
Calcium,Dissolved	14.0		1.00	1	03/27/2018 13:03	WG1087892
Chromium	0.00667		0.00200	1	03/27/2018 20:37	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Cobalt	0.00264		0.00200	1	03/27/2018 20:37	WG1088759
Cobalt,Dissolved	0.00257		0.00200	1	03/27/2018 13:03	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:37	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 13:03	WG1087892
Iron	0.382		0.100	1	03/27/2018 20:37	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 13:03	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:37	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Magnesium	10.1		1.00	1	03/27/2018 20:37	WG1088759
Magnesium,Dissolved	10.1		1.00	1	03/27/2018 13:03	WG1087892
Manganese	0.0919		0.00500	1	03/27/2018 20:37	WG1088759
Manganese,Dissolved	0.0916		0.00500	1	03/27/2018 13:03	WG1087892
Nickel	0.00927		0.00200	1	03/27/2018 20:37	WG1088759
Nickel,Dissolved	0.00974		0.00200	1	03/27/2018 13:03	WG1087892
Potassium	1.38		1.00	1	03/27/2018 20:37	WG1088759
Potassium,Dissolved	1.31		1.00	1	03/27/2018 13:03	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:37	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:37	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Sodium	17.0		1.00	1	03/27/2018 20:37	WG1088759
Sodium,Dissolved	17.0		1.00	1	03/27/2018 13:03	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:37	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 13:03	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:37	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 13:03	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:37	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 13:03	WG1087892

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	03/24/2018 17:04	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 17:04	WG1088881
Benzene	ND		0.00100	1	03/24/2018 17:04	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 17:04	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 17:04	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 17:04	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 17:04	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 17:04	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 17:04	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 17:04	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 17:04	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 17:04	WG1088881

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	03/24/2018 17:04	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:04	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 17:04	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 17:04	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:04	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 17:04	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:04	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:04	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 17:04	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 17:04	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 17:04	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 17:04	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 17:04	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 17:04	WG1088881
Styrene	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 17:04	WG1088881
Toluene	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 17:04	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 17:04	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 17:04	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 17:04	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 17:04	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 17:04	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 17:04	WG1088881
(S) Toluene-d8	*107*		*80.0-120*		*03/24/2018 17:04*	WG1088881
(S) Dibromofluoromethane	*97.0*		*76.0-123*		*03/24/2018 17:04*	WG1088881
(S) a,a,a-Trifluorotoluene	*104*		*80.0-120*		*03/24/2018 17:04*	WG1088881
(S) 4-Bromofluorobenzene	*99.4*		*80.0-120*		*03/24/2018 17:04*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 21:28	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 21:28	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	32.7	B	30.0	1	03/26/2018 12:44	WG1088664

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	03/23/2018 11:20	WG1088053

Sample Narrative:

L979682-05 WG1088053: Endpoint pH 4.5 Headspace

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	03/23/2018 16:16	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/26/2018 22:54	WG1089295

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 01:59	WG1088339
Chloride	11.2		1.00	1	03/23/2018 01:59	WG1088339
Fluoride	ND		0.100	1	03/23/2018 01:59	WG1088339
Nitrate	1.58		0.100	1	03/23/2018 01:59	WG1088339
Sulfate	ND		5.00	1	03/23/2018 01:59	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/23/2018 12:26	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:23	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 08:51	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:42	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.442		0.100	1	03/27/2018 20:42	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 13:59	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:42	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:42	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Barium	0.0104		0.00500	1	03/27/2018 20:42	WG1088759
Barium,Dissolved	0.00874		0.00500	1	03/27/2018 13:59	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:42	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:42	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 13:59	WG1087892
Calcium	8.33		1.00	1	03/27/2018 20:42	WG1088759
Calcium,Dissolved	8.37		1.00	1	03/27/2018 13:59	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:42	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:42	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:42	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 13:59	WG1087892
Iron	0.311		0.100	1	03/27/2018 20:42	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 13:59	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:42	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Magnesium	2.36		1.00	1	03/27/2018 20:42	WG1088759
Magnesium,Dissolved	2.36		1.00	1	03/27/2018 13:59	WG1087892
Manganese	0.0170		0.00500	1	03/27/2018 20:42	WG1088759
Manganese,Dissolved	0.00682		0.00500	1	03/27/2018 13:59	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:42	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Potassium	1.00		1.00	1	03/27/2018 20:42	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 13:59	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:42	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:42	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Sodium	3.19		1.00	1	03/27/2018 20:42	WG1088759
Sodium,Dissolved	3.22		1.00	1	03/27/2018 13:59	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:42	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 13:59	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:42	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 13:59	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:42	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 13:59	WG1087892

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	03/24/2018 17:23	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 17:23	WG1088881
Benzene	ND		0.00100	1	03/24/2018 17:23	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 17:23	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 17:23	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 17:23	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 17:23	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 17:23	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 17:23	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 17:23	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 17:23	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 17:23	WG1088881

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	03/24/2018 17:23	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:23	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 17:23	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 17:23	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:23	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 17:23	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:23	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:23	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 17:23	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 17:23	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 17:23	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 17:23	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 17:23	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 17:23	WG1088881
Styrene	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 17:23	WG1088881
Toluene	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 17:23	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 17:23	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 17:23	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 17:23	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 17:23	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 17:23	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 17:23	WG1088881
(S) Toluene-d8	*106*		*80.0-120*		*03/24/2018 17:23*	WG1088881
(S) Dibromofluoromethane	*98.0*		*76.0-123*		*03/24/2018 17:23*	WG1088881
(S) a,a,a-Trifluorotoluene	*104*		*80.0-120*		*03/24/2018 17:23*	WG1088881
(S) 4-Bromofluorobenzene	*99.1*		*80.0-120*		*03/24/2018 17:23*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 21:41	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 21:41	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	31.1	B	30.0	1	03/26/2018 12:46	WG1088664

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	03/23/2018 11:26	WG1088053

Sample Narrative:

L979682-06 WG1088053: Endpoint pH 4.5 Headspace

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	03/23/2018 16:18	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/26/2018 22:54	WG1089295

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 02:11	WG1088339
Chloride	14.5		1.00	1	03/23/2018 02:11	WG1088339
Fluoride	ND		0.100	1	03/23/2018 02:11	WG1088339
Nitrate	0.767		0.100	1	03/23/2018 02:11	WG1088339
Sulfate	ND		5.00	1	03/23/2018 02:11	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/23/2018 12:28	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:25	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 08:54	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:45	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	1.28		0.100	1	03/27/2018 20:46	WG1088759
Aluminum,Dissolved	0.409		0.100	1	03/27/2018 14:04	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:46	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:46	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Barium	0.0380		0.00500	1	03/27/2018 20:46	WG1088759
Barium,Dissolved	0.0267		0.00500	1	03/27/2018 14:04	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:46	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:46	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 14:04	WG1087892
Calcium	7.40		1.00	1	03/27/2018 20:46	WG1088759
Calcium,Dissolved	7.09		1.00	1	03/27/2018 14:04	WG1087892
Chromium	0.00218		0.00200	1	03/27/2018 20:46	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:46	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:46	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 14:04	WG1087892
Iron	1.24		0.100	1	03/27/2018 20:46	WG1088759
Iron,Dissolved	0.498		0.100	1	03/27/2018 14:04	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:46	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Magnesium	2.73		1.00	1	03/27/2018 20:46	WG1088759
Magnesium,Dissolved	2.62		1.00	1	03/27/2018 14:04	WG1087892
Manganese	0.0143		0.00500	1	03/27/2018 20:46	WG1088759
Manganese,Dissolved	0.00875		0.00500	1	03/27/2018 14:04	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:46	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Potassium	1.09		1.00	1	03/27/2018 20:46	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 14:04	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:46	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:46	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Sodium	3.45		1.00	1	03/27/2018 20:46	WG1088759
Sodium,Dissolved	3.43		1.00	1	03/27/2018 14:04	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:46	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 14:04	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:46	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 14:04	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:46	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 14:04	WG1087892

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	03/24/2018 17:43	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 17:43	WG1088881
Benzene	ND		0.00100	1	03/24/2018 17:43	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 17:43	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 17:43	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 17:43	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 17:43	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 17:43	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 17:43	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 17:43	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 17:43	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 17:43	WG1088881

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	03/24/2018 17:43	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 17:43	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 17:43	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 17:43	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:43	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 17:43	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:43	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 17:43	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 17:43	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 17:43	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 17:43	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 17:43	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 17:43	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 17:43	WG1088881
Styrene	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 17:43	WG1088881
Toluene	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 17:43	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 17:43	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 17:43	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 17:43	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 17:43	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 17:43	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 17:43	WG1088881
(S) Toluene-d8	*106*		*80.0-120*		*03/24/2018 17:43*	WG1088881
(S) Dibromofluoromethane	*98.1*		*76.0-123*		*03/24/2018 17:43*	WG1088881
(S) a,a,a-Trifluorotoluene	*105*		*80.0-120*		*03/24/2018 17:43*	WG1088881
(S) 4-Bromofluorobenzene	*99.5*		*80.0-120*		*03/24/2018 17:43*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 21:53	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 21:53	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	74.8		30.0	1	03/26/2018 12:47	WG1088664

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	03/23/2018 11:31	WG1088053

Sample Narrative:
L979682-07 WG1088053: 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	ND		0.100	1	03/23/2018 16:19	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/27/2018 13:37	WG1089656

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 02:24	WG1088339
Chloride	48.7		1.00	1	03/23/2018 02:24	WG1088339
Fluoride	ND		0.100	1	03/23/2018 02:24	WG1088339
Nitrate	4.03		0.100	1	03/23/2018 02:24	WG1088339
Sulfate	ND		5.00	1	03/23/2018 02:24	WG1088339

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/23/2018 12:31	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:27	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/28/2018 08:56	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:55	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.236		0.100	1	03/27/2018 20:50	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 14:08	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:50	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:50	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Barium	0.0389		0.00500	1	03/27/2018 20:50	WG1088759
Barium,Dissolved	0.0366		0.00500	1	03/27/2018 14:08	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:50	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:50	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 14:08	WG1087892
Calcium	18.1		1.00	1	03/27/2018 20:50	WG1088759
Calcium,Dissolved	18.0		1.00	1	03/27/2018 14:08	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:50	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:50	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:50	WG1088759
Copper,Dissolved	0.00501	B	0.00500	1	03/27/2018 14:08	WG1087892
Iron	1.18		0.100	1	03/27/2018 20:50	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 14:08	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:50	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Magnesium	5.95		1.00	1	03/27/2018 20:50	WG1088759
Magnesium,Dissolved	6.16		1.00	1	03/27/2018 14:08	WG1087892
Manganese	0.0238		0.00500	1	03/27/2018 20:50	WG1088759
Manganese,Dissolved	0.0160		0.00500	1	03/27/2018 14:08	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:50	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Potassium	1.66		1.00	1	03/27/2018 20:50	WG1088759
Potassium,Dissolved	1.65		1.00	1	03/27/2018 14:08	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:50	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:50	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Sodium	10.4		1.00	1	03/27/2018 20:50	WG1088759
Sodium,Dissolved	10.5		1.00	1	03/27/2018 14:08	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:50	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 14:08	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:50	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 14:08	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:50	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 14:08	WG1087892

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	03/24/2018 18:02	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 18:02	WG1088881
Benzene	ND		0.00100	1	03/24/2018 18:02	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 18:02	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 18:02	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 18:02	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 18:02	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 18:02	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 18:02	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 18:02	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 18:02	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 18:02	WG1088881

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	03/24/2018 18:02	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 18:02	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 18:02	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 18:02	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 18:02	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 18:02	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 18:02	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 18:02	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 18:02	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 18:02	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 18:02	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 18:02	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 18:02	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 18:02	WG1088881
Styrene	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 18:02	WG1088881
Toluene	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 18:02	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 18:02	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 18:02	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 18:02	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 18:02	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 18:02	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 18:02	WG1088881
(S) Toluene-d8	*106*		*80.0-120*		*03/24/2018 18:02*	WG1088881
(S) Dibromofluoromethane	*99.1*		*76.0-123*		*03/24/2018 18:02*	WG1088881
(S) a,a,a-Trifluorotoluene	*104*		*80.0-120*		*03/24/2018 18:02*	WG1088881
(S) 4-Bromofluorobenzene	*98.1*		*80.0-120*		*03/24/2018 18:02*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 22:05	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 22:05	WG1088432

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	03/26/2018 12:48	WG1088664

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	03/23/2018 11:37	WG1088053

Sample Narrative:

L979682-08 WG1088053: Endpoint pH 4.5 Headspace

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	03/23/2018 16:21	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/27/2018 13:37	WG1089656

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 02:36	WG1088339
Chloride	6.86		1.00	1	03/23/2018 02:36	WG1088339
Fluoride	ND	P1	0.100	1	03/23/2018 02:36	WG1088339
Nitrate	0.488	J3 Q	0.100	1	03/23/2018 02:36	WG1088339
Sulfate	ND		5.00	1	03/23/2018 02:36	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/23/2018 12:33	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:29	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 08:59	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 18:59	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	03/27/2018 20:55	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 14:12	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:55	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:55	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Barium	0.00705		0.00500	1	03/27/2018 20:55	WG1088759
Barium,Dissolved	0.00798		0.00500	1	03/27/2018 14:12	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:55	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:55	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 14:12	WG1087892
Calcium	4.30		1.00	1	03/27/2018 20:55	WG1088759
Calcium,Dissolved	4.31		1.00	1	03/27/2018 14:12	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:55	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:55	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:55	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 14:12	WG1087892
Iron	0.103		0.100	1	03/27/2018 20:55	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 14:12	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:55	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Magnesium	2.70		1.00	1	03/27/2018 20:55	WG1088759
Magnesium,Dissolved	2.76		1.00	1	03/27/2018 14:12	WG1087892
Manganese	0.0142		0.00500	1	03/27/2018 20:55	WG1088759
Manganese,Dissolved	0.0144		0.00500	1	03/27/2018 14:12	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:55	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Potassium	ND		1.00	1	03/27/2018 20:55	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 14:12	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:55	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:55	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Sodium	3.86		1.00	1	03/27/2018 20:55	WG1088759
Sodium,Dissolved	3.97		1.00	1	03/27/2018 14:12	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:55	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 14:12	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:55	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 14:12	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:55	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 14:12	WG1087892

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	03/24/2018 18:21	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 18:21	WG1088881
Benzene	ND		0.00100	1	03/24/2018 18:21	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 18:21	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 18:21	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 18:21	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 18:21	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 18:21	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 18:21	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 18:21	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 18:21	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 18:21	WG1088881

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	03/24/2018 18:21	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 18:21	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 18:21	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 18:21	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 18:21	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 18:21	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 18:21	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 18:21	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 18:21	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 18:21	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 18:21	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 18:21	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 18:21	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 18:21	WG1088881
Styrene	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 18:21	WG1088881
Toluene	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 18:21	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 18:21	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 18:21	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 18:21	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 18:21	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 18:21	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 18:21	WG1088881
(S) Toluene-d8	*105*		*80.0-120*		*03/24/2018 18:21*	WG1088881
(S) Dibromofluoromethane	*98.6*		*76.0-123*		*03/24/2018 18:21*	WG1088881
(S) a,a,a-Trifluorotoluene	*105*		*80.0-120*		*03/24/2018 18:21*	WG1088881
(S) 4-Bromofluorobenzene	*98.4*		*80.0-120*		*03/24/2018 18:21*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 22:18	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 22:18	WG1088432

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	03/26/2018 12:49	WG1088664

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	03/23/2018 11:43	WG1088053

Sample Narrative:

L979682-09 WG1088053: 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	ND		0.100	1	03/23/2018 16:23	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/27/2018 13:37	WG1089656

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 03:38	WG1088339
Chloride	ND		1.00	1	03/23/2018 03:38	WG1088339
Fluoride	ND		0.100	1	03/23/2018 03:38	WG1088339
Nitrate	ND		0.100	1	03/23/2018 03:38	WG1088339
Sulfate	ND		5.00	1	03/23/2018 03:38	WG1088339

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/23/2018 12:35	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:32	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/28/2018 09:02	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 19:02	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	03/27/2018 20:59	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 14:17	WG1087892
Antimony	ND		0.00200	1	03/27/2018 20:59	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 20:59	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Barium	ND		0.00500	1	03/27/2018 20:59	WG1088759
Barium,Dissolved	ND		0.00500	1	03/27/2018 14:17	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 20:59	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 20:59	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 14:17	WG1087892
Calcium	ND		1.00	1	03/27/2018 20:59	WG1088759
Calcium,Dissolved	ND		1.00	1	03/27/2018 14:17	WG1087892
Chromium	ND		0.00200	1	03/27/2018 20:59	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 20:59	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Copper	ND		0.00500	1	03/27/2018 20:59	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 11:58	WG1089404
Iron	ND		0.100	1	03/27/2018 20:59	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 14:17	WG1087892
Lead	ND		0.00200	1	03/27/2018 20:59	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Magnesium	ND		1.00	1	03/27/2018 20:59	WG1088759
Magnesium,Dissolved	ND		1.00	1	03/27/2018 14:17	WG1087892
Manganese	ND		0.00500	1	03/27/2018 20:59	WG1088759
Manganese,Dissolved	ND		0.00500	1	03/27/2018 14:17	WG1087892
Nickel	ND		0.00200	1	03/27/2018 20:59	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Potassium	ND		1.00	1	03/27/2018 20:59	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 14:17	WG1087892
Selenium	ND		0.00200	1	03/27/2018 20:59	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Silver	ND		0.00200	1	03/27/2018 20:59	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Sodium	ND		1.00	1	03/27/2018 20:59	WG1088759
Sodium,Dissolved	ND		1.00	1	03/27/2018 14:17	WG1087892
Thallium	ND		0.00200	1	03/27/2018 20:59	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 14:17	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 20:59	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 14:17	WG1087892
Zinc	ND		0.0250	1	03/27/2018 20:59	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 14:17	WG1087892

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	03/24/2018 12:52	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 12:52	WG1088881
Benzene	ND		0.00100	1	03/24/2018 12:52	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 12:52	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 12:52	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 12:52	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 12:52	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 12:52	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 12:52	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 12:52	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 12:52	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 12:52	WG1088881

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	03/24/2018 12:52	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 12:52	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 12:52	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 12:52	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 12:52	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 12:52	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 12:52	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 12:52	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 12:52	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 12:52	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 12:52	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 12:52	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 12:52	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 12:52	WG1088881
Styrene	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 12:52	WG1088881
Toluene	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 12:52	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 12:52	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 12:52	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 12:52	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 12:52	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 12:52	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 12:52	WG1088881
(S) Toluene-d8	*107*		*80.0-120*		*03/24/2018 12:52*	WG1088881
(S) Dibromofluoromethane	*97.8*		*76.0-123*		*03/24/2018 12:52*	WG1088881
(S) a,a,a-Trifluorotoluene	*104*		*80.0-120*		*03/24/2018 12:52*	WG1088881
(S) 4-Bromofluorobenzene	*100*		*80.0-120*		*03/24/2018 12:52*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 22:30	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 22:30	WG1088432

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	03/26/2018 12:50	WG1088664

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	03/23/2018 11:48	WG1088053

Sample Narrative:

L979682-10 WG1088053: Endpoint pH 4.5 Headspace

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	03/23/2018 17:58	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/27/2018 13:37	WG1089656

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 03:51	WG1088339
Chloride	ND		1.00	1	03/23/2018 03:51	WG1088339
Fluoride	ND		0.100	1	03/23/2018 03:51	WG1088339
Nitrate	ND		0.100	1	03/23/2018 03:51	WG1088339
Sulfate	ND		5.00	1	03/23/2018 03:51	WG1088339

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/23/2018 12:42	WG1088320
Mercury,Dissolved	ND		0.000200	1	03/23/2018 10:34	WG1088322

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/28/2018 09:05	WG1088457
Boron,Dissolved	ND		0.200	1	03/28/2018 19:06	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	03/27/2018 21:03	WG1088759
Aluminum,Dissolved	ND		0.100	1	03/27/2018 14:21	WG1087892
Antimony	ND		0.00200	1	03/27/2018 21:03	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Arsenic	ND		0.00200	1	03/27/2018 21:03	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Barium	ND		0.00500	1	03/27/2018 21:03	WG1088759
Barium,Dissolved	ND		0.00500	1	03/27/2018 14:21	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	03/27/2018 21:03	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Cadmium	ND		0.00100	1	03/27/2018 21:03	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/27/2018 14:21	WG1087892
Calcium	ND		1.00	1	03/27/2018 21:03	WG1088759
Calcium,Dissolved	ND		1.00	1	03/27/2018 14:21	WG1087892
Chromium	ND		0.00200	1	03/27/2018 21:03	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Cobalt	ND		0.00200	1	03/27/2018 21:03	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Copper	ND		0.00500	1	03/27/2018 21:03	WG1088759
Copper,Dissolved	ND		0.00500	1	03/27/2018 14:21	WG1087892
Iron	ND		0.100	1	03/27/2018 21:03	WG1088759
Iron,Dissolved	ND		0.100	1	03/27/2018 14:21	WG1087892
Lead	ND		0.00200	1	03/27/2018 21:03	WG1088759
Lead,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Magnesium	ND		1.00	1	03/27/2018 21:03	WG1088759
Magnesium,Dissolved	ND		1.00	1	03/27/2018 14:21	WG1087892
Manganese	ND		0.00500	1	03/27/2018 21:03	WG1088759
Manganese,Dissolved	ND		0.00500	1	03/27/2018 14:21	WG1087892
Nickel	ND		0.00200	1	03/27/2018 21:03	WG1088759
Nickel,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Potassium	ND		1.00	1	03/27/2018 21:03	WG1088759
Potassium,Dissolved	ND		1.00	1	03/27/2018 14:21	WG1087892
Selenium	ND		0.00200	1	03/27/2018 21:03	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Silver	ND		0.00200	1	03/27/2018 21:03	WG1088759
Silver,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Sodium	ND		1.00	1	03/27/2018 21:03	WG1088759
Sodium,Dissolved	ND		1.00	1	03/27/2018 14:21	WG1087892
Thallium	ND		0.00200	1	03/27/2018 21:03	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/27/2018 14:21	WG1087892
Vanadium	ND		0.00500	1	03/27/2018 21:03	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/27/2018 14:21	WG1087892
Zinc	ND		0.0250	1	03/27/2018 21:03	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/27/2018 14:21	WG1087892

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	03/24/2018 13:11	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 13:11	WG1088881
Benzene	ND		0.00100	1	03/24/2018 13:11	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 13:11	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 13:11	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 13:11	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 13:11	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 13:11	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 13:11	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 13:11	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 13:11	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 13:11	WG1088881

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	03/24/2018 13:11	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 13:11	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 13:11	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 13:11	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 13:11	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 13:11	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 13:11	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 13:11	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 13:11	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 13:11	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 13:11	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 13:11	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 13:11	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 13:11	WG1088881
Styrene	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 13:11	WG1088881
Toluene	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 13:11	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 13:11	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 13:11	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 13:11	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 13:11	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 13:11	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 13:11	WG1088881
(S) Toluene-d8	*106*		*80.0-120*		*03/24/2018 13:11*	WG1088881
(S) Dibromofluoromethane	*97.4*		*76.0-123*		*03/24/2018 13:11*	WG1088881
(S) a,a,a-Trifluorotoluene	*104*		*80.0-120*		*03/24/2018 13:11*	WG1088881
(S) 4-Bromofluorobenzene	*100*		*80.0-120*		*03/24/2018 13:11*	WG1088881

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/23/2018 22:43	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/23/2018 22:43	WG1088432

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	03/24/2018 13:31	WG1088881
Acrylonitrile	ND		0.0100	1	03/24/2018 13:31	WG1088881
Benzene	ND		0.00100	1	03/24/2018 13:31	WG1088881
Bromochloromethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
Bromodichloromethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
Bromoform	ND		0.00100	1	03/24/2018 13:31	WG1088881
Bromomethane	ND		0.00500	1	03/24/2018 13:31	WG1088881
Carbon disulfide	ND		0.00100	1	03/24/2018 13:31	WG1088881
Carbon tetrachloride	ND		0.00100	1	03/24/2018 13:31	WG1088881
Chlorobenzene	ND		0.00100	1	03/24/2018 13:31	WG1088881
Chlorodibromomethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
Chloroethane	ND		0.00500	1	03/24/2018 13:31	WG1088881
Chloroform	ND		0.00500	1	03/24/2018 13:31	WG1088881
Chloromethane	ND		0.00250	1	03/24/2018 13:31	WG1088881
Dibromomethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/24/2018 13:31	WG1088881
1,2-Dibromoethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,2-Dichlorobenzene	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,4-Dichlorobenzene	ND		0.00100	1	03/24/2018 13:31	WG1088881
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/24/2018 13:31	WG1088881
1,1-Dichloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,2-Dichloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,1-Dichloroethene	ND		0.00100	1	03/24/2018 13:31	WG1088881
cis-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 13:31	WG1088881
trans-1,2-Dichloroethene	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,2-Dichloropropane	ND		0.00100	1	03/24/2018 13:31	WG1088881
cis-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 13:31	WG1088881
trans-1,3-Dichloropropene	ND		0.00100	1	03/24/2018 13:31	WG1088881
Ethylbenzene	ND		0.00100	1	03/24/2018 13:31	WG1088881
2-Hexanone	ND		0.0100	1	03/24/2018 13:31	WG1088881
Iodomethane	ND		0.0100	1	03/24/2018 13:31	WG1088881
2-Butanone (MEK)	ND		0.0100	1	03/24/2018 13:31	WG1088881
Methylene Chloride	ND		0.00500	1	03/24/2018 13:31	WG1088881
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/24/2018 13:31	WG1088881
Styrene	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
Tetrachloroethene	ND		0.00100	1	03/24/2018 13:31	WG1088881
Toluene	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,1,1-Trichloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
1,1,2-Trichloroethane	ND		0.00100	1	03/24/2018 13:31	WG1088881
Trichloroethene	ND		0.00100	1	03/24/2018 13:31	WG1088881
Trichlorofluoromethane	ND		0.00500	1	03/24/2018 13:31	WG1088881
1,2,3-Trichloropropane	ND		0.00250	1	03/24/2018 13:31	WG1088881
Vinyl acetate	ND		0.0100	1	03/24/2018 13:31	WG1088881
Vinyl chloride	ND		0.00100	1	03/24/2018 13:31	WG1088881
Xylenes, Total	ND		0.00300	1	03/24/2018 13:31	WG1088881
(S) Toluene-d8	*104*		*80.0-120*		*03/24/2018 13:31*	WG1088881
(S) Dibromofluoromethane	*96.3*		*76.0-123*		*03/24/2018 13:31*	WG1088881
(S) a,a,a-Trifluorotoluene	*103*		*80.0-120*		*03/24/2018 13:31*	WG1088881
(S) 4-Bromofluorobenzene	*100*		*80.0-120*		*03/24/2018 13:31*	WG1088881

Method Blank (MB)

(MB) R3296347-1 03/26/18 12:26

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.98	J	1.43	30.0

L978549-03 Original Sample (OS) • Duplicate (DUP)

(OS) L978549-03 03/26/18 12:29 • (DUP) R3296347-4 03/26/18 12:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	131	125	1	4.69		20

L979724-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-01 03/26/18 12:51 • (DUP) R3296347-7 03/26/18 12:51

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	34.2	29.0	1	16.5	J	20

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

(LCS) R3296347-2 03/26/18 12:27 • (LCSD) R3296347-3 03/26/18 12:28

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 %
Hardness (colorimetric) as CaCO3	150	153	153	102	102	85.0-115			0.000	20

L979682-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-02 03/26/18 12:40 • (MS) R3296347-5 03/26/18 12:40 • (MSD) R3296347-6 03/26/18 12:41

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	67.8	190	195	81.5	84.8	1	80.0-120			2.60	20

L979201-19 Original Sample (OS) • Duplicate (DUP)

(OS) L979201-19 03/23/18 08:05 • (DUP) R3295792-3 03/23/18 08:13

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Alkalinity	U	0.000	1	0.000		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L979682-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979682-01 03/23/18 10:13 • (DUP) R3295792-7 03/23/18 10:20

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Alkalinity	46.4	45.0	1	3.01		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

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

(LCS) R3295792-5 03/23/18 08:28 • (LCSD) R3295792-6 03/23/18 09:56

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	107	103	107	103	85.0-115			3.69	20

Sample Narrative:

LCS: Endpoint pH 4.5

LCSD: Endpoint pH 4.5

L979682-02 Original Sample (OS) • Duplicate (DUP)

(OS) L979682-02 03/23/18 10:57 • (DUP) R3297136-1 03/23/18 11:04

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	ND	12.8	1	3.96	J	20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

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

(LCS) R3297136-3 03/23/18 11:54 • (LCSD) R3297136-4 03/23/18 13:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	99.8	111	99.8	111	85.0-115			10.6	20

Sample Narrative:

LCS: Endpoint pH 4.5

LCSD: Endpoint pH 4.5

Method Blank (MB)

(MB) R3296286-1 03/23/18 15:48

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

L979576-02 Original Sample (OS) • Duplicate (DUP)

(OS) L979576-02 03/23/18 15:56 • (DUP) R3296286-4 03/23/18 15:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.0650	1	0.000		10

L979755-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979755-01 03/23/18 18:28 • (DUP) R3296286-7 03/23/18 18:30

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	664	694	250	4.31		10

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

(LCS) R3296286-2 03/23/18 15:49 • (LCSD) R3296286-3 03/23/18 15:51

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 %
Ammonia Nitrogen	7.50	7.42	7.22	99.0	96.3	90.0-110			2.73	10

L979576-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L979576-03 03/23/18 15:59 • (MS) R3296286-5 03/23/18 16:00

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	5.18	102	1	90.0-110	

L979755-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979755-02 03/23/18 18:31 • (MS) R3296286-8 03/23/18 18:33 • (MSD) R3296286-9 03/23/18 18:34

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	0.00500	7020	7060	6970	737	0.000	1000	90.0-110	V	V	1.28	10

Method Blank (MB)

(MB) R3296514-1 03/26/18 22:48

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

L979387-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979387-01 03/26/18 22:49 • (DUP) R3296514-4 03/26/18 22:49

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	29.5	29.0	1	1.78		20

L980117-04 Original Sample (OS) • Duplicate (DUP)

(OS) L980117-04 03/26/18 22:54 • (DUP) R3296514-7 03/26/18 22:55

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	73.5	80.7	1	9.30		20

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

(LCS) R3296514-2 03/26/18 22:48 • (LCSD) R3296514-3 03/26/18 22:48

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 %
COD	242	227	227	93.7	93.6	90.0-110			0.0927	20

L979642-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979642-02 03/26/18 22:51 • (MS) R3296514-5 03/26/18 22:51 • (MSD) R3296514-6 03/26/18 22:52

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 %
COD	400	ND	405	401	99.6	98.6	1	80.0-120			0.980	20

Method Blank (MB)

(MB) R3296709-1 03/27/18 13:34

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

L979682-09 Original Sample (OS) • Duplicate (DUP)

(OS) L979682-09 03/27/18 13:37 • (DUP) R3296709-4 03/27/18 13:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	0.000	1	0.000		20

L979830-03 Original Sample (OS) • Duplicate (DUP)

(OS) L979830-03 03/27/18 13:41 • (DUP) R3296709-7 03/27/18 13:41

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	18.4	19.4	1	5.17		20

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

(LCS) R3296709-2 03/27/18 13:35 • (LCSD) R3296709-3 03/27/18 13:35

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 %
COD	242	222	221	91.8	91.1	90.0-110			0.718	20

L979682-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-10 03/27/18 13:37 • (MS) R3296709-5 03/27/18 13:38 • (MSD) R3296709-6 03/27/18 13:38

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	400	397	99.9	99.3	1	80.0-120			0.615	20

Method Blank (MB)

(MB) R3297496-1 03/29/18 14:29

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

L980478-01 Original Sample (OS) • Duplicate (DUP)

(OS) L980478-01 03/29/18 14:32 • (DUP) R3297496-4 03/29/18 14:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	63.0	63.1	1	0.176		20

L980496-03 Original Sample (OS) • Duplicate (DUP)

(OS) L980496-03 03/29/18 14:35 • (DUP) R3297496-7 03/29/18 14:36

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	6.67	1	0.000		20

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

(LCS) R3297496-2 03/29/18 14:30 • (LCSD) R3297496-3 03/29/18 14:30

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 %
COD	242	226	225	93.2	93.0	90.0-110			0.178	20

L980484-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980484-01 03/29/18 14:33 • (MS) R3297496-5 03/29/18 14:34 • (MSD) R3297496-6 03/29/18 14:34

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	146	542	542	98.9	98.9	1	80.0-120			0.0295	20

Method Blank (MB)

(MB) R3295807-1 03/22/18 22:15

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

L979663-04 Original Sample (OS) • Duplicate (DUP)

(OS) L979663-04 03/22/18 23:30 • (DUP) R3295807-4 03/22/18 23:42

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	11.1	11.0	1	0.926		15
Fluoride	0.110	0.105	1	5.31		15
Nitrate	U	0.000	1	0.000		15
Sulfate	3.87	3.84	1	0.778	J	15

L979682-08 Original Sample (OS) • Duplicate (DUP)

(OS) L979682-08 03/23/18 02:36 • (DUP) R3295807-7 03/23/18 02:48

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	6.86	7.07	1	3.01		15
Fluoride	ND	0.0373	1	46.6	J P1	15
Nitrate	0.488	0.623	1	24.4	J3	15
Sulfate	ND	0.614	1	5.34	J	15

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

(LCS) R3295807-2 03/22/18 22:28 • (LCSD) R3295807-3 03/22/18 22:40

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 %
Bromide	40.0	38.1	38.1	95.2	95.3	80.0-120			0.142	15
Chloride	40.0	40.2	40.0	100	100	80.0-120			0.300	15
Fluoride	8.00	8.10	8.11	101	101	80.0-120			0.132	15
Nitrate	8.00	8.22	8.19	103	102	80.0-120			0.334	15

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

(LCS) R3295807-2 03/22/18 22:28 • (LCSD) R3295807-3 03/22/18 22:40

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 %
Sulfate	40.0	39.0	38.9	97.5	97.4	80.0-120			0.147	15

L979663-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979663-04 03/22/18 23:30 • (MS) R3295807-5 03/22/18 23:55 • (MSD) R3295807-6 03/23/18 00:07

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	42.5	43.8	85.0	87.7	1	80.0-120			3.16	15
Chloride	50.0	11.1	64.9	60.8	108	99.5	1	80.0-120			6.51	15
Fluoride	5.00	0.110	5.12	5.29	100	104	1	80.0-120			3.21	15
Nitrate	5.00	U	4.60	4.79	92.0	95.8	1	80.0-120			4.02	15
Sulfate	50.0	3.87	49.4	50.7	91.1	93.6	1	80.0-120			2.55	15

L979682-08 Original Sample (OS) • Matrix Spike (MS)

(OS) L979682-08 03/23/18 02:36 • (MS) R3295807-8 03/23/18 03:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	40.3	80.7	1	80.0-120	
Chloride	50.0	6.86	54.7	95.8	1	80.0-120	
Fluoride	5.00	ND	4.84	96.4	1	80.0-120	
Nitrate	5.00	0.488	4.90	88.2	1	80.0-120	
Sulfate	50.0	ND	41.3	81.5	1	80.0-120	

Method Blank (MB)

(MB) R3295824-1 03/23/18 11:31

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) R3295824-2 03/23/18 11:34 • (LCSD) R3295824-3 03/23/18 11:36

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	0.00299	0.00284	99.7	94.6	80.0-120			5.30	20

L979456-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979456-01 03/23/18 11:38 • (MS) R3295824-4 03/23/18 11:47 • (MSD) R3295824-5 03/23/18 11:50

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	0.00300	ND	0.00301	0.00297	100	99.0	1	75.0-125			1.31	20

Method Blank (MB)

(MB) R3295820-1 03/23/18 09:37

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) R3295820-2 03/23/18 09:40 • (LCSD) R3295820-3 03/23/18 09:42

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	0.00289	0.00298	96.5	99.3	80.0-120			2.89	20

L979341-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979341-01 03/23/18 09:44 • (MS) R3295820-4 03/23/18 09:46 • (MSD) R3295820-5 03/23/18 09:53

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	0.00298	0.00299	99.4	99.6	1	75.0-125			0.151	20

Method Blank (MB)

(MB) R3296989-1 03/28/18 08:10

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) R3296989-2 03/28/18 08:12 • (LCSD) R3296989-3 03/28/18 08:15

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	1.02	1.04	102	104	80.0-120			2.32	20

L979688-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979688-01 03/28/18 08:17 • (MS) R3296989-5 03/28/18 08:22 • (MSD) R3296989-6 03/28/18 08:25

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 %
Boron	1.00	ND	1.04	1.08	99.8	103	1	75.0-125			3.46	20

Method Blank (MB)

(MB) R3297236-1 03/28/18 17:33

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) R3297236-2 03/28/18 17:36 • (LCSD) R3297236-3 03/28/18 17:39

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	0.969	97.4	96.9	80.0-120			0.459	20

L979410-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979410-02 03/28/18 17:43 • (MS) R3297236-5 03/28/18 17:50 • (MSD) R3297236-6 03/28/18 17:53

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	0.396	1.35	1.35	95.5	94.9	1	75.0-125			0.432	20

Method Blank (MB)

(MB) R3296773-1 03/27/18 12:24

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	0.00562		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) R3296773-2 03/27/18 12:29 • (LCSD) R3296773-3 03/27/18 12:33

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	4.94	4.91	98.9	98.3	80.0-120			0.653	20
Antimony,Dissolved	0.0500	0.0483	0.0481	96.7	96.2	80.0-120			0.554	20
Arsenic,Dissolved	0.0500	0.0500	0.0502	99.9	100	80.0-120			0.554	20
Barium,Dissolved	0.0500	0.0484	0.0484	96.8	96.7	80.0-120			0.0324	20
Beryllium,Dissolved	0.0500	0.0500	0.0502	99.9	100	80.0-120			0.508	20
Cadmium,Dissolved	0.0500	0.0494	0.0496	98.8	99.1	80.0-120			0.330	20
Calcium,Dissolved	5.00	5.02	5.04	100	101	80.0-120			0.497	20
Chromium,Dissolved	0.0500	0.0510	0.0504	102	101	80.0-120			1.18	20
Copper,Dissolved	0.0500	0.0499	0.0553	99.9	111	80.0-120			10.2	20
Cobalt,Dissolved	0.0500	0.0524	0.0527	105	105	80.0-120			0.550	20
Iron,Dissolved	5.00	5.10	5.13	102	103	80.0-120			0.744	20

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

(LCS) R3296773-2 03/27/18 12:29 • (LCSD) R3296773-3 03/27/18 12:33

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	0.0503	0.0504	101	101	80.0-120			0.158	20
Magnesium,Dissolved	5.00	5.19	5.25	104	105	80.0-120			1.15	20
Manganese,Dissolved	0.0500	0.0494	0.0499	98.7	99.8	80.0-120			1.08	20
Nickel,Dissolved	0.0500	0.0521	0.0528	104	106	80.0-120			1.16	20
Potassium,Dissolved	5.00	5.13	5.12	103	102	80.0-120			0.170	20
Selenium,Dissolved	0.0500	0.0479	0.0497	95.9	99.4	80.0-120			3.57	20
Silver,Dissolved	0.0500	0.0489	0.0487	97.8	97.5	80.0-120			0.337	20
Sodium,Dissolved	5.00	5.20	5.27	104	105	80.0-120			1.21	20
Thallium,Dissolved	0.0500	0.0511	0.0507	102	101	80.0-120			0.682	20
Vanadium,Dissolved	0.0500	0.0496	0.0497	99.1	99.4	80.0-120			0.247	20
Zinc,Dissolved	0.0500	0.0508	0.0511	102	102	80.0-120			0.659	20

L979682-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-01 03/27/18 12:37 • (MS) R3296773-5 03/27/18 12:46 • (MSD) R3296773-6 03/27/18 12:50

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 %
Aluminum,Dissolved	5.00	ND	5.00	5.03	99.5	100	1	75.0-125			0.761	20
Antimony,Dissolved	0.0500	ND	0.0485	0.0492	97.0	98.4	1	75.0-125			1.42	20
Arsenic,Dissolved	0.0500	0.0109	0.0617	0.0613	102	101	1	75.0-125			0.738	20
Barium,Dissolved	0.0500	0.0215	0.0699	0.0709	96.8	98.7	1	75.0-125			1.41	20
Beryllium,Dissolved	0.0500	ND	0.0513	0.0516	103	103	1	75.0-125			0.609	20
Cadmium,Dissolved	0.0500	ND	0.0502	0.0502	100	100	1	75.0-125			0.0429	20
Calcium,Dissolved	5.00	7.58	12.5	12.5	99.2	99.3	1	75.0-125			0.0506	20
Chromium,Dissolved	0.0500	ND	0.0508	0.0504	102	101	1	75.0-125			0.825	20
Cobalt,Dissolved	0.0500	0.0448	0.0980	0.0969	106	104	1	75.0-125			1.13	20
Potassium,Dissolved	5.00	1.28	6.44	6.46	103	103	1	75.0-125			0.164	20
Iron,Dissolved	5.00	8.83	13.8	13.8	98.7	98.8	1	75.0-125			0.0355	20
Lead,Dissolved	0.0500	ND	0.0511	0.0512	102	102	1	75.0-125			0.319	20
Magnesium,Dissolved	5.00	2.83	8.09	8.09	105	105	1	75.0-125			0.0177	20
Manganese,Dissolved	0.0500	0.791	0.833	0.828	84.9	74.8	1	75.0-125		V	0.610	20
Nickel,Dissolved	0.0500	0.00676	0.0592	0.0589	105	104	1	75.0-125			0.528	20
Selenium,Dissolved	0.0500	ND	0.0511	0.0516	102	103	1	75.0-125			0.875	20
Silver,Dissolved	0.0500	ND	0.0489	0.0495	97.7	99.1	1	75.0-125			1.34	20
Sodium,Dissolved	5.00	4.68	9.96	10.0	106	106	1	75.0-125			0.411	20
Thallium,Dissolved	0.0500	ND	0.0516	0.0519	103	104	1	75.0-125			0.585	20
Vanadium,Dissolved	0.0500	ND	0.0503	0.0498	101	99.6	1	75.0-125			0.928	20
Zinc,Dissolved	0.0500	ND	0.0642	0.0661	101	105	1	75.0-125			3.03	20

Method Blank (MB)

(MB) R3296857-1 03/27/18 19:43

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	0.000314	J	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	0.00303	J	0.00256	0.0250

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

(LCS) R3296857-2 03/27/18 19:48 • (LCSD) R3296857-3 03/27/18 19:52

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	5.19	5.09	104	102	80.0-120			1.83	20
Antimony	0.0500	0.0498	0.0489	99.5	97.8	80.0-120			1.70	20
Arsenic	0.0500	0.0510	0.0502	102	100	80.0-120			1.70	20
Barium	0.0500	0.0510	0.0496	102	99.2	80.0-120			2.82	20
Beryllium	0.0500	0.0505	0.0496	101	99.3	80.0-120			1.68	20
Cadmium	0.0500	0.0509	0.0501	102	100	80.0-120			1.47	20
Calcium	5.00	5.19	5.19	104	104	80.0-120			0.112	20
Chromium	0.0500	0.0503	0.0498	101	99.6	80.0-120			1.06	20
Copper	0.0500	0.0520	0.0508	104	102	80.0-120			2.24	20
Cobalt	0.0500	0.0530	0.0529	106	106	80.0-120			0.249	20
Iron	5.00	5.23	5.21	105	104	80.0-120			0.348	20

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

(LCS) R3296857-2 03/27/18 19:48 • (LCSD) R3296857-3 03/27/18 19:52

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	0.0512	0.0506	102	101	80.0-120			1.25	20
Magnesium	5.00	5.38	5.30	108	106	80.0-120			1.53	20
Manganese	0.0500	0.0511	0.0508	102	102	80.0-120			0.736	20
Nickel	0.0500	0.0524	0.0523	105	105	80.0-120			0.329	20
Potassium	5.00	5.30	5.19	106	104	80.0-120			2.15	20
Selenium	0.0500	0.0526	0.0516	105	103	80.0-120			2.01	20
Silver	0.0500	0.0499	0.0491	99.8	98.3	80.0-120			1.52	20
Sodium	5.00	5.47	5.59	109	112	80.0-120			2.22	20
Thallium	0.0500	0.0523	0.0520	105	104	80.0-120			0.513	20
Vanadium	0.0500	0.0500	0.0498	100	99.7	80.0-120			0.429	20
Zinc	0.0500	0.0530	0.0522	106	104	80.0-120			1.64	20

L979682-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-02 03/27/18 19:56 • (MS) R3296857-5 03/27/18 20:05 • (MSD) R3296857-6 03/27/18 20:09

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	0.846	6.10	5.82	105	99.5	1	75.0-125			4.65	20
Antimony	0.0500	ND	0.0523	0.0506	105	101	1	75.0-125			3.41	20
Arsenic	0.0500	ND	0.0527	0.0506	104	100	1	75.0-125			3.96	20
Barium	0.0500	0.102	0.158	0.154	111	103	1	75.0-125			2.79	20
Beryllium	0.0500	ND	0.0521	0.0511	104	102	1	75.0-125			1.95	20
Cadmium	0.0500	0.00671	0.0584	0.0572	103	101	1	75.0-125			2.11	20
Calcium	5.00	14.5	19.9	19.8	108	106	1	75.0-125			0.491	20
Chromium	0.0500	ND	0.0525	0.0503	103	98.2	1	75.0-125			4.22	20
Copper	0.0500	ND	0.0556	0.0536	103	99.2	1	75.0-125			3.61	20
Cobalt	0.0500	ND	0.0538	0.0518	108	104	1	75.0-125			3.82	20
Potassium	5.00	14.4	20.4	20.0	118	112	1	75.0-125			1.55	20
Iron	5.00	0.578	5.96	5.66	108	102	1	75.0-125			5.09	20
Lead	0.0500	ND	0.0540	0.0520	106	102	1	75.0-125			3.79	20
Magnesium	5.00	6.88	12.4	12.3	111	109	1	75.0-125			0.848	20
Manganese	0.0500	0.0496	0.102	0.0995	104	99.6	1	75.0-125			2.11	20
Nickel	0.0500	ND	0.0543	0.0525	106	102	1	75.0-125			3.43	20
Selenium	0.0500	ND	0.0517	0.0513	103	103	1	75.0-125			0.800	20
Silver	0.0500	ND	0.0514	0.0492	103	98.5	1	75.0-125			4.23	20
Sodium	5.00	25.4	30.8	30.2	107	95.2	1	75.0-125			1.98	20
Thallium	0.0500	ND	0.0544	0.0518	109	104	1	75.0-125			4.92	20
Vanadium	0.0500	ND	0.0531	0.0512	102	98.5	1	75.0-125			3.64	20
Zinc	0.0500	0.0499	0.102	0.0997	105	99.7	1	75.0-125			2.75	20

Method Blank (MB)

(MB) R3297438-1 03/29/18 11:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Copper,Dissolved	0.00630		0.000520	0.00500

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

(LCS) R3297438-2 03/29/18 11:34 • (LCSD) R3297438-3 03/29/18 11:38

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 %
Copper,Dissolved	0.0500	0.0507	0.0494	101	98.7	80.0-120			2.59	20

L980385-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980385-02 03/29/18 11:42 • (MS) R3297438-5 03/29/18 11:50 • (MSD) R3297438-6 03/29/18 11:54

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 %
Copper,Dissolved	0.0500	0.00251	0.0514	0.0503	97.8	95.7	1	75.0-125			2.06	20

Method Blank (MB)

(MB) R3297237-1 03/28/18 21:58

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Copper,Dissolved	U		0.000520	0.00500

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

(LCS) R3297237-2 03/28/18 22:02 • (LCSD) R3297237-3 03/28/18 22:06

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 %
Copper,Dissolved	0.0500	0.0516	0.0519	103	104	80.0-120			0.626	20

L980796-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980796-01 03/28/18 22:11 • (MS) R3297237-5 03/28/18 22:19 • (MSD) R3297237-6 03/28/18 22:24

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 %
Copper,Dissolved	0.0500	0.00574	0.0589	0.0576	106	104	1	75.0-125			2.13	20

Method Blank (MB)

(MB) R3296862-3 03/24/18 11:11

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) R3296862-3 03/24/18 11:11

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	*106*			*80.0-120*
(S) Dibromofluoromethane	*96.2*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*104*			*80.0-120*
(S) 4-Bromofluorobenzene	*101*			*80.0-120*

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

(LCS) R3296862-1 03/24/18 10:13 • (LCSD) R3296862-2 03/24/18 10:32

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	0.122	0.120	97.4	96.0	10.0-160			1.47	23
Acrylonitrile	0.125	0.123	0.121	98.7	97.2	60.0-142			1.52	20
Benzene	0.0250	0.0233	0.0231	93.2	92.5	69.0-123			0.768	20
Bromodichloromethane	0.0250	0.0230	0.0229	92.0	91.5	76.0-120			0.540	20
Bromochloromethane	0.0250	0.0243	0.0241	97.1	96.2	76.0-122			0.901	20
Bromoform	0.0250	0.0263	0.0254	105	102	67.0-132			3.16	20
Bromomethane	0.0250	0.0172	0.0197	68.6	78.7	18.0-160			13.6	20
Carbon disulfide	0.0250	0.0222	0.0216	88.9	86.4	55.0-127			2.93	20
Carbon tetrachloride	0.0250	0.0265	0.0260	106	104	63.0-122			2.06	20
Chlorobenzene	0.0250	0.0250	0.0247	100	98.8	79.0-121			1.34	20
Chlorodibromomethane	0.0250	0.0252	0.0250	101	100	75.0-125			0.740	20
Chloroethane	0.0250	0.0265	0.0255	106	102	47.0-152			4.13	20
Chloroform	0.0250	0.0228	0.0226	91.1	90.2	72.0-121			0.947	20
Chloromethane	0.0250	0.0176	0.0174	70.5	69.4	48.0-139			1.54	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0258	0.0247	103	98.9	64.0-127			4.33	20
1,2-Dibromoethane	0.0250	0.0253	0.0250	101	100	77.0-123			1.03	20
Dibromomethane	0.0250	0.0244	0.0247	97.6	98.8	78.0-120			1.20	20
1,2-Dichlorobenzene	0.0250	0.0257	0.0253	103	101	80.0-120			1.54	20
1,4-Dichlorobenzene	0.0250	0.0241	0.0243	96.3	97.2	77.0-120			0.942	20
trans-1,4-Dichloro-2-butene	0.0250	0.0218	0.0216	87.3	86.2	55.0-134			1.16	20
1,1-Dichloroethane	0.0250	0.0237	0.0231	94.7	92.4	70.0-126			2.53	20
1,2-Dichloroethane	0.0250	0.0241	0.0241	96.4	96.2	67.0-126			0.149	20

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

(LCS) R3296862-1 03/24/18 10:13 • (LCSD) R3296862-2 03/24/18 10:32

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 %
1,1-Dichloroethene	0.0250	0.0221	0.0216	88.3	86.3	64.0-129			2.26	20
cis-1,2-Dichloroethene	0.0250	0.0222	0.0227	88.8	90.9	73.0-120			2.28	20
trans-1,2-Dichloroethene	0.0250	0.0223	0.0220	89.4	88.2	71.0-121			1.38	20
1,2-Dichloropropane	0.0250	0.0237	0.0226	94.7	90.4	75.0-125			4.69	20
cis-1,3-Dichloropropene	0.0250	0.0247	0.0245	98.9	98.1	79.0-123			0.856	20
trans-1,3-Dichloropropene	0.0250	0.0254	0.0244	101	97.6	74.0-127			3.96	20
Ethylbenzene	0.0250	0.0250	0.0246	99.9	98.5	77.0-120			1.43	20
2-Hexanone	0.125	0.127	0.123	102	98.6	58.0-147			3.12	20
Iodomethane	0.125	0.0723	0.0866	57.9	69.3	57.0-140			18.0	20
2-Butanone (MEK)	0.125	0.120	0.117	96.3	93.4	37.0-158			3.10	20
Methylene Chloride	0.0250	0.0234	0.0229	93.6	91.8	66.0-121			2.00	20
4-Methyl-2-pentanone (MIBK)	0.125	0.124	0.121	99.6	96.5	59.0-143			3.16	20
Styrene	0.0250	0.0250	0.0245	100	98.2	78.0-124			2.02	20
1,1,1,2-Tetrachloroethane	0.0250	0.0245	0.0243	97.8	97.0	75.0-122			0.811	20
1,1,2,2-Tetrachloroethane	0.0250	0.0222	0.0220	88.9	87.8	71.0-122			1.15	20
Tetrachloroethene	0.0250	0.0265	0.0257	106	103	70.0-127			3.28	20
Toluene	0.0250	0.0247	0.0240	98.9	96.0	77.0-120			3.00	20
1,1,1-Trichloroethane	0.0250	0.0229	0.0221	91.6	88.3	68.0-122			3.73	20
1,1,2-Trichloroethane	0.0250	0.0241	0.0234	96.5	93.6	78.0-120			3.06	20
Trichloroethene	0.0250	0.0268	0.0269	107	108	78.0-120			0.527	20
Trichlorofluoromethane	0.0250	0.0262	0.0251	105	100	56.0-137			4.13	20
1,2,3-Trichloropropane	0.0250	0.0239	0.0240	95.7	95.9	72.0-124			0.267	20
Vinyl acetate	0.125	0.0627	0.0582	50.2	46.6	46.0-160			7.53	20
Vinyl chloride	0.0250	0.0236	0.0230	94.3	92.0	64.0-133			2.41	20
Xylenes, Total	0.0750	0.0754	0.0737	101	98.3	77.0-120			2.28	20
(S) Toluene-d8				*104*	*103*	*80.0-120*				
(S) Dibromofluoromethane				*96.9*	*98.4*	*76.0-123*				
(S) a,a,a-Trifluorotoluene				*104*	*104*	*80.0-120*				
(S) 4-Bromofluorobenzene				*102*	*101*	*80.0-120*				

Method Blank (MB)

(MB) R3296042-1 03/23/18 18:22

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

L979755-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979755-01 03/23/18 19:12 • (DUP) R3296042-3 03/23/18 18:59

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	ND	0.000	.943	0.000		20
1,2-Dibromo-3-Chloropropane	ND	0.000	.943	0.000		20

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

(LCS) R3296042-4 03/23/18 21:16 • (LCSD) R3296042-5 03/23/18 23:20

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	0.000229	0.000238	91.7	95.0	60.0-140			3.60	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000246	0.000251	98.5	101	60.0-140			2.10	20

L979755-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L979755-02 03/23/18 18:47 • (MS) R3296042-2 03/23/18 18:35

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	0.0000887	88.7	.843	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000992	99.2	.843	63.0-149	

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, 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.
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.
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.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
Q	Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences 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 ESC Lab Sciences.

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	T 104704245-17-14
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

ESC Lab Sciences 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. ESC Lab Sciences 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

Pres Chk

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 171-873

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip 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

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page 1 of 2

ESC LABORATORIES
a subsidiary of Accutest
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L979682

M159

Acctnum: CEC
Template: T133579
Prelogin: P643480
TSR: 526 - Chris McCord
PB: 3/7/18 MW6
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. M6020AP1-FF 250mlHDPE-HNO3	M6020AP1,HARD 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk				Remarks	Sample # (lab only)
MW-1	Grab	GW	-	3-21-18	10:16	10	X	X	X	X	X	X						-01
MW-3	✓	GW	-	3-22-18	10:36	10	X	X	X	X	X	X						-02
MW-4		GW	-	3-22-18	8:50	10	X	X	X	X	X	X						-03
MW-5		GW	-	3-21-18	11:06	10	X	X	X	X	X	X						-04
TMW-1		GW	-	3-21-18	14:50	10	X	X	X	X	X	X						-05
TMW-2		GW	-	3-21-18	19:00	10	X	X	X	X	X	X						-06
TMW-3		GW	-	3-21-18	18:10	10	X	X	X	X	X	X						-07
DUPLICATE		GW	-	3-21-18	-	10	X	X	X	X	X	X						-08
FIELD BLANK		GW	-	3-21-18	17:42	10	X	X	X	X	X	X						-09
EQUIPMENT BLANK		GW	-	3-22-18	13:00	10	X	X	X	X	X	X						-10

* 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
M6020AP1(Tot/Diss)includes Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ clt

Tracking # 550

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
Unice

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / ~~No~~ ~~HCl~~ / MeoH TBR
Philip Campbell	3-22-18	1655		N
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.2 °C Bottles Received: 104
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 3/22/18 Time: 1655
			Susan Rach CDK880	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	PC, 40's °F
DATE & TIME	3-21-18 / 9:35	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	30.50	SAMPLING EQUIPMENT	dedicated bladder pump/tubing
DEPTH TO WATER (feet)	20.92	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	9.58	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	1.76	EQUIPMENT BLANK COLLECTED?	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	9:45	0	12.7	5.87	105.8	6.00	98.4	168	20.94
0.25	9:48	3	14.0	5.31	86.9	4.74	89.8	98.8	20.94
0.50	9:51	6	13.9	5.37	84.0	4.08	84.4	90.6	20.94
0.75	9:54	9	14.2	5.39	85.5	3.40	81.9	55.7	20.94
1.0	9:57	12	14.2	5.47	89.8	2.41	80.6	23.9	20.95
1.25	10:00	15	14.1	5.53	91.2	2.16	77.4	14.8	20.95
1.50	10:03	18	14.2	5.56	92.3	1.99	75.9	11.2	20.95
1.75	10:06	21	14.2	5.58	94.7	1.67	74.4	7.00	20.95

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.75	10:10	21	14.2	5.58	94.7	1.67	74.4	6.14

(= at metals

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	
Number of Containers		Sampler Signature	Phil J. 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

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-2
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Clear, upper 40's
DATE & TIME	3-22-18/11:15	EVENT FREQUENCY	Quarterly
PURGE METHOD	~~NA, parameters only~~ Peristaltic	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	10.00	SAMPLING EQUIPMENT	YSI 600 pro plus, peristaltic pump w/ flow through cell
DEPTH TO WATER (feet)	5.20 (3-21-18)	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	NS
WATER COLUMN (feet)	4.80	FIELD BLANK COLLECTED?	NS
PURGE VOLUME (gallons)	0.85	EQUIPMENT BLANK COLLECTED?	NS

$|V_0| \approx 0.85$ gallons

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0.85	11:25	5	11.7	6.19	229.7	0.44	65.5	9.08

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	None
Number of Containers	0 - Not sampled, not in sampling plan	Sampler Signature	Phil Campbell

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	No pump
Well Clear of Weeds/Accessible?	yes/yes	Fittings/Well Head Condition	OK
Pad/Casing Quality	good/good	Lock Condition	Good

Pump rate =
~~refill = 20sec.~~
~~D.~~ Refill = 15-20 sec.
Discharge = 4 sec.

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-3 (page 1 of 2)
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Clear, 40's
DATE & TIME	3-22-18/ 9:30	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	SAMPLING EQUIPMENT	dedicated bladder pump/tubing
DEPTH TO WATER (feet)	15.65 (3-21-18)	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	NO
WATER COLUMN (feet)	11.35	FIELD BLANK COLLECTED?	NO
PURGE VOLUME (gallons)	4.75	EQUIPMENT BLANK COLLECTED?	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	9:35	0	12.3	6.06	269.8	5.28	106.0	>1000	15.95
0.40	9:38	3	12.5	5.91	276.6	0.89	101.5	107	15.95
0.75	9:41	6	12.4	5.90	276.5	0.72	98.8	74.5	15.95
1.0	9:44	9	12.4	5.92	276.5	0.71	97.1	69.3	15.95
1.25	9:47	12	12.4	5.92	276.3	0.73	95.6	70.3	15.95
1.50	9:50	15	12.4	5.92	276.2	0.59	95.4	66.0	15.95
1.75	9:53	18	12.2	5.92	275.4	0.50	94.4	67.9	15.95
2.00	9:56	21	12.3	5.92	275.6	0.47	93.3	71.2	15.95

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
~~4.75~~	10:30							
Sample Charateristics (Odor, Color)	Clear, No Odor		Preservatives Used			HCl, HNO3, HCl, NaHSO4, None		
Number of Containers	10		Sampler Signature			Philip A. 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
Pad/Casing Quality	good/good	Lock Condition	good

2.25	9:59	24	12.3	5.92	275.3	0.43	92.5	62.1	15.95
2.50	10:02	27	12.3	5.91	275.4	0.45	92.1	55.9	15.95
2.75	10:05	30	12.3	5.90	275.5	0.49	91.8	51.8	15.95
3.00	10:08	33	12.3	5.91	275.6	0.43	91.0	48.7	15.95
3.25	10:11	36	12.3	5.91	272.0	0.41	90.8	50.8	15.95

continued on page 2.

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-3 (continued) - page 2 of 2
LOCATION	Camden, TN	TEMPERATURE & WEATHER	PC, 40's
DATE & TIME	3-22-18	EVENT FREQUENCY	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Ded. bladder	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	27	SAMPLING EQUIPMENT	~~Bailer~~ Dedicated bladder pump/tubing
DEPTH TO WATER (feet)	15.65 (3-21-18)	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	11.35	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	4.75	EQUIPMENT BLANK COLLECTED?	No

PURGE INFORMATION (continued from previous page)

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
3.50	10:14	39	12.3	5.92	275.5	0.34	90.1	51.2	15.95
3.70	10:17	42	12.3	5.92	275.6	0.34	90.0	49.7	15.95
3.90	10:20	45	12.2	5.92	275.4	0.32	89.5	42.3	15.95
4.25	10:23	48	12.2	5.92	275.3	0.30	88.3	36.3	15.95
4.50	10:26	51	12.2	5.93	275.3	0.28	87.4	34.2	15.95
4.75	10:29	54	12.2	5.92	275.3	0.27	87.3	33.9	15.95

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.75	10:36	54	12.2	5.92	275.3	0.27	87.3	34.3

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	
Number of Containers	10	Sampler Signature	Philip A. Campbell

* @ metals sample

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
Pad/Casing Quality	good/good	Lock Condition	good

* NTU = 34.5 after sampling

* NTU = 2.21 after field-filtered.

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-4
LOCATION	Camden, TN	TEMPERATURE & WEATHER	sunny, 35°F
DATE & TIME	3-22-18 / 8:20	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	23.10	SAMPLING EQUIPMENT	dedicated bladder pump/tubing
DEPTH TO WATER (feet)	10.43 (3-21-18)	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	Yes
WATER COLUMN (feet)	12.67	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	3.5	EQUIPMENT BLANK COLLECTED?	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	ATV
0	8:25	0	12.3	5.39	61.6	5.69	74.3	111	10.58
0.5	8:28	3	13.4	5.68	59.3	3.08	46.9	76.1	10.59
1.0	8:31	6	13.4	5.76	59.0	3.03	42.6	54.2	10.59
1.5	8:34	9	13.5	5.81	58.2	3.07	39.3	20.2	10.59
2.0	8:37	12	13.5	5.85	57.8	3.06	37.4	6.77	10.59
2.5	8:40	15	13.4	5.90	57.4	3.04	35.8	6.66	10.59
3.0	8:43	18	13.5	5.93	57.7	2.98	36.1	5.04	10.59
3.5	8:46	21	13.4	5.93	57.7	2.97	37.0	4.98	10.59

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.5	8:50	21	13.4	5.93	57.7	2.97	37.0	4.98

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	
Number of Containers	10	Sampler Signature	Philip 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
Pad/Casing Quality	good / good	Lock Condition	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-5
LOCATION	Camden, TN	TEMPERATURE & WEATHER	PC, windy, 40's
DATE & TIME	2-21-18 / 10:30	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	33.85	SAMPLING EQUIPMENT	dedicated bladder pump/tubing
DEPTH TO WATER (feet)	8.42	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	25.43	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	2.25	EQUIPMENT BLANK COLLECTED?	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH (STD)	Conductivity (µs/cm)	DO (mg/L)	ORP (mV)	NTU	ID TW (CFM)
0	10:33	0	13.8	5.52	210.1	2.48	82.7	24.5	8.45
0.25	10:36	3	14.0	5.33	245.9	1.19	77.8	43.5	8.49
0.50	10:39	6	14.2	5.29	247.3	0.96	75.3	53.9	8.54
0.75	10:42	9	14.0	5.30	244.6	0.90	73.9	41.7	8.55
1.0	10:45	12	13.9	5.31	241.9	0.92	73.0	35.9	8.55
1.25	10:48	15	13.6	5.32	239.0	0.90	72.5	32.9	8.55
1.50	10:51	18	14.1	5.32	239.7	0.91	72.1	31.8	8.55
1.75	10:54	21	14.2	5.32	239.6	0.89	71.6	33.2	8.55

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.25	1100	27	14.1	5.32	238.4	0.89	71.7	21.7
Sample Charateristics (Odor, Color)	Clear, No odor		Preservatives Used					
Number of Containers	10		Sampler Signature					

@ metals

NTU = 3.24 @ field filtered sample

WELL DATA

Number of Baffles	4	Well Cap Dedicated/In Place?	yes / yes
Well Clear of Weeds/Accessible?	yes / yes	Fittings/Well Head Condition	yes / yes
Pad/Casing Quality	good / good	Lock Condition	good

2.0	10:57	24	14.0	5.33	238.0	0.89	71.5	28.2	8.55
2.25	11:00	27	14.1	5.32	238.4	0.89	71.7	29.8	8.55

* started purge with dedicated bladder pump for 20 min. switched to new tubing & peristaltic pump

continued on page 2 of 2.

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 (page 1 of 2)
LOCATION	Camden, TN	TEMPERATURE & WEATHER	PC, 40's
DATE & TIME	3-21-18 12:05	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump *	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5 0	SAMPLING EQUIPMENT	dedicated bladder pump/tubing *
DEPTH TO WATER (feet)	5.65	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	1"	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	26.85	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	1vol = 1.07 gallons 3vol = 3.21 26.85 x 0.04 = 1.074	EQUIPMENT BLANK COLLECTED?	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	12:15	3	11.1	5.82	71.7	7.70	72.4	>1000	6.30
0.10	12:18	6	11.4	5.73	70.9	7.14	76.4	>1000	6.31
0.20	12:21	9	12.0	5.74	72.1	6.98	77.0	>1000	6.45
0.30	12:24	12	12.3	5.74	73.5	6.71	77.3	>1000	6.50
0.40	12:27	15	12.6	5.73	74.3	6.55	78.1	>1000	6.52
0.80	12:42	30	12.7	5.71	75.2	6.46	82.2	>1000	6.55
1.0	12:52	40	12.9	5.72	75.9	6.35	84.7	>1000	6.55
1.15	13:02	50	12.6	5.72	75.2	6.17	88.5	>1000	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
Sample Charateristics (Odor, Color)			Preservatives Used					
Number of Containers			Sampler Signature					

Next page Final sample data

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	dedicated pump/yes
Well Clear of Weeds/Accessible?	yes/yes	Fittings/Well Head Condition	good/good
Pad/Casing Quality	No pad/no casing	Lock Condition	OK

1.30	13:12	60	12.8	5.72	75.6	6.17	92.2	>1000	6.55
1.50	13:22	70	13.0	5.72	>5.9	6.20	92.4	>1000*	6.55

stop. Use peristaltic

*detector signal too low

**sampled using clean tubing with peristaltic pump. Used "soda straw" method for VOC's.

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 (Continued) - 2 of 2
LOCATION	Camden, TN	TEMPERATURE & WEATHER	AC, 40's
DATE & TIME	3-21-18	EVENT FREQUENCY	Quarterly
PURGE METHOD	Peristaltic Pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5	SAMPLING EQUIPMENT	~~Bailer~~ Peristaltic ~~Bailer~~
DEPTH TO WATER (feet)	5.65	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	1"	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	26.85'	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	1Vol = 1.07 gall / 3Vol = 3.21 gallons	EQUIPMENT BLANK COLLECTED?	No

From low Flow

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	
									NTU
1.5	13:35	83	-	-	-	-	-	-	7.6
2.25	13:45	93	14.3	5.66	80.8	6.12	98.4	>1000	
3.0	13:55	103	14.0	5.69	76.2	6.67	97.1	>1000	
3.5	14:05	113	14.5	5.68	79.6	5.65	97.1	>1000	
4.0	14:15	123	13.1	5.78	76.8	6.70	100.3	262	8.65
4.5	14:20	128	14.1	5.79	72.8	6.15	101.3	266	8.90
5.0	14:36	138	14.7	5.74	77.6	6.19	99.6	138	8.91
5.5	14:40	148	14.5	5.73	77.5	6.14	98.9	19.8	metals

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
5.50	14:50	148	14.5	5.73	77.5	6.19	98.9	19.8

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	HCl, HNO3, Na thio, None, H2SO4
Number of Containers	10	Sampler Signature	Philip Campbell

NTU = 1.88 @ field filtered metals

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
Pad/Casing Quality	No pad	Lock Condition	good

** used peristaltic pump + clean tubing, soda straw method for VOC's samples.

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	20C, windy / 40's
DATE & TIME	3-21-18 / 15:20	EVENT FREQUENCY	Quarterly
PURGE METHOD	~~low-flow w/bladder pump~~ peristaltic Low-flow	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	27.5 0	SAMPLING EQUIPMENT	~~dedicated bladder pump/tubing~~ peristaltic pump ** bailer
DEPTH TO WATER (feet)	10.11	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	1"	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	17.39	FIELD BLANK COLLECTED?	NO
PURGE VOLUME (gallons)	1Vol = 0.7 / 3Vol = 2.1 gallons	EQUIPMENT BLANK COLLECTED?	No

17.39 X 0.04 ≈ 0.7 gal = 1Vol

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW (ft)
0	15:30	0	NA	NA	NA	NA	NA	>1000	14.1
0.35	15:35	5	12.9	5.61	109.1	7.80	106.0	>1000	~~13.9~~
0.70	15:40	10	13.6	5.67	93.2	7.40	103.2	>1000	~~14.3~~
1.0	15:45	15	14.1	5.72	82.7	8.10	101.7	>1000	~~14.0~~ color
1.25	15:50	20	14.0	5.69	71.8	7.56	99.2	>1000	14.2
1.50	15:55	25	13.9	5.68	71.3	7.50	98.0	>1000	14.4
2.10	16:05	35	13.9	5.72	83.5	6.96	100.7	>1000	14.80
2.70	16:15	45	13.9	5.65	86.9	6.94	101.4		14.85

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.50	16:00	85	12.2	5.64	75.4	8.41	91.3	38.5

Sample Charateristics (Odor, Color)	clear, No odor	Preservatives Used	
Number of Containers	10	Sampler Signature	Philip Campbell

@ metals NTU = 28.5 @ filter

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	dedicated bladder / yes *
Well Clear of Weeds/Accessible?	yes / yes	Fittings/Well Head Condition	good
Pad/Casing Quality	No pad / No casing	Lock Condition	good (needs Pad +

3.10	16:25	55	13.5	5.64	87.6	6.93	was tick up to lock	
3.60	16:35	65	13.6	5.64	87.4	6.90	104.2	>1000
4.10	16:45	75	13.7	5.63	86.8	6.91	104.4	>1000
4.50	16:55	85	13.8	5.62	86.5	6.90	100.8	>1000

bladder pump not used for purging/sampling. Too much sediment in temp. wells. 13.87

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	PC, windy / 40's
DATE & TIME	3-21-18 / 17:00	EVENT FREQUENCY	Quarterly
PURGE METHOD	low-flow w/bladder pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	28.00	SAMPLING EQUIPMENT	dedicated bladder pump/tubing
DEPTH TO WATER (feet)	8.32	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	1"	DUPLICATE COLLECTED?	NO
WATER COLUMN (feet)	19.68	FIELD BLANK COLLECTED?	yes / 17:42 sample
PURGE VOLUME (gallons)	1 vol = 0.79 / 3 vol = 2.37	EQUIPMENT BLANK COLLECTED?	yes / 3-22-18 @ 13:00

1 Vol = 19.68 X 0.04 = 0.79 gallons 3 Vol = 2.37 gallons

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	17:05	0	12.6	5.37	227.4	1.85	116.3	>1000	8.50
0.30	17:10	5	12.8	5.43	225.8	1.86	113.4	226	8.53
0.75	17:15	10	12.4	5.43	225.2	1.80	110.0	>1000	8.55
1.20	17:20	15	12.9	5.32	222.3	0.97	107.3	>1000	8.60
1.75	17:25	20	13.5	5.32	210.6	1.73	106.0	>1000	8.63
2.10	17:30	25	12.[illegible]	5.45	212.8	2.05	166.3	>1000	8.67
2.50	17:35	30	12.8	5.50	213.6	2.68	106.7	>1000	8.69

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.50	18:10	60	12.4	5.35	193.3	2.15	103.8	15.3

@ metals sample

NTU = 2.32 after field filter

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	
Number of Containers	10	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
Pad/Casing Quality	No pad / No steel casing	Lock Condition	good (needs pad)

2.90	17:40	35	12.7	5.44	205.6	1.40	106.2	>1000	8.70
3.40	17:45	40	12.6	5.38	200.1	1.57	105.8	>1000	8.70
3.75	17:50	45	12.5	5.37	198.6	2.32	105.6	589	8.71
4.10	17:55	50	12.4	5.36	192.5	2.20	104.1	444	8.70
4.25				5.35	193.2	2.18	103.9	88.5	8.70
4.50	18:05	60	12.4	5.35	193.3	2.15	103.8	15.3	8.70

EQUIPMENT CALIBRATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane Suite 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	J. Campbell
LOCATION	CEC
DATE AND TIME	3-5-2018 / 13:45
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus w/ Quatro
Equipment Serial #	#1

pH Calibration

pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	8/2021	3.95	172	160 to 180	Yes	4.0	Yes
7	5/2019	6.96	38	+/-50	Yes	7.0	Yes
10	5/2018	9.91	-190	-160 to -180	No	10.00	Yes

Temperature Calibration Check

Cert. Thermometer Value (deg C)	Meter Value (deg C)
-	-

DO Calibration

Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
756.9	756.9	100	96.8	Yes

Specific Conductivity Calibration

Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)
1000 µS/cm	12/2018	965	1001

ORP Calibration

ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
240	10/2022		

Hach Model 2100P Turbidimeter Calibration

Calibration verification Test performed and passed?	NTU Standard	Within Range? (Yes/No)	Measured Value	Stored?	Final Verification test passed? (Yes/No)
(Yes)	20				
No	100				
Note: if verification passed, calibration not required	800				

EQUIPMENT CALIBRATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard lane Suite 170 Franklin, Tennessee 37067 - 800-763-2326 - w

EQUIPMENT CALIBRATION FORM – Field Check

NAME OF REPRESENTATIVE	Phillip Campbell
LOCATION	Former EWS - Camden, TN
DATE AND TIME	3-22-18 / 8:00
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro plus w/ quattro cable
Equipment Serial #	YSI # 1

Field check pH

pH Calibration

pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	8/2021	4.01	165	160 to 180	yes	✓	yes,
7	5/2019	7.02	-41	+/-50	↓	✓	yes
10	5/2018	10.0	-176	-160 to -180	↓	✓	yes

pH calibration OK.

Temperature Calibration Check

Cert. Thermometer Value (deg C)	Meter Value (deg C)
—	—

DO Calibration

Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
756.9	756.9	160	97.2	yes

Specific Conductivity Calibration

Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)
—	—		

ORP Calibration

ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)

Hach Model 2100P Turbidimeter Calibration

Calibration verification Test performed and passed?	NTU Standard	Within Range? (Yes/No)	Measured Value	Stored?	Final Verification test passed? (Yes/No)
(Yes)	20				
No	100				
Note: if verification passed, calibration not required	800				

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:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **171-873**

Lab Project # **CEC-EWS CAMDEN LF**

Collected by (print): Philip Campbell

Site/Facility ID # **CAMDEN, TN**

P.O. #

Collected by (signature): Philip 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 #

Analysis / Container / Preservative

Pres Chk

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. M6020AP1-FF 250mlHDPE-HNO3	M6020AP1,HARD 250mlHDPE-HNO3	SV8011 40mlCir-NaThio	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk				Remarks	Sample # (lab only)
MW-1	Grab	GW	-	3-21-18	10:10	10	X	X	X	X	X	X						
MW-3		GW	-	3-22-18	10:30	10	X	X	X	X	X	X						
MW-4		GW	-	3-22-18	8:50	10	X	X	X	X	X	X						
MW-5		GW	-	3-21-18	11:06	10	X	X	X	X	X	X						
TMW-1		GW	-	3-21-18	14:50	10	X	X	X	X	X	X						
TMW-2		GW	-	3-21-18	19:00	10	X	X	X	X	X	X						
TMW-3		GW	-	3-21-18	18:10	10	X	X	X	X	X	X						
DUPLICATE		GW	-	3-21-18	-	10	X	X	X	X	X	X						
FIELD BLANK		GW	-	3-21-18	17:42	10	X	X	X	X	X	X						
EQUIPMENT BLANK	↓	GW	-	3-22-18	13:00	10	X	X	X	X	X	X						

Chain of Custody Page 1 of 1

ESC LABS
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T133579**
Prelogin: **P643480**
TSR: **526 - Chris McCord**
PB: 3/7/18 vw6

Shipped Via: **FedEX Ground**

* 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**
M6020AP1(Tot/Diss)includes Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ clt

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
none

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Philip Campbell	3-22-18	1655			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:
			Sarah Beach	3/22/18	1655

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**

Project Description: **EWS Camden Class 2 Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **171-873**

Lab Project # **CEC-EWS CAMDEN LF**

Collected by (print): Phil C.

Site/Facility ID # **CAMDEN, TN**

P.O. #

Collected by (signature): Phil C. 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 #

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. M6020AP1-FF 250mlHDPE-HNO3	M6020AP1,HARD 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk				Remarks	Sample # (lab only)
TRIP BLANK	—	GW	—	—	—	1							X					

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

ESC LABORATORY SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T133579**
Prelogin: **P643480**
TSR: **526 - Chris McCord**
PB: 3/7/18 mc6
Shipped Via: **FedEX Ground**

* 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**
M6020AP1(Tot/Diss)includes Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__UPS __FedEx __Courier __CT

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
Huce

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Phil C. Campbell	3-22-18	1655		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
			Sue Roach	3/22/18 1655

Hold: Condition: NCF / OK

ANALYTICAL REPORT

March 31, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L979755
Samples Received:	03/22/2018
Project Number:	171-873
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
Technical Service Representative

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 ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

IWC-L L979755-01 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/22/18 12:00	03/22/18 16:58

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	250	03/26/18 15:16	03/26/18 15:16	KK
Wet Chemistry by Method 2320 B-2011	WG1089616	1	03/28/18 09:59	03/28/18 09:59	CSU
Wet Chemistry by Method 350.1	WG1088542	250	03/23/18 18:28	03/23/18 18:28	JER
Wet Chemistry by Method 410.4	WG1089656	10	03/27/18 10:25	03/27/18 13:39	TH
Wet Chemistry by Method 9056A	WG1088648	500	03/24/18 20:27	03/24/18 20:27	DR
Wet Chemistry by Method 9056A	WG1089317	5000	03/27/18 00:23	03/27/18 00:23	MAJ
Mercury by Method 7470A	WG1089288	1	03/25/18 15:53	03/26/18 12:40	ABL
Mercury by Method 7470A	WG1089292	10	03/26/18 13:04	03/26/18 17:13	EL
Metals (ICP) by Method 6010B	WG1088467	10	03/27/18 20:37	03/29/18 03:15	TRB
Metals (ICP) by Method 6010B	WG1089110	10	03/27/18 15:21	03/29/18 01:35	TRB
Metals (ICPMS) by Method 6020	WG1087892	10	03/26/18 12:11	03/27/18 14:25	LAT
Metals (ICPMS) by Method 6020	WG1087892	100	03/26/18 12:11	03/27/18 16:15	LAT
Metals (ICPMS) by Method 6020	WG1087892	2000	03/26/18 12:11	03/27/18 16:59	LAT
Metals (ICPMS) by Method 6020	WG1088461	20	03/27/18 08:24	03/28/18 16:22	JPD
Metals (ICPMS) by Method 6020	WG1088461	2000	03/27/18 08:24	03/28/18 16:27	JPD
Metals (ICPMS) by Method 6020	WG1088461	50	03/27/18 08:24	03/28/18 16:58	JPD
Metals (ICPMS) by Method 6020	WG1088461	50	03/27/18 08:24	03/28/18 22:32	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1089631	1	03/26/18 19:17	03/26/18 19:17	JHH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1089631	10	03/28/18 19:18	03/28/18 19:18	BMB
EDB / DBCP by Method 8011	WG1088432	.943	03/23/18 08:15	03/23/18 19:12	JNS

APWC-L L979755-02 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	03/22/18 12:45	03/22/18 16:58

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	10	03/26/18 15:09	03/26/18 15:09	KK
Wet Chemistry by Method 2320 B-2011	WG1089616	100	03/28/18 17:09	03/28/18 17:09	CSU
Wet Chemistry by Method 350.1	WG1088542	1000	03/23/18 18:31	03/23/18 18:31	JER
Wet Chemistry by Method 410.4	WG1090324	50	03/28/18 17:09	03/28/18 19:59	MZ
Wet Chemistry by Method 9056A	WG1088648	5000	03/24/18 20:39	03/24/18 20:39	DR
Wet Chemistry by Method 9056A	WG1089317	5000	03/27/18 00:39	03/27/18 00:39	MAJ
Mercury by Method 7470A	WG1089292	10	03/26/18 13:04	03/26/18 17:15	EL
Mercury by Method 7470A	WG1089873	10	03/28/18 01:11	03/28/18 13:34	EL
Metals (ICP) by Method 6010B	WG1088757	9	03/26/18 19:24	03/26/18 23:19	TRB
Metals (ICP) by Method 6010B	WG1088765	20	03/28/18 08:17	03/29/18 03:18	TRB
Metals (ICPMS) by Method 6020	WG1087892	200	03/26/18 12:11	03/27/18 16:19	LAT
Metals (ICPMS) by Method 6020	WG1087892	5	03/26/18 12:11	03/27/18 14:30	LAT
Metals (ICPMS) by Method 6020	WG1090089	180	03/28/18 09:16	03/29/18 13:44	JPD
Metals (ICPMS) by Method 6020	WG1090089	9	03/28/18 09:16	03/28/18 17:11	LD
Metals (ICPMS) by Method 6020	WG1090089	9	03/28/18 09:16	03/29/18 13:40	JPD
Metals (ICPMS) by Method 6020	WG1091157	180	03/29/18 15:21	03/29/18 20:33	JDG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1089631	5	03/28/18 19:39	03/28/18 19:39	BMB
EDB / DBCP by Method 8011	WG1088432	.845	03/23/18 08:15	03/23/18 18:47	JNS

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 radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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
Technical Service Representative

Project Narrative

L979755-02: The sample was not able to be adjusted to <2su for the metals analysis due to a matrix issue.

L979755-01, -02: Nitrate is being reported outside of the 48hr hold time due to a matrix issue requiring higher dilutions to be prepped for other anions in the sample. The concentrations are too high to accuarately report Nitrate at lower dilutions.

Sample Handling and Receiving

The following analysis were performed from an unpreserved, insufficiently or inadequately preserved sample.

ESC Sample ID	Project Sample ID	Method
L979755-02	APWC-L	6010B, 6020, 7470A

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	26000		7500	250	03/26/2018 15:16	WG1089441

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	03/28/2018 09:59	WG1089616

Sample Narrative:

L979755-01 WG1089616: 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	664		25.0	250	03/23/2018 18:28	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	3810		100	10	03/27/2018 13:39	WG1089656

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		500	500	03/24/2018 20:27	WG1088648
Chloride	44500		5000	5000	03/27/2018 00:23	WG1089317
Fluoride	617		500	5000	03/27/2018 00:23	WG1089317
Nitrate	ND	Q	50.0	500	03/24/2018 20:27	WG1088648
Sulfate	5520		2500	500	03/24/2018 20:27	WG1088648

Sample Narrative:

L979755-01 WG1088648: diluted due to matrix

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	0.000600		0.000200	1	03/26/2018 12:40	WG1089288
Mercury,Dissolved	ND		0.00200	10	03/26/2018 17:13	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		2.00	10	03/29/2018 01:35	WG1089110
Boron,Dissolved	ND		2.00	10	03/29/2018 03:15	WG1088467

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	423		2.00	20	03/28/2018 16:22	WG1088461
Aluminum,Dissolved	438		1.00	10	03/27/2018 14:25	WG1087892
Antimony	ND		0.0400	20	03/28/2018 16:22	WG1088461
Antimony,Dissolved	ND		0.0200	10	03/27/2018 14:25	WG1087892
Arsenic	0.368		0.0400	20	03/28/2018 16:22	WG1088461

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Arsenic,Dissolved	0.403		0.0200	10	03/27/2018 14:25	WG1087892
Barium	1.67		0.100	20	03/28/2018 16:22	WG1088461
Barium,Dissolved	1.80		0.0500	10	03/27/2018 14:25	WG1087892
Beryllium	0.126		0.0400	20	03/28/2018 16:22	WG1088461
Beryllium,Dissolved	0.125		0.0200	10	03/27/2018 14:25	WG1087892
Cadmium	188		0.0200	20	03/28/2018 16:22	WG1088461
Cadmium,Dissolved	193		0.100	100	03/27/2018 16:15	WG1087892
Calcium	4980		20.0	20	03/28/2018 16:22	WG1088461
Calcium,Dissolved	5180		10.0	10	03/27/2018 14:25	WG1087892
Chromium	0.0400		0.0400	20	03/28/2018 16:22	WG1088461
Chromium,Dissolved	0.0411		0.0200	10	03/27/2018 14:25	WG1087892
Cobalt	1.39		0.0400	20	03/28/2018 16:22	WG1088461
Cobalt,Dissolved	1.41		0.0200	10	03/27/2018 14:25	WG1087892
Copper	23.7		0.250	50	03/28/2018 22:32	WG1088461
Copper,Dissolved	26.1		0.500	100	03/27/2018 16:15	WG1087892
Iron	752		2.00	20	03/28/2018 16:22	WG1088461
Iron,Dissolved	743		1.00	10	03/27/2018 14:25	WG1087892
Lead	0.404		0.0400	20	03/28/2018 16:22	WG1088461
Lead,Dissolved	0.433		0.0200	10	03/27/2018 14:25	WG1087892
Magnesium	1890		20.0	20	03/28/2018 16:22	WG1088461
Magnesium,Dissolved	1920		10.0	10	03/27/2018 14:25	WG1087892
Manganese	380		0.250	50	03/28/2018 16:58	WG1088461
Manganese,Dissolved	378		0.500	100	03/27/2018 16:15	WG1087892
Nickel	1.39		0.0400	20	03/28/2018 16:22	WG1088461
Nickel,Dissolved	1.37		0.0200	10	03/27/2018 14:25	WG1087892
Potassium	6080		20.0	20	03/28/2018 16:22	WG1088461
Potassium,Dissolved	6210		10.0	10	03/27/2018 14:25	WG1087892
Selenium	0.402		0.0400	20	03/28/2018 16:22	WG1088461
Selenium,Dissolved	0.608		0.0200	10	03/27/2018 14:25	WG1087892
Silver	ND		0.0400	20	03/28/2018 16:22	WG1088461
Silver,Dissolved	ND		0.0200	10	03/27/2018 14:25	WG1087892
Sodium	11700		20.0	20	03/28/2018 16:22	WG1088461
Sodium,Dissolved	11700		100	100	03/27/2018 16:15	WG1087892
Thallium	0.0855		0.0400	20	03/28/2018 16:22	WG1088461
Thallium,Dissolved	0.0908		0.0200	10	03/27/2018 14:25	WG1087892
Vanadium	ND		0.100	20	03/28/2018 16:22	WG1088461
Vanadium,Dissolved	0.0648		0.0500	10	03/27/2018 14:25	WG1087892
Zinc	2470		50.0	2000	03/28/2018 16:27	WG1088461
Zinc,Dissolved	2480		50.0	2000	03/27/2018 16:59	WG1087892

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	1.40	J4	0.500	10	03/28/2018 19:18	WG1089631
Acrylonitrile	ND		0.0100	1	03/26/2018 19:17	WG1089631
Benzene	ND		0.00100	1	03/26/2018 19:17	WG1089631
Bromochloromethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
Bromodichloromethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
Bromoform	ND		0.00100	1	03/26/2018 19:17	WG1089631
Bromomethane	ND		0.00500	1	03/26/2018 19:17	WG1089631
Carbon disulfide	0.00455		0.00100	1	03/26/2018 19:17	WG1089631
Carbon tetrachloride	ND		0.00100	1	03/26/2018 19:17	WG1089631
Chlorobenzene	ND		0.00100	1	03/26/2018 19:17	WG1089631
Chlorodibromomethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
Chloroethane	ND		0.00500	1	03/26/2018 19:17	WG1089631
Chloroform	ND		0.00500	1	03/26/2018 19:17	WG1089631

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloromethane	0.00418		0.00250	1	03/26/2018 19:17	WG1089631
Dibromomethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/26/2018 19:17	WG1089631
1,2-Dibromoethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,2-Dichlorobenzene	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,4-Dichlorobenzene	ND		0.00100	1	03/26/2018 19:17	WG1089631
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/26/2018 19:17	WG1089631
1,1-Dichloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,2-Dichloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,1-Dichloroethene	ND		0.00100	1	03/26/2018 19:17	WG1089631
cis-1,2-Dichloroethene	ND		0.00100	1	03/26/2018 19:17	WG1089631
trans-1,2-Dichloroethene	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,2-Dichloropropane	ND		0.00100	1	03/26/2018 19:17	WG1089631
cis-1,3-Dichloropropene	ND		0.00100	1	03/26/2018 19:17	WG1089631
trans-1,3-Dichloropropene	ND		0.00100	1	03/26/2018 19:17	WG1089631
Ethylbenzene	ND		0.00100	1	03/26/2018 19:17	WG1089631
2-Hexanone	ND		0.0100	1	03/26/2018 19:17	WG1089631
Iodomethane	ND		0.0100	1	03/26/2018 19:17	WG1089631
2-Butanone (MEK)	0.0773		0.0100	1	03/26/2018 19:17	WG1089631
Methylene Chloride	ND		0.00500	1	03/26/2018 19:17	WG1089631
4-Methyl-2-pentanone (MIBK)	0.0160		0.0100	1	03/26/2018 19:17	WG1089631
Styrene	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
Tetrachloroethene	ND		0.00100	1	03/26/2018 19:17	WG1089631
Toluene	0.00264		0.00100	1	03/26/2018 19:17	WG1089631
1,1,1-Trichloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
1,1,2-Trichloroethane	ND		0.00100	1	03/26/2018 19:17	WG1089631
Trichloroethene	ND		0.00100	1	03/26/2018 19:17	WG1089631
Trichlorofluoromethane	ND		0.00500	1	03/26/2018 19:17	WG1089631
1,2,3-Trichloropropane	ND		0.00250	1	03/26/2018 19:17	WG1089631
Vinyl acetate	ND		0.0100	1	03/26/2018 19:17	WG1089631
Vinyl chloride	ND		0.00100	1	03/26/2018 19:17	WG1089631
Xylenes, Total	0.00306		0.00300	1	03/26/2018 19:17	WG1089631
(S) Toluene-d8	*104*		*80.0-120*		*03/28/2018 19:18*	WG1089631
(S) Toluene-d8	*109*		*80.0-120*		*03/26/2018 19:17*	WG1089631
(S) Dibromofluoromethane	*89.1*		*76.0-123*		*03/26/2018 19:17*	WG1089631
(S) Dibromofluoromethane	*89.1*		*76.0-123*		*03/28/2018 19:18*	WG1089631
(S) a,a,a-Trifluorotoluene	*94.8*		*80.0-120*		*03/28/2018 19:18*	WG1089631
(S) a,a,a-Trifluorotoluene	*103*		*80.0-120*		*03/26/2018 19:17*	WG1089631
(S) 4-Bromofluorobenzene	*110*		*80.0-120*		*03/28/2018 19:18*	WG1089631
(S) 4-Bromofluorobenzene	*106*		*80.0-120*		*03/26/2018 19:17*	WG1089631

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.00000943	.943	03/23/2018 19:12	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000189	.943	03/23/2018 19:12	WG1088432

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	770		300	10	03/26/2018 15:09	WG1089441

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	20600		2000	100	03/28/2018 17:09	WG1089616

Sample Narrative:

L979755-02 WG1089616: 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	7020	V	100	1000	03/23/2018 18:31	WG1088542

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	28000		500	50	03/28/2018 19:59	WG1090324

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		5000	5000	03/24/2018 20:39	WG1088648
Chloride	193000		5000	5000	03/24/2018 20:39	WG1088648
Fluoride	ND		500	5000	03/27/2018 00:39	WG1089317
Nitrate	ND	Q	500	5000	03/24/2018 20:39	WG1088648
Sulfate	ND		25000	5000	03/24/2018 20:39	WG1088648

Sample Narrative:

L979755-02 WG1088648, WG1089317: diluted due to matrix

L979755-02 WG1088648, WG1089317: matrix interference.

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.00200	10	03/28/2018 13:34	WG1089873
Mercury,Dissolved	ND		0.00200	10	03/26/2018 17:15	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	8.96		1.80	9	03/26/2018 23:19	WG1088757
Boron,Dissolved	9.23		4.00	20	03/29/2018 03:18	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.900	9	03/28/2018 17:11	WG1090089
Aluminum,Dissolved	ND		0.500	5	03/27/2018 14:30	WG1087892
Antimony	0.0459		0.0180	9	03/28/2018 17:11	WG1090089
Antimony,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Arsenic	0.0273	B	0.0180	9	03/28/2018 17:11	WG1090089
Arsenic,Dissolved	0.0288		0.0100	5	03/27/2018 14:30	WG1087892
Barium	1.49		0.0450	9	03/28/2018 17:11	WG1090089
Barium,Dissolved	1.71		1.00	200	03/27/2018 16:19	WG1087892
Beryllium	ND		0.0180	9	03/29/2018 13:40	WG1090089
Beryllium,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892
Cadmium	0.293		0.00900	9	03/28/2018 17:11	WG1090089
Cadmium,Dissolved	0.374		0.00500	5	03/27/2018 14:30	WG1087892
Calcium	271		9.00	9	03/28/2018 17:11	WG1090089
Calcium,Dissolved	315		5.00	5	03/27/2018 14:30	WG1087892
Chromium	ND		0.0180	9	03/29/2018 13:40	WG1090089
Chromium,Dissolved	ND		0.0100	5	03/27/2018 14:30	WG1087892
Cobalt	0.0214		0.0180	9	03/28/2018 17:11	WG1090089
Cobalt,Dissolved	0.0263		0.0100	5	03/27/2018 14:30	WG1087892
Copper	35.6		0.900	180	03/29/2018 13:44	WG1090089
Copper,Dissolved	38.5		1.00	200	03/27/2018 16:19	WG1087892
Iron	ND		0.900	9	03/28/2018 17:11	WG1090089
Iron,Dissolved	ND		0.500	5	03/27/2018 14:30	WG1087892
Lead	ND		0.0180	9	03/28/2018 17:11	WG1090089
Lead,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892
Magnesium	ND		9.00	9	03/28/2018 17:11	WG1090089
Magnesium,Dissolved	ND		5.00	5	03/27/2018 14:30	WG1087892
Manganese	0.227		0.0450	9	03/28/2018 17:11	WG1090089
Manganese,Dissolved	0.323		0.0250	5	03/27/2018 14:30	WG1087892
Nickel	0.439		0.0180	9	03/28/2018 17:11	WG1090089
Nickel,Dissolved	0.501		0.0100	5	03/27/2018 14:30	WG1087892
Potassium	52300		180	180	03/29/2018 13:44	WG1090089
Potassium,Dissolved	52500		200	200	03/27/2018 16:19	WG1087892
Selenium	0.0325		0.0180	9	03/28/2018 17:11	WG1090089
Selenium,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892
Silver	ND		0.0180	9	03/28/2018 17:11	WG1090089
Silver,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892
Sodium	66400		180	180	03/29/2018 20:33	WG1091157
Sodium,Dissolved	71400		200	200	03/27/2018 16:19	WG1087892
Thallium	ND		0.0180	9	03/28/2018 17:11	WG1090089
Thallium,Dissolved	ND		0.400	200	03/27/2018 16:19	WG1087892
Vanadium	0.0613	B	0.0450	9	03/28/2018 17:11	WG1090089
Vanadium,Dissolved	0.0721		0.0250	5	03/27/2018 14:30	WG1087892
Zinc	19.0		0.225	9	03/28/2018 17:11	WG1090089
Zinc,Dissolved	24.0		5.00	200	03/27/2018 16:19	WG1087892

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.366	J4	0.250	5	03/28/2018 19:39	WG1089631
Acrylonitrile	ND		0.0500	5	03/28/2018 19:39	WG1089631
Benzene	ND		0.00500	5	03/28/2018 19:39	WG1089631
Bromochloromethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
Bromodichloromethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
Bromoform	ND		0.00500	5	03/28/2018 19:39	WG1089631
Bromomethane	ND		0.0250	5	03/28/2018 19:39	WG1089631
Carbon disulfide	ND		0.00500	5	03/28/2018 19:39	WG1089631
Carbon tetrachloride	ND		0.00500	5	03/28/2018 19:39	WG1089631
Chlorobenzene	ND		0.00500	5	03/28/2018 19:39	WG1089631
Chlorodibromomethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
Chloroethane	ND		0.0250	5	03/28/2018 19:39	WG1089631

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloroform	ND		0.0250	5	03/28/2018 19:39	WG1089631
Chloromethane	ND		0.0125	5	03/28/2018 19:39	WG1089631
Dibromomethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,2-Dibromo-3-Chloropropane	ND		0.0250	5	03/28/2018 19:39	WG1089631
1,2-Dibromoethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,2-Dichlorobenzene	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,4-Dichlorobenzene	ND		0.00500	5	03/28/2018 19:39	WG1089631
trans-1,4-Dichloro-2-butene	ND		0.0125	5	03/28/2018 19:39	WG1089631
1,1-Dichloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,2-Dichloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,1-Dichloroethene	ND		0.00500	5	03/28/2018 19:39	WG1089631
cis-1,2-Dichloroethene	ND		0.00500	5	03/28/2018 19:39	WG1089631
trans-1,2-Dichloroethene	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,2-Dichloropropane	ND		0.00500	5	03/28/2018 19:39	WG1089631
cis-1,3-Dichloropropene	ND		0.00500	5	03/28/2018 19:39	WG1089631
trans-1,3-Dichloropropene	ND		0.00500	5	03/28/2018 19:39	WG1089631
Ethylbenzene	ND		0.00500	5	03/28/2018 19:39	WG1089631
2-Hexanone	ND		0.0500	5	03/28/2018 19:39	WG1089631
Iodomethane	ND		0.0500	5	03/28/2018 19:39	WG1089631
2-Butanone (MEK)	ND		0.0500	5	03/28/2018 19:39	WG1089631
Methylene Chloride	ND		0.0250	5	03/28/2018 19:39	WG1089631
4-Methyl-2-pentanone (MIBK)	ND		0.0500	5	03/28/2018 19:39	WG1089631
Styrene	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,1,1,2-Tetrachloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,1,2,2-Tetrachloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
Tetrachloroethene	ND		0.00500	5	03/28/2018 19:39	WG1089631
Toluene	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,1,1-Trichloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
1,1,2-Trichloroethane	ND		0.00500	5	03/28/2018 19:39	WG1089631
Trichloroethene	ND		0.00500	5	03/28/2018 19:39	WG1089631
Trichlorofluoromethane	ND		0.0250	5	03/28/2018 19:39	WG1089631
1,2,3-Trichloropropane	ND		0.0125	5	03/28/2018 19:39	WG1089631
Vinyl acetate	ND		0.0500	5	03/28/2018 19:39	WG1089631
Vinyl chloride	ND		0.00500	5	03/28/2018 19:39	WG1089631
Xylenes, Total	ND		0.0150	5	03/28/2018 19:39	WG1089631
(S) Toluene-d8	*104*		*80.0-120*		*03/28/2018 19:39*	WG1089631
(S) Dibromofluoromethane	*78.8*		*76.0-123*		*03/28/2018 19:39*	WG1089631
(S) a,a,a-Trifluorotoluene	*96.7*		*80.0-120*		*03/28/2018 19:39*	WG1089631
(S) 4-Bromofluorobenzene	*107*		*80.0-120*		*03/28/2018 19:39*	WG1089631

Sample Narrative:

L979755-02 WG1089631: Non-target compounds too high to run at a lower dilution.

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.00000845	.845	03/23/2018 18:47	WG1088432
1,2-Dibromo-3-Chloropropane	ND		0.0000169	.845	03/23/2018 18:47	WG1088432

Method Blank (MB)

(MB) R3296409-1 03/26/18 14:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.95	J	1.43	30.0

L978679-03 Original Sample (OS) • Duplicate (DUP)

(OS) L978679-03 03/26/18 14:38 • (DUP) R3296409-4 03/26/18 14:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	173	169	1	2.34		20

L979724-05 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-05 03/26/18 14:47 • (DUP) R3296409-5 03/26/18 14:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	56.4	50.2	1	11.6		20

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

(LCS) R3296409-2 03/26/18 14:32 • (LCSD) R3296409-3 03/26/18 14:33

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 %
Hardness (colorimetric) as CaCO3	150	153	151	102	101	85.0-115			1.32	20

L980127-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980127-01 03/26/18 14:59 • (MS) R3296409-6 03/26/18 15:00 • (MSD) R3296409-7 03/26/18 15:01

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 %
Hardness (colorimetric) as CaCO3	150	133	227	227	62.7	62.7	1	80.0-120	E J6	E J6	0.000	20

L979116-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979116-01 03/28/18 09:44 • (DUP) R3297109-1 03/28/18 09:52

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	36.1	37.1	1	2.94		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L980523-06 Original Sample (OS) • Duplicate (DUP)

(OS) L980523-06 03/28/18 14:10 • (DUP) R3297109-4 03/28/18 14:17

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	4.86	0.000	1	200	P1	20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

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

(LCS) R3297109-2 03/28/18 10:56 • (LCSD) R3297109-3 03/28/18 12:20

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 %
Alkalinity	100	93.4	97.3	93.4	97.3	85.0-115			4.05	20

Sample Narrative:
LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5

Method Blank (MB)

(MB) R3296286-1 03/23/18 15:48

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

L979576-02 Original Sample (OS) • Duplicate (DUP)

(OS) L979576-02 03/23/18 15:56 • (DUP) R3296286-4 03/23/18 15:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.0650	1	0.000		10

L979755-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979755-01 03/23/18 18:28 • (DUP) R3296286-7 03/23/18 18:30

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	664	694	250	4.31		10

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

(LCS) R3296286-2 03/23/18 15:49 • (LCSD) R3296286-3 03/23/18 15:51

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 %
Ammonia Nitrogen	7.50	7.42	7.22	99.0	96.3	90.0-110			2.73	10

L979576-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L979576-03 03/23/18 15:59 • (MS) R3296286-5 03/23/18 16:00

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	5.18	102	1	90.0-110	

L979755-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979755-02 03/23/18 18:31 • (MS) R3296286-8 03/23/18 18:33 • (MSD) R3296286-9 03/23/18 18:34

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	0.00500	7020	7060	6970	737	0.000	1000	90.0-110	V	V	1.28	10

Method Blank (MB)

(MB) R3296709-1 03/27/18 13:34

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

L979682-09 Original Sample (OS) • Duplicate (DUP)

(OS) L979682-09 03/27/18 13:37 • (DUP) R3296709-4 03/27/18 13:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	0.000	1	0.000		20

L979830-03 Original Sample (OS) • Duplicate (DUP)

(OS) L979830-03 03/27/18 13:41 • (DUP) R3296709-7 03/27/18 13:41

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	18.4	19.4	1	5.17		20

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

(LCS) R3296709-2 03/27/18 13:35 • (LCSD) R3296709-3 03/27/18 13:35

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 %
COD	242	222	221	91.8	91.1	90.0-110			0.718	20

L979682-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-10 03/27/18 13:37 • (MS) R3296709-5 03/27/18 13:38 • (MSD) R3296709-6 03/27/18 13:38

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	400	397	99.9	99.3	1	80.0-120			0.615	20

Method Blank (MB)

(MB) R3297217-1 03/28/18 19:53

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

L979494-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979494-01 03/28/18 19:55 • (DUP) R3297217-4 03/28/18 19:55

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	51.4	53.0	1	3.02		20

L980852-01 Original Sample (OS) • Duplicate (DUP)

(OS) L980852-01 03/28/18 20:04 • (DUP) R3297217-7 03/28/18 20:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	957	960	1	0.345		20

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

(LCS) R3297217-2 03/28/18 19:53 • (LCSD) R3297217-3 03/28/18 19:54

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 %
COD	242	221	222	91.3	91.6	90.0-110			0.249	20

L980184-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980184-01 03/28/18 20:01 • (MS) R3297217-5 03/28/18 20:01 • (MSD) R3297217-6 03/28/18 20:01

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 %
COD	400	20.1	419	421	99.8	100	1	80.0-120			0.407	20

Method Blank (MB)

(MB) R3296144-1 03/24/18 12:56

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
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L979731-02 Original Sample (OS) • Duplicate (DUP)

(OS) L979731-02 03/24/18 14:51 • (DUP) R3296144-4 03/24/18 15:04

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	50.9	50.7	1	0.304		15
Nitrate	U	0.000	1	0.000		15
Sulfate	U	0.000	1	0.000		15

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

(LCS) R3296144-2 03/24/18 13:08 • (LCSD) R3296144-3 03/24/18 13:21

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 %
Bromide	40.0	41.2	41.3	103	103	80.0-120			0.0608	15
Chloride	40.0	40.2	40.1	100	100	80.0-120			0.0961	15
Nitrate	8.00	8.26	8.24	103	103	80.0-120			0.302	15
Sulfate	40.0	41.7	41.5	104	104	80.0-120			0.368	15

L979731-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L979731-02 03/24/18 14:51 • (MS) R3296144-5 03/24/18 15:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	ND	0.000	1	80.0-120	J6
Chloride	50.0	50.9	97.8	93.9	1	80.0-120	
Nitrate	5.00	U	ND	0.000	1	80.0-120	J6
Sulfate	50.0	U	ND	0.000	1	80.0-120	J6

Method Blank (MB)

(MB) R3296615-1 03/26/18 16:41

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100

L979731-10 Original Sample (OS) • Duplicate (DUP)

(OS) L979731-10 03/26/18 19:30 • (DUP) R3296615-4 03/26/18 20:17

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	17.9	17.9	1	0.346		15
Fluoride	0.0767	0.0741	1	3.45	J	15

L979731-16 Original Sample (OS) • Duplicate (DUP)

(OS) L979731-16 03/26/18 22:35 • (DUP) R3296615-7 03/26/18 23:22

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	0.352	0.000	1	200	P1	15

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

(LCS) R3296615-2 03/26/18 16:57 • (LCSD) R3296615-3 03/26/18 17:12

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 %
Chloride	40.0	39.5	39.5	98.7	98.7	80.0-120			0.0101	15
Fluoride	8.00	8.12	8.15	101	102	80.0-120			0.387	15

L979731-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979731-11 03/26/18 20:32 • (MS) R3296615-5 03/26/18 21:03 • (MSD) R3296615-6 03/26/18 21:18

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 %
Chloride	50.0	72.3	122	124	99.8	104	1	80.0-120	E	E	1.55	15

L979731-16 Original Sample (OS) • Matrix Spike (MS)

(OS) L979731-16 03/26/18 22:35 • (MS) R3296615-8 03/26/18 23:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Fluoride	5.00	0.352	5.27	98.4	1	80.0-120	

Method Blank (MB)

(MB) R3296380-1 03/26/18 12:26

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) R3296380-2 03/26/18 12:29 • (LCSD) R3296380-3 03/26/18 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	0.00267	0.00304	89.1	101	80.0-120			12.8	20

L979911-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979911-02 03/26/18 12:33 • (MS) R3296380-4 03/26/18 12:36 • (MSD) R3296380-5 03/26/18 12:38

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	0.00300	0.00304	100	101	1	75.0-125			1.30	20

Method Blank (MB)

(MB) R3296473-1 03/26/18 16:44

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) R3296473-2 03/26/18 16:46 • (LCSD) R3296473-3 03/26/18 16:48

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 %
Mercury,Dissolved	0.00300	0.00268	0.00269	89.4	89.7	80.0-120			0.231	20

L980079-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980079-07 03/26/18 16:50 • (MS) R3296473-4 03/26/18 16:53 • (MSD) R3296473-5 03/26/18 16:55

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 %
Mercury,Dissolved	0.00300	ND	0.00249	0.00234	82.9	77.9	1	75.0-125			6.20	20

Method Blank (MB)

(MB) R3297149-1 03/28/18 13:04

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) R3297149-2 03/28/18 13:06 • (LCSD) R3297149-3 03/28/18 13:21

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	0.00300	0.00299	0.00303	99.5	101	80.0-120			1.39	20

L980409-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980409-03 03/28/18 13:23 • (MS) R3297149-4 03/28/18 13:26 • (MSD) R3297149-5 03/28/18 13:29

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	0.00299	0.00300	99.7	100	1	75.0-125			0.423	20

Method Blank (MB)

(MB) R3297236-1 03/28/18 17:33

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) R3297236-2 03/28/18 17:36 • (LCSD) R3297236-3 03/28/18 17:39

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	0.969	97.4	96.9	80.0-120			0.459	20

L979410-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979410-02 03/28/18 17:43 • (MS) R3297236-5 03/28/18 17:50 • (MSD) R3297236-6 03/28/18 17:53

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	0.396	1.35	1.35	95.5	94.9	1	75.0-125			0.432	20

Method Blank (MB)

(MB) R3296525-1 03/26/18 22:25

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) R3296525-2 03/26/18 22:27 • (LCSD) R3296525-3 03/26/18 22:30

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 %
Boron	1.00	1.01	0.974	101	97.4	80.0-120			3.10	20

L979884-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979884-02 03/26/18 22:32 • (MS) R3296525-5 03/26/18 22:37 • (MSD) R3296525-6 03/26/18 22:40

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	1.04	1.04	100	99.7	1	75.0-125			0.412	20

Method Blank (MB)

(MB) R3297262-1 03/28/18 19:24

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

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

(LCS) R3297262-2 03/28/18 19:28 • (LCSD) R3297262-3 03/28/18 19:31

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron,Dissolved	1.00	0.980	0.989	98.0	98.9	80.0-120			0.933	20

L979911-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979911-04 03/28/18 19:34 • (MS) R3297262-5 03/28/18 19:41 • (MSD) R3297262-6 03/28/18 19:44

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron,Dissolved	1.00	ND	1.03	1.05	98.3	101	1	75.0-125			2.32	20

Method Blank (MB)

(MB) R3297256-1 03/28/18 17:22

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

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

(LCS) R3297256-2 03/28/18 17:25 • (LCSD) R3297256-3 03/28/18 17:27

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron	1.00	1.03	1.02	103	102	80.0-120			1.33	20

L980184-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980184-01 03/28/18 17:30 • (MS) R3297256-5 03/28/18 17:35 • (MSD) R3297256-6 03/28/18 17:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron	1.00	24.4	25.1	25.1	68.4	64.9	1	75.0-125	V	V	0.141	20

Method Blank (MB)

(MB) R3296773-1 03/27/18 12:24

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	0.00562		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) R3296773-2 03/27/18 12:29 • (LCSD) R3296773-3 03/27/18 12:33

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	4.94	4.91	98.9	98.3	80.0-120			0.653	20
Antimony,Dissolved	0.0500	0.0483	0.0481	96.7	96.2	80.0-120			0.554	20
Arsenic,Dissolved	0.0500	0.0500	0.0502	99.9	100	80.0-120			0.554	20
Barium,Dissolved	0.0500	0.0484	0.0484	96.8	96.7	80.0-120			0.0324	20
Beryllium,Dissolved	0.0500	0.0500	0.0502	99.9	100	80.0-120			0.508	20
Cadmium,Dissolved	0.0500	0.0494	0.0496	98.8	99.1	80.0-120			0.330	20
Calcium,Dissolved	5.00	5.02	5.04	100	101	80.0-120			0.497	20
Chromium,Dissolved	0.0500	0.0510	0.0504	102	101	80.0-120			1.18	20
Copper,Dissolved	0.0500	0.0499	0.0553	99.9	111	80.0-120			10.2	20
Cobalt,Dissolved	0.0500	0.0524	0.0527	105	105	80.0-120			0.550	20
Iron,Dissolved	5.00	5.10	5.13	102	103	80.0-120			0.744	20

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

(LCS) R3296773-2 03/27/18 12:29 • (LCSD) R3296773-3 03/27/18 12:33

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	0.0503	0.0504	101	101	80.0-120			0.158	20
Magnesium,Dissolved	5.00	5.19	5.25	104	105	80.0-120			1.15	20
Manganese,Dissolved	0.0500	0.0494	0.0499	98.7	99.8	80.0-120			1.08	20
Nickel,Dissolved	0.0500	0.0521	0.0528	104	106	80.0-120			1.16	20
Potassium,Dissolved	5.00	5.13	5.12	103	102	80.0-120			0.170	20
Selenium,Dissolved	0.0500	0.0479	0.0497	95.9	99.4	80.0-120			3.57	20
Silver,Dissolved	0.0500	0.0489	0.0487	97.8	97.5	80.0-120			0.337	20
Sodium,Dissolved	5.00	5.20	5.27	104	105	80.0-120			1.21	20
Thallium,Dissolved	0.0500	0.0511	0.0507	102	101	80.0-120			0.682	20
Vanadium,Dissolved	0.0500	0.0496	0.0497	99.1	99.4	80.0-120			0.247	20
Zinc,Dissolved	0.0500	0.0508	0.0511	102	102	80.0-120			0.659	20

L979682-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-01 03/27/18 12:37 • (MS) R3296773-5 03/27/18 12:46 • (MSD) R3296773-6 03/27/18 12:50

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 %
Aluminum,Dissolved	5.00	ND	5.00	5.03	99.5	100	1	75.0-125			0.761	20
Antimony,Dissolved	0.0500	ND	0.0485	0.0492	97.0	98.4	1	75.0-125			1.42	20
Arsenic,Dissolved	0.0500	0.0109	0.0617	0.0613	102	101	1	75.0-125			0.738	20
Barium,Dissolved	0.0500	0.0215	0.0699	0.0709	96.8	98.7	1	75.0-125			1.41	20
Beryllium,Dissolved	0.0500	ND	0.0513	0.0516	103	103	1	75.0-125			0.609	20
Cadmium,Dissolved	0.0500	ND	0.0502	0.0502	100	100	1	75.0-125			0.0429	20
Calcium,Dissolved	5.00	7.58	12.5	12.5	99.2	99.3	1	75.0-125			0.0506	20
Chromium,Dissolved	0.0500	ND	0.0508	0.0504	102	101	1	75.0-125			0.825	20
Cobalt,Dissolved	0.0500	0.0448	0.0980	0.0969	106	104	1	75.0-125			1.13	20
Potassium,Dissolved	5.00	1.28	6.44	6.46	103	103	1	75.0-125			0.164	20
Iron,Dissolved	5.00	8.83	13.8	13.8	98.7	98.8	1	75.0-125			0.0355	20
Lead,Dissolved	0.0500	ND	0.0511	0.0512	102	102	1	75.0-125			0.319	20
Magnesium,Dissolved	5.00	2.83	8.09	8.09	105	105	1	75.0-125			0.0177	20
Manganese,Dissolved	0.0500	0.791	0.833	0.828	84.9	74.8	1	75.0-125		V	0.610	20
Nickel,Dissolved	0.0500	0.00676	0.0592	0.0589	105	104	1	75.0-125			0.528	20
Selenium,Dissolved	0.0500	ND	0.0511	0.0516	102	103	1	75.0-125			0.875	20
Silver,Dissolved	0.0500	ND	0.0489	0.0495	97.7	99.1	1	75.0-125			1.34	20
Sodium,Dissolved	5.00	4.68	9.96	10.0	106	106	1	75.0-125			0.411	20
Thallium,Dissolved	0.0500	ND	0.0516	0.0519	103	104	1	75.0-125			0.585	20
Vanadium,Dissolved	0.0500	ND	0.0503	0.0498	101	99.6	1	75.0-125			0.928	20
Zinc,Dissolved	0.0500	ND	0.0642	0.0661	101	105	1	75.0-125			3.03	20

Method Blank (MB)

(MB) R3297194-1 03/28/18 12:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	0.0197	J	0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	0.000511	J	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
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	0.000279	J	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

Method Blank (MB)

(MB) R3297196-1 03/28/18 03:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Copper	U		0.000520	0.00500

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

(LCS) R3297194-2 03/28/18 12:57 • (LCSD) R3297194-3 03/28/18 13:01

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 %
Aluminum	5.00	4.87	4.95	97.4	99.0	80.0-120			1.58	20
Antimony	0.0500	0.0469	0.0455	93.8	91.0	80.0-120			2.99	20
Arsenic	0.0500	0.0490	0.0482	98.0	96.5	80.0-120			1.56	20
Barium	0.0500	0.0462	0.0454	92.4	90.8	80.0-120			1.74	20
Beryllium	0.0500	0.0484	0.0484	96.9	96.9	80.0-120			0.00126	20

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

(LCS) R3297194-2 03/28/18 12:57 • (LCSD) R3297194-3 03/28/18 13:01

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 %
Cadmium	0.0500	0.0504	0.0506	101	101	80.0-120			0.247	20
Calcium	5.00	4.93	4.95	98.5	99.0	80.0-120			0.489	20
Chromium	0.0500	0.0506	0.0511	101	102	80.0-120			0.849	20
Cobalt	0.0500	0.0517	0.0513	103	103	80.0-120			0.733	20
Iron	5.00	5.14	5.15	103	103	80.0-120			0.0715	20
Lead	0.0500	0.0495	0.0499	99.1	99.9	80.0-120			0.758	20
Magnesium	5.00	5.16	5.22	103	104	80.0-120			1.10	20
Manganese	0.0500	0.0495	0.0492	98.9	98.4	80.0-120			0.571	20
Nickel	0.0500	0.0524	0.0518	105	104	80.0-120			1.01	20
Potassium	5.00	5.07	5.12	101	102	80.0-120			0.958	20
Selenium	0.0500	0.0496	0.0494	99.2	98.9	80.0-120			0.319	20
Silver	0.0500	0.0481	0.0478	96.2	95.7	80.0-120			0.475	20
Sodium	5.00	5.20	5.32	104	106	80.0-120			2.23	20
Thallium	0.0500	0.0499	0.0505	99.8	101	80.0-120			1.10	20
Vanadium	0.0500	0.0498	0.0497	99.6	99.5	80.0-120			0.0939	20
Zinc	0.0500	0.0504	0.0504	101	101	80.0-120			0.0553	20

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

(LCS) R3297196-2 03/28/18 03:23 • (LCSD) R3297196-3 03/28/18 03:27

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 %
Copper	0.0500	0.0499	0.0498	99.9	99.5	80.0-120			0.330	20

L979731-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979731-11 03/28/18 13:06 • (MS) R3297194-5 03/28/18 13:14 • (MSD) R3297194-6 03/28/18 13:19

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	187	192	189	108	45.2	1	75.0-125		V	1.65	20
Antimony	0.0500	U	0.0490	0.0489	97.9	97.8	1	75.0-125			0.132	20
Arsenic	0.0500	0.00778	0.0566	0.0559	97.7	96.3	1	75.0-125			1.24	20
Barium	0.0500	0.0686	0.119	0.118	99.8	98.2	1	75.0-125			0.660	20
Beryllium	0.0500	0.0141	0.0580	0.0599	87.9	91.7	1	75.0-125			3.22	20
Cadmium	0.0500	0.00231	0.0518	0.0521	99.0	99.5	1	75.0-125			0.476	20
Calcium	5.00	108	113	113	86.0	85.3	1	75.0-125			0.0335	20
Chromium	0.0500	0.00195	0.0486	0.0497	93.4	95.5	1	75.0-125			2.20	20
Cobalt	0.0500	0.554	0.593	0.597	77.1	84.9	1	75.0-125			0.656	20
Potassium	5.00	21.1	26.3	26.1	104	99.3	1	75.0-125			0.894	20

L979731-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979731-11 03/28/18 13:06 • (MS) R3297194-5 03/28/18 13:14 • (MSD) R3297194-6 03/28/18 13:19

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 %
Iron	5.00	0.466	5.27	5.36	96.0	97.8	1	75.0-125			1.69	20
Lead	0.0500	0.0159	0.0666	0.0667	101	102	1	75.0-125			0.215	20
Magnesium	5.00	68.4	72.4	72.0	78.8	71.7	1	75.0-125		V	0.491	20
Manganese	0.0500	3.16	3.15	3.15	0.000	0.000	1	75.0-125	V	V	0.229	20
Nickel	0.0500	21.7	21.2	21.3	0.000	0.000	1	75.0-125	E V	E V	0.0745	20
Selenium	0.0500	0.00780	0.0593	0.0586	103	101	1	75.0-125			1.29	20
Silver	0.0500	U	0.0483	0.0478	96.5	95.6	1	75.0-125			0.979	20
Sodium	5.00	267	267	269	18.1	43.0	1	75.0-125	V	V	0.464	20
Thallium	0.0500	0.000774	0.0520	0.0522	103	103	1	75.0-125			0.291	20
Vanadium	0.0500	0.000984	0.0486	0.0489	95.2	95.9	1	75.0-125			0.713	20
Zinc	0.0500	0.401	0.452	0.451	102	100	1	75.0-125			0.213	20

L979731-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979731-11 03/28/18 03:32 • (MS) R3297196-5 03/28/18 03:40 • (MSD) R3297196-6 03/28/18 03:45

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 %
Copper	0.0500	0.00725	0.0528	0.0530	91.1	91.4	1	75.0-125			0.284	20

Method Blank (MB)

(MB) R3297231-1 03/28/18 16:44

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	0.00539	J	0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	0.000436	J	0.000250	0.00200
Barium	U		0.000360	0.00500
Cadmium	0.000167	J	0.000160	0.00100
Calcium	0.0607	J	0.0460	1.00
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	0.000292	J	0.000250	0.00500
Nickel	0.000529	J	0.000350	0.00200
Potassium	0.540	J	0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Thallium	U		0.000190	0.00200
Vanadium	0.00118	J	0.000180	0.00500
Zinc	U		0.00256	0.0250

Method Blank (MB)

(MB) R3297498-1 03/29/18 13:13

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Beryllium	0.000160	J	0.000120	0.00200
Chromium	U		0.000540	0.00200
Copper	U		0.000520	0.00500

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

(LCS) R3297231-2 03/28/18 16:48 • (LCSD) R3297231-3 03/28/18 16:52

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	5.04	5.23	101	105	80.0-120			3.68	20
Antimony	0.0500	0.0432	0.0460	86.4	91.9	80.0-120			6.17	20
Arsenic	0.0500	0.0488	0.0503	97.6	101	80.0-120			3.03	20
Barium	0.0500	0.0462	0.0467	92.4	93.3	80.0-120			1.03	20
Cadmium	0.0500	0.0478	0.0489	95.6	97.8	80.0-120			2.23	20
Calcium	5.00	4.88	4.92	97.5	98.4	80.0-120			0.931	20

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

(LCS) R3297231-2 03/28/18 16:48 • (LCSD) R3297231-3 03/28/18 16:52

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 %
Cobalt	0.0500	0.0516	0.0535	103	107	80.0-120			3.45	20
Iron	5.00	4.94	5.15	98.9	103	80.0-120			4.11	20
Lead	0.0500	0.0483	0.0500	96.6	100	80.0-120			3.56	20
Magnesium	5.00	5.17	5.32	103	106	80.0-120			2.82	20
Manganese	0.0500	0.0480	0.0492	96.0	98.4	80.0-120			2.50	20
Nickel	0.0500	0.0517	0.0535	103	107	80.0-120			3.44	20
Potassium	5.00	5.21	5.29	104	106	80.0-120			1.64	20
Selenium	0.0500	0.0490	0.0490	98.0	98.1	80.0-120			0.121	20
Silver	0.0500	0.0462	0.0485	92.4	96.9	80.0-120			4.79	20
Thallium	0.0500	0.0475	0.0484	95.0	96.7	80.0-120			1.80	20
Vanadium	0.0500	0.0515	0.0531	103	106	80.0-120			3.04	20
Zinc	0.0500	0.0488	0.0503	97.6	101	80.0-120			3.02	20

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

(LCS) R3297498-2 03/29/18 13:16 • (LCSD) R3297498-3 03/29/18 13:20

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 %
Beryllium	0.0500	0.0477	0.0487	95.4	97.5	80.0-120			2.10	20
Chromium	0.0500	0.0497	0.0510	99.5	102	80.0-120			2.40	20
Copper	0.0500	0.0502	0.0515	100	103	80.0-120			2.73	20

L980678-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980678-07 03/28/18 16:56 • (MS) R3297231-5 03/28/18 17:04 • (MSD) R3297231-6 03/28/18 17:07

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	0.152	5.30	5.21	103	101	1	75.0-125			1.67	20
Antimony	0.0500	U	0.0467	0.0462	93.4	92.3	1	75.0-125			1.18	20
Arsenic	0.0500	0.00153	0.0512	0.0505	99.4	97.9	1	75.0-125			1.43	20
Barium	0.0500	0.0703	0.116	0.117	92.0	92.7	1	75.0-125			0.295	20
Cadmium	0.0500	U	0.0494	0.0492	98.8	98.4	1	75.0-125			0.455	20
Calcium	5.00	3.36	8.12	8.07	95.3	94.2	1	75.0-125			0.656	20
Cobalt	0.0500	0.00618	0.0585	0.0578	105	103	1	75.0-125			1.09	20
Potassium	5.00	0.493	5.41	5.50	98.3	100	1	75.0-125			1.73	20
Iron	5.00	129	131	131	42.8	41.9	1	75.0-125	V	V	0.0337	20
Lead	0.0500	U	0.0492	0.0481	98.4	96.2	1	75.0-125			2.21	20
Magnesium	5.00	2.17	7.42	7.35	105	104	1	75.0-125			0.932	20
Manganese	0.0500	0.186	0.229	0.229	85.7	84.9	1	75.0-125			0.186	20

L980678-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980678-07 03/28/18 16:56 • (MS) R3297231-5 03/28/18 17:04 • (MSD) R3297231-6 03/28/18 17:07

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 %
Nickel	0.0500	0.00881	0.0618	0.0610	106	104	1	75.0-125			1.20	20
Selenium	0.0500	0.000390	0.0493	0.0493	97.9	97.9	1	75.0-125			0.0415	20
Silver	0.0500	U	0.0489	0.0489	97.8	97.7	1	75.0-125			0.0712	20
Thallium	0.0500	U	0.0473	0.0470	94.6	93.9	1	75.0-125			0.713	20
Vanadium	0.0500	0.000322	0.0520	0.0514	103	102	1	75.0-125			0.993	20
Zinc	0.0500	0.0118	0.0631	0.0599	103	96.3	1	75.0-125			5.14	20

L980678-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980678-07 03/29/18 13:24 • (MS) R3297498-5 03/29/18 13:32 • (MSD) R3297498-6 03/29/18 13:36

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 %
Beryllium	0.0500	0.000176	0.0454	0.0473	90.5	94.3	1	75.0-125			4.12	20
Chromium	0.0500	U	0.0512	0.0496	102	99.2	1	75.0-125			3.27	20
Copper	0.0500	U	0.0531	0.0509	106	102	1	75.0-125			4.07	20

Method Blank (MB)

(MB) R3297609-7 03/29/18 21:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sodium	U		0.110	1.00

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

(LCS) R3297609-2 03/29/18 20:07 • (LCSD) R3297609-3 03/29/18 20:11

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	5.00	5.09	5.06	102	101	80.0-120			0.619	20

L981404-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L981404-01 03/29/18 20:16 • (MS) R3297609-5 03/29/18 20:24 • (MSD) R3297609-6 03/29/18 20:29

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	5.00	13.2	18.0	18.2	94.2	99.2	1	75.0-125			1.37	20

Method Blank (MB)

(MB) R3297072-2 03/26/18 16:47

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) R3297072-2 03/26/18 16:47

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	*106*			*80.0-120*
(S) Dibromofluoromethane	*96.5*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*105*			*80.0-120*
(S) 4-Bromofluorobenzene	*101*			*80.0-120*

Laboratory Control Sample (LCS)

(LCS) R3297072-1 03/26/18 16:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	0.125	0.283	226	10.0-160	J4
Acrylonitrile	0.125	0.156	125	60.0-142	
Benzene	0.0250	0.0223	89.3	69.0-123	
Bromodichloromethane	0.0250	0.0231	92.4	76.0-120	
Bromochloromethane	0.0250	0.0220	87.9	76.0-122	
Bromoform	0.0250	0.0230	91.8	67.0-132	
Bromomethane	0.0250	0.0339	136	18.0-160	
Carbon disulfide	0.0250	0.0190	76.1	55.0-127	
Carbon tetrachloride	0.0250	0.0227	90.8	63.0-122	
Chlorobenzene	0.0250	0.0233	93.4	79.0-121	
Chlorodibromomethane	0.0250	0.0227	90.9	75.0-125	
Chloroethane	0.0250	0.0246	98.2	47.0-152	
Chloroform	0.0250	0.0237	94.8	72.0-121	
Chloromethane	0.0250	0.0235	93.9	48.0-139	
1,2-Dibromo-3-Chloropropane	0.0250	0.0249	99.6	64.0-127	
1,2-Dibromoethane	0.0250	0.0216	86.6	77.0-123	
Dibromomethane	0.0250	0.0225	89.9	78.0-120	
1,2-Dichlorobenzene	0.0250	0.0241	96.4	80.0-120	
1,4-Dichlorobenzene	0.0250	0.0223	89.3	77.0-120	
trans-1,4-Dichloro-2-butene	0.0250	0.0241	96.4	55.0-134	
1,1-Dichloroethane	0.0250	0.0227	90.6	70.0-126	
1,2-Dichloroethane	0.0250	0.0227	90.7	67.0-126	

Laboratory Control Sample (LCS)

(LCS) R3297072-1 03/26/18 16:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
1,1-Dichloroethene	0.0250	0.0218	87.2	64.0-129	
cis-1,2-Dichloroethene	0.0250	0.0236	94.2	73.0-120	
trans-1,2-Dichloroethene	0.0250	0.0232	92.9	71.0-121	
1,2-Dichloropropane	0.0250	0.0231	92.3	75.0-125	
cis-1,3-Dichloropropene	0.0250	0.0229	91.5	79.0-123	
trans-1,3-Dichloropropene	0.0250	0.0231	92.3	74.0-127	
Ethylbenzene	0.0250	0.0232	92.6	77.0-120	
2-Hexanone	0.125	0.135	108	58.0-147	
Iodomethane	0.125	0.116	92.6	57.0-140	
2-Butanone (MEK)	0.125	0.110	87.9	37.0-158	
Methylene Chloride	0.0250	0.0237	94.8	66.0-121	
4-Methyl-2-pentanone (MIBK)	0.125	0.125	100	59.0-143	
Styrene	0.0250	0.0197	78.7	78.0-124	
1,1,1,2-Tetrachloroethane	0.0250	0.0236	94.3	75.0-122	
1,1,2,2-Tetrachloroethane	0.0250	0.0231	92.4	71.0-122	
Tetrachloroethene	0.0250	0.0245	98.1	70.0-127	
Toluene	0.0250	0.0215	85.9	77.0-120	
1,1,1-Trichloroethane	0.0250	0.0226	90.3	68.0-122	
1,1,2-Trichloroethane	0.0250	0.0236	94.4	78.0-120	
Trichloroethene	0.0250	0.0252	101	78.0-120	
Trichlorofluoromethane	0.0250	0.0252	101	56.0-137	
1,2,3-Trichloropropane	0.0250	0.0221	88.5	72.0-124	
Vinyl acetate	0.125	0.0947	75.7	46.0-160	
Vinyl chloride	0.0250	0.0226	90.6	64.0-133	
Xylenes, Total	0.0750	0.0691	92.1	77.0-120	
(S) Toluene-d8			*105*	*80.0-120*	
(S) Dibromofluoromethane			*95.8*	*76.0-123*	
(S) a,a,a-Trifluorotoluene			*105*	*80.0-120*	
(S) 4-Bromofluorobenzene			*92.8*	*80.0-120*	

Method Blank (MB)

(MB) R3296042-1 03/23/18 18:22

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

L979755-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979755-01 03/23/18 19:12 • (DUP) R3296042-3 03/23/18 18:59

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	ND	0.000	.943	0.000		20
1,2-Dibromo-3-Chloropropane	ND	0.000	.943	0.000		20

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

(LCS) R3296042-4 03/23/18 21:16 • (LCSD) R3296042-5 03/23/18 23:20

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	0.000229	0.000238	91.7	95.0	60.0-140			3.60	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000246	0.000251	98.5	101	60.0-140			2.10	20

L979755-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L979755-02 03/23/18 18:47 • (MS) R3296042-2 03/23/18 18:35

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	0.0000887	88.7	.843	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000992	99.2	.843	63.0-149	

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, 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.
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.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
Q	Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences 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 ESC Lab Sciences.

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	T 104704245-17-14
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

ESC Lab Sciences 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. ESC Lab Sciences 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:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 171-873

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (Signature): Philip 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

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. M6020AP1-FF 250mlHDPE-HNO3	M6020AP1,HARD 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl					Remarks	Sample # (lab only)
IWC-L	Grab	GW	-	3-22-18	1200	10	X	X	X	X	X	X						-01
APWC-L	Grab	GW	-	3-22-18	1245	10	X	X	X	X	X	X						-02

* 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
M6020AP1(Tot/Diss)includes Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH ___ Temp ___
Flow ___ Other ___

Samples returned via: __ UPS __ FedEx __ Courier CT

Tracking #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	3-22-18	16:58	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) Sue Anderson

Trip Blank Received: Yes / No HCl / MeoH TBR

Temp: 6.0°C 0.0°C Bottles Received: 10

Date: 3/22/18 Time: 1658

Hold:

Condition: NCF / OK

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
None

If preservation required by Login: Date/Time

Chain of Custody Page 1 of 1

ESC LABS
a subsidiary of Pace Analytical
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L979955

C197

Acctnum: CEC
Template: T133582
Prelogin: P643552
TSR: 526 - Chris McCord
PB: JB 3-7-18
Shipped Via: FedEX Ground

ESC Lab Sciences
Non-Conformance Form

Login #:L979755	Client:CEC	Date:03/22/18	Evaluated by: Myra "Katie" Ingram

Non-Conformance (check applicable items)

	Sample Integrity		Chain of Custody Clarification		
	Parameter(s) past holding time		Login Clarification Needed		**If Broken Container:**
	Improper temperature		Chain of custody is incomplete		Insufficient packing material around container
	Improper container type		Please specify Metals requested.		Insufficient packing material inside cooler
X	Improper preservation		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courie
	Insufficient sample volume.		Received additional samples not listed on coc.		Sample was frozen
	Sample is biphasic.		Sample ids on containers do not match ids on coc		Container lid not intact
	Vials received with headspace.		Trip Blank not received.		**If no Chain of Custody:**
	Broken container		Client did not "X" analysis.		Received by:
	Broken container:		Chain of Custody is missing		Date/Time:
	Sufficient sample remains				Temp./Cont. Rec./pH:
					Carrier:
					Tracking#

Login Comments:

All containers for ID: APWC-L have a ph of 11

Client informed by:	x	Call		Email		Voice Mail		Date:3/23/18	Time: 11:02
TSR Initials:CM	Client Contact: Philip Campbell								

Login Instructions:

Samples were preserved in the field. Matrix related issue. Please adjust Total and Dissolved metals as well. Dissolved metals were field filtered.

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.**	APWC-L
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, 50's
DATE & TIME	3-22-18 / 12:45	**EVENT FREQUENCY**	Grab
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
–	12:45	–	23.1	9.95	312624	0.03	-160.1	20.7

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	
Number of Containers	10 ~~12~~	**Sampler Signature**	P Murphy for Campbell

ANALYTICAL REPORT

March 29, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L979724
Samples Received:	03/22/2018
Project Number:	171-873
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:

Jason Romer
Technical Service Representative

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 ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

CHARLIE CREEK US L979724-01 GW

Collected by: Caleb Duke | Collected date/time: 03/21/18 12:15 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1088664	1	03/26/18 12:51	03/26/18 12:51	KK
Wet Chemistry by Method 350.1	WG1088824	1	03/27/18 13:25	03/27/18 13:25	JER
Wet Chemistry by Method 9056A	WG1088583	1	03/23/18 21:56	03/23/18 21:56	MAJ
Mercury by Method 7470A	WG1088455	1	03/23/18 09:48	03/25/18 10:18	EL
Mercury by Method 7470A	WG1089292	1	03/26/18 13:04	03/26/18 16:57	EL
Metals (ICP) by Method 6010B	WG1088757	1	03/26/18 19:24	03/26/18 22:42	TRB
Metals (ICP) by Method 6010B	WG1088765	1	03/28/18 08:17	03/28/18 19:48	TRB
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:08	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/28/18 14:24	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 12:02	JPD
Metals (ICPMS) by Method 6020	WG1091034	1	03/29/18 11:46	03/29/18 13:45	JPD

CHARLIE CREEK MS L979724-02 GW

Collected by: Caleb Duke | Collected date/time: 03/21/18 11:30 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	1	03/26/18 14:45	03/26/18 14:45	KK
Wet Chemistry by Method 350.1	WG1088824	1	03/27/18 13:28	03/27/18 13:28	JER
Wet Chemistry by Method 9056A	WG1088583	1	03/23/18 22:08	03/23/18 22:08	MAJ
Mercury by Method 7470A	WG1088455	1	03/23/18 09:48	03/25/18 10:50	EL
Mercury by Method 7470A	WG1089292	1	03/26/18 13:04	03/26/18 16:59	EL
Metals (ICP) by Method 6010B	WG1088757	1	03/26/18 19:24	03/26/18 22:45	TRB
Metals (ICP) by Method 6010B	WG1088765	1	03/28/18 08:17	03/28/18 19:51	TRB
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:12	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/28/18 14:47	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 12:19	JPD
Metals (ICPMS) by Method 6020	WG1091034	1	03/29/18 11:46	03/29/18 13:49	JPD

CANE CREEK US L979724-03 GW

Collected by: Caleb Duke | Collected date/time: 03/21/18 11:45 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	1	03/26/18 14:46	03/26/18 14:46	KK
Wet Chemistry by Method 350.1	WG1088824	1	03/27/18 13:31	03/27/18 13:31	JER
Wet Chemistry by Method 9056A	WG1088583	1	03/23/18 23:10	03/23/18 23:10	MAJ
Mercury by Method 7470A	WG1088455	1	03/23/18 09:48	03/25/18 10:52	EL
Mercury by Method 7470A	WG1089292	1	03/26/18 13:04	03/26/18 17:02	EL
Metals (ICP) by Method 6010B	WG1088757	1	03/26/18 19:24	03/26/18 22:48	TRB
Metals (ICP) by Method 6010B	WG1088765	1	03/28/18 08:17	03/28/18 19:55	TRB
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:16	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/28/18 14:51	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 12:23	JPD
Metals (ICPMS) by Method 6020	WG1091034	1	03/29/18 11:46	03/29/18 13:54	JPD

CANE CREEK MS L979724-04 GW

Collected by: Caleb Duke | Collected date/time: 03/21/18 10:30 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	1	03/26/18 14:46	03/26/18 14:46	KK
Wet Chemistry by Method 350.1	WG1088824	1	03/27/18 13:33	03/27/18 13:33	JER
Wet Chemistry by Method 9056A	WG1088583	1	03/23/18 23:23	03/23/18 23:23	MAJ
Mercury by Method 7470A	WG1088455	1	03/23/18 09:48	03/25/18 10:54	EL
Mercury by Method 7470A	WG1089292	1	03/26/18 13:04	03/26/18 17:04	EL

CANE CREEK MS L979724-04 GW

Collected by: Caleb Duke
Collected date/time: 03/21/18 10:30
Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1088757	1	03/26/18 19:24	03/26/18 22:57	TRB
Metals (ICP) by Method 6010B	WG1088765	1	03/28/18 08:17	03/28/18 20:05	TRB
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:30	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/28/18 14:55	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 12:27	JPD
Metals (ICPMS) by Method 6020	WG1091034	1	03/29/18 11:46	03/29/18 14:11	JPD

CANE CREEK DS-1 L979724-05 GW

Collected by: Caleb Duke
Collected date/time: 03/21/18 10:00
Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1089441	1	03/26/18 14:47	03/26/18 14:47	KK
Wet Chemistry by Method 350.1	WG1088824	1	03/27/18 13:35	03/27/18 13:35	JER
Wet Chemistry by Method 9056A	WG1088583	1	03/23/18 23:35	03/23/18 23:35	MAJ
Mercury by Method 7470A	WG1088455	1	03/23/18 09:48	03/25/18 10:56	EL
Mercury by Method 7470A	WG1089292	1	03/26/18 13:04	03/26/18 17:11	EL
Metals (ICP) by Method 6010B	WG1088757	1	03/26/18 19:24	03/26/18 23:00	TRB
Metals (ICP) by Method 6010B	WG1088765	1	03/28/18 08:17	03/28/18 20:08	TRB
Metals (ICPMS) by Method 6020	WG1088759	1	03/27/18 08:45	03/27/18 21:34	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/28/18 14:59	LD
Metals (ICPMS) by Method 6020	WG1089404	1	03/27/18 21:46	03/29/18 12:31	JPD
Metals (ICPMS) by Method 6020	WG1091034	1	03/29/18 11:46	03/29/18 14:15	JPD

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 radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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.

Jason Romer
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	34.2	B	30.0	1	03/26/2018 12:51	WG1088664

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	03/27/2018 13:25	WG1088824

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 21:56	WG1088583
Chloride	5.93		1.00	1	03/23/2018 21:56	WG1088583
Fluoride	ND		0.100	1	03/23/2018 21:56	WG1088583

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/25/2018 10:18	WG1088455
Mercury,Dissolved	ND		0.000200	1	03/26/2018 16:57	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/26/2018 22:42	WG1088757
Boron,Dissolved	ND		0.200	1	03/28/2018 19:48	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.458		0.100	1	03/27/2018 21:08	WG1088759
Aluminum,Dissolved	0.213		0.100	1	03/28/2018 14:24	WG1089404
Antimony	ND		0.00200	1	03/27/2018 21:08	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Arsenic	ND		0.00200	1	03/27/2018 21:08	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Barium	0.0331		0.00500	1	03/27/2018 21:08	WG1088759
Barium,Dissolved	0.0270		0.00500	1	03/28/2018 14:24	WG1089404
Beryllium	ND		0.00200	1	03/27/2018 21:08	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Cadmium	ND		0.00100	1	03/27/2018 21:08	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/28/2018 14:24	WG1089404
Calcium	8.40		1.00	1	03/27/2018 21:08	WG1088759
Calcium,Dissolved	8.06		1.00	1	03/28/2018 14:24	WG1089404
Chromium	ND		0.00200	1	03/27/2018 21:08	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/29/2018 12:02	WG1089404
Cobalt	ND		0.00200	1	03/27/2018 21:08	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Copper	ND		0.00500	1	03/27/2018 21:08	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 12:02	WG1089404
Iron	0.771		0.100	1	03/27/2018 21:08	WG1088759
Iron,Dissolved	0.311		0.100	1	03/28/2018 14:24	WG1089404
Lead	ND		0.00200	1	03/27/2018 21:08	WG1088759
Lead,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.00		1.00	1	03/27/2018 21:08	WG1088759
Magnesium,Dissolved	1.99		1.00	1	03/28/2018 14:24	WG1089404
Manganese	0.127		0.00500	1	03/27/2018 21:08	WG1088759
Manganese,Dissolved	0.0578		0.00500	1	03/28/2018 14:24	WG1089404
Nickel	0.00229		0.00200	1	03/27/2018 21:08	WG1088759
Nickel,Dissolved	0.00227	B	0.00200	1	03/28/2018 14:24	WG1089404
Potassium	1.08		1.00	1	03/27/2018 21:08	WG1088759
Potassium,Dissolved	1.15	B	1.00	1	03/28/2018 14:24	WG1089404
Selenium	ND		0.00200	1	03/27/2018 21:08	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Silver	ND		0.00200	1	03/27/2018 21:08	WG1088759
Silver,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Sodium	5.21		1.00	1	03/27/2018 21:08	WG1088759
Sodium,Dissolved	4.80		1.00	1	03/29/2018 13:45	WG1091034
Thallium	ND		0.00200	1	03/27/2018 21:08	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/28/2018 14:24	WG1089404
Vanadium	ND		0.00500	1	03/27/2018 21:08	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/28/2018 14:24	WG1089404
Zinc	ND		0.0250	1	03/27/2018 21:08	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/28/2018 14:24	WG1089404

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	36.1	B	30.0	1	03/26/2018 14:45	WG1089441

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	03/27/2018 13:28	WG1088824

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 22:08	WG1088583
Chloride	7.03		1.00	1	03/23/2018 22:08	WG1088583
Fluoride	ND	P1	0.100	1	03/23/2018 22:08	WG1088583

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/25/2018 10:50	WG1088455
Mercury,Dissolved	ND		0.000200	1	03/26/2018 16:59	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/26/2018 22:45	WG1088757
Boron,Dissolved	ND		0.200	1	03/28/2018 19:51	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.529		0.100	1	03/27/2018 21:12	WG1088759
Aluminum,Dissolved	0.168		0.100	1	03/28/2018 14:47	WG1089404
Antimony	ND		0.00200	1	03/27/2018 21:12	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Arsenic	ND		0.00200	1	03/27/2018 21:12	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Barium	0.0359		0.00500	1	03/27/2018 21:12	WG1088759
Barium,Dissolved	0.0295		0.00500	1	03/28/2018 14:47	WG1089404
Beryllium	ND		0.00200	1	03/27/2018 21:12	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Cadmium	ND		0.00100	1	03/27/2018 21:12	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/28/2018 14:47	WG1089404
Calcium	10.1		1.00	1	03/27/2018 21:12	WG1088759
Calcium,Dissolved	9.46		1.00	1	03/28/2018 14:47	WG1089404
Chromium	ND		0.00200	1	03/27/2018 21:12	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/29/2018 12:19	WG1089404
Cobalt	ND		0.00200	1	03/27/2018 21:12	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Copper	ND		0.00500	1	03/27/2018 21:12	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 12:19	WG1089404
Iron	0.890		0.100	1	03/27/2018 21:12	WG1088759
Iron,Dissolved	0.297		0.100	1	03/28/2018 14:47	WG1089404
Lead	ND		0.00200	1	03/27/2018 21:12	WG1088759
Lead,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.29		1.00	1	03/27/2018 21:12	WG1088759
Magnesium,Dissolved	2.22		1.00	1	03/28/2018 14:47	WG1089404
Manganese	0.207		0.00500	1	03/27/2018 21:12	WG1088759
Manganese,Dissolved	0.142		0.00500	1	03/28/2018 14:47	WG1089404
Nickel	0.00234		0.00200	1	03/27/2018 21:12	WG1088759
Nickel,Dissolved	0.00217	B	0.00200	1	03/28/2018 14:47	WG1089404
Potassium	1.23		1.00	1	03/27/2018 21:12	WG1088759
Potassium,Dissolved	1.63	B	1.00	1	03/28/2018 14:47	WG1089404
Selenium	ND		0.00200	1	03/27/2018 21:12	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Silver	ND		0.00200	1	03/27/2018 21:12	WG1088759
Silver,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Sodium	5.51		1.00	1	03/27/2018 21:12	WG1088759
Sodium,Dissolved	5.08		1.00	1	03/29/2018 13:49	WG1091034
Thallium	ND		0.00200	1	03/27/2018 21:12	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/28/2018 14:47	WG1089404
Vanadium	ND		0.00500	1	03/27/2018 21:12	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/28/2018 14:47	WG1089404
Zinc	ND		0.0250	1	03/27/2018 21:12	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/28/2018 14:47	WG1089404

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	59.8		30.0	1	03/26/2018 14:46	WG1089441

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	03/27/2018 13:31	WG1088824

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 23:10	WG1088583
Chloride	7.76		1.00	1	03/23/2018 23:10	WG1088583
Fluoride	ND		0.100	1	03/23/2018 23:10	WG1088583

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/25/2018 10:52	WG1088455
Mercury,Dissolved	ND		0.000200	1	03/26/2018 17:02	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/26/2018 22:48	WG1088757
Boron,Dissolved	ND		0.200	1	03/28/2018 19:55	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.574		0.100	1	03/27/2018 21:16	WG1088759
Aluminum,Dissolved	0.124		0.100	1	03/28/2018 14:51	WG1089404
Antimony	ND		0.00200	1	03/27/2018 21:16	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Arsenic	ND		0.00200	1	03/27/2018 21:16	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Barium	0.0360		0.00500	1	03/27/2018 21:16	WG1088759
Barium,Dissolved	0.0290		0.00500	1	03/28/2018 14:51	WG1089404
Beryllium	ND		0.00200	1	03/27/2018 21:16	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Cadmium	ND		0.00100	1	03/27/2018 21:16	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/28/2018 14:51	WG1089404
Calcium	14.3		1.00	1	03/27/2018 21:16	WG1088759
Calcium,Dissolved	13.6		1.00	1	03/28/2018 14:51	WG1089404
Chromium	ND		0.00200	1	03/27/2018 21:16	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/29/2018 12:23	WG1089404
Cobalt	0.00285		0.00200	1	03/27/2018 21:16	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Copper	ND		0.00500	1	03/27/2018 21:16	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 12:23	WG1089404
Iron	1.56		0.100	1	03/27/2018 21:16	WG1088759
Iron,Dissolved	0.386		0.100	1	03/28/2018 14:51	WG1089404
Lead	ND		0.00200	1	03/27/2018 21:16	WG1088759
Lead,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	4.99		1.00	1	03/27/2018 21:16	WG1088759
Magnesium,Dissolved	4.89		1.00	1	03/28/2018 14:51	WG1089404
Manganese	0.549		0.00500	1	03/27/2018 21:16	WG1088759
Manganese,Dissolved	0.301		0.00500	1	03/28/2018 14:51	WG1089404
Nickel	0.00495		0.00200	1	03/27/2018 21:16	WG1088759
Nickel,Dissolved	0.00446	B	0.00200	1	03/28/2018 14:51	WG1089404
Potassium	1.61		1.00	1	03/27/2018 21:16	WG1088759
Potassium,Dissolved	1.62	B	1.00	1	03/28/2018 14:51	WG1089404
Selenium	ND		0.00200	1	03/27/2018 21:16	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Silver	ND		0.00200	1	03/27/2018 21:16	WG1088759
Silver,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Sodium	6.41		1.00	1	03/27/2018 21:16	WG1088759
Sodium,Dissolved	6.02		1.00	1	03/29/2018 13:54	WG1091034
Thallium	ND		0.00200	1	03/27/2018 21:16	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/28/2018 14:51	WG1089404
Vanadium	ND		0.00500	1	03/27/2018 21:16	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/28/2018 14:51	WG1089404
Zinc	ND		0.0250	1	03/27/2018 21:16	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/28/2018 14:51	WG1089404

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	52.7		30.0	1	03/26/2018 14:46	WG1089441

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	03/27/2018 13:33	WG1088824

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	03/23/2018 23:23	WG1088583
Chloride	8.33		1.00	1	03/23/2018 23:23	WG1088583
Fluoride	ND		0.100	1	03/23/2018 23:23	WG1088583

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/25/2018 10:54	WG1088455
Mercury,Dissolved	ND		0.000200	1	03/26/2018 17:04	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/26/2018 22:57	WG1088757
Boron,Dissolved	ND		0.200	1	03/28/2018 20:05	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.627		0.100	1	03/27/2018 21:30	WG1088759
Aluminum,Dissolved	0.153		0.100	1	03/28/2018 14:55	WG1089404
Antimony	ND		0.00200	1	03/27/2018 21:30	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Arsenic	ND		0.00200	1	03/27/2018 21:30	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Barium	0.0360		0.00500	1	03/27/2018 21:30	WG1088759
Barium,Dissolved	0.0286		0.00500	1	03/28/2018 14:55	WG1089404
Beryllium	ND		0.00200	1	03/27/2018 21:30	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Cadmium	ND		0.00100	1	03/27/2018 21:30	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/28/2018 14:55	WG1089404
Calcium	13.4		1.00	1	03/27/2018 21:30	WG1088759
Calcium,Dissolved	12.7		1.00	1	03/28/2018 14:55	WG1089404
Chromium	ND		0.00200	1	03/27/2018 21:30	WG1088759
Chromium,Dissolved	0.00617	B	0.00200	1	03/29/2018 12:27	WG1089404
Cobalt	ND		0.00200	1	03/27/2018 21:30	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Copper	ND		0.00500	1	03/27/2018 21:30	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 12:27	WG1089404
Iron	1.32		0.100	1	03/27/2018 21:30	WG1088759
Iron,Dissolved	0.391		0.100	1	03/28/2018 14:55	WG1089404
Lead	ND		0.00200	1	03/27/2018 21:30	WG1088759
Lead,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	4.09		1.00	1	03/27/2018 21:30	WG1088759
Magnesium,Dissolved	3.97		1.00	1	03/28/2018 14:55	WG1089404
Manganese	0.411		0.00500	1	03/27/2018 21:30	WG1088759
Manganese,Dissolved	0.236		0.00500	1	03/28/2018 14:55	WG1089404
Nickel	0.00386		0.00200	1	03/27/2018 21:30	WG1088759
Nickel,Dissolved	0.00708		0.00200	1	03/28/2018 14:55	WG1089404
Potassium	1.61		1.00	1	03/27/2018 21:30	WG1088759
Potassium,Dissolved	1.77	B	1.00	1	03/28/2018 14:55	WG1089404
Selenium	ND		0.00200	1	03/27/2018 21:30	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Silver	ND		0.00200	1	03/27/2018 21:30	WG1088759
Silver,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Sodium	6.38		1.00	1	03/27/2018 21:30	WG1088759
Sodium,Dissolved	5.91		1.00	1	03/29/2018 14:11	WG1091034
Thallium	ND		0.00200	1	03/27/2018 21:30	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/28/2018 14:55	WG1089404
Vanadium	ND		0.00500	1	03/27/2018 21:30	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/28/2018 14:55	WG1089404
Zinc	ND		0.0250	1	03/27/2018 21:30	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/28/2018 14:55	WG1089404

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	56.4		30.0	1	03/26/2018 14:47	WG1089441

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	03/27/2018 13:35	WG1088824

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/23/2018 23:35	WG1088583
Chloride	8.47		1.00	1	03/23/2018 23:35	WG1088583
Fluoride	ND		0.100	1	03/23/2018 23:35	WG1088583

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/25/2018 10:56	WG1088455
Mercury,Dissolved	ND		0.000200	1	03/26/2018 17:11	WG1089292

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/26/2018 23:00	WG1088757
Boron,Dissolved	ND		0.200	1	03/28/2018 20:08	WG1088765

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.662		0.100	1	03/27/2018 21:34	WG1088759
Aluminum,Dissolved	0.135		0.100	1	03/28/2018 14:59	WG1089404
Antimony	ND		0.00200	1	03/27/2018 21:34	WG1088759
Antimony,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Arsenic	ND		0.00200	1	03/27/2018 21:34	WG1088759
Arsenic,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Barium	0.0361		0.00500	1	03/27/2018 21:34	WG1088759
Barium,Dissolved	0.0302		0.00500	1	03/28/2018 14:59	WG1089404
Beryllium	ND		0.00200	1	03/27/2018 21:34	WG1088759
Beryllium,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Cadmium	ND		0.00100	1	03/27/2018 21:34	WG1088759
Cadmium,Dissolved	ND		0.00100	1	03/28/2018 14:59	WG1089404
Calcium	13.5		1.00	1	03/27/2018 21:34	WG1088759
Calcium,Dissolved	12.7		1.00	1	03/28/2018 14:59	WG1089404
Chromium	ND		0.00200	1	03/27/2018 21:34	WG1088759
Chromium,Dissolved	ND		0.00200	1	03/29/2018 12:31	WG1089404
Cobalt	ND		0.00200	1	03/27/2018 21:34	WG1088759
Cobalt,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Copper	ND		0.00500	1	03/27/2018 21:34	WG1088759
Copper,Dissolved	ND		0.00500	1	03/29/2018 12:31	WG1089404
Iron	1.36		0.100	1	03/27/2018 21:34	WG1088759
Iron,Dissolved	0.357		0.100	1	03/28/2018 14:59	WG1089404
Lead	ND		0.00200	1	03/27/2018 21:34	WG1088759
Lead,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	4.21		1.00	1	03/27/2018 21:34	WG1088759
Magnesium,Dissolved	4.08		1.00	1	03/28/2018 14:59	WG1089404
Manganese	0.425		0.00500	1	03/27/2018 21:34	WG1088759
Manganese,Dissolved	0.254		0.00500	1	03/28/2018 14:59	WG1089404
Nickel	0.00392		0.00200	1	03/27/2018 21:34	WG1088759
Nickel,Dissolved	0.00356	B	0.00200	1	03/28/2018 14:59	WG1089404
Potassium	1.66		1.00	1	03/27/2018 21:34	WG1088759
Potassium,Dissolved	1.74	B	1.00	1	03/28/2018 14:59	WG1089404
Selenium	ND		0.00200	1	03/27/2018 21:34	WG1088759
Selenium,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Silver	ND		0.00200	1	03/27/2018 21:34	WG1088759
Silver,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Sodium	6.53		1.00	1	03/27/2018 21:34	WG1088759
Sodium,Dissolved	6.06		1.00	1	03/29/2018 14:15	WG1091034
Thallium	ND		0.00200	1	03/27/2018 21:34	WG1088759
Thallium,Dissolved	ND		0.00200	1	03/28/2018 14:59	WG1089404
Vanadium	ND		0.00500	1	03/27/2018 21:34	WG1088759
Vanadium,Dissolved	ND		0.00500	1	03/28/2018 14:59	WG1089404
Zinc	ND		0.0250	1	03/27/2018 21:34	WG1088759
Zinc,Dissolved	ND		0.0250	1	03/28/2018 14:59	WG1089404

Method Blank (MB)

(MB) R3296347-1 03/26/18 12:26

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.98	J	1.43	30.0

L978549-03 Original Sample (OS) • Duplicate (DUP)

(OS) L978549-03 03/26/18 12:29 • (DUP) R3296347-4 03/26/18 12:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	131	125	1	4.69		20

L979724-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-01 03/26/18 12:51 • (DUP) R3296347-7 03/26/18 12:51

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	34.2	29.0	1	16.5	J	20

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

(LCS) R3296347-2 03/26/18 12:27 • (LCSD) R3296347-3 03/26/18 12:28

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 %
Hardness (colorimetric) as CaCO3	150	153	153	102	102	85.0-115			0.000	20

L979682-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-02 03/26/18 12:40 • (MS) R3296347-5 03/26/18 12:40 • (MSD) R3296347-6 03/26/18 12:41

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	67.8	190	195	81.5	84.8	1	80.0-120			2.60	20

Method Blank (MB)

(MB) R3296409-1 03/26/18 14:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.95	J	1.43	30.0

L978679-03 Original Sample (OS) • Duplicate (DUP)

(OS) L978679-03 03/26/18 14:38 • (DUP) R3296409-4 03/26/18 14:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	173	169	1	2.34		20

L979724-05 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-05 03/26/18 14:47 • (DUP) R3296409-5 03/26/18 14:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	56.4	50.2	1	11.6		20

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

(LCS) R3296409-2 03/26/18 14:32 • (LCSD) R3296409-3 03/26/18 14:33

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 %
Hardness (colorimetric) as CaCO3	150	153	151	102	101	85.0-115			1.32	20

L980127-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980127-01 03/26/18 14:59 • (MS) R3296409-6 03/26/18 15:00 • (MSD) R3296409-7 03/26/18 15:01

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 %
Hardness (colorimetric) as CaCO3	150	133	227	227	62.7	62.7	1	80.0-120	E J6	E J6	0.000	20

Method Blank (MB)

(MB) R3296784-1 03/27/18 13:20

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

L979724-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-01 03/27/18 13:25 • (DUP) R3296784-4 03/27/18 13:27

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

L979863-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979863-01 03/27/18 14:03 • (DUP) R3296784-6 03/27/18 14:05

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

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

(LCS) R3296784-2 03/27/18 13:22 • (LCSD) R3296784-3 03/27/18 13:24

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 %
Ammonia Nitrogen	7.50	7.24	7.10	96.5	94.6	90.0-110			1.94	10

L979724-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L979724-02 03/27/18 13:28 • (MS) R3296784-5 03/27/18 13:30

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	4.81	96.3	1	90.0-110	

L979866-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979866-01 03/27/18 14:06 • (MS) R3296784-7 03/27/18 14:08 • (MSD) R3296784-8 03/27/18 14:10

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	U	4.77	4.81	95.3	96.2	1	90.0-110			0.940	10

Method Blank (MB)

(MB) R3296079-1 03/23/18 12:13

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

L979688-04 Original Sample (OS) • Duplicate (DUP)

(OS) L979688-04 03/23/18 19:52 • (DUP) R3296079-4 03/23/18 20:04

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	4.94	4.82	1	2.47		15
Fluoride	0.252	0.246	1	2.53		15

L979724-02 Original Sample (OS) • Duplicate (DUP)

(OS) L979724-02 03/23/18 22:08 • (DUP) R3296079-7 03/23/18 22:21

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	7.03	7.01	1	0.276		15
Fluoride	ND	0.0439	1	37.6	J P1	15

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

(LCS) R3296079-2 03/23/18 12:26 • (LCSD) R3296079-3 03/23/18 12:38

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 %
Bromide	40.0	38.0	37.7	95.0	94.3	80.0-120			0.732	15
Chloride	40.0	40.1	40.1	100	100	80.0-120			0.112	15
Fluoride	8.00	8.14	8.13	102	102	80.0-120			0.102	15

L979688-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979688-04 03/23/18 19:52 • (MS) R3296079-5 03/23/18 20:41 • (MSD) R3296079-6 03/23/18 20:54

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	45.5	46.2	91.0	92.5	1	80.0-120			1.61	15
Chloride	50.0	4.94	55.5	55.8	101	102	1	80.0-120			0.461	15
Fluoride	5.00	0.252	5.32	5.42	101	103	1	80.0-120			1.89	15

L979724-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L979724-02 03/23/18 22:08 • (MS) R3296079-8 03/23/18 22:33

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	45.8	91.6	1	80.0-120	
Chloride	50.0	7.03	57.6	101	1	80.0-120	
Fluoride	5.00	ND	5.13	102	1	80.0-120	

Method Blank (MB)

(MB) R3296172-1 03/25/18 10:11

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) R3296172-2 03/25/18 10:14 • (LCSD) R3296172-3 03/25/18 10:16

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	0.00285	0.00301	95.1	100	80.0-120			5.30	20

L979724-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979724-01 03/25/18 10:18 • (MS) R3296172-4 03/25/18 10:20 • (MSD) R3296172-5 03/25/18 10:23

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	0.00311	0.00315	104	105	1	75.0-125			1.39	20

Method Blank (MB)

(MB) R3296473-1 03/26/18 16:44

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) R3296473-2 03/26/18 16:46 • (LCSD) R3296473-3 03/26/18 16:48

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 %
Mercury,Dissolved	0.00300	0.00268	0.00269	89.4	89.7	80.0-120			0.231	20

L980079-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980079-07 03/26/18 16:50 • (MS) R3296473-4 03/26/18 16:53 • (MSD) R3296473-5 03/26/18 16:55

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 %
Mercury,Dissolved	0.00300	ND	0.00249	0.00234	82.9	77.9	1	75.0-125			6.20	20

Method Blank (MB)

(MB) R3296525-1 03/26/18 22:25

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) R3296525-2 03/26/18 22:27 • (LCSD) R3296525-3 03/26/18 22:30

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 %
Boron	1.00	1.01	0.974	101	97.4	80.0-120			3.10	20

L979884-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979884-02 03/26/18 22:32 • (MS) R3296525-5 03/26/18 22:37 • (MSD) R3296525-6 03/26/18 22:40

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	1.04	1.04	100	99.7	1	75.0-125			0.412	20

Method Blank (MB)

(MB) R3297262-1 03/28/18 19:24

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) R3297262-2 03/28/18 19:28 • (LCSD) R3297262-3 03/28/18 19:31

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 %
Boron,Dissolved	1.00	0.980	0.989	98.0	98.9	80.0-120			0.933	20

L979911-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979911-04 03/28/18 19:34 • (MS) R3297262-5 03/28/18 19:41 • (MSD) R3297262-6 03/28/18 19:44

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	ND	1.03	1.05	98.3	101	1	75.0-125			2.32	20

Method Blank (MB)

(MB) R3296857-1 03/27/18 19:43

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	0.000314	J	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	0.00303	J	0.00256	0.0250

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

(LCS) R3296857-2 03/27/18 19:48 • (LCSD) R3296857-3 03/27/18 19:52

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	5.19	5.09	104	102	80.0-120			1.83	20
Antimony	0.0500	0.0498	0.0489	99.5	97.8	80.0-120			1.70	20
Arsenic	0.0500	0.0510	0.0502	102	100	80.0-120			1.70	20
Barium	0.0500	0.0510	0.0496	102	99.2	80.0-120			2.82	20
Beryllium	0.0500	0.0505	0.0496	101	99.3	80.0-120			1.68	20
Cadmium	0.0500	0.0509	0.0501	102	100	80.0-120			1.47	20
Calcium	5.00	5.19	5.19	104	104	80.0-120			0.112	20
Chromium	0.0500	0.0503	0.0498	101	99.6	80.0-120			1.06	20
Copper	0.0500	0.0520	0.0508	104	102	80.0-120			2.24	20
Cobalt	0.0500	0.0530	0.0529	106	106	80.0-120			0.249	20
Iron	5.00	5.23	5.21	105	104	80.0-120			0.348	20

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

(LCS) R3296857-2 03/27/18 19:48 • (LCSD) R3296857-3 03/27/18 19:52

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	0.0512	0.0506	102	101	80.0-120			1.25	20
Magnesium	5.00	5.38	5.30	108	106	80.0-120			1.53	20
Manganese	0.0500	0.0511	0.0508	102	102	80.0-120			0.736	20
Nickel	0.0500	0.0524	0.0523	105	105	80.0-120			0.329	20
Potassium	5.00	5.30	5.19	106	104	80.0-120			2.15	20
Selenium	0.0500	0.0526	0.0516	105	103	80.0-120			2.01	20
Silver	0.0500	0.0499	0.0491	99.8	98.3	80.0-120			1.52	20
Sodium	5.00	5.47	5.59	109	112	80.0-120			2.22	20
Thallium	0.0500	0.0523	0.0520	105	104	80.0-120			0.513	20
Vanadium	0.0500	0.0500	0.0498	100	99.7	80.0-120			0.429	20
Zinc	0.0500	0.0530	0.0522	106	104	80.0-120			1.64	20

L979682-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979682-02 03/27/18 19:56 • (MS) R3296857-5 03/27/18 20:05 • (MSD) R3296857-6 03/27/18 20:09

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	0.846	6.10	5.82	105	99.5	1	75.0-125			4.65	20
Antimony	0.0500	ND	0.0523	0.0506	105	101	1	75.0-125			3.41	20
Arsenic	0.0500	ND	0.0527	0.0506	104	100	1	75.0-125			3.96	20
Barium	0.0500	0.102	0.158	0.154	111	103	1	75.0-125			2.79	20
Beryllium	0.0500	ND	0.0521	0.0511	104	102	1	75.0-125			1.95	20
Cadmium	0.0500	0.00671	0.0584	0.0572	103	101	1	75.0-125			2.11	20
Calcium	5.00	14.5	19.9	19.8	108	106	1	75.0-125			0.491	20
Chromium	0.0500	ND	0.0525	0.0503	103	98.2	1	75.0-125			4.22	20
Copper	0.0500	ND	0.0556	0.0536	103	99.2	1	75.0-125			3.61	20
Cobalt	0.0500	ND	0.0538	0.0518	108	104	1	75.0-125			3.82	20
Potassium	5.00	14.4	20.4	20.0	118	112	1	75.0-125			1.55	20
Iron	5.00	0.578	5.96	5.66	108	102	1	75.0-125			5.09	20
Lead	0.0500	ND	0.0540	0.0520	106	102	1	75.0-125			3.79	20
Magnesium	5.00	6.88	12.4	12.3	111	109	1	75.0-125			0.848	20
Manganese	0.0500	0.0496	0.102	0.0995	104	99.6	1	75.0-125			2.11	20
Nickel	0.0500	ND	0.0543	0.0525	106	102	1	75.0-125			3.43	20
Selenium	0.0500	ND	0.0517	0.0513	103	103	1	75.0-125			0.800	20
Silver	0.0500	ND	0.0514	0.0492	103	98.5	1	75.0-125			4.23	20
Sodium	5.00	25.4	30.8	30.2	107	95.2	1	75.0-125			1.98	20
Thallium	0.0500	ND	0.0544	0.0518	109	104	1	75.0-125			4.92	20
Vanadium	0.0500	ND	0.0531	0.0512	102	98.5	1	75.0-125			3.64	20
Zinc	0.0500	0.0499	0.102	0.0997	105	99.7	1	75.0-125			2.75	20

Method Blank (MB)

(MB) R3297181-1 03/28/18 13:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.00674	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.000250	0.00200
Barium,Dissolved	0.000768	J	0.000360	0.00500
Beryllium,Dissolved	U		0.000120	0.00200
Cadmium,Dissolved	U		0.000160	0.00100
Calcium,Dissolved	0.0830	J	0.0460	1.00
Cobalt,Dissolved	U		0.000260	0.00200
Iron,Dissolved	0.0190	J	0.0150	0.100
Lead,Dissolved	0.00126	J	0.000240	0.00200
Magnesium,Dissolved	U		0.100	1.00
Manganese,Dissolved	0.000430	J	0.000250	0.00500
Nickel,Dissolved	0.000694	J	0.000350	0.00200
Potassium,Dissolved	0.254	J	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	0.00116	J	0.000180	0.00500
Zinc,Dissolved	0.00438	J	0.00256	0.0250

Method Blank (MB)

(MB) R3297438-1 03/29/18 11:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chromium,Dissolved	0.000637	J	0.000540	0.00200
Copper,Dissolved	0.00630		0.000520	0.00500

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

(LCS) R3297181-2 03/28/18 13:57 • (LCSD) R3297181-3 03/28/18 14:00

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	4.80	4.82	96.1	96.4	80.0-120			0.399	20
Antimony,Dissolved	0.0500	0.0444	0.0444	88.8	88.7	80.0-120			0.0765	20
Arsenic,Dissolved	0.0500	0.0484	0.0475	96.8	94.9	80.0-120			2.02	20
Barium,Dissolved	0.0500	0.0461	0.0441	92.3	88.2	80.0-120			4.49	20
Beryllium,Dissolved	0.0500	0.0427	0.0427	85.5	85.4	80.0-120			0.0495	20
Cadmium,Dissolved	0.0500	0.0478	0.0470	95.5	94.1	80.0-120			1.52	20

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

(LCS) R3297181-2 03/28/18 13:57 • (LCSD) R3297181-3 03/28/18 14:00

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 %
Calcium,Dissolved	5.00	4.73	4.62	94.5	92.3	80.0-120			2.34	20
Cobalt,Dissolved	0.0500	0.0501	0.0497	100	99.3	80.0-120			0.906	20
Iron,Dissolved	5.00	4.87	4.79	97.5	95.9	80.0-120			1.68	20
Lead,Dissolved	0.0500	0.0468	0.0468	93.5	93.7	80.0-120			0.177	20
Magnesium,Dissolved	5.00	4.99	4.96	99.7	99.1	80.0-120			0.577	20
Manganese,Dissolved	0.0500	0.0465	0.0461	93.0	92.2	80.0-120			0.805	20
Nickel,Dissolved	0.0500	0.0504	0.0507	101	101	80.0-120			0.591	20
Potassium,Dissolved	5.00	4.93	4.86	98.6	97.2	80.0-120			1.35	20
Selenium,Dissolved	0.0500	0.0465	0.0453	93.0	90.6	80.0-120			2.55	20
Silver,Dissolved	0.0500	0.0468	0.0464	93.6	92.8	80.0-120			0.855	20
Thallium,Dissolved	0.0500	0.0471	0.0472	94.1	94.4	80.0-120			0.320	20
Vanadium,Dissolved	0.0500	0.0502	0.0495	100	99.0	80.0-120			1.41	20
Zinc,Dissolved	0.0500	0.0475	0.0465	95.0	92.9	80.0-120			2.25	20

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

(LCS) R3297438-2 03/29/18 11:34 • (LCSD) R3297438-3 03/29/18 11:38

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 %
Chromium,Dissolved	0.0500	0.0497	0.0483	99.5	96.6	80.0-120			2.91	20
Copper,Dissolved	0.0500	0.0507	0.0494	101	98.7	80.0-120			2.59	20

L980385-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980385-02 03/28/18 14:04 • (MS) R3297181-5 03/28/18 14:12 • (MSD) R3297181-6 03/28/18 14:16

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	0.105	4.84	4.86	94.6	95.1	1	75.0-125			0.479	20
Antimony,Dissolved	0.0500	U	0.0459	0.0466	91.8	93.1	1	75.0-125			1.41	20
Arsenic,Dissolved	0.0500	0.00171	0.0494	0.0498	95.4	96.2	1	75.0-125			0.825	20
Barium,Dissolved	0.0500	0.0428	0.0901	0.0902	94.6	94.7	1	75.0-125			0.0787	20
Beryllium,Dissolved	0.0500	U	0.0422	0.0431	84.3	86.2	1	75.0-125			2.22	20
Cadmium,Dissolved	0.0500	U	0.0475	0.0481	95.1	96.3	1	75.0-125			1.26	20
Calcium,Dissolved	5.00	51.5	55.9	55.8	87.4	84.8	1	75.0-125			0.237	20
Cobalt,Dissolved	0.0500	U	0.0489	0.0495	97.9	99.1	1	75.0-125			1.19	20
Potassium,Dissolved	5.00	2.76	7.67	7.80	98.2	101	1	75.0-125			1.72	20
Iron,Dissolved	5.00	0.523	5.25	5.32	94.6	95.8	1	75.0-125			1.17	20
Lead,Dissolved	0.0500	0.00152	0.0486	0.0487	94.2	94.4	1	75.0-125			0.149	20
Magnesium,Dissolved	5.00	11.9	16.9	17.0	102	103	1	75.0-125			0.247	20

L980385-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980385-02 03/28/18 14:04 • (MS) R3297181-5 03/28/18 14:12 • (MSD) R3297181-6 03/28/18 14:16

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 %
Manganese,Dissolved	0.0500	0.0149	0.0599	0.0602	90.0	90.5	1	75.0-125			0.417	20
Nickel,Dissolved	0.0500	0.00121	0.0500	0.0503	97.5	98.2	1	75.0-125			0.760	20
Selenium,Dissolved	0.0500	0.000384	0.0476	0.0486	94.5	96.4	1	75.0-125			2.02	20
Silver,Dissolved	0.0500	U	0.0465	0.0468	92.9	93.6	1	75.0-125			0.737	20
Thallium,Dissolved	0.0500	U	0.0466	0.0473	93.1	94.6	1	75.0-125			1.57	20
Vanadium,Dissolved	0.0500	0.00145	0.0500	0.0510	97.0	99.0	1	75.0-125			1.98	20
Zinc,Dissolved	0.0500	0.00609	0.0528	0.0535	93.5	94.9	1	75.0-125			1.34	20

L980385-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L980385-02 03/29/18 11:42 • (MS) R3297438-5 03/29/18 11:50 • (MSD) R3297438-6 03/29/18 11:54

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 %
Chromium,Dissolved	0.0500	U	0.0482	0.0481	96.3	96.3	1	75.0-125			0.0595	20
Copper,Dissolved	0.0500	0.00251	0.0514	0.0503	97.8	95.7	1	75.0-125			2.06	20

Method Blank (MB)

(MB) R3297500-1 03/29/18 13:14

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

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

(LCS) R3297500-2 03/29/18 13:19 • (LCSD) R3297500-3 03/29/18 13:23

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	4.99	5.08	99.8	102	80.0-120			1.75	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

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, 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.
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.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

ESC Lab Sciences 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 ESC Lab Sciences.

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	T 104704245-17-14
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

ESC Lab Sciences 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. ESC Lab Sciences performs all testing at our central laboratory.

ANALYTICAL REPORT

March 27, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L979727
Samples Received:	03/22/2018
Project Number:	142-059
Description:	EWS Landfill Sediment & Stream Sampling
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Technical Service Representative

TABLE OF CONTENTS

CHARLIE CREEK US L979727-01 Solid

Collected by: Caleb Duke | Collected date/time: 03/21/18 12:15 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1088500	1	03/23/18 10:00	03/23/18 22:17	MAJ
Mercury by Method 7471A	WG1088626	1	03/23/18 11:40	03/26/18 14:23	EL
Metals (ICP) by Method 6010B	WG1088694	1	03/25/18 17:07	03/27/18 04:42	TRB

CHARLIE CREEK MS L979727-02 Solid

Collected by: Caleb Duke | Collected date/time: 03/21/18 11:30 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1088500	1	03/23/18 10:00	03/23/18 23:19	MAJ
Mercury by Method 7471A	WG1088626	1	03/23/18 11:40	03/26/18 13:32	EL
Metals (ICP) by Method 6010B	WG1088694	1	03/25/18 17:07	03/27/18 04:46	TRB

CANE CREEK US L979727-03 Solid

Collected by: Caleb Duke | Collected date/time: 03/21/18 11:45 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1088500	1	03/23/18 10:00	03/23/18 23:40	MAJ
Mercury by Method 7471A	WG1088626	1	03/23/18 11:40	03/26/18 14:25	EL
Metals (ICP) by Method 6010B	WG1088694	1	03/25/18 17:07	03/27/18 04:49	TRB

CANE CREEK MS L979727-04 Solid

Collected by: Caleb Duke | Collected date/time: 03/21/18 10:30 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1088500	1	03/23/18 10:00	03/24/18 00:01	MAJ
Mercury by Method 7471A	WG1088626	1	03/23/18 11:40	03/26/18 14:27	EL
Metals (ICP) by Method 6010B	WG1088694	1	03/25/18 17:07	03/27/18 04:53	TRB

CANE CREEK DS-1 L979727-05 Solid

Collected by: Caleb Duke | Collected date/time: 03/21/18 10:00 | Received date/time: 03/22/18 17:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1088500	1	03/23/18 10:00	03/24/18 00:22	MAJ
Mercury by Method 7471A	WG1088626	1	03/23/18 11:40	03/26/18 14:29	EL
Metals (ICP) by Method 6010B	WG1088694	1	03/25/18 17:07	03/27/18 04:56	TRB

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 radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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
Technical Service Representative

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	03/23/2018 22:17	WG1088500
Chloride	ND		10.0	1	03/23/2018 22:17	WG1088500
Fluoride	ND		1.00	1	03/23/2018 22:17	WG1088500

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	03/26/2018 14:23	WG1088626

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1070		10.0	1	03/27/2018 04:42	WG1088694
Antimony	ND		2.00	1	03/27/2018 04:42	WG1088694
Arsenic	ND		2.00	1	03/27/2018 04:42	WG1088694
Barium	7.13		0.500	1	03/27/2018 04:42	WG1088694
Beryllium	ND		0.200	1	03/27/2018 04:42	WG1088694
Boron	ND		10.0	1	03/27/2018 04:42	WG1088694
Cadmium	ND		0.500	1	03/27/2018 04:42	WG1088694
Calcium	626		100	1	03/27/2018 04:42	WG1088694
Chromium	3.16		1.00	1	03/27/2018 04:42	WG1088694
Cobalt	ND		1.00	1	03/27/2018 04:42	WG1088694
Copper	ND		2.00	1	03/27/2018 04:42	WG1088694
Iron	2580		10.0	1	03/27/2018 04:42	WG1088694
Lead	4.77		0.500	1	03/27/2018 04:42	WG1088694
Magnesium	172		100	1	03/27/2018 04:42	WG1088694
Manganese	64.5		1.00	1	03/27/2018 04:42	WG1088694
Nickel	ND		2.00	1	03/27/2018 04:42	WG1088694
Potassium	250		100	1	03/27/2018 04:42	WG1088694
Selenium	ND		2.00	1	03/27/2018 04:42	WG1088694
Silver	ND		1.00	1	03/27/2018 04:42	WG1088694
Sodium	ND		100	1	03/27/2018 04:42	WG1088694
Thallium	ND		2.00	1	03/27/2018 04:42	WG1088694
Vanadium	4.77		2.00	1	03/27/2018 04:42	WG1088694
Zinc	7.44		5.00	1	03/27/2018 04:42	WG1088694

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	03/23/2018 23:19	WG1088500
Chloride	34.3		10.0	1	03/23/2018 23:19	WG1088500
Fluoride	ND		1.00	1	03/23/2018 23:19	WG1088500

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	03/26/2018 13:32	WG1088626

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1480		10.0	1	03/27/2018 04:46	WG1088694
Antimony	ND		2.00	1	03/27/2018 04:46	WG1088694
Arsenic	ND		2.00	1	03/27/2018 04:46	WG1088694
Barium	15.4		0.500	1	03/27/2018 04:46	WG1088694
Beryllium	ND		0.200	1	03/27/2018 04:46	WG1088694
Boron	ND		10.0	1	03/27/2018 04:46	WG1088694
Cadmium	ND		0.500	1	03/27/2018 04:46	WG1088694
Calcium	360		100	1	03/27/2018 04:46	WG1088694
Chromium	4.30		1.00	1	03/27/2018 04:46	WG1088694
Cobalt	1.85		1.00	1	03/27/2018 04:46	WG1088694
Copper	ND		2.00	1	03/27/2018 04:46	WG1088694
Iron	3900		10.0	1	03/27/2018 04:46	WG1088694
Lead	3.70		0.500	1	03/27/2018 04:46	WG1088694
Magnesium	128		100	1	03/27/2018 04:46	WG1088694
Manganese	161		1.00	1	03/27/2018 04:46	WG1088694
Nickel	2.12		2.00	1	03/27/2018 04:46	WG1088694
Potassium	186		100	1	03/27/2018 04:46	WG1088694
Selenium	ND		2.00	1	03/27/2018 04:46	WG1088694
Silver	ND		1.00	1	03/27/2018 04:46	WG1088694
Sodium	ND		100	1	03/27/2018 04:46	WG1088694
Thallium	ND		2.00	1	03/27/2018 04:46	WG1088694
Vanadium	7.01		2.00	1	03/27/2018 04:46	WG1088694
Zinc	15.4		5.00	1	03/27/2018 04:46	WG1088694

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	03/23/2018 23:40	WG1088500
Chloride	ND		10.0	1	03/23/2018 23:40	WG1088500
Fluoride	ND		1.00	1	03/23/2018 23:40	WG1088500

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	03/26/2018 14:25	WG1088626

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	639		10.0	1	03/27/2018 04:49	WG1088694
Antimony	ND		2.00	1	03/27/2018 04:49	WG1088694
Arsenic	ND		2.00	1	03/27/2018 04:49	WG1088694
Barium	9.80		0.500	1	03/27/2018 04:49	WG1088694
Beryllium	ND		0.200	1	03/27/2018 04:49	WG1088694
Boron	ND		10.0	1	03/27/2018 04:49	WG1088694
Cadmium	ND		0.500	1	03/27/2018 04:49	WG1088694
Calcium	219		100	1	03/27/2018 04:49	WG1088694
Chromium	2.48		1.00	1	03/27/2018 04:49	WG1088694
Cobalt	ND		1.00	1	03/27/2018 04:49	WG1088694
Copper	ND		2.00	1	03/27/2018 04:49	WG1088694
Iron	1890		10.0	1	03/27/2018 04:49	WG1088694
Lead	1.57		0.500	1	03/27/2018 04:49	WG1088694
Magnesium	ND		100	1	03/27/2018 04:49	WG1088694
Manganese	53.0		1.00	1	03/27/2018 04:49	WG1088694
Nickel	ND		2.00	1	03/27/2018 04:49	WG1088694
Potassium	ND		100	1	03/27/2018 04:49	WG1088694
Selenium	ND		2.00	1	03/27/2018 04:49	WG1088694
Silver	ND		1.00	1	03/27/2018 04:49	WG1088694
Sodium	ND		100	1	03/27/2018 04:49	WG1088694
Thallium	ND		2.00	1	03/27/2018 04:49	WG1088694
Vanadium	3.67		2.00	1	03/27/2018 04:49	WG1088694
Zinc	ND		5.00	1	03/27/2018 04:49	WG1088694

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	03/24/2018 00:01	WG1088500
Chloride	ND		10.0	1	03/24/2018 00:01	WG1088500
Fluoride	ND		1.00	1	03/24/2018 00:01	WG1088500

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	03/26/2018 14:27	WG1088626

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	591		10.0	1	03/27/2018 04:53	WG1088694
Antimony	ND		2.00	1	03/27/2018 04:53	WG1088694
Arsenic	ND		2.00	1	03/27/2018 04:53	WG1088694
Barium	9.19		0.500	1	03/27/2018 04:53	WG1088694
Beryllium	ND		0.200	1	03/27/2018 04:53	WG1088694
Boron	ND		10.0	1	03/27/2018 04:53	WG1088694
Cadmium	ND		0.500	1	03/27/2018 04:53	WG1088694
Calcium	ND		100	1	03/27/2018 04:53	WG1088694
Chromium	3.51		1.00	1	03/27/2018 04:53	WG1088694
Cobalt	ND		1.00	1	03/27/2018 04:53	WG1088694
Copper	ND		2.00	1	03/27/2018 04:53	WG1088694
Iron	2530		10.0	1	03/27/2018 04:53	WG1088694
Lead	1.65		0.500	1	03/27/2018 04:53	WG1088694
Magnesium	ND		100	1	03/27/2018 04:53	WG1088694
Manganese	106		1.00	1	03/27/2018 04:53	WG1088694
Nickel	ND		2.00	1	03/27/2018 04:53	WG1088694
Potassium	ND		100	1	03/27/2018 04:53	WG1088694
Selenium	ND		2.00	1	03/27/2018 04:53	WG1088694
Silver	ND		1.00	1	03/27/2018 04:53	WG1088694
Sodium	ND		100	1	03/27/2018 04:53	WG1088694
Thallium	ND		2.00	1	03/27/2018 04:53	WG1088694
Vanadium	4.32		2.00	1	03/27/2018 04:53	WG1088694
Zinc	8.57		5.00	1	03/27/2018 04:53	WG1088694

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	03/24/2018 00:22	WG1088500
Chloride	ND		10.0	1	03/24/2018 00:22	WG1088500
Fluoride	ND		1.00	1	03/24/2018 00:22	WG1088500

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	03/26/2018 14:29	WG1088626

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	721		10.0	1	03/27/2018 04:56	WG1088694
Antimony	ND		2.00	1	03/27/2018 04:56	WG1088694
Arsenic	ND		2.00	1	03/27/2018 04:56	WG1088694
Barium	6.98		0.500	1	03/27/2018 04:56	WG1088694
Beryllium	ND		0.200	1	03/27/2018 04:56	WG1088694
Boron	ND		10.0	1	03/27/2018 04:56	WG1088694
Cadmium	ND		0.500	1	03/27/2018 04:56	WG1088694
Calcium	130		100	1	03/27/2018 04:56	WG1088694
Chromium	4.97		1.00	1	03/27/2018 04:56	WG1088694
Cobalt	1.06		1.00	1	03/27/2018 04:56	WG1088694
Copper	ND		2.00	1	03/27/2018 04:56	WG1088694
Iron	3160		10.0	1	03/27/2018 04:56	WG1088694
Lead	2.29		0.500	1	03/27/2018 04:56	WG1088694
Magnesium	ND		100	1	03/27/2018 04:56	WG1088694
Manganese	95.9		1.00	1	03/27/2018 04:56	WG1088694
Nickel	ND		2.00	1	03/27/2018 04:56	WG1088694
Potassium	ND		100	1	03/27/2018 04:56	WG1088694
Selenium	ND		2.00	1	03/27/2018 04:56	WG1088694
Silver	ND		1.00	1	03/27/2018 04:56	WG1088694
Sodium	ND		100	1	03/27/2018 04:56	WG1088694
Thallium	ND		2.00	1	03/27/2018 04:56	WG1088694
Vanadium	5.92		2.00	1	03/27/2018 04:56	WG1088694
Zinc	9.45		5.00	1	03/27/2018 04:56	WG1088694

Method Blank (MB)

(MB) R3295934-1 03/23/18 11:43

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

L979598-01 Original Sample (OS) • Duplicate (DUP)

(OS) L979598-01 03/23/18 17:03 • (DUP) R3295934-7 03/23/18 17:24

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	44.4	44.2	1	0.436		15
Fluoride	10.7	12.4	1	15.1	J3	15

L979603-03 Original Sample (OS) • Duplicate (DUP)

(OS) L979603-03 03/23/18 20:11 • (DUP) R3295934-8 03/23/18 20:32

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0.000		15
Chloride	101	47.4	1	72.2	J3	15
Fluoride	7.85	10.5	1	28.8	J3	15

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

(LCS) R3295934-2 03/23/18 12:04 • (LCSD) R3295934-3 03/23/18 12:24

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 %
Bromide	200	206	221	103	110	80.0-120			6.81	15
Chloride	200	216	199	108	99.6	80.0-120			8.09	15
Fluoride	20.0	20.6	20.8	103	104	80.0-120			1.18	15

L977477-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L977477-04 03/23/18 13:13 • (MS) R3295934-4 03/23/18 13:34 • (MSD) R3295934-5 03/23/18 13:55

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	U	1160	685	188	111	1	80.0-120	J5	J3	51.8	15
Chloride	619	56.9	730	654	109	96.5	1	80.0-120			11.1	15
Fluoride	61.9	4.07	21.2	18.9	27.6	23.9	1	80.0-120	J6	J6	11.5	15

L977477-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L977477-04 03/23/18 13:13 • (MS) R3295934-9 03/24/18 11:41

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	619	U	675	109	1	80.0-120	
Chloride	619	56.9	707	105	1	80.0-120	
Fluoride	61.9	4.07	18.2	22.8	1	80.0-120	J6

Method Blank (MB)

(MB) R3296468-1 03/26/18 13:26

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) R3296468-2 03/26/18 13:28 • (LCSD) R3296468-3 03/26/18 13:30

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	0.303	0.309	101	103	80.0-120			1.80	20

L979727-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979727-02 03/26/18 13:32 • (MS) R3296468-4 03/26/18 13:34 • (MSD) R3296468-5 03/26/18 13:43

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	ND	0.255	0.281	85.1	93.7	1	75.0-125			9.57	20

Method Blank (MB)

(MB) R3296532-1 03/27/18 03:14

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aluminum	U		3.50	10.0
Antimony	U		0.750	2.00
Arsenic	U		0.650	2.00
Barium	U		0.170	0.500
Beryllium	U		0.0700	0.200
Boron	1.30	J	1.26	10.0
Cadmium	U		0.0700	0.500
Calcium	U		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
Lead	U		0.190	0.500
Magnesium	U		1.11	100
Manganese	U		0.120	1.00
Nickel	U		0.490	2.00
Potassium	U		10.2	100
Selenium	U		0.740	2.00
Silver	U		0.280	1.00
Sodium	U		9.85	100
Thallium	U		0.650	2.00
Vanadium	U		0.240	2.00
Zinc	U		0.590	5.00

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

(LCS) R3296532-2 03/27/18 03:18 • (LCSD) R3296532-3 03/27/18 03:21

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	976	988	97.6	98.8	80.0-120			1.18	20
Antimony	100	96.9	98.7	96.9	98.7	80.0-120			1.87	20
Arsenic	100	96.7	97.9	96.7	97.9	80.0-120			1.27	20
Barium	100	102	103	102	103	80.0-120			1.31	20
Beryllium	100	99.0	101	99.0	101	80.0-120			1.83	20
Boron	100	97.5	99.2	97.5	99.2	80.0-120			1.76	20
Cadmium	100	94.4	95.5	94.4	95.5	80.0-120			1.08	20
Calcium	1000	976	994	97.6	99.4	80.0-120			1.86	20
Chromium	100	96.5	97.4	96.5	97.4	80.0-120			0.858	20
Cobalt	100	102	103	102	103	80.0-120			1.42	20

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

(LCS) R3296532-2 03/27/18 03:18 • (LCSD) R3296532-3 03/27/18 03:21

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 %
Copper	100	97.4	99.3	97.4	99.3	80.0-120			1.93	20
Iron	1000	956	975	95.6	97.5	80.0-120			1.90	20
Lead	100	98.8	100	98.8	100	80.0-120			1.51	20
Magnesium	1000	1010	1030	101	103	80.0-120			2.05	20
Manganese	100	95.3	96.7	95.3	96.7	80.0-120			1.47	20
Nickel	100	101	102	101	102	80.0-120			1.44	20
Potassium	1000	994	1010	99.4	101	80.0-120			1.70	20
Selenium	100	95.9	97.0	95.9	97.0	80.0-120			1.22	20
Silver	20.0	17.7	18.0	88.7	89.9	80.0-120			1.35	20
Sodium	1000	990	1000	99.0	100	80.0-120			1.45	20
Thallium	100	97.8	99.6	97.8	99.6	80.0-120			1.84	20
Vanadium	100	98.7	101	98.7	101	80.0-120			2.06	20
Zinc	100	99.1	101	99.1	101	80.0-120			1.76	20

L979668-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979668-13 03/27/18 03:24 • (MS) R3296532-6 03/27/18 03:34 • (MSD) R3296532-7 03/27/18 03:38

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 %
Aluminum	1000	8570	9670	11100	110	250	1	75.0-125		V	13.4	20
Antimony	100	ND	57.0	57.3	55.9	56.3	1	75.0-125	J6	J6	0.569	20
Arsenic	100	4.20	94.8	97.5	90.6	93.3	1	75.0-125			2.87	20
Barium	100	126	213	264	86.7	138	1	75.0-125		J3 J5	21.5	20
Beryllium	100	0.219	92.4	95.8	92.1	95.6	1	75.0-125			3.70	20
Boron	100	ND	88.4	92.3	88.4	92.3	1	75.0-125			4.25	20
Cadmium	100	ND	89.0	91.4	89.0	91.4	1	75.0-125			2.64	20
Calcium	1000	3680	4700	5320	102	164	1	75.0-125		J5	12.4	20
Chromium	100	13.1	96.3	104	83.3	91.3	1	75.0-125			7.98	20
Cobalt	100	4.28	103	108	99.2	104	1	75.0-125			4.70	20
Copper	100	17.1	109	114	91.4	97.1	1	75.0-125			5.15	20
Iron	1000	16300	17700	19600	137	332	1	75.0-125	V	V	10.5	20
Lead	100	14.2	106	110	91.6	95.8	1	75.0-125			3.87	20
Magnesium	1000	5220	6180	7310	95.9	209	1	75.0-125		V	16.8	20
Manganese	100	285	383	400	98.1	115	1	75.0-125			4.27	20
Nickel	100	10.0	106	113	95.9	103	1	75.0-125			6.55	20
Potassium	1000	3400	4370	5640	96.4	224	1	75.0-125		J3 J5	25.5	20
Selenium	100	ND	89.9	92.3	89.9	92.3	1	75.0-125			2.64	20
Silver	20.0	ND	16.7	17.3	83.4	86.3	1	75.0-125			3.46	20
Sodium	1000	218	1150	1210	93.5	99.3	1	75.0-125			4.95	20

L979668-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L979668-13 03/27/18 03:24 • (MS) R3296532-6 03/27/18 03:34 • (MSD) R3296532-7 03/27/18 03:38

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 %
Thallium	100	ND	89.6	92.4	89.6	92.4	1	75.0-125			3.04	20
Vanadium	100	31.0	121	130	89.7	98.8	1	75.0-125			7.29	20
Zinc	100	569	568	588	0.000	19.0	1	75.0-125	V	V	3.45	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, 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.
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
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.
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.

ESC Lab Sciences 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 ESC Lab Sciences.

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	T 104704245-17-14
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

ESC Lab Sciences 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. ESC Lab Sciences 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:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 142-059

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): C Duke

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): C Duke

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

Quote #

Date Results Needed

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
a subsidiary of Accutest

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 979727

Tab B133

Acctnum: CEC
Template: T134050
Prelogin: P644905
TSR: 526 - Chris McCord
PB: 3-19-18 GD

Shipped Via: Courier

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Bromide, Cl, F 4ozClr-NoPres	Total Metals 2ozClr-NoPres	Remarks	Sample # (lab only)
CHARLIE CREEK US	Grab	SS	—	3/21	1215	2	X	X		-01
CHARLIE CREEK MS	"	SS	—	"	1130	2	X	X		-02
CANE CREEK US	"	SS	—	"	1145	2	X	X		-03
CANE CREEK MS	"	SS	—	"	1030	2	X	X		-04
CANE CREEK DS-1	"	SS	—	"	1000	2	X	X		-05

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Total Metals = M6010AP1+Al,Ca,Fe,K,Mg,Mn,Na

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ 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)
Rebekah Donahoo	3/21/18	230	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date: 3/22/18	Time: 1730	Received for lab by: (Signature)

Trip Blank Received: Yes / (No) HCL / MeoH TBR

Temp: 2.1° °C to 4 Bottles Received: 10

Date: 3/22/18 Time: 1730

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

3/21/18

EWS stream sampling

Sample	Time		Pictures
Cane Creek DS-1	1000		1-3
Temp	8.52	°C	
pH	6.47		
Cond	0.118	ms/cm	
DO	14.10*	mg/L	*probably wrong
ORP	150	mV	
Turb	2.4	NTU	

Sample	Time		Pictures
	1030		4-5
Cane Creek MS			
Temp	8.57	°C	
pH	6.52		
Cond	0.111	ms/cm	
DO	14.63*	mg/L	
ORP	142	mV	
Turb	2.5	NTU	

Sample	Time	Pictures
Charlie Creek MS	1130	6-7

Temp	8.82	°C
pH	6.59	
COND	0.086	ms/cm
DO	14.58*	mg/L
ORP	137	mV
Turb	1.5	NTV

Sample	Time	Pictures
Cane creek US	1145	8-11

Temp	9.25	°C
pH	6.71	
COND	0.126	ms/cm
DO	14.28	mg/L
ORP	111	mV
Turb	2.6	NTU

Sample		Time		Pictures
Charlie Creek		1215		12-13
US				
	Temp	9.74	°C	
	pH	6.75		
	cond	0.072	ms/cm	
	DO	14.83 *	mg/L	
	ORP	134	mV	
	turb	1.6	NTU	

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

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Phone: 615-333-7797
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Client Project # 171-873

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): C Duke

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): C Duke

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

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Anions(Br,Cl,Fl) 125mlHDPE-NoPres	Diss.M6020AP1-LF 250mlHDPE-NoPres	M6020AP1,HARD 250mlHDPE-HNO3	NH3 125mlHDPE-H2SO4	L2	L2	Remarks	Sample # (lab only)
CHARLIE CREEK US	Grab	GW	—	3/21	1215	4	X	X	X	X				-01
CHARLIE CREEK MS		GW	—		1130	4	X	X	X	X				-02
CANE CREEK US		GW	—		1145	4	X	X	X	X				-03
CANE CREEK MS		GW	—		1030	4	X	X	X	X				-04
CANE CREEK DS-1		GW	—		1000	4	X	X	X	X				-05

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 979724

B132

Acctnum: CEC
Template: T133580
Prelogin: P643554
TSR: 526 - Chris McCord
PB: JB 3-7-18
Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: M6020AP1(Tot/Diss)includes Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ 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)
Rebekah Pomeroy	3/21/18	230	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
	3/22/18	1730	

Trip Blank Received: Yes (No) HCL / MeoH TBR

Temp: 2.1°C °C Bottles Received: 20

Date: 3/22/18 Time: 1730

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

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 FIELD BLANKS

I. SCOPE AND APPLICABILITY

The purpose of a blank in general is to evaluate artificially introduced sources of contamination. Field blanks are part of a continuum of blank types that may be used to monitor for contamination introduced throughout the life span of a sample from collection through to analysis (see Exhibit 1). Examples of field blanks include equipment blanks, lot checks of dedicated sampling equipment, bottle blanks, transfer blanks, decontamination/rinsate source blanks and trip blanks (see 04-01-02).

A. Equipment Blanks are collected to assess the adequacy of decontamination procedures for non-dedicated sampling equipment and may help evaluate whether field conditions, and/or sampling equipment, sample transport, preparation and/or analysis are contributing contaminants to samples. Equipment blanks are typically performed on non-dedicated sampling equipment that requires decontamination between uses. Equipment blanks should not be collected near running machinery which may emit fumes that can contaminate the blanks
.

B. Lot Checks are rinsates of disposable sampling equipment analyzed for the target analytes of interest that are sampled using that equipment. This may include peristolic tubing, sampling scoops or bailers as well as the empty bottles provided by the laboratory if there are concerns with their purity.

C. Transfer Blanks are empty sample containers filled with water in the field to monitor for ambient contamination - they most typically are used for aqueous samples for organics such as volatiles, GRO, and DRO but may also be useful if airborne particulates are of concern for inorganic parameters. The water source should be the same as what will be used for the final rinse of decontaminated field equipment (see 04-04-01).

D. Decontamination/Rinsate Source Blanks are samples created from the source of final rinsate water used in the field. They differ from Transfer Blanks in that they would typically be filled in a "clean" location as opposed to the field to avoid picking up unexpected ambient contamination. This type of blank, while rare, typically is utilized when an unexplained and persistent contaminant has been detected in the equipment blanks and all other potential sources of contamination have been eliminated as the source.

II. PROJECT-SPECIFIC REQUIREMENTS

WATER TYPES TO BE USED FOR BLANKS: Blank water refers to water that is free of any analytes of interest. Common water types include distilled, deionized, HPLC-grade, pesticide grade etc. Depending on the data quality objectives for the project and expected levels of target analytes, the choice of water used for field blanks water may vary. Investigations where trace levels (parts per billion or lower) of contaminant are of interest may require water that meets higher purity standards than soil investigations where target analytes may be in the parts per million range.

Sources of water suitable for use for field blanks include:

A. **Laboratory supplied water** is laboratory reagent water that is used in the analytical or cleaning processes, as well as for their method blanks. For the best comparability between field blanks and laboratory method or instrument blanks it is recommended that laboratory supplied water be used. This water should be in glass containers if organics analytes are of interest. In addition, this water should be from the laboratory performing the analyses and not left over from a prior investigation or from a different laboratory. This eliminates any variability introduced as a result of different blank water sources. Left over water from a previous project is not recommended for use as a field blank as the possibility exists that the water could have become contaminated during storage.

B. **Store purchased distilled/deionized**: If trace level analyses are not required, the use of commercially prepared distilled/deionized water purchased from a supermarket or home improvement store may be sufficient. As this water typically is available in plastic jugs, it is not an appropriate blank water source when trace level organics are the constituents of interest.

C. **Ultra Pure**: Certified metal-grade, pesticide-grade or HPLC-grade water may be purchased from most chemical supply companies.

III. METHODOLOGY

A. Review the SOP for the medium sampled, the project specific field sampling plan or quality assurance project plan to determine the blank collection frequency required for the project. Due to cost or other considerations, every project may not warrant the use of an equipment blank. Considerations impacting the frequency of equipment blank collection may include expected concentration ranges of the analytes of interest, field conditions (i.e. will sampling activities occur in an area where there are potential background ambient concentrations of target analytes), use of new sampling equipment, newly trained staff, or use of an unknown laboratory. Field blanks may also be collected if unexpected results in field samples are observed.

B. Record the source, date opened and lot number of the water used for the rinsate blanks.

C. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

D. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket or bowl. 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 and/or bowl used for homogenizing.

E. Fill a complete set of sample bottles.

F. Assign the blank a sample id – if it is desirable to obscure the fact that the sample is a blank, use the same format as the other samples in the series, otherwise a simplified sample id such as FB-mmddyy is recommended (where FB could be EB, TRB, LC etc. as appropriate for the blank type).

G. Assign the blank a sample date and time. Laboratory protocols for assigning sampling date/time to improperly labeled samples vary widely and may impact sampling holding times for certain short hold parameters.

H. Include the blanks on the Chain of Custody form along with the other samples.

I. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock blank water 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 (include a lot number if available and the type of sample container)
- 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 06-02-05).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume I, Chapter I. Washington, DC.
EPA, 2009. Region III Fact Sheet: Quality Control Tool – Blanks
(http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf)

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY

A trip blank is a container of laboratory reagent water that is prepared by the laboratory and shipped, unopened, to the field with empty sample containers and then from the field along with the full sample containers. Trip blanks are used to document contamination attributable to shipping and field handling procedures (i.e., diffusion of volatile organics through the septum during daily collection activities, shipment and storage) as well as provide an independent assessment of laboratory introduced contamination. If the trip blank and associated laboratory preparation blanks are free of analytes of interest, it may safely be assumed that reported analytes are actually present in the environmental samples.

II. PROJECT-SPECIFIC REQUIREMENTS

A. Frequency: *Specify the project specific frequency based on the Work Plan.*

B. Other Criteria: A trip blank is used for all classes of volatile organic analyte analyses (VOA), such as TCL volatile organic compounds (VOCs), BTEX, methanol or other purgeable organic compounds. If you are unsure whether a specific analysis is considered a purgeable method, confirm with the laboratory.

1. Trip blanks are also required for soil samples submitted for TPH-gasoline range organics and other purgeable organics analyses (VOAs). These trip blanks should be prepared in the same manner as an aqueous trip blank.
2. If some of the daily samples being collected/shipped together are submitted for typical VOCs (SW846-8260 or EPA 624) while others are submitted for TPH gasoline/diesel range organics (or another purgeable organic method), you will need to include 2 sets of trip blanks and analyze one for each unique (non-overlapping analyte list) method.

C. Other Considerations: Even if the project Work Plan doesn't specifically call for the use of Trip Blanks there are certain situations where the use of a Trip Blank should be evaluated:

1. If an unexpected high field PID reading is encountered during sampling, a trip blank may be warranted to monitor for cross contamination if other samples are included in the shipment.
2. When there is suspicion of the potential of airborne contamination from external sources such as idling vehicles or machinery or operations upwind using VOCs (such as a refinery, spray painting etc.) although such contamination is best monitored for using a transfer blank where the VOA vial is filled in the field with the water used for equipment rinsate blanks.
3. In general, if there is a suspicion of external cross contamination, a trip blank could be submitted to the laboratory to be placed on HOLD. If unexpected results are encountered in the other samples in the shipment, the laboratory can then be requested to analyze the trip blank to determine whether cross contamination has occurred however holding times must be closely monitored in such cases.

III. METHODOLOGY

For those projects where trip blanks are required, appropriate procedures are discussed below:

A. One trip blank should be included with each cooler containing volatile samples. To save on trip blank analysis costs, you may collect all volatile samples during the day in a single cooler and ship them separately from other sample bottles (if necessary to minimize the number of trip blanks required).

B. When ordering bottles from the laboratory for the sampling event, request sufficient trip blanks such that there is at least one trip blank associated with each day of sample collection activities (with a few spares as a contingency if unexpected conditions expand the field activities or a trip blank container breaks).

C. A trip blank is associated with a group of samples that are collected together throughout the day and shipped together. (It is not necessary to maintain the trip blanks with the same set(s) of vials that are shipped from the laboratory, unless there is a concern that these sample containers have potentially been exposed to contamination during shipment, when it is recommended that fresh containers be obtained.)

D. The trip blank should go out to the field in a cooler (with ice) that volatile field samples containers are added to as they are collected during each day's sampling activities. Handle the blank in the same manner as the filled sample vials.

E. Assign the trip blank a sample number identifying its source, consistent with the format used for the sampling event. One suggestion is to include the sample date in the sample number to aid in matching it with the associated field samples in presentation of results in the project report (i.e. TB0401 or TRIP0401 for the trip blank associated with samples collected on 04/01).

F. Assign a date and time to the trip blank on the COC and sample container as if it were a field sample. The time stamp for the trip blank is when the first sample is added to the cooler containing the trip blank. Do not leave this field blank as the laboratory will require a date and time stamp to monitor analysis holding times. Laboratory protocols for assigning this date if left blank can vary considerably.

G. Return the trip blanks to the laboratory with the samples. Include the trip blank information along with the samples on the Chain-of-Custody form (SOP 06-02-02). Analysis is performed for the same suite of volatile organic compounds as the associated samples. (i.e., it is only necessary to request BTEX if associated samples are only analyzed for BTEX). However, if samples with different subsets of volatile constituents are collected and shipped together, select the method that covers all of the constituents. It is not necessary to analyze for both BTEX and TCL VOCs, for example.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Trip blanks should never be opened in the field.

B. If there are multiple sample teams on the project that are collecting samples separately from each other during the day, a separate trip blank should be assigned to each group which is then shipped separately to the lab.

C. Do not combine groupings of samples with different associated trip blanks into the same cooler for shipping.

D. Do not combine multiple days' worth of VOC samples into a cooler for shipment unless they have been in the same cooler with the trip blank and each other throughout the sampling process.

V. DOCUMENTATION

Describe handling of the trip blanks in the Trip Report (SOP 06-02-05). Include the sample numbers assigned and associated samples (if more than one trip blank is used).

VI. REFERENCES:

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC

EPA Region III Quality Control Fact Sheet, Field Blanks, http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf

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.

06-02-02 CHAIN-OF-CUSTODY FORM

I. SCOPE AND APPLICABILITY

A Chain-of-Custody (COC) Form must be completed for each shipment of samples for laboratory analysis. The COC form is the communication record between the project field team and the laboratory login personnel. Accurate and legible completion of the COC form is necessary to insure that samples are analyzed for the correct parameters.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

Complete a Chain-of-Custody Form as provided by the laboratory for each shipping container of samples containing the following information (each laboratory will have their own preferred COC form so the location of the information on the form may vary):

- CEC project number and name
- Project Manager or designated CEC contact with their phone number and email
- Date and time of sample collection
- Sample number
- Sample Matrix
- Total number of bottles or jars
- Preservation (this is especially important if the laboratory is expected to preserve the bottles upon receipt)
- Suites of analyses requested, in specific terms. Examples:
  TCL VOCs
  RCRA Metals
  BTEX
  PNAs-SW846 8270/SIM
  Avoid vague descriptors like "VOCs" or "metals." If a project specific analyte list (subset of metals or organic compounds for example) has been set up with the project and is referenced on the COC, include a copy of it with each shipment to the laboratory to ensure that it becomes part of the data report and the sample custody records. It should be possible to determine exactly what sample analyses were requested/required from the COC.
- Requested turnaround time (be specific (i.e. 48 hours, 3 days, etc.,) if not standard)
- Any special notes/requests, for example indicate high PID readings if applicable, request for lower reporting limits – don't assume you will get drinking water limits just because you submit a drinking water sample, this must be requested either in advance or on the COC
- Signature of CEC person relinquishing custody to the laboratory or shipping courier
- Date and time samples were handed over to someone else or placed under custody seals

Signatures of every person who has control of the samples should appear on the Chain-of-Custody Form. If another person, even another CEC employee, takes responsibility for packing or shipping the samples after you have completed the form and before the samples have been sealed, that person should sign as receiving and subsequently relinquishing the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

- Use of vague terms such as VOCs or Metals may lead to missing parameters. Verify with the laboratory which compounds/metals are part of their standard analyses to ensure that all necessary parameters will be reported.
- Illegible sample names/IDs will lead to the sample login personnel guessing/interpreting what was written which may result in the laboratory report not reflecting the intended sample names/ID. It is often not possible for the laboratory to retroactively edit the report and more importantly the

underlying analysis records to correct sample names/IDs.

- If lower reporting limits are required, this must be communicated to the laboratory on the COC in addition to any prior communication as this may impact how samples are logged in for analysis.

V. DOCUMENTATION

Use the laboratory supplied COC forms (paper or electronic) or equivalent. If three part forms are not used, either make a photocopy, take a photo of or fax the COC before placing it in the cooler. Use of the Chain-of-Custody Form is discussed in SOP 06-01-01 and SOP 06-01-03.

VI. REFERENCES: None.

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.