4TH QUARTER 2020 GROUNDWATER ASSESSMENT MONITORING REPORT NOVEMBER 2020 MONITORING EVENT

FORMER ENVIRONMENTAL WASTE SOLUTIONS (EWS) 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

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TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

This report documents the 4th quarter 2020 assessment-monitoring event, which was performed at the former Environmental Waste Solutions, LLC (EWS) Camden Class II Landfill on November 17th, 2020, and a re-sample event that was performed at MW-3 on December 8, 2020.

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

Beginning in 2008, the site entered into the Groundwater Detection-Monitoring Program, and groundwater samples were collected from site monitoring wells on a semi-annual basis. EWS entered the Assessment Monitoring Program because of chloride concentrations reported above the 250 mg/l EPA secondary drinking water standard (2DWS) at monitoring well MW-3 during the November 2015 semi-annual detection-monitoring event. As a result, additional groundwater quality assessment activities were completed which included the installation of a new permanent groundwater monitoring well (MW-5), the installation of three (3) temporary monitoring wells (TMW-1, TMW-2, TMW-3), and completion of a private water-use survey. In addition, the semi-annual detection monitoring frequency was increased from semi-annual to quarterly assessment monitoring. The observed chloride concentration at MW-3 during this November 2020 event (18.7 mg/l) was well below the 2DWS.

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

The 4th quarter 2020 sampling event at the facility included the following sampling activities:

Groundwater samples were collected by CEC on November 17, 2020 from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. A groundwater re-sample event was completed at MW-3 on December 8, 2020, and a sample was collected from MW-3 and analyzed for total cadmium and dissolved cadmium. A leachate sample was also collected by CEC on December 9, 2020 from the "Industrial Waste Cell (IWC)" during this event. No sample was collected from the "Aluminum Processing Waste Cell (APWC)" during this sampling event since leachate was not currently being generated from the APWC. The amount of leachate produced from the IWC and APWC have been minimal since the landfill was capped, and the leachate flows being pumped from the IWC cell

has been intermittent. Also, no leachate has been generated from the APWC cell for the past several months.

Pace Analytical (Pace) is the laboratory sub-contracted to perform the chemical analyses. Laboratory reports for the 4th quarter 2020 groundwater analyses were prepared by Pace and reported to CEC on December 1st, 2020 for the groundwater samples. Total cadmium was detected over the MCL at MW-3 in the sample taken during the November 17, 2020 sampling event. A verification re-sample event for cadmium was completed at MW-3 on December 8, 2020 to determine the validity of the cadmium detection over the MCL during the initial November 17, 2020 event. The results of the MW-3 re-sample event were prepared by Pace and reported to CEC on December 16, 2020. The IWC-leachate sample analysis was prepared by Pace and reported to CEC on December 21, 2020.

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). Where primary or secondary standards were not available (i.e., cobalt), concentrations were reviewed and compared against their EPA Regional Screening Levels (RSLs). 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. The results of the analyses during this assessment-monitoring event are summarized in the following paragraphs.

As stated previously in this report, total cadmium was detected above the MCL (0.005 mg/l) at MW-3 (0.00816 mg/l) during the November 17, 2020 monitoring event and was higher in concentration compared to the previous June 2, 2020 event (0.00278 mg/l). In a duplicate sample collected from MW-3 during the November 17, 2020 monitoring event, the total cadmium concentration (0.00817 mg/l) was similar to the concentration in the original sample from MW-3. During the December 8, 2020 verification re-sample event, the total cadmium (0.00906 mg/l) and dissolved cadmium (0.00787 mg/l) concentrations at MW-3 were both above the MCL. The cadmium detections at MW-3 during this event were the only cadmium detections above the Practical Quantification Limit (PQL) at any of the groundwater monitoring locations. Based on the Mann-Kendall trend test, no distinct statistically significant trend was identified for total cadmium concentrations at MW-3, when considering data from the past 19 sampling events since November 2016. Total cadmium was first detected above the PQL during the November 10, 2016 event (0.00177 mg/l) and was first detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l).

Although there have been elevated concentrations of total cadmium in MW-3, the cadmium levels observed in MW-3 have improved significantly since closure activities have been completed.

During the previous 3 consecutive quarterly monitoring events, the cadmium concentrations at MW-3 were below the MCL.

Twelve SSIs were identified over background during this event. SSIs included mercury (up-gradient MW-1), chloride (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3), total cadmium (MW-3), fluoride (MW-3), sulfate (MW-3), and zinc (MW-3 and MW-5). The chloride, fluoride, sulfate, and zinc detections observed in the site monitoring wells were all below their associated MCLs or 2DWS.

Glossary of Terms

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

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

1.0 INTRODUCTION

1.1 SITE LOCATION

The former EWS 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 landfill cap construction and closure activities have been completed by TDEC. Continued post-closure activities at the facility are being implemented to protect the environment and human health. These activities include leachate pre-treatment, leachate hauling and disposal, storm water management activities, and groundwater monitoring activities.

2.0 AQUIFER CHARACTERISTICS

2.1 GEOLOGIC AND AQUIFER CHARACTERISTICS

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

2.1.1 Camden and Harriman Formations

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

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

2.2 MONITOR WELL INTEGRITY & STATIC WATER LEVELS

The groundwater-monitoring network for the former EWS Class II Landfill currently consists of monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Due to insufficient groundwater recharge 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 was in response to elevated chloride concentrations at MW-3, which were first detected during the November 2015 sampling event. In addition to providing potentiometric information for the site, these temporary wells yield groundwater samples for water-quality analyses.

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

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

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

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

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

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

Top of casing elevation has been determined by a licensed land surveyor and is referenced to the current Tennessee State Plane 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 22.38 feet below the top of casing at the up-gradient monitor well MW-1 to approximately 11.38 feet below the top of casing at monitor well MW-4. The potentiometric gradient calculated from groundwater elevation data collected on November 17, 2020 is approximately 1.26%.

The potentiometric gradient is calculated according to the following formula:

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

$$\frac{(394.09') - (370.09')}{1{,}910'} * 100 = 1.26\%$$

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

2.5 HYDRAULIC CONDUCTIVITY

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

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 INSTRUMENTATION

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

3.2 GROUNDWATER PURGING AND COLLECTION OF FIELD PARAMETER VALUES

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

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

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

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

During the November 17, 2020 monitoring event, a peristaltic pump was utilized during purging activities in the temporary monitoring wells (TMW-1, TMW-2, and TMW-3). According to the USEPA SESD groundwater sampling procedures, peristaltic pumps can be utilized as an alternative and acceptable method for low-flow or multiple volume purging and sampling activities.

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

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

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

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

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

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

3.3 GROUNDWATER SAMPLE COLLECTION & PRESERVATION

Groundwater samples were collected from monitoring wells when field parameter data indicated that stagnant water had been purged from the well and replaced by groundwater from the adjacent formation that is representative of actual aquifer conditions. Groundwater was placed in the laboratory supplied sample vessels in the following order: Appendix I organics – three (3) forty (40) mL amber glass containers preserved with hydrochloric acid (HCl); Appendix I organics EDB and DBCP– three (3) forty (40) mL clear glass containers preserved with sodium thiosulfate ($Na_2S_2O_3$); total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) – one (1) two-hundred fifty (250) ml HDPE container preserved with nitric acid (HNO_3); alkalinity – one (1) one-hundred (100) ml unpreserved amber glass container; 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).

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.

3.4 LEACHATE SAMPLING PROCEDURES

A leachate sample was also collected by CEC on December 9, 2020 from the "Industrial Waste Cell (IWC)" during this event. The amount of leachate produced from the IWC and APWC has been minimal since the landfill was capped, and the leachate being pumped from the IWC and APWC cells has been intermittent. No leachate was being pumped from the IWC Leachate during the November 17, 2020 groundwater event, and the IWC leachate sample was collected on December 9, 2020 in conjunction with a pumping event. 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. No sample was collected from the "Aluminum Processing Waste Cell (APWC)" during this sampling event since leachate was not being pumped from the APWC. Laboratory reports from the IWC leachate analyses were prepared by Pace and reported to CEC on December 21, 2020. The approximate APWC and IWC leachate sample locations are shown on **Figure 2 – Potentiometric Surface Map located in Appendix A**.

3.5 QUALITY ASSURANCE AND QUALITY CONTROL

3.5.1 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 near monitoring well TMW-1 and a duplicate sample was collected from MW-3. The field blank was collected by pouring deionized water into a set of sample bottles provided by the laboratory, thereby allowing any airborne contaminants a chance to enter the field blank sample. The duplicate sample was collected by taking separate samples from within MW-3 at the same time. In addition, a laboratory supplied trip blank for VOC analysis was prepared and placed in a cooler, which was present during groundwater sampling activities. Upon the collection of the final groundwater sample, the trip blank was placed in a sample cooler and delivered to Pace for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

Pace reported the groundwater laboratory analytical results to CEC on December 1, 2020. Laboratory analytical testing of the field blank presented in the analytical report showed no indications of any constituents above the laboratory PQL. The results for the duplicate sample collected from MW-3 were similar to the original MW-3 sample results.

3.5.2 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.

As indicated by laboratory qualifier "T8", the nitrate sample from the duplicate sample collected on November 17, 2020 was prepared and/or analyzed past holding time as defined by the method and the nitrate concentration at the duplicate sample location should be considered a minimum value. Although all collected samples were submitted to Pace Analytical well within the 48-hour hold times for nitrate, Pace Analytical was not able to prepare the duplicate sample for nitrate within the 48-hour hold time. The internal laboratory IQA and IQC results are included in the laboratory analytical reports located in **Appendix C – Laboratory Analytical Reports & Field Information Logs**.

3.6 SAMPLE CHAIN-OF-CUSTODY

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

4.0 LABORATORY ANALYTICAL PROCEDURES

4.1 ANALYTICAL METHODS

All laboratory analyses for the 4th quarter 2020 groundwater assessment-monitoring event were completed by Pace Analytical. The analytical methods chosen for these monitoring events were in full compliance with the procedures required by the DSWM and the USEPA's publication SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (3rd Edition).

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

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals)
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 130.1	Hardness (colorimetric) as $CaCO_3$
Method 350.1	Ammonia Nitrogen
Method 410.4	Chemical Oxygen Demand (COD)

4.2 LABORATORY ANALYTICAL RESULTS

Constituent values from all inorganic laboratory analyses for groundwater and leachate samples, along with applicable MCLs or 2DWSs, are presented in **Table 2a – Groundwater and Leachate Analytical Data in Appendix A**. Copies of the laboratory reports are located in **Appendix C – Laboratory Analytical Report & Field Information Logs**.

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

Total Arsenic was **not** detected above the MCL (0.01 mg/l) at up-gradient MW-1 (0.00513 mg/l) during this 4th Quarter 2020 event. Arsenic has been detected at concentrations that exceed the MCL during previous monitoring events only at up-gradient well MW-1. Arsenic was not detected above the laboratory PQL (<0.002 mg/l) in any of the down-gradient monitoring wells during this November 2020 event, which is consistent with previous sampling events. For this site, 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 Cadmium was detected above the MCL (0.005 mg/l) at MW-3 and the duplicate sample collected from MW-3 during this November 17, 2020 monitoring event. Total cadmium was also detected above the MCL in the sample collected from MW-3 during the verification re-sampling event on December 8, 2020. In addition, the dissolved cadmium concentration at MW-3 during the verification re-sample event on December 8, 2020 was also above the MCL. A summary of cadmium concentrations (total cadmium and dissolved cadmium) and turbidity values observed at MW-3 during each sampling event since May 9, 2016 is referenced in the table and graph below:

MW-3
Summary of Cadmium Concentrations and Turbidity Measurements

Date	Total Cadmium (mg/l)	Cadmium, Dissolved (mg/l)	Turbidity (NTU)
12/8/2020	**0.00906**	**0.00787**	**10.8**
11/17/2020	**0.00816**	NA	**14.0**
8/26/2020	**0.00242**	NA	**6.66**
6/2/2020	**0.00278**	NA	**5.38**
2/27/2020	**0.00214**	NA	**7.63**
11/20/2019	**0.00157**	NA	**2.11**
9/6/2019	**0.0088**	NA	**2.98**
6/4/2019	**0.0292**	**0.0297**	**2.98**
3/5/2019	**0.0117**	**0.0133**	**6.27**
12/4/2018	**0.144**	**0.139**	**4.77**
9/27/2018	**0.204**	**0.204**	**1.05**
9/12/2018	**0.297**	**0.320**	**1.12**
6/19/2018	**0.0312**	**0.0292**	**4.90**
3/22/2018	**0.00671**	**0.00637**	**24.3**
12/14/2017	**0.00659**	**0.00733**	**23.0**
9/28/2017	**0.00926**	**0.0102**	**18.9**
8/8/2017	**0.0113**	NA	**16.6**
6/8/2017	**0.0286**	NA	**34.8**
11/10/2016	**0.00177**	NA	**64.5**
5/9/2016	<0.001	NA	**8.39**

NA-Not Analyzed

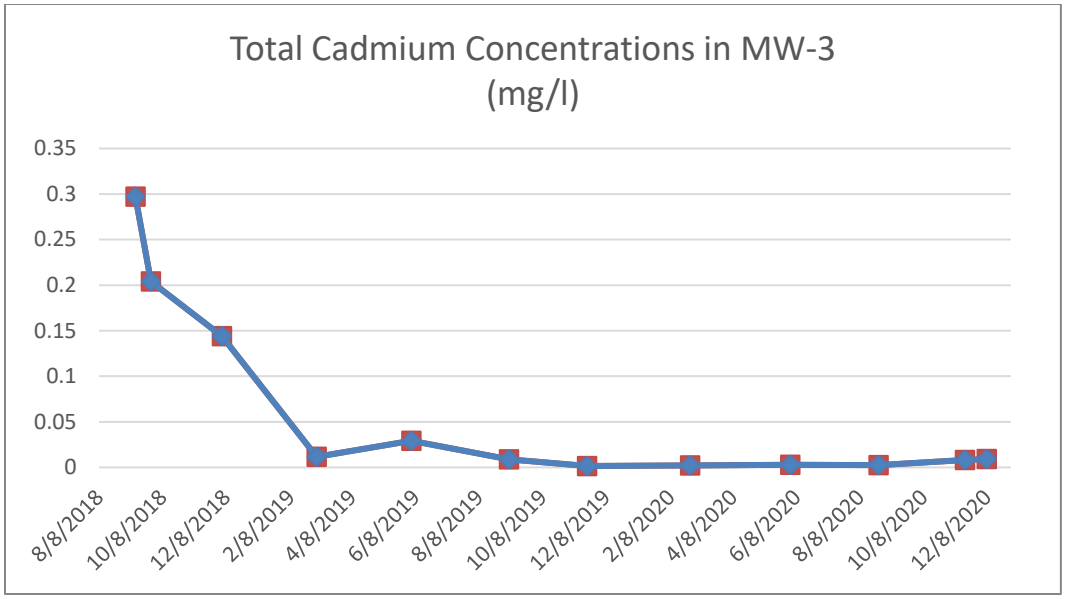


Figure – Cadmium concentrations in MW-3

Since the fall of 2018, the total cadmium concentrations observed in MW-3 have shown an overall decrease in concentration. During the previous four consecutive sampling events from November 2019 to August 2020, the cadmium concentrations at MW-3 were below the MCL. However, during this November 17, 2020 sampling event and the verification re-sample event on December 8, 2020, the observed cadmium concentrations at MW-3 were slightly above the MCL. Although the current cadmium concentrations during this event are above the MCL, these concentrations remain significantly lower than the concentrations observed in 2018. The cause of the increased cadmium at MW-3 during this event is not completely understood at this time. However, TDEC and CEC expect that the total cadmium concentrations at MW-3 will generally decrease to levels below the MCL since landfill closure activities have been completed. TDEC and CEC will continue to carefully monitor the total cadmium concentrations at MW-3 during future events.

Total Cobalt was detected in up-gradient well MW-1 (0.0291 mg/l) and down-gradient well MW-3 (0.00445 mg/l) during this November 2020 event. Cobalt does not have an MCL; however, the TDEC-DSWM uses the EPA regional screening level (RSL) of 0.006 mg/l as the groundwater protection standard for this constituent. The reported cobalt detection at up-gradient well MW-1 was above the RSL for cobalt during this November 2020 event. However, the reported cobalt concentration in down-gradient monitoring well MW-3 was below the RSL for cobalt during this November 2020 event. Cobalt has historically been detected at concentrations that exceed the RSL at MW-1 prior to the disposal of waste in the landfill, and total cobalt was detected in MW-1 at similar concentrations during previous events. For this site, the presence of cobalt in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, since there is no development immediately up-gradient of MW-1.

Total Chromium was detected in MW-5 (0.00391 mg/l), which was not above the MCL of 0.1 mg/l for chromium.

Total Mercury was detected in up-gradient well MW-1 (0.00258 mg/l) during this November 2020 monitoring event, which was slightly above the MCL of 0.002 mg/l for mercury concentrations. Total mercury has consistently been detected above the PQL at MW-1 since January 2009. Total mercury was not detected above the laboratory PQL (0.000200 mg/l) at any of the down-gradient wells during this November 2020 event. Although total mercury has been previously detected above the PQL at up-gradient MW-1, total mercury has not been detected above the laboratory PQL in any of the down-gradient monitoring wells since monitoring began at the site in 2008. The presence of mercury in the local groundwater near up-gradient monitoring well MW-1 may be attributable to naturally occurring deposits in the soil overburden, since there is no development immediately 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 during the 4th quarter 2020 sampling event from the former EWS Class II Landfill groundwater monitoring well network indicated that three of the site-specific groundwater-monitoring list of compounds were detected at concentrations that exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters include **aluminum** in down-gradient wells MW-3, MW-5, and TMW-2; **iron** in up-gradient well MW-1 and down-gradient well MW-4; and **manganese** in up-gradient well MW-1 and down-gradient wells MW-3, MW-4, and MW-5. **Chloride, sulfate,** and **nickel** detections were below the 2DWS during this event. The observed concentrations for the constituents given below are discussed relative to the 2DWS.

The **Total Aluminum** concentrations observed in MW-3 (0.284 mg/l), MW-5 (0.344 mg/l), and TMW-2 (0.235 mg/l) during this November 2020 sampling event were above the 2DWS (0.2 mg/l). During the previous August 2020 event, total aluminum was not detected above the PQL (<0.1 mg/l) in MW-3, MW-5, or TMW-2. Total aluminum was also detected in upgradient well MW-1 (0.19 mg/l) and downgradient well TMW-1 (0.126 mg/l), which were below the 2DWS (0.2 mg/l). Aluminum was not detected above the PQL (<0.1 mg/l) at MW-4 or TMW-3 during this November 2020 event.

The **Chloride** concentrations reported at MW-1 (2.48 mg/l), MW-3 (18.7 mg/l), MW-4 (9.04 mg/l), MW-5 (74.8 mg/l), TMW-1 (24.3 mg/l), TMW-2 (37.6 mg/l), and TMW-3 (62.9 mg/l) during this November 2020 event were below the 2DWS for chloride concentrations (250 mg/l). The chloride concentrations for this November 2020 event are similar to the concentrations observed at samples collected from each well during the previous August 2020 event. The chloride concentration at MW-3 continues to be significantly lower in concentration compared to the previous events in December 2018 (65 mg/l), September 2018 (222 mg/l), November 2015 (458 mg/l), and the supplemental re-sampling in December 2015 (360 mg/l).

Fluoride was detected at MW-3 (0.179 mg/l) and the duplicate sample collected from MW-3 (0.180 mg/l) during this November 2020 monitoring event, which were well below the MCL (4.0 mg/l) for fluoride. In addition, the observed fluoride concentrations at MW-3 and the duplicate sample collected at MW-3 were well below the 2DWS (2.0 mg/l) for fluoride.

Total Iron was detected above the 2DWS (0.3 mg/l) in up-gradient well MW-1 (5.36 mg/l) and down-gradient well MW-4 (4.94 mg/l) during this November 2020 monitoring event. Iron was detected above the PQLs of the laboratory (0.1 mg/l), but below the 2DWS (0.3 mg/l) during this November 2020 event at wells MW-3 (0.172 mg/l), MW-5 (0.287 mg/l), TMW-1 (0.242 mg/l), and TMW-2 (0.153 mg/l). The reported total iron concentrations at each of the groundwater monitoring wells were less than the highest concentrations observed prior to placement of waste and do not exhibit a trend via time-series graphs. The presence of iron in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, and iron has consistently been detected above the 2DWS in up-gradient well MW-1.

Total Manganese detections were observed above the 2DWS (0.05 mg/l) in up-gradient MW-1 (0.486 mg/l) and down-gradient wells MW-3 (0.545 mg/l), MW-4 (0.0587 mg/l), and MW-5 (0.235 mg/l) during the November 2020 monitoring event. Total Manganese has been consistently detected at concentrations above the 2DWS (0.05 mg/l) in up-gradient well MW-1. The presence of total manganese in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden. During this November 2020 event, total manganese was also detected below 2DWS (0.05 mg/l) but above the laboratory PQL (<0.005 mg/l) in wells TMW-1 (0.00552 mg/l) and TMW-3 (0.00985 mg/l).

Total Nickel was detected in up-gradient well MW-1 (0.00632 mg/l) and down-gradient wells MW-3 (0.00708 mg/l) and MW-5 (0.00714 mg/l) during the November 2020 sampling event, and these values were not above the MCL value obtained from the Tennessee Division of Water Resources (TN DWR) Public Water Systems chapter rule 0400-45-01-.06 (0.10 mg/l). Total nickel has been detected at concentrations above the TN DWR Public Water Systems MCL (0.1 mg/l) in up-gradient well MW-1 during previous events on April 9, 2009 (total nickel at MW-1= 0.2 mg/l) and May 19, 2009 (total nickel at MW-1=0.17 mg/l). Therefore, the presence of total nickel in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden.

The **Sulfate** concentration reported at MW-3 (61.4 mg/l) during this November 2020 sampling event was below the 2DWS for sulfate (250 mg/l). In addition, the sulfate concentrations at MW-3 have been consistently decreasing each event since September 2018.

Sulfate was also detected in MW-5 (11.2 mg/l) during this November 2020 event and was below the 2DWS. Sulfate was not detected above the PQL of 5.00 mg/l in any of the other monitoring wells across the site.

Total Magnesium does not currently have an established MCL, 2DWS, EPA RSL, or an approved alternate groundwater protection standard (GWPS). The total magnesium concentration at MW-3 during this November 2020 (6.86 mg/l) event was slightly higher than the June 2020 sample event (6.2 mg/l) which was lower than the previous February 2020 event (6.73 mg/l), November 2019 (10.3 mg/l), September 2019 (13 mg/l), June 2019 (20.8 mg/l), March 2019 (7.83 mg/l), December 2018 (36.4 mg/l), and September 2018 (64 mg/l) respective event concentrations.

Magnesium was also detected above the laboratory PQL (1.00 mg/l) during the November 2020 sample event in MW-1 (2.36 mg/l), MW-4 (3.1 mg/l), MW-5 (11.5 mg/l), TMW-1 (3.47 mg/l), TMW-2 (4.98 mg/l), and TMW-3 (6.86 mg/l).

4.3 QUALITY CONTROL QUALIFIER CODES

The EPA Contract Laboratory Program states that sample and result qualifiers should be utilized as part of a total quality-control process. Pace complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. Three QC qualifier codes (E, J4, and T8) were indicated during the laboratory analysis of groundwater samples collected during the November 17, 2020 event. Specific information concerning each laboratory QC qualifier code can be found on page 49 of 52 in the December 1, 2020 Laboratory Analytical Report in **Appendix C**. No QC qualifier codes were indicated on the laboratory report for the December 8, 2020 re-sample event at MW-3 or the IWC-Leachate laboratory report for the December 9, 2020 leachate sample event.

5.0 STATISTICAL ANALYSIS

5.1 APPLICABLE METHODS

The Rules of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management Chapter 0400-11-01-.04(7) state, in part, that each landfill must conduct and report statistical analyses as part of the evaluation of groundwater monitoring data. Statistical analyses of the sampling data was performed on monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3.

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

After the non-representative background sample data were removed, the distribution of the data was evaluated for normality. The test for normality was conducted using the Shapiro-Wilks method if N <50 or Shapiro-Francia method if N>50. The normality test was performed for both raw and log-transformed data, with replacement of non-detects to half of the corresponding laboratory PQL. Data determined to be normally distributed were evaluated using parametric

prediction limit (PPL) analysis. Inter-well and intra-well (intra-well utilized for upgradient MW-1) statistical methods were appropriately utilized to determine statistically significant increases in constituent concentrations.

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

Inter-well analyses compared the concentrations observed at the down-gradient monitoring locations (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) to the concentrations observed at the up-gradient monitoring location (MW-1) during this monitoring event. Chloride data distribution tests from all up-gradient and down-gradient monitoring wells indicated normality when the data were log-transformed and non-detects were replaced by half of the corresponding PQL. Therefore, the chloride data at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were evaluated using PPL inter-well analysis. All other data sets (aluminum, barium, total cadmium, chromium, cobalt, 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 at least 50% non-detects existed for the given parameter, non-parametric inter-well prediction limit analysis was conducted on the data. For this site, the total % non-detects for aluminum (41.22% non-detects) and barium (6.04% non-detects) were less than 50%, and Shewart-CUSUM control charts were utilized for aluminum and barium analysis. Based on the high amount of left-censored data (>/=50% of non-detects) for total cadmium, chromium, cobalt, fluoride, nickel, zinc, and sulfate, non-parametric inter-well prediction limit analysis was conducted for the background data from up-gradient well MW-1 compared to down-gradient monitoring wells (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). Additional statistical procedures performed included Mann-Kendall trend analyses.

The computer program ChemStat v.6.4 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

One statistically significant increase (SSI) in the reported mercury concentrations was identified in up-gradient well MW-1 using intra-well non-parametric prediction limit analysis.

SSIs over background identified for the current monitoring event include chloride at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3, total cadmium at MW-3, fluoride at MW-3, sulfate at MW-3, and zinc at MW-3 and MW-5. When considering data since the November 10, 2016, statistically significant trends in data were observed using the Mann-Kendall trend analyses at the 95% confidence level. Trend analyses revealed a statistically significant upward trend in barium at MW-4, MW-5, TMW-1, and TMW-3; chloride at MW-4, MW-5, TMW-1, TMW-2, and TMW-3; chromium at MW-5; sulfate at MW-5; and zinc at MW-5. Trend analysis revealed a downward trend in aluminum concentrations at TMW-2 and chloride concentrations at MW-3. There were no distinct statistically significant trends in concentrations for any of the other detected constituents.

The total cadmium concentration observed at MW-3 indicated an SSI in reported concentrations using inter-well non-parametric prediction limits by using cadmium concentrations observed at the up-gradient monitoring location (MW-1) as background for comparison. From June 2017 to September 2019, the total cadmium concentrations observed at MW-3 were above the MCL of 0.005 mg/l. However, the total cadmium concentrations observed at MW-3 from November 2019 to August 2020 were below the MCL. Although the total cadmium concentration at MW-3 during this event was above the MCL and indicated as an SSI, no distinct statistically significant trend was identified by Mann-Kendall for total cadmium concentrations at MW-3 when considering data from the past 19 sampling events since November 10, 2016.

The chloride concentrations observed at MW-3 (18.7 mg/l), MW-4 (9.04 mg/l), MW-5 (74.8 mg/l), TMW-1 (24.3 mg/l), TMW-2 (37.6 mg/l), and TMW-3 (62.9 mg/l) produced SSIs over background during this event. The chloride detections at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are consistent with previous data and are below the 2DWS for chloride concentrations (250 mg/l). When considering data from the past 16 sampling events since November 2016, the data showed a downward trend in chloride concentrations at MW-3 and an upward trend in chloride concentrations at MW-4, MW-5, TMW-1, TMW-2, and TMW-3 using the Mann-Kendall trend analyses at the 95% confidence level.

The chromium concentration observed at MW-5 (0.00391 mg/l) was less than the MCL (0.1 mg/l), and did not produce a SSI in reported concentrations during this event. When considering chromium data from MW-5 since November 2016, the data did not show an upward or downward trend in chromium concentrations at MW-5 using the Mann-Kendall trend analysis at the 95% confidence level.

The cobalt concentration observed at MW-3 (0.00445 mg/l) was less than the GWPS value referenced from the EPA Regional Screening Levels for cobalt (0.006 mg/l) and did not produce a SSI in reported concentrations during this event. When considering cobalt data from MW-3 since

November 2016, the data did not show an upward or downward trend in cobalt concentrations at MW-3 using the Mann-Kendall trend analysis at the 95% confidence level.

A SSI for fluoride concentrations was identified during this sampling event at MW-3. The fluoride concentration at MW-3 (0.179 mg/l) was less than the MCL (4.0 mg/l) during this event and was less than the previous August 2020 event (0.279 mg/l). However, no distinct statistically significant trend was identified by Mann-Kendall for fluoride concentrations at MW-3 when considering data from the past 16 sampling events since November 10, 2016.

A SSI for sulfate concentrations at MW-3 was identified during this sampling event. However, when considering all data accumulated from MW-3 since November 10, 2016, the data did not show an upward or downward trend in sulfate concentrations at MW-3 using the Mann-Kendall trend analysis at the 95% confidence level. The sulfate concentration reported during this sampling event (61.4 mg/l) was higher than the previous August 2020 sample event (34.3 mg/l). Regardless, the concentration remains below the 2DWS of 250 mg/l. Sulfate was also detected in MW-5 (11.2 mg/l) during this November 2020 event, which was well below the 2DWS of 250 mg /l. While there was an upward trend in sulfate concentrations identified in MW-5 during this event, there was no reported SSI. Sulfate was not detected above the PQL in any of the other monitoring wells across the site.

The zinc concentrations observed at MW-3 (0.0507 mg/l) and MW-5 (0.110 mg/l) produced SSIs over background during this event. The zinc concentrations at MW-3 and MW-5 were less than the 2DWS limit of 5 mg/l. Zinc was most recently indicated as a SSI at MW-3 during the previous June 2020 event. When considering zinc data from MW-3 since November 2016, the data did not show an upward or downward trend in zinc concentrations at MW-3 using the Mann-Kendall trend analysis at the 95% confidence level. However, an upward trend in zinc concentrations at MW-5 was observed using the Mann-Kendall trend analyses at the 95% confidence level when considering zinc data at MW-5 from sampling events since November 2016. Zinc was not detected above the PQL in any of the other monitoring wells across the site.

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 fourth quarter assessment-monitoring event of 2020 are summarized as follows:

- SSIs included mercury (up-gradient MW-1), chloride (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3), total cadmium (MW-3), fluoride (MW-3), sulfate (MW-3), and zinc (MW-3 and MW-5).
- Trend analyses revealed a statistically significant upward trend in barium at MW-4, MW-5, TMW-1, and TMW-3; chloride at MW-4, MW-5, TMW-1, TMW-2, and TMW-3; sulfate at MW-5; and zinc at MW-5. Trend analysis revealed a downward trend in aluminum concentrations at TMW-2 and chloride concentrations at MW-3. There were no distinct statistically significant trends in concentrations for any of the other detected constituents during this event.
- The total cadmium levels at MW-3 have generally improved since closure activities have been completed. In addition, there have been no cadmium detections from groundwater samples obtained from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3. Although the current cadmium concentration at MW-3 during this event is slightly above the MCL, the cadmium concentrations at MW-3 remain significantly lower than the cadmium concentrations observed at MW-3 in previous sampling events. The cause of the increased cadmium at MW-3 is not completely understood at this time. However, TDEC and CEC expect that the total cadmium concentrations at MW-3 will generally decrease to levels below the MCL since landfill closure activities have been completed. TDEC and CEC will continue to carefully monitor the total cadmium concentrations at MW-3 during future events.
- A SSI was identified for the reported sulfate concentration at MW-3. However, the sulfate concentrations at MW-3 do not exhibit a statistically significant increasing or decreasing trend when considering data from MW-3 since November 10, 2016.
- The chloride concentrations at MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are still well below the 250 mg/l 2DWS.
- Although the zinc concentration reported at MW-3 was indicated as an SSI using all available data since 2008, the levels appear to be decreasing in concentration since September 2018 and are still below the 2DWS of 5 mg/l. In addition, the zinc concentrations at MW-3 did not exhibit a statistically significant increasing or decreasing trend when considering data from MW-3 since November 10, 2016.
- No VOCs were detected above their respective laboratory PQL in any of the groundwater monitoring wells during the monitoring event.

The first quarter 2021 assessment-monitoring event is tentatively scheduled for February 2021 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. As mentioned previously, the

amount of leachate produced from the IWC and APWC has been minimal since the landfill was capped, and the leachate being pumped from the IWC and APWC cells has been intermittent. If possible, leachate samples will also be collected from the APWC and IWC during the first quarter 2021 assessment-monitoring event.

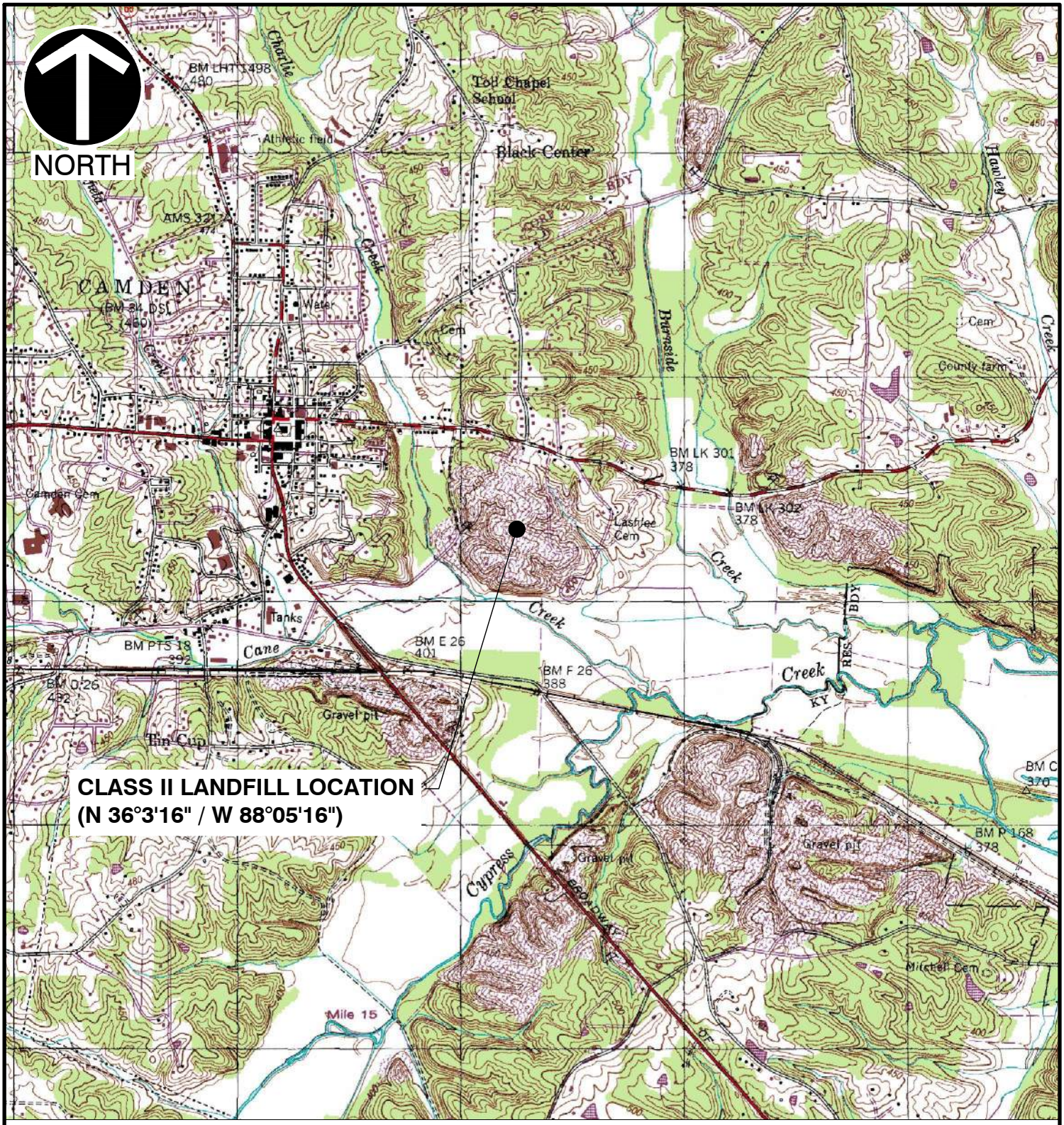
Since the former EWS Class II Landfill site remains in assessment monitoring, a private water use survey update is required annually. An annual water use survey update for the former EWS Class II Landfill site was completed by CEC in November 2020, and no new wells or springs were identified within the required search radius for the site during the November 2020 update. The annual 2020 water use survey update is documented in a separate report.

7.0 RECOMMENDATIONS

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

1. It is recommended that all permanent monitoring wells on the site continue to be monitored quarterly. In addition, quarterly groundwater samples will continue to be collected from temporary monitoring wells down-gradient from MW-3.
2. If certain groundwater samples have turbidities that are elevated, samples will be collected for dissolved metals analysis (in addition to total metals analysis).

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

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FORMER EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	AAB	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	1
DATE:	DECEMBER 2020	DWG SCALE:	1"=2000'	PROJECT NO:	181-364		

P:\2018\181-364\-CADD\Dwg\181-364_ FIGURE 1 - SITE LOCATION MAP.dwg{LAYOUT1} LS:(9/17/2020 - abaugh) - LP: 12/14/2020 12:44 PM

NORTH

LEGEND

MW1 394.09	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 374.43	TEMPORARY GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
390	POTENTIOMETRIC SURFACE CONTOUR (FMSL)
	GROUND WATER FLOW DIRECTION
MH1	MANHOLE
	APPROXIMATE FILL LIMITS
FM	LEACHATE FORCE MAIN

NOTE:

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

$$i = \frac{394.09' \text{ (MW–1)} - 370.09' \text{ (MW–4)}}{1{,}910'} = 0.0126 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

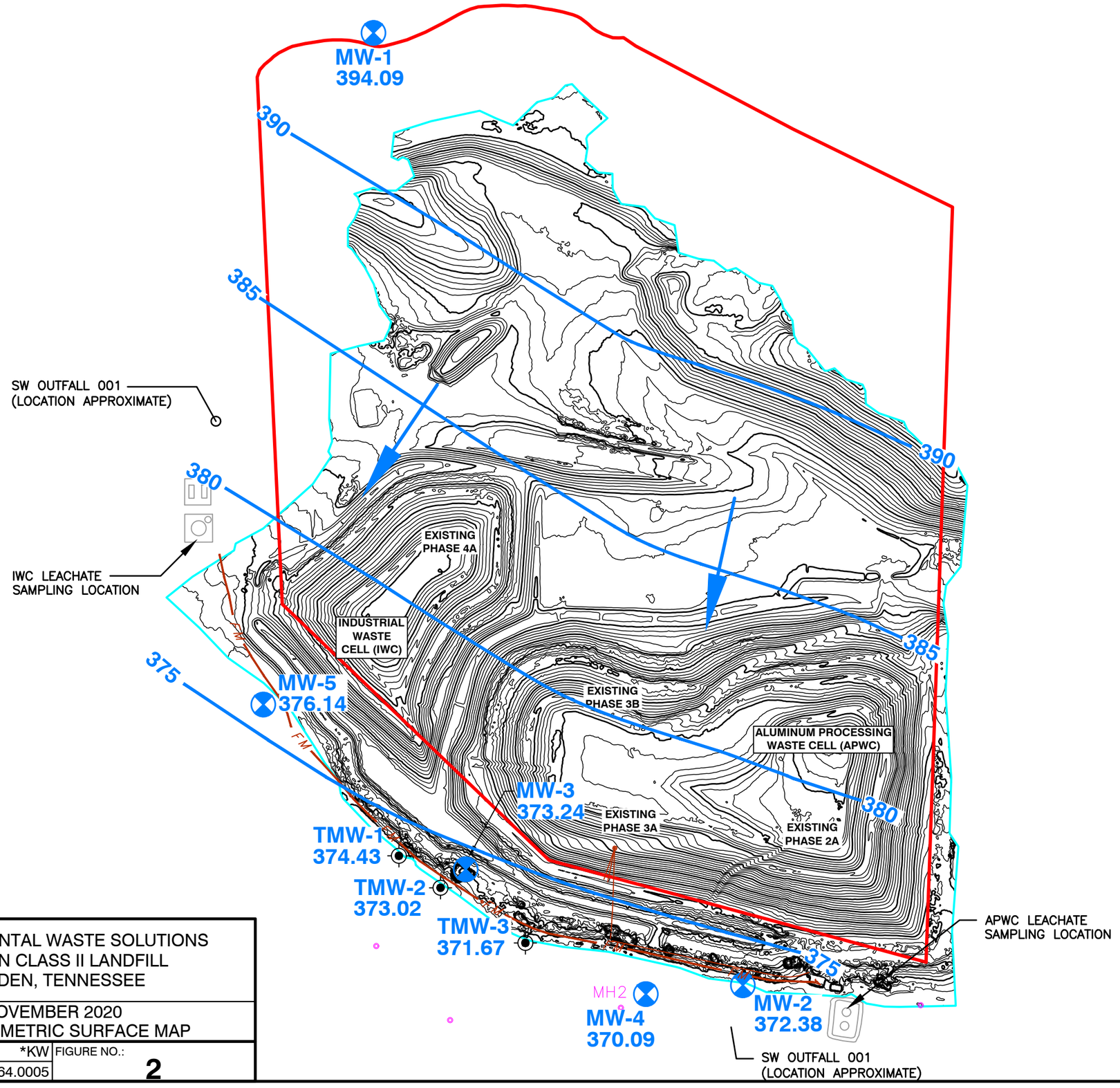
THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

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



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ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

NOVEMBER 2020
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	AAB	CHECKED BY:	PC	APPROVED BY:	*KW	FIGURE NO.:	2
DATE:	DECEMBER 2020	DWG SCALE:	1"=200'	PROJECT NO:	181-364.0005		

P:\2018\181-364\-CADD\DWG\181-364_ GROUNDWATER MAP DECEMBER 2020.DWG{FIG 2 (2)}LS:{ABAUGH – 12/14/2020} – LP: 12/14/2020_12:42:05_PM

Table 1

Former Environmental Waste Solutions Camden Class II Landfill

Field Parameters and Potentiometric Data - 4th Quarter 2020

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)	Temp. (˚C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
MW-1	11/17/2020	10:15	416.47	385.97	0.17	1.4	22.38	394.09	16.0	40.9	49.4	5.28	1.67	169.1	7.12
MW-2*	11/17/2020	10:50	380.35	367.70	0.17	0.8	7.97	372.38	17.4	244.8	286.3	5.86	3.54	190.0	3.99
MW-3	11/17/2020	14:40	392.90	365.10	0.17	1.4	19.66	373.24	18.5	218.9	249.4	5.31	2.37	253.8	14.0
MW-3 (re-sample)	12/8/2020	16:00	392.90	365.10	0.17	1.4	19.55	373.35	17.9	259.5	300.1	5.04	0.95	193.2	10.8
MW-4	11/17/2020	11:30	381.47	358.37	0.17	2.0	11.38	370.09	17.2	69.0	81.8	5.75	2.60	192.4	4.89
MW-5	11/17/2020	13:15	385.25	351.40	0.17	4.2	9.11	376.14	17.2	279.6	329.0	5.05	1.11	255.2	9.48
TMW-1	11/17/2020	12:30	381.19	348.99	0.085	1.1	6.76	374.43	16.7	114.9	136.5	5.30	3.88	405.1	8.57
TMW-2	11/17/2020	11:35	384.27	356.77	0.085	0.7	11.25	373.02	16.2	141.0	169.1	5.54	9.26	408.4	8.49
TMW-3	11/17/2020	10:15	381.37	353.37	0.085	0.8	9.70	371.67	16.3	241.6	290.0	5.06	1.33	355.2	4.53
**Leachate (IWC-L)	12/9/2020	11:00	NA	NA	NA	NA	NA	NA	NS	NS	NS	3.70	NS	NS	NS
**Leachate (APWC-L)	11/17/2020	NS	NA	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS

[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 November 17, 2020.

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

**Leachate (IWC-L) was collected from the lift station access. pH meter on-site used for pH measurement only. APWC-L was not producing leachate and was not sampled.

NS= Not Sampled

NA= Not Applicable.

Table 2
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Groundwater and Leachate Analytical Data - 4th Quarter 2020

Parameter	MCL/GWPS (mg/l)	MW-1	Q	MW-3	Q	Duplicate (MW-3)	Q	MW-3 (re-sample)	Q	MW-4	Q	MW-5	Q	TMW-1	Q	TMW-2	Q	TMW-3	Q	IWC-Leachate	Q	APWC-Leachate	Q	Field Blank	Q
		11/17/2020		11/17/2020		11/17/2020		12/8/2020		11/17/2020		11/17/2020		11/17/2020		11/17/2020		11/17/2020		12/9/2020		NS		11/17/2020	
		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)		Value (mg/l)	
Hardness	-	**17.8**		**76.2**		**76.5**		NS		**26.7**		**90.6**		**44.8**		**54.4**		**81.2**		**41400**		NS		<2.50	
Alkalinity	-	**30.1**		<20.0		<20.0		NS		<20.0		<20.0		<20.0		<20.0		<20.0		<20.0		NS		<20.0	
Ammonia Nitrogen	-	<0.250		<0.250		<0.250		NS		<0.250		<0.250		<0.250		<0.250		<0.250		**1760**		NS		<0.250	
COD	-	<20.0		<20.0		<20.0		NS		<20.0		<20.0		<20.0		<20.0		<20.0		**11000**		NS		<20.0	
Boron	-	<0.200		<0.200		<0.200		NS		<0.200		<0.200		<0.200		<0.200		<0.200		<1.00		NS		<0.200	
Bromide	-	<1.00		<1.00		<1.00		NS		<1.00		<1.00		<1.00		<1.00		<1.00		<100		NS		<1.00	
Chloride	250 [2]	**2.48**		**18.7**		**18.3**		NS		**9.04**		**74.8**		**24.3**		**37.6**		**62.9**		**88900**		NS		<1.00	
Fluoride	2 [2]	<0.150		**0.179**		**0.18**		NS		<0.150		<0.150		<0.150		<0.150		<0.150		<15.0		NS		<0.150	
Nitrate	10 [1]	<0.100		**0.302**		**0.268**	T8	NS		**0.9**		**1.3**		**1.72**		**0.83**		**5.35**		<10.0		NS		<0.100	
Sulfate	250 [2]	<5.00		**61.4**		**61.4**		NS		<5.00		**11.2**		<5.00		<5.00		<5.00		**609**		NS		<5.00	
Aluminum	0.2 [2]	**0.19**		**0.284**		**0.339**		NS		<0.100		**0.344**		**0.126**		**0.235**		<0.100		**360**		NS		<0.100	
Antimony	0.006	<0.00400		<0.00400		<0.00400		NS		<0.00400		<0.00400		<0.00400		<0.00400		<0.00400		<0.200		NS		<0.00400	
Arsenic	0.01	**0.00513**		<0.00200		<0.00200		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.306**		NS		<0.00200	
Barium	2	<0.0200		**0.0709**		**0.071**		NS		<0.0200		**0.0531**		<0.0200		**0.0313**		**0.0454**		**2.81**		NS		<0.0200	
Beryllium	0.004	<0.00200		<0.00200		<0.00200		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.100		NS		<0.00200	
Cadmium	0.005	<0.00100		**0.00816**		**0.00817**		**0.00906**		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**18.8**		NS		<0.00100	
Cadmium (Dissolved)	0.005	NS		NS		NS		**0.00787**		NS		NS		NS		NS		NS		NS		NS		NS	
Calcium	-	**3.25**		**19.2**		**19.3**		NS		**5.58**		**17.2**		**12.2**		**13.6**		**21.2**		**14300**		NS		<1.00	
Chromium	0.1	<0.00200		<0.00200		<0.00200		NS		<0.00200		**0.00391**		<0.00200		<0.00200		<0.00200		<0.100		NS		<0.00200	
Cobalt	0.006 [3]	**0.0291**		**0.00445**		**0.0046**		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.472**		NS		<0.00200	
Copper	1.3	<0.00500		<0.00500		<0.00500		NS		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		**1.21**		NS		<0.00500	
Iron	0.3 [2]	**5.36**		**0.172**		**0.187**		NS		**4.94**		**0.287**		**0.242**		**0.153**		<0.100		**452**		NS		<0.100	
Lead	0.015	<0.00500		<0.00500		<0.00500		NS		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		**0.785**		NS		<0.00500	
Magnesium	-	**2.36**		**6.86**		**6.91**		NS		**3.1**		**11.5**		**3.47**		**4.98**		**6.86**		**1380**		NS		<1.00	
Manganese	0.05 [2]	**0.486**		**0.545**		**0.549**		NS		**0.0587**		**0.235**		**0.00552**		<0.00500		**0.00985**		**43**		NS		<0.00500	
Nickel	0.10 [1]	**0.00632**		**0.00708**		**0.00664**		NS		<0.00200		**0.00714**		<0.00200		<0.00200		<0.00200		**0.691**		NS		<0.00200	
Potassium	-	<2.00		**6.28**		**6.36**		NS		<2.00		<2.00		<2.00		<2.00		<2.00		**14100**		NS		<2.00	
Selenium	0.05	<0.00200		<0.00200		<0.00200		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.568**		NS		<0.00200	
Silver	0.10 [2]	<0.00200		<0.00200		<0.00200		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.100		NS		<0.00200	
Sodium	-	**2.59**		**7.35**		**7.39**		NS		**3.94**		**19.8**		**3.83**		**5.63**		**13.7**		**23800**		NS		<2.00	
Thallium	0.002	<0.00200		<0.00200		<0.00200		NS		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.100		NS		<0.00200	
Vanadium	-	<0.00500		<0.00500		<0.00500		NS		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.250		NS		<0.00500	
Zinc	5 [2]	<0.0250		**0.0507**		**0.0484**		NS		<0.0250		**0.110**		<0.0250		<0.0250		<0.0250		**190**		NS		<0.0250	
Mercury	0.002	**0.00258**		<0.000200		<0.000200		NS		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		NS		<0.000200	
								NS														NS			
Acetone	-	<0.0500		<0.0500		<0.0500		NS		<0.0500		<0.0500		<0.0500		<0.0500		<0.0500		**2.35**		NS		<0.0500	
2-Butanone (MEK)	-	<0.0100		<0.0100		<0.0100		NS		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		**0.269**		NS		<0.0100	

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
NS- Not Sampled for analysis.
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.
Qualifiers:
J4: The associated batch QC was outside the established quality control range for accuracy
T8: Sample(s) received past/too close to holding time expiration.

Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data - 4th Quarter 2020

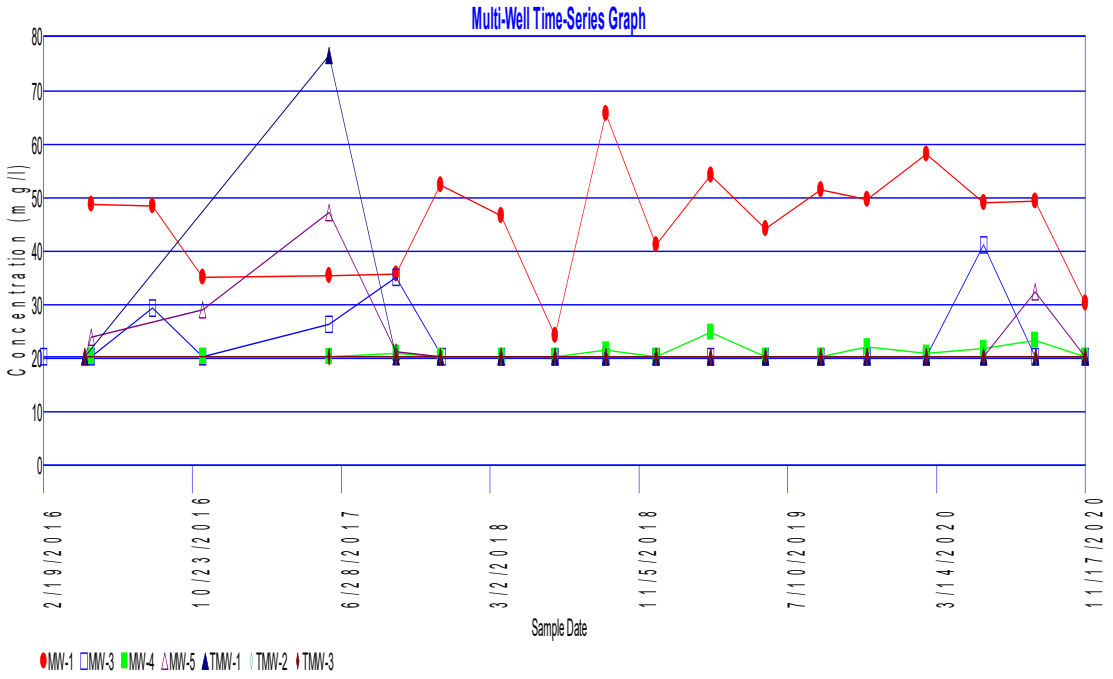
Intra-Well Statistical Summary (Upgradient Background Well MW-1)							
Constituent	Well	% Non Detects	Normality	Intra-well NPPL	Intra-well PPL	Shewhart-Cusum	SSI
Arsenic	MW-1	0.00	non-parametric	Pass	--	Pass	No
Chloride	MW-1	0.00	non-parametric	Pass	--	Pass	No
Cobalt	MW-1	0.00	log-normal	--	Pass	--	No
Nickel	MW-1	35.48	non-parametric	Pass	--	Pass	No
Mercury	MW-1	32.26	non-parametric	Pass	--	**Fail**	**Yes**

Inter-Well Statistical Summary (Downgradient Compliance Wells)								
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	SSI	Mann-Kendall Trend Analysis[1]
Aluminum	MW-3	41.22	non-parametric	--	--	Pass	No	No Trend
	MW-5		non-parametric	--	--	Pass	No	No Trend
	TMW-1		non-parametric	--	--	Pass	No	No Trend
	TMW-2		non-parametric	--	--	Pass	No	**Downward Trend**
Barium	MW-3	6.04	non-parametric	--	--	Pass	No	No Trend
	MW-4		non-parametric	--	--	Pass	No	**Upward Trend**
	MW-5		non-parametric	--	--	Pass	No	**Upward Trend**
	TMW-1		non-parametric	--	--	Pass	No	**Upward Trend**
	TMW-2		non-parametric	--	--	Pass	No	No Trend
	TMW-3		non-parametric	--	--	Pass	No	**Upward Trend**
Total Cadmium	MW-3	87.33	non-parametric	**Fail**	--	--	**Yes**	No Trend
Chloride	MW-3	0.00	log-normal	--	**Fail**	--	**Yes**	**Downward Trend**
	MW-4		log-normal	--	**Fail**	--	**Yes**	**Upward Trend**
	MW-5		log-normal	--	**Fail**	--	**Yes**	**Upward Trend**
	TMW-1		log-normal	--	**Fail**	--	**Yes**	**Upward Trend**
	TMW-2		log-normal	--	**Fail**	--	**Yes**	**Upward Trend**
	TMW-3		log-normal	--	**Fail**	--	**Yes**	**Upward Trend**
Chromium	MW-5	74.32	non-parametric	Pass	--	--	No	No Trend
Cobalt	MW-3	59.46	non-parametric	Pass	--	--	No	No Trend
Fluoride	MW-3	85.71	non-parametric	**Fail**	--	--	**Yes**	No Trend
Nickel	MW-3	60.00	non-parametric	Pass	--	--	No	No Trend
	MW-5		non-parametric	Pass	--	--	No	No Trend
Sulfate	MW-3	64.67	non-parametric	**Fail**	--	--	**Yes**	No Trend
	MW-5		non-parametric	Pass	--	--	No	**Upward Trend**
Zinc	MW-3	68.00	non-parametric	**Fail**	--	--	**Yes**	No Trend
	MW-5		non-parametric	**Fail**	--	--	**Yes**	**Upward Trend**

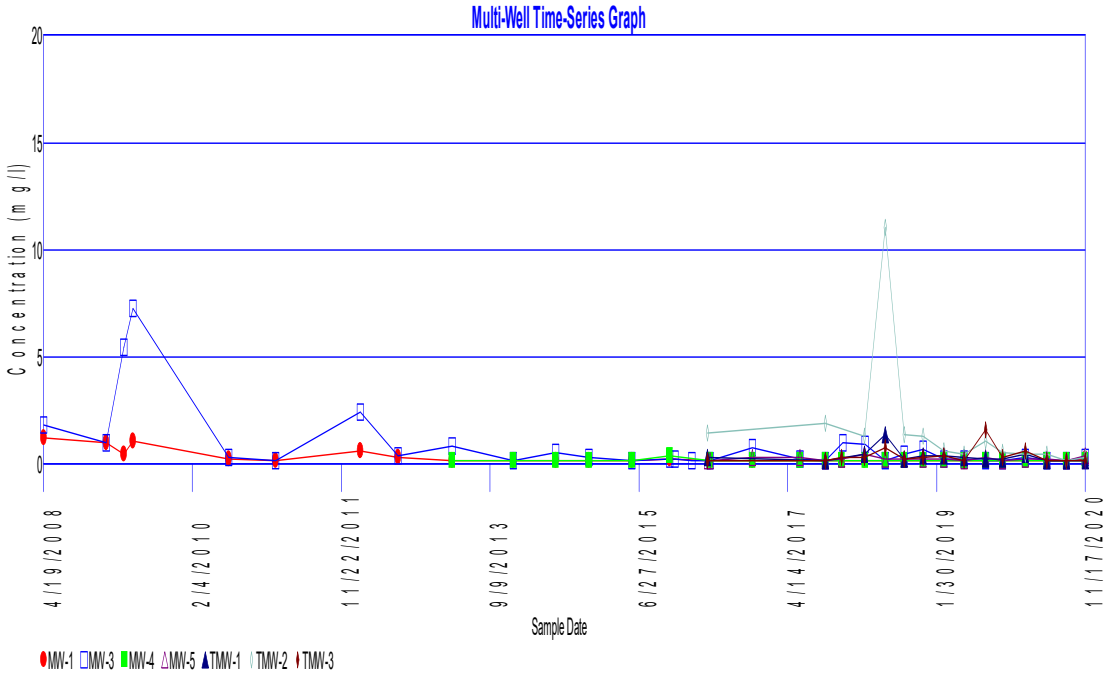
[1] **Mann-Kendall Trend Analysis was completed using recent data since the November 10, 2016 sampling event.**

APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

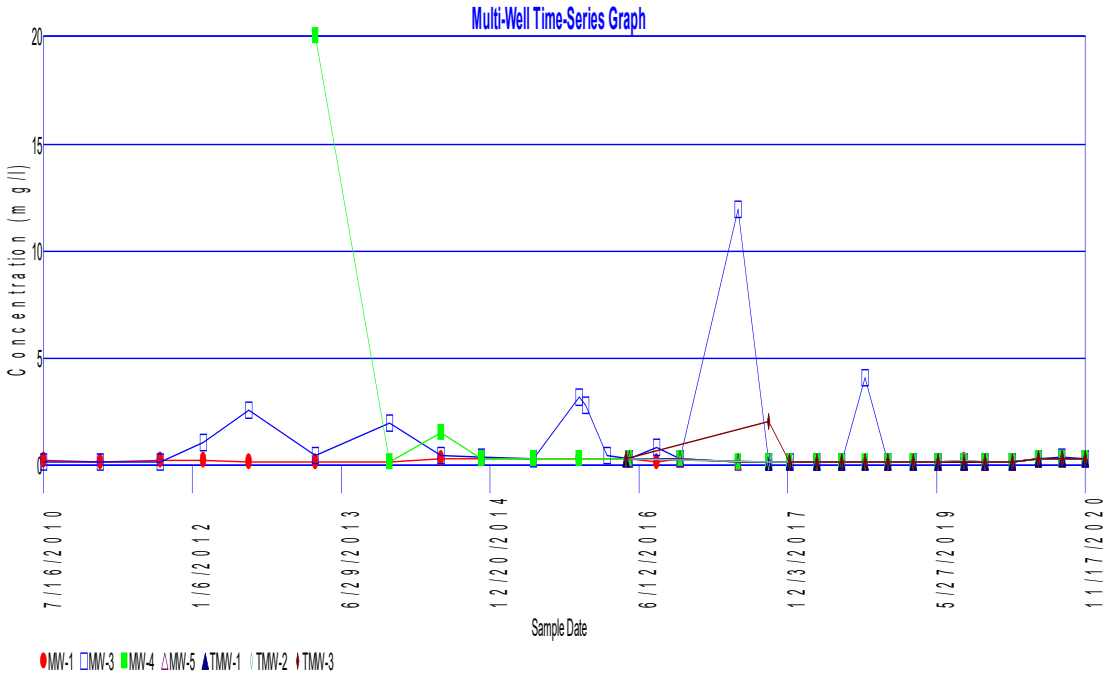
Alkalinity



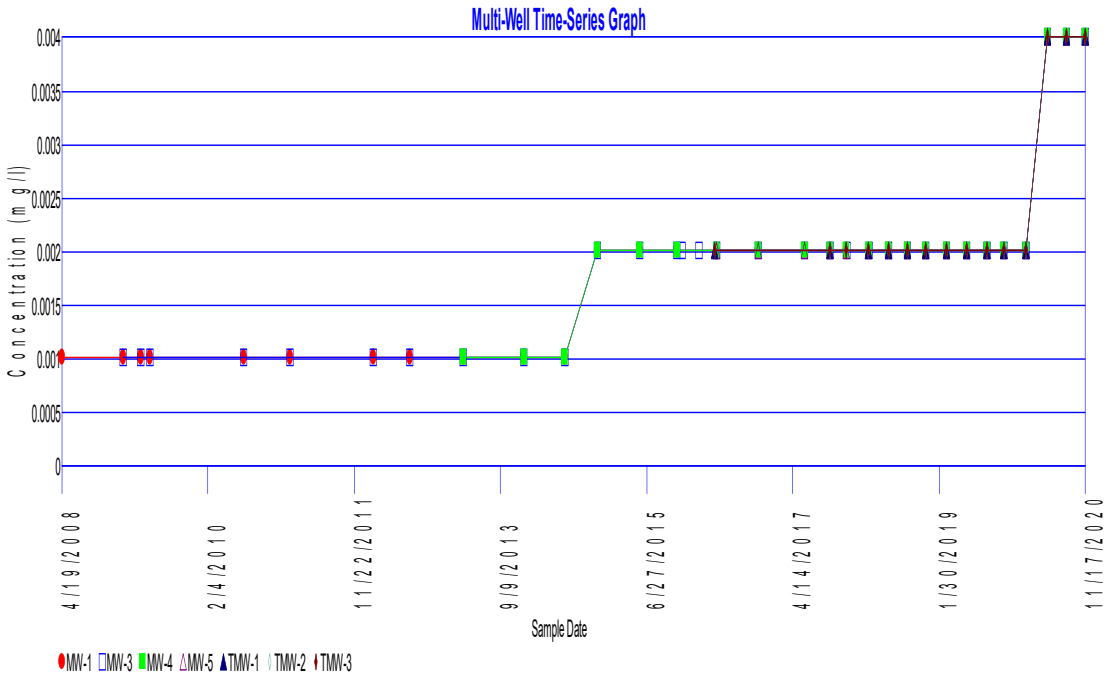
Aluminum



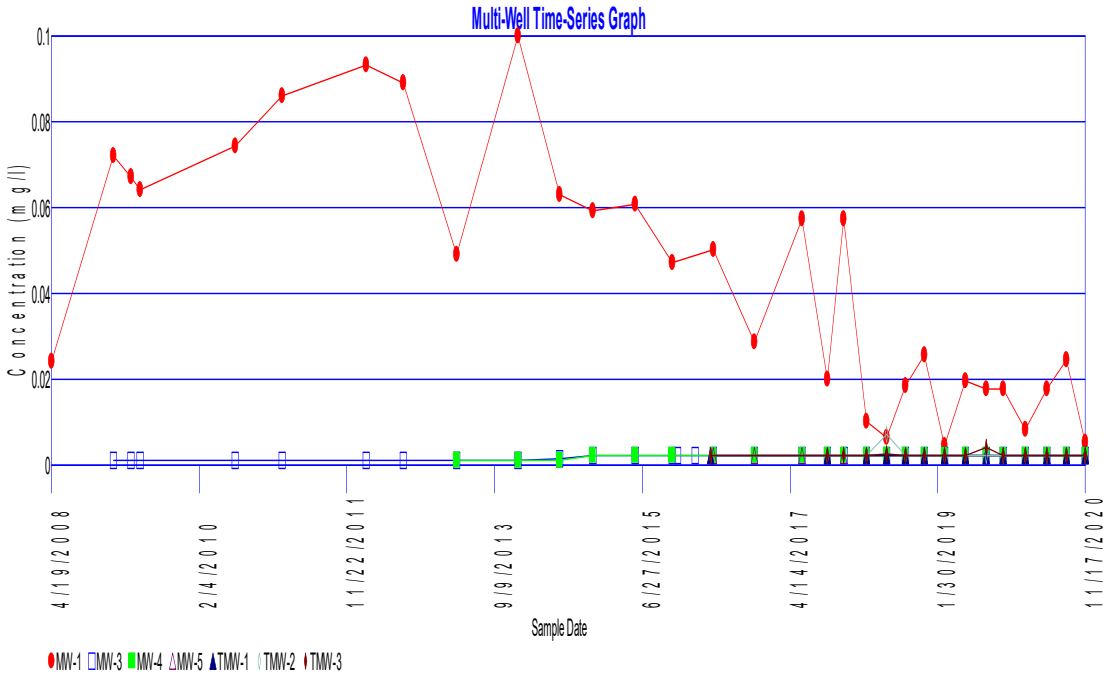
Ammonia Nitrogen



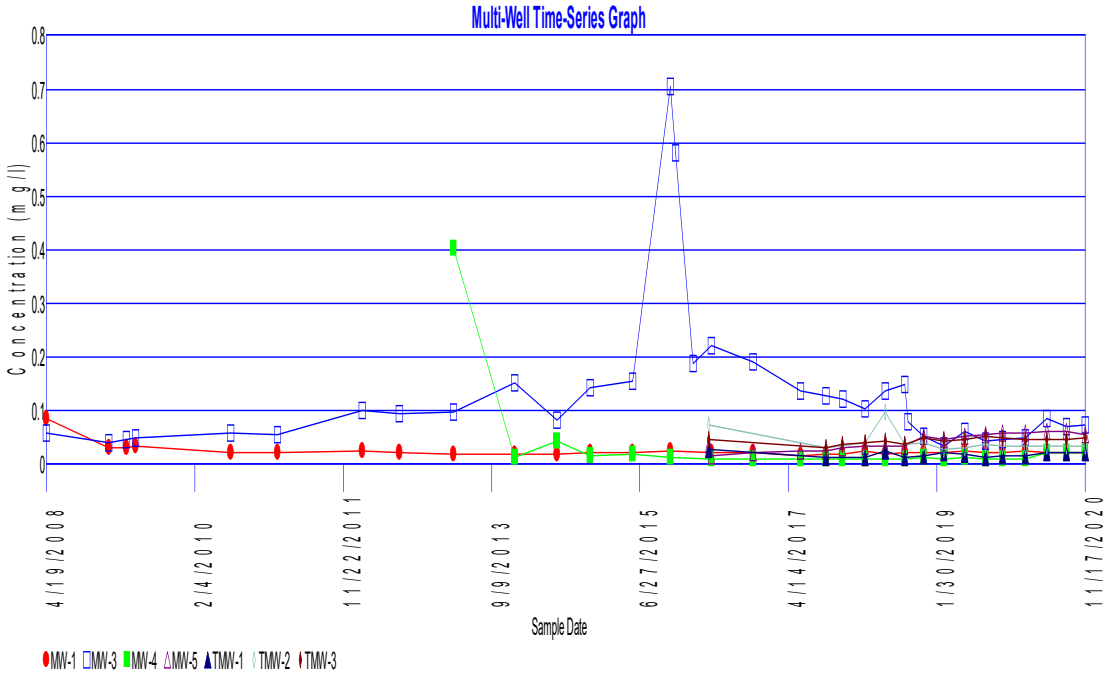
Antimony

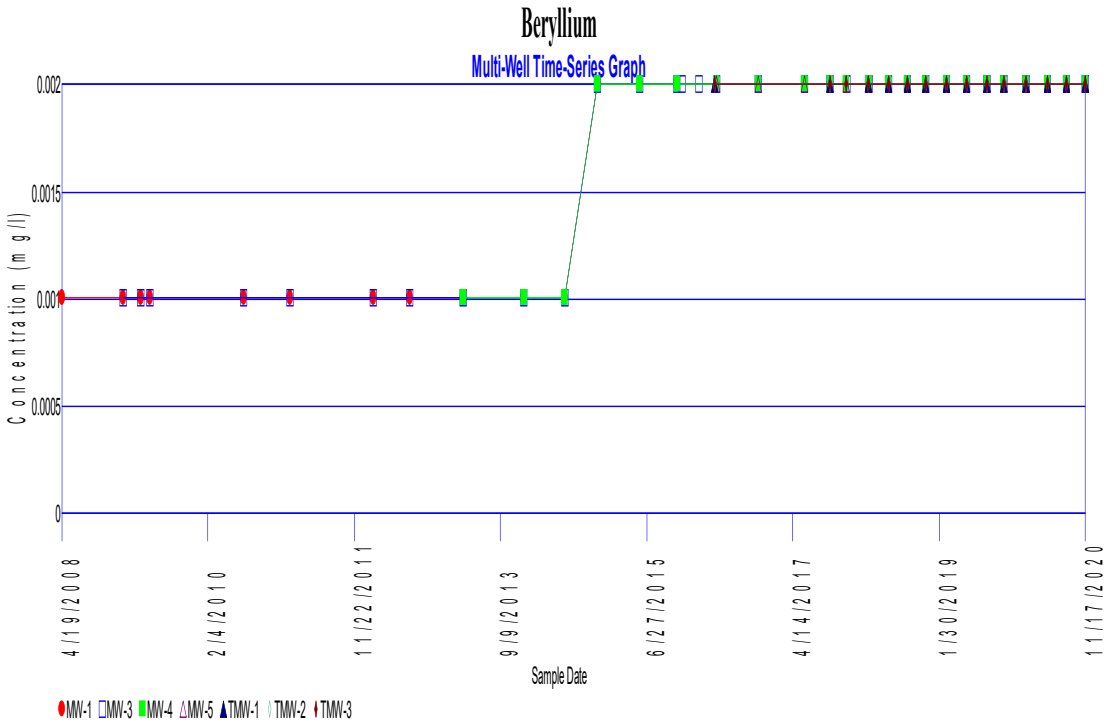


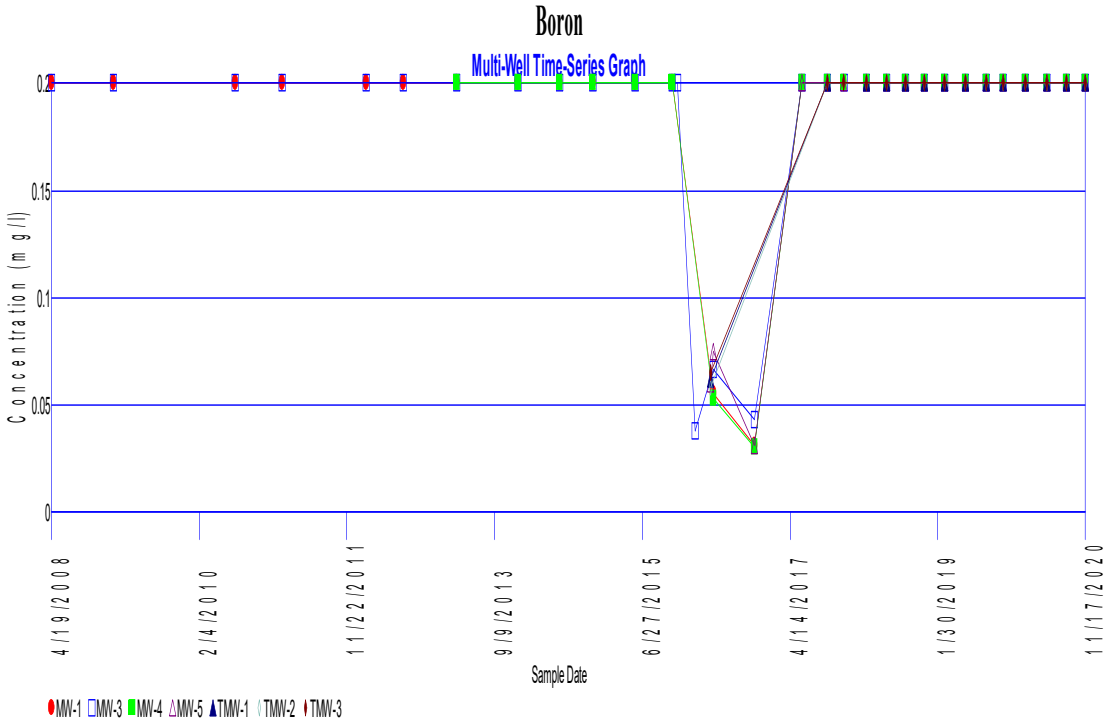
Arsenic



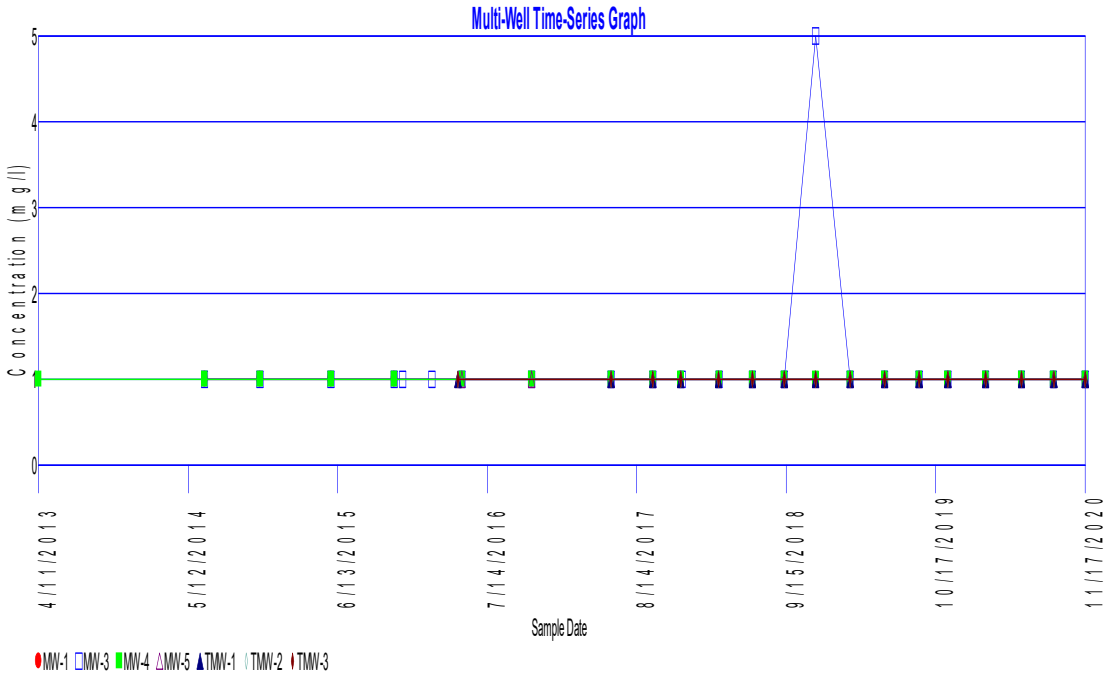
Barium



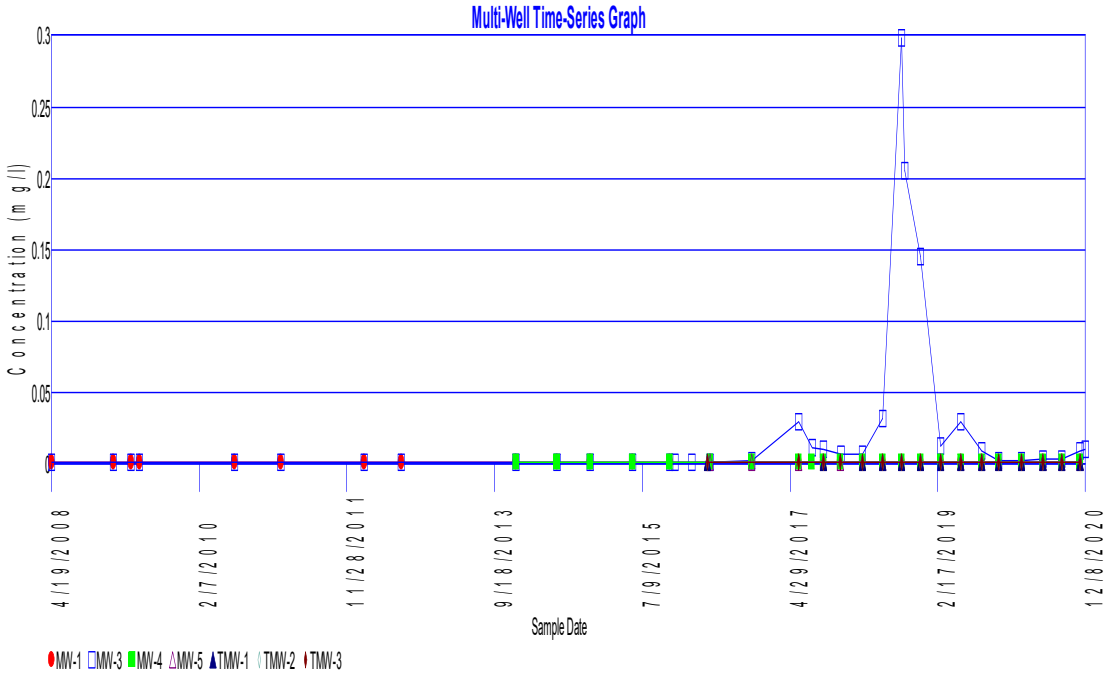

Beryllium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
2/4/2010
11/22/2011
9/9/2013
6/27/2015
4/14/2017
1/30/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Boron
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
2/4/2010
11/22/2011
9/9/2013
6/27/2015
4/14/2017
1/30/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

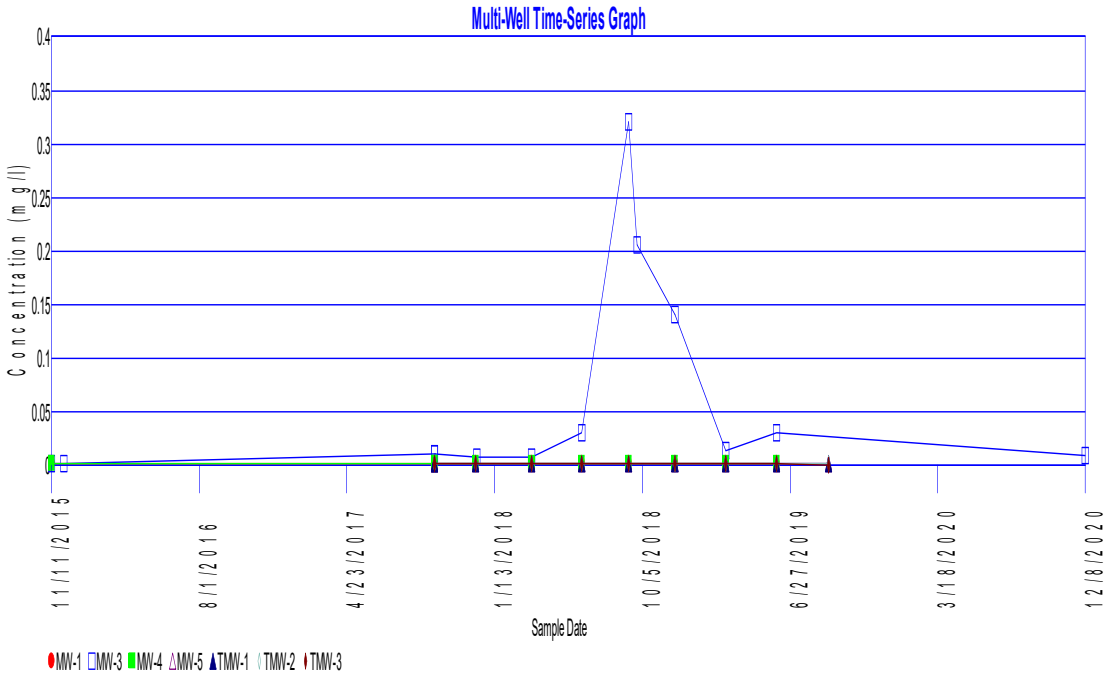
Bromide



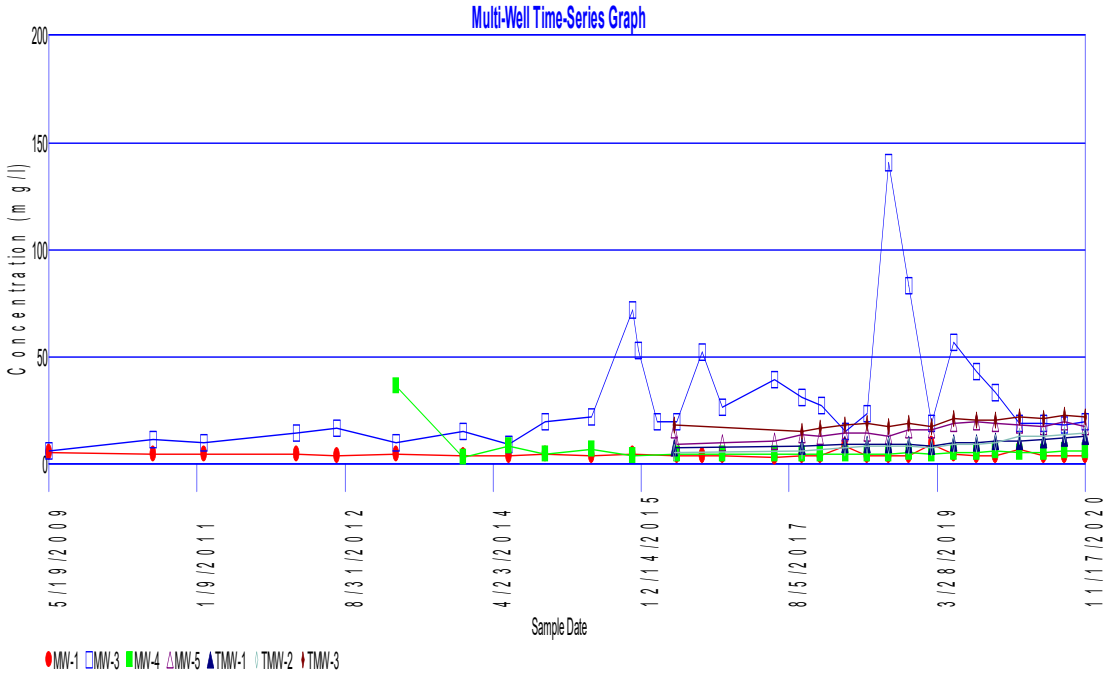
Total Cadmium



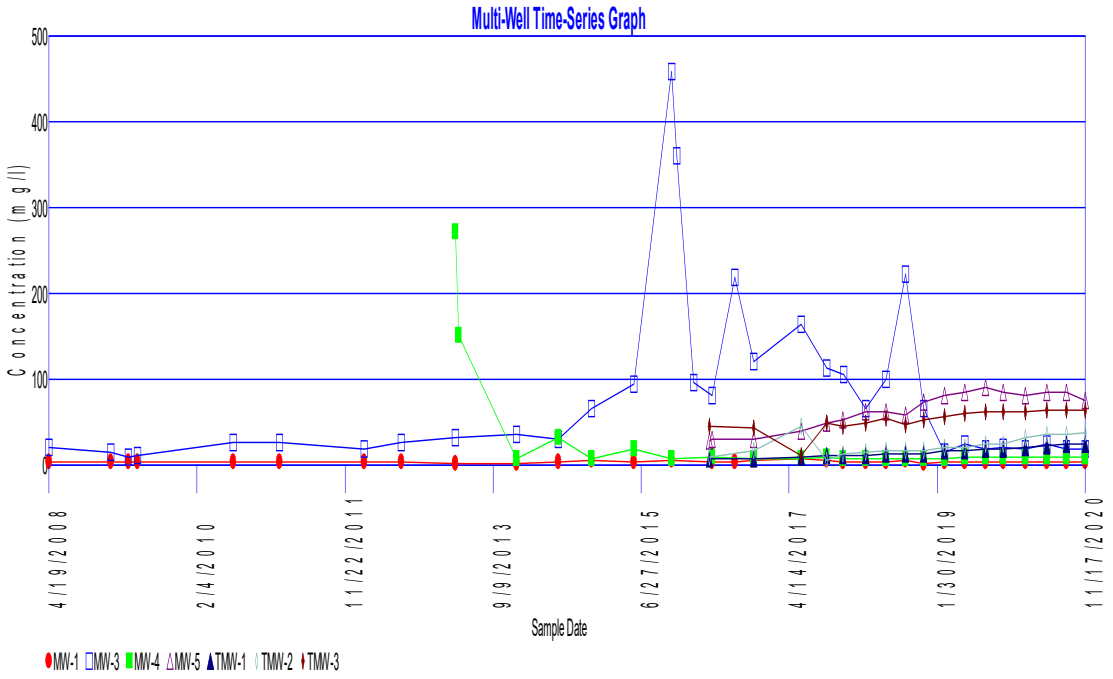
Cadmium,Dissolved



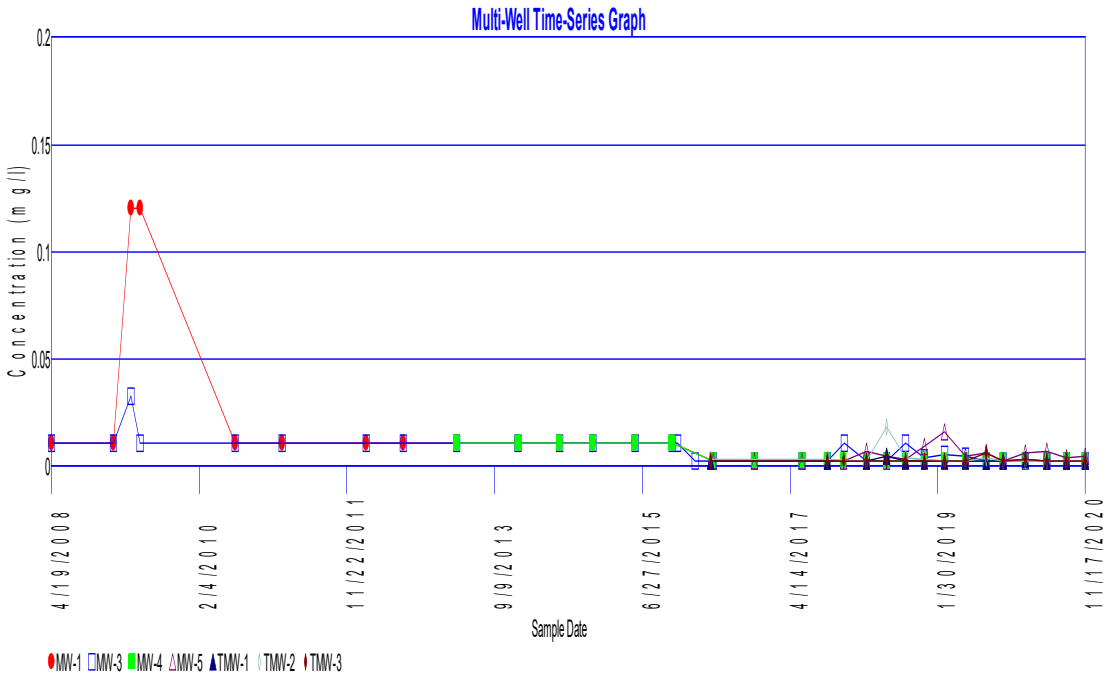
Calcium



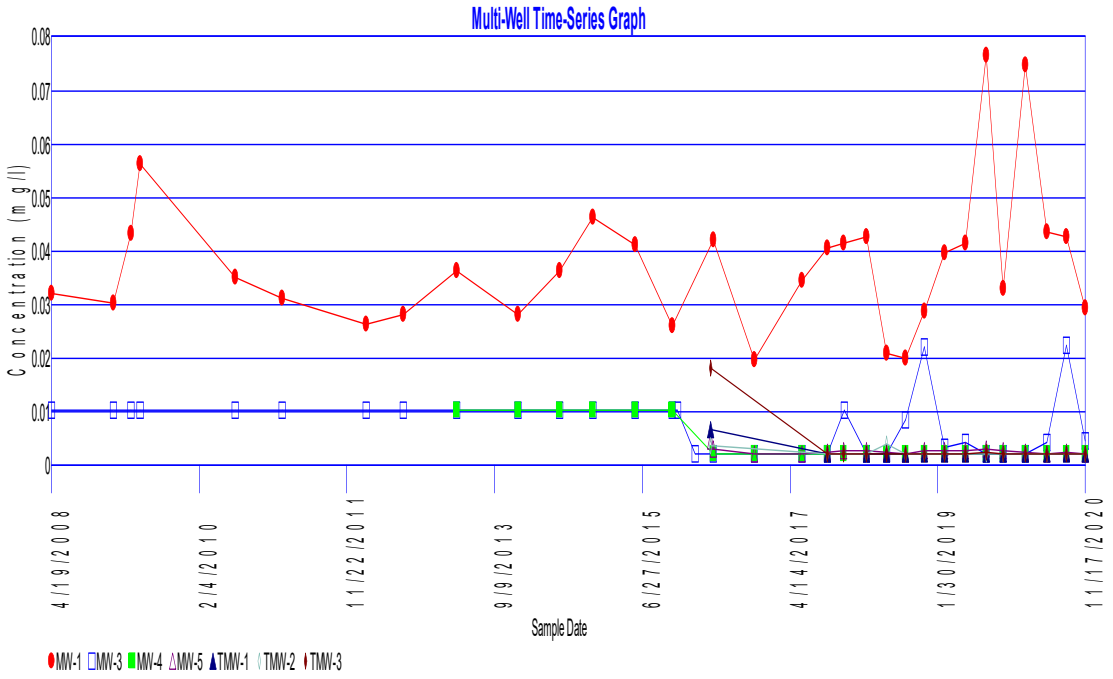
Chloride



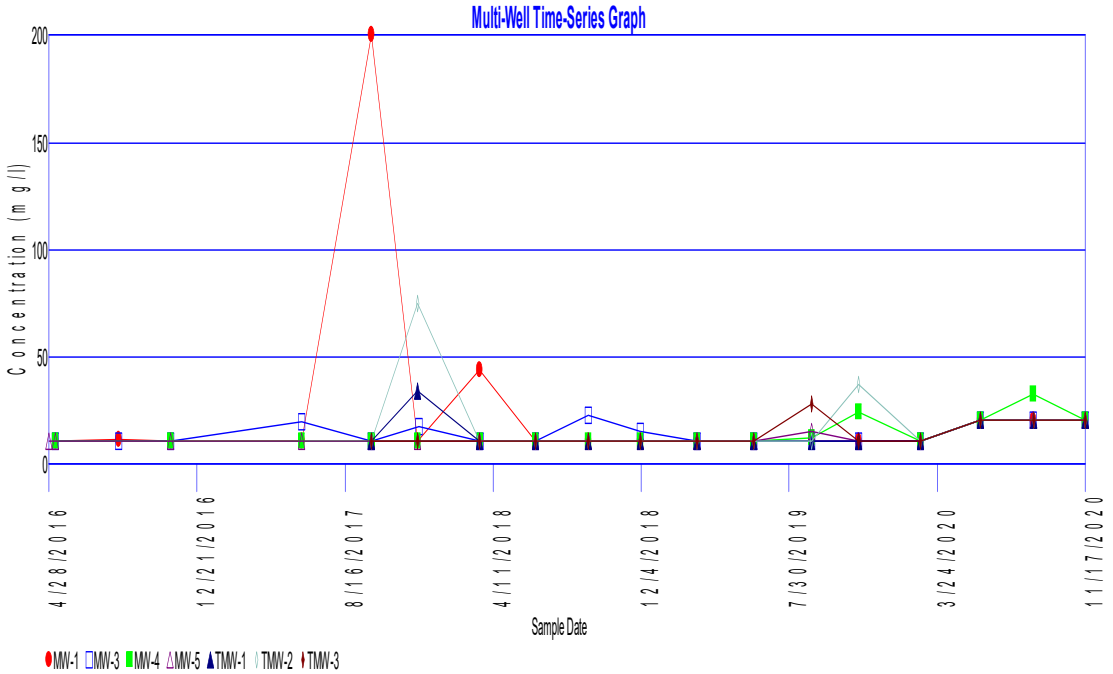
Chromium



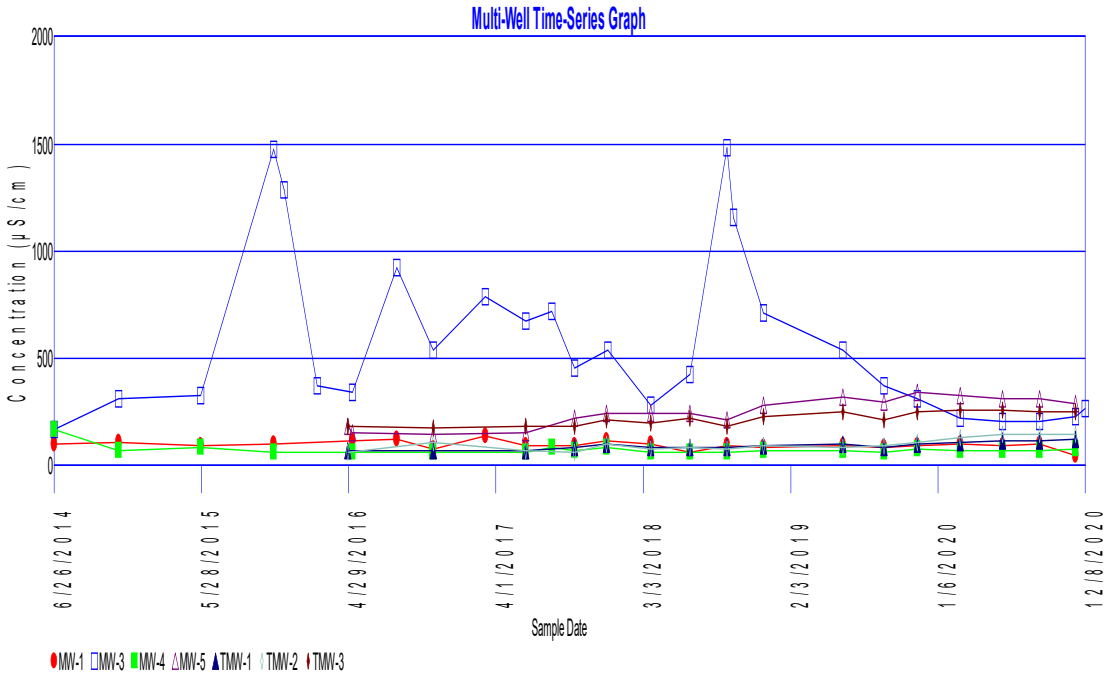
Cobalt


Multi-Well Time-Series Graph
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
2/4/2010
11/22/2011
9/9/2013
6/27/2015
4/14/2017
1/30/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

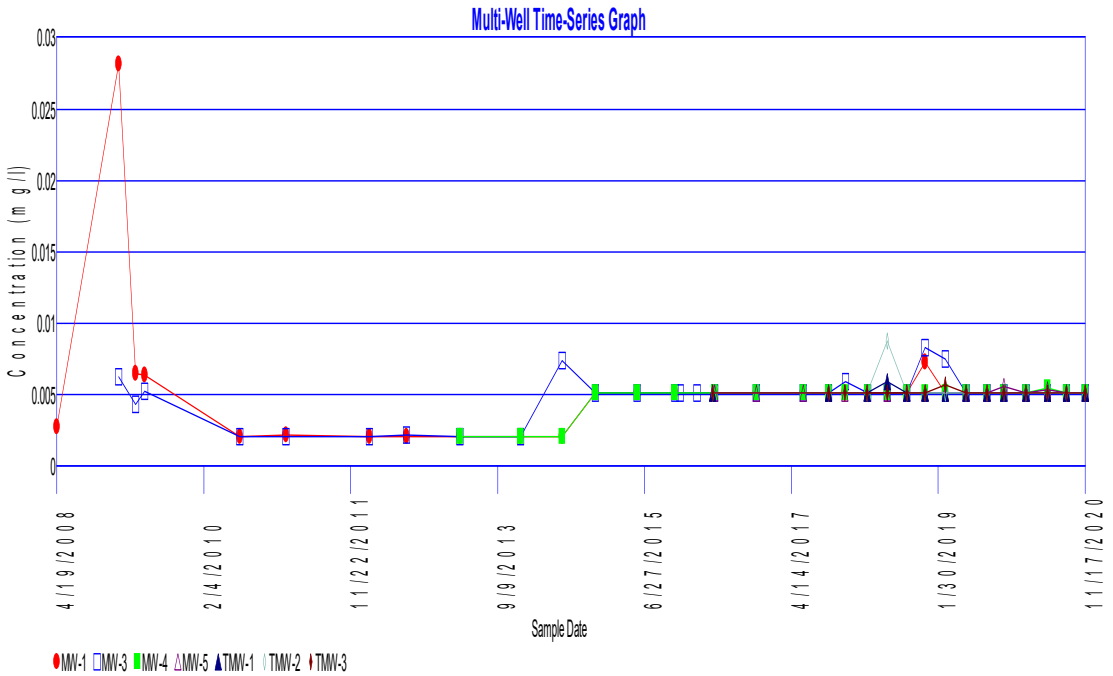
COD


Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
4/28/2016
12/21/2016
8/16/2017
4/11/2018
12/4/2018
7/30/2019
3/24/2020
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

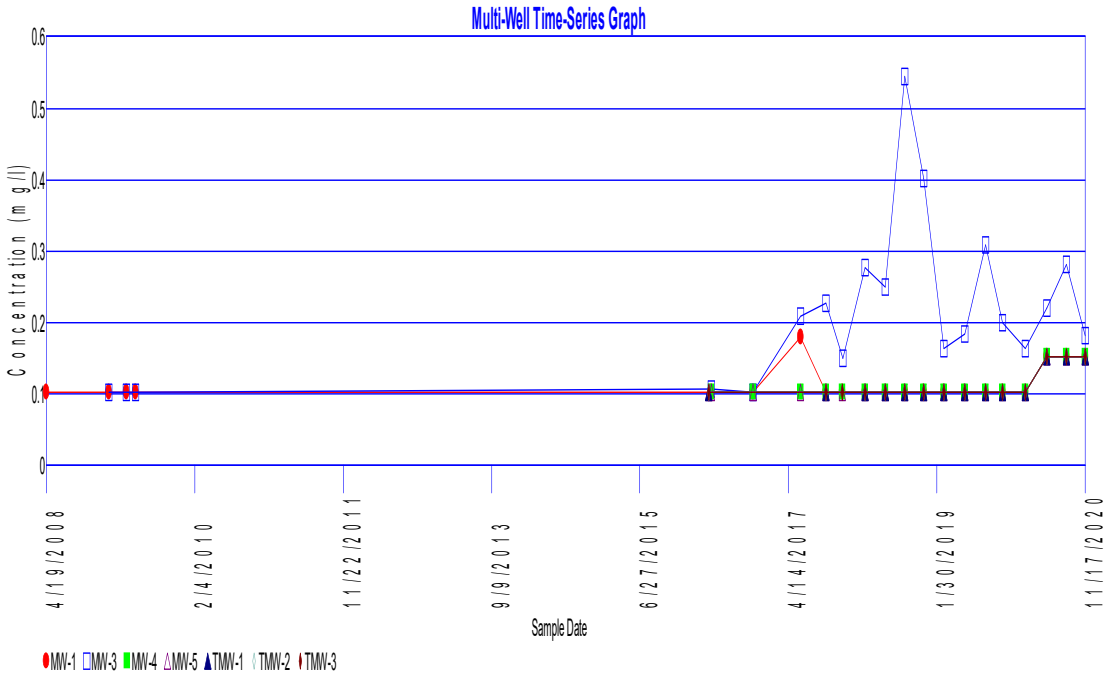
Conductivity



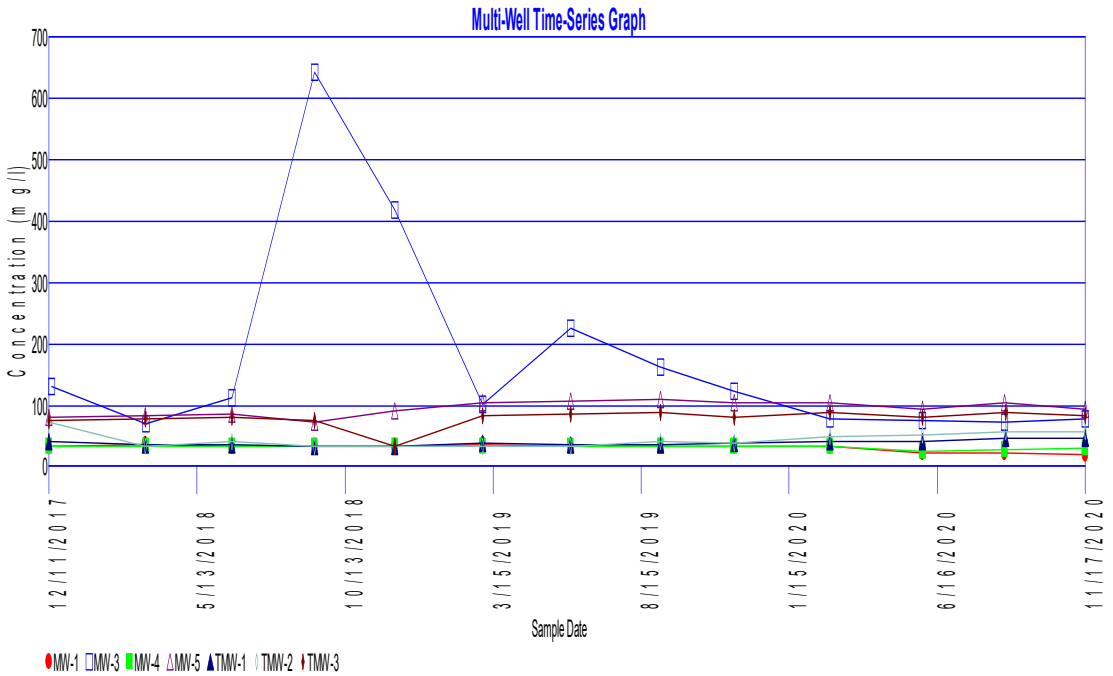
Copper



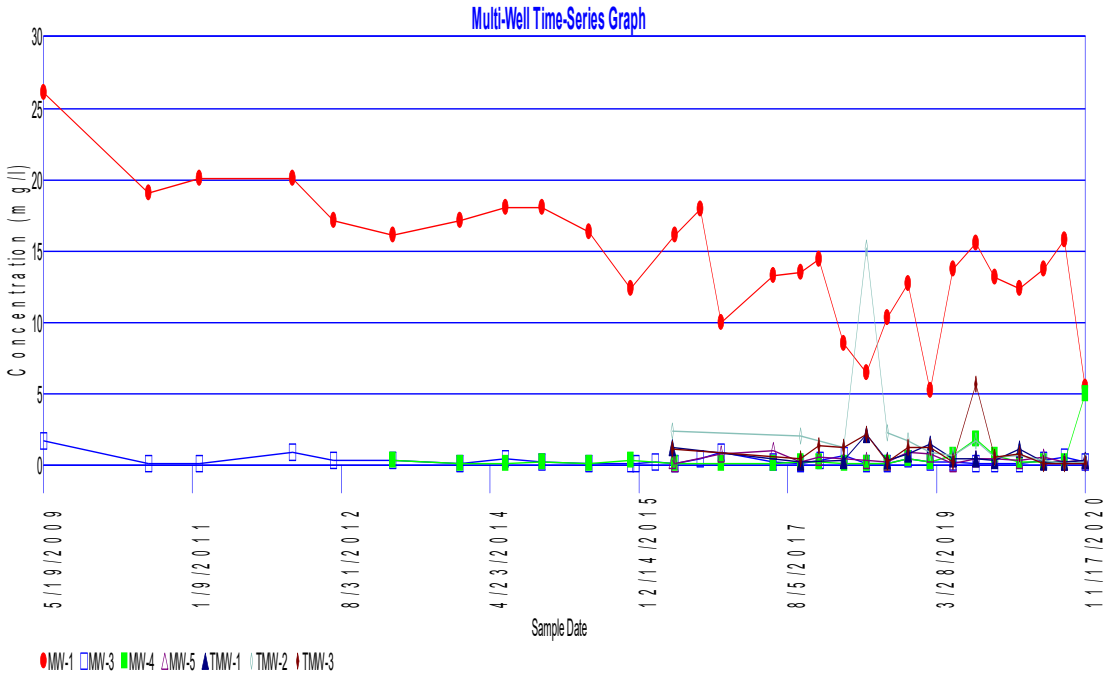
Fluoride



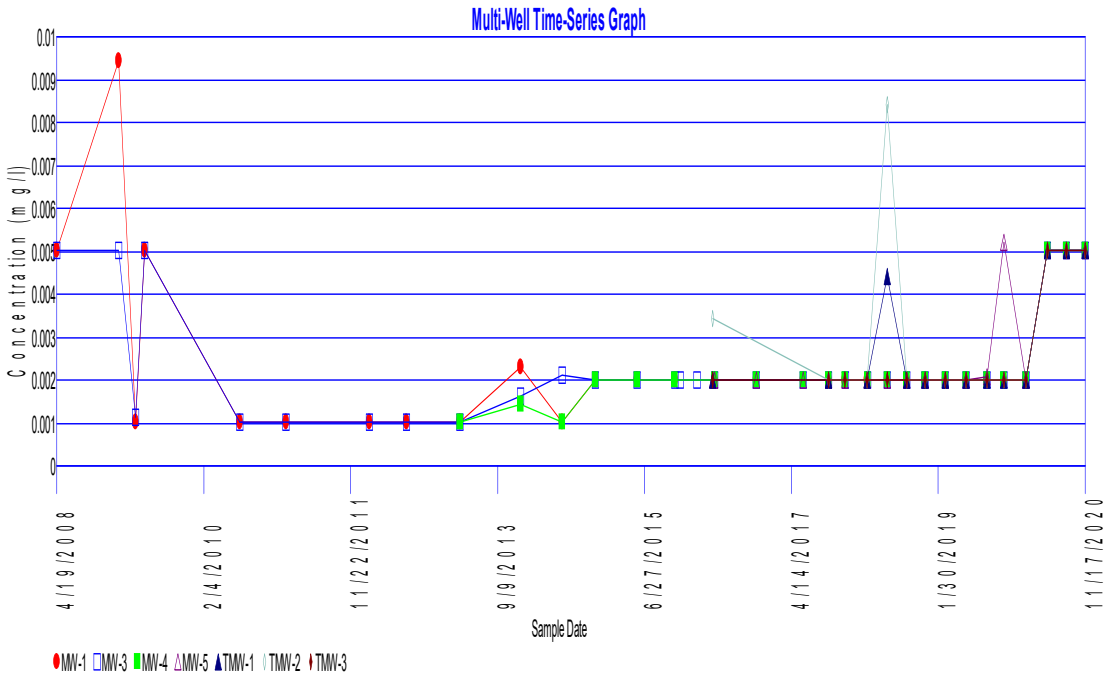
Hardness



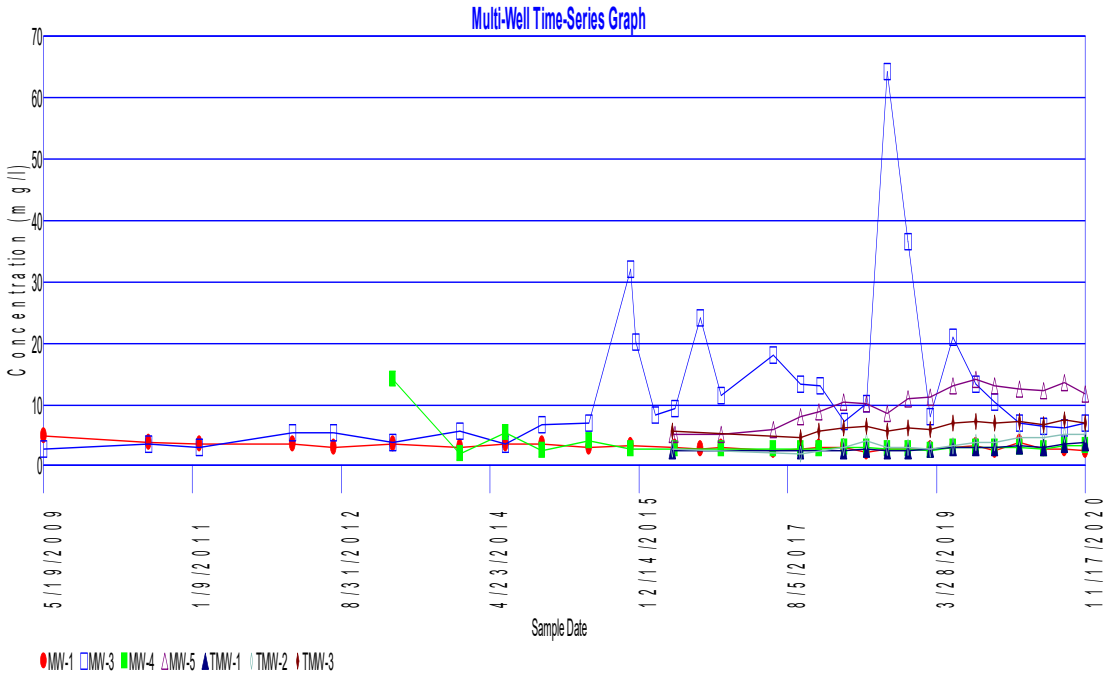
Iron


Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
5/19/2009
1/9/2011
8/31/2012
4/23/2014
12/14/2015
8/5/2017
3/28/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

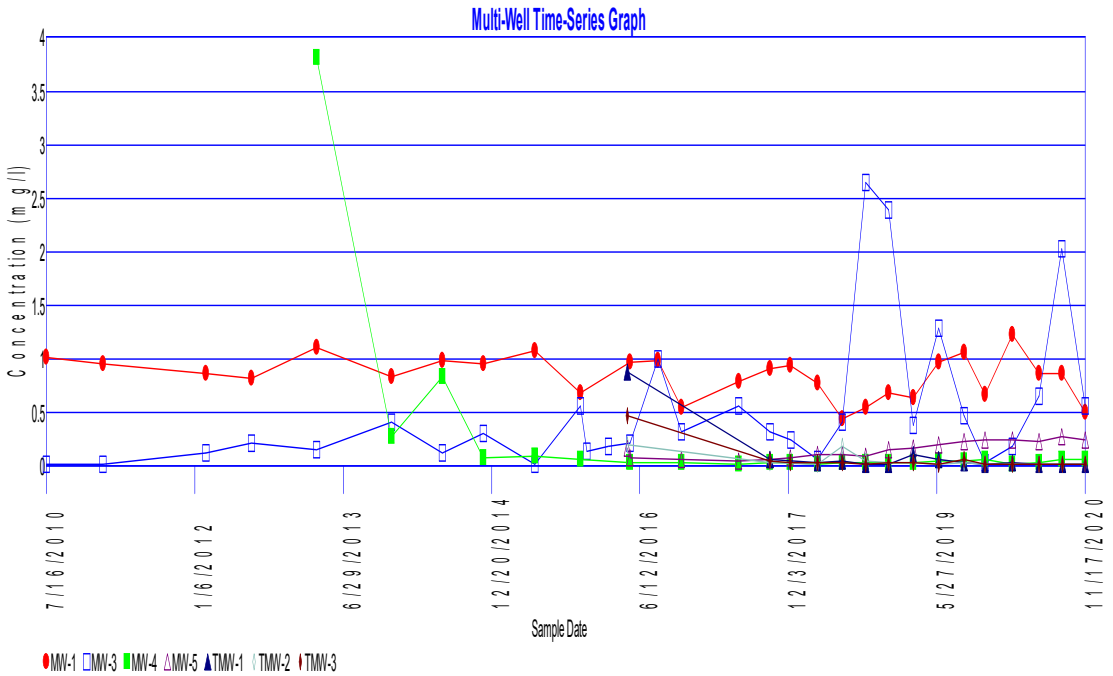
Lead


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
2/4/2010
11/22/2011
9/9/2013
6/27/2015
4/14/2017
1/30/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

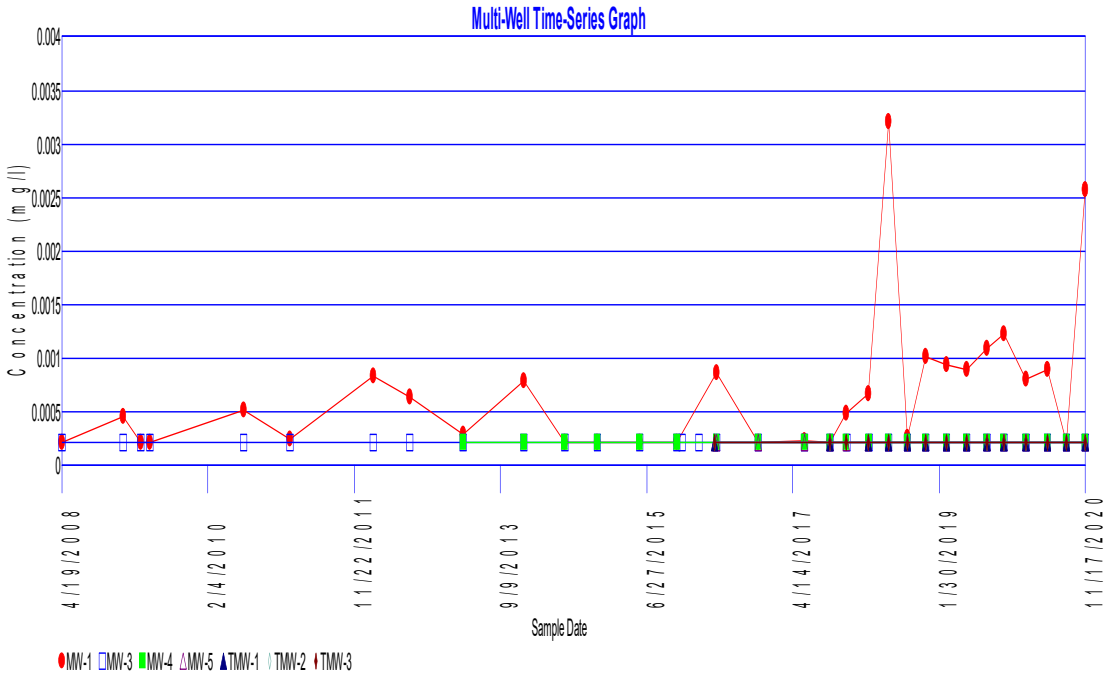
Magnesium



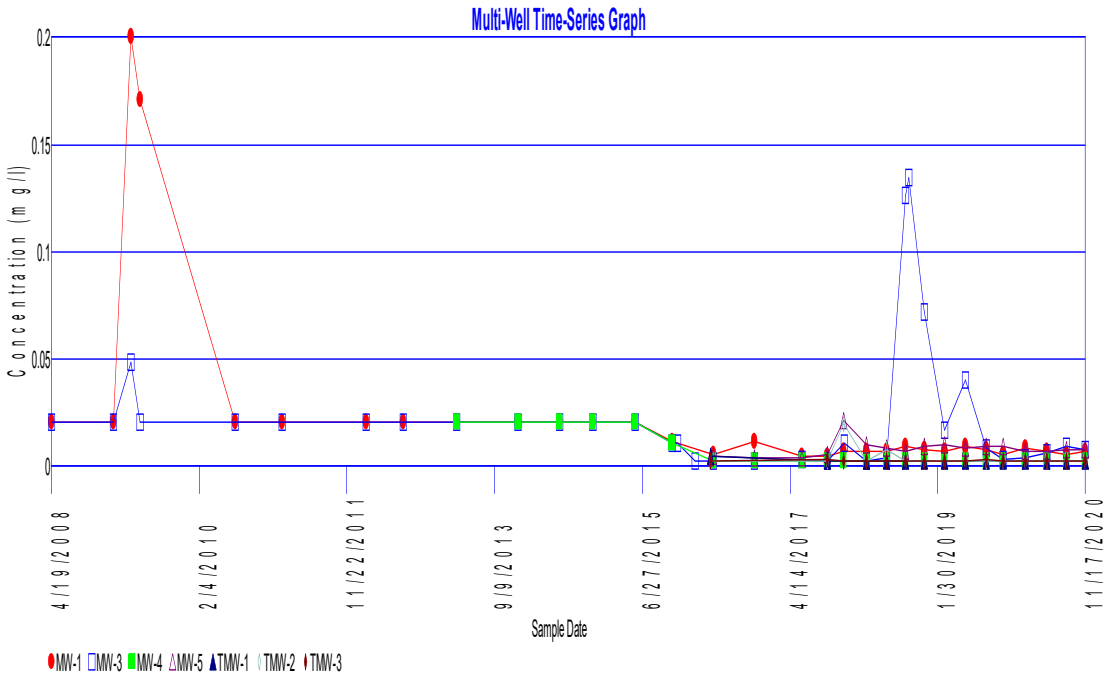
Manganese



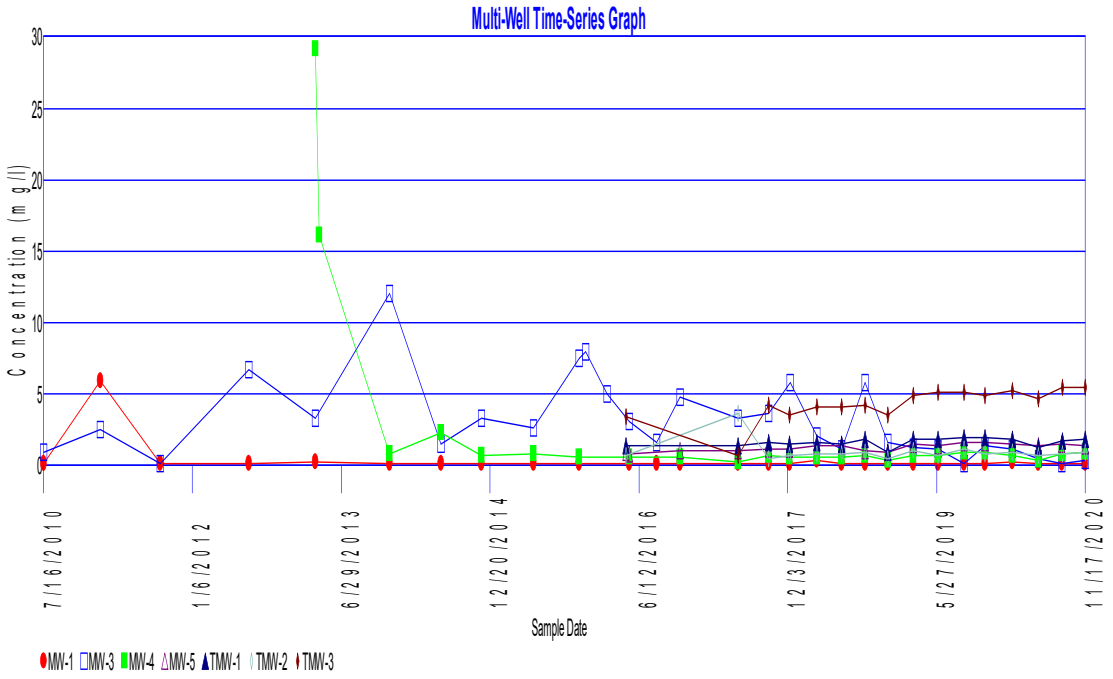
Mercury



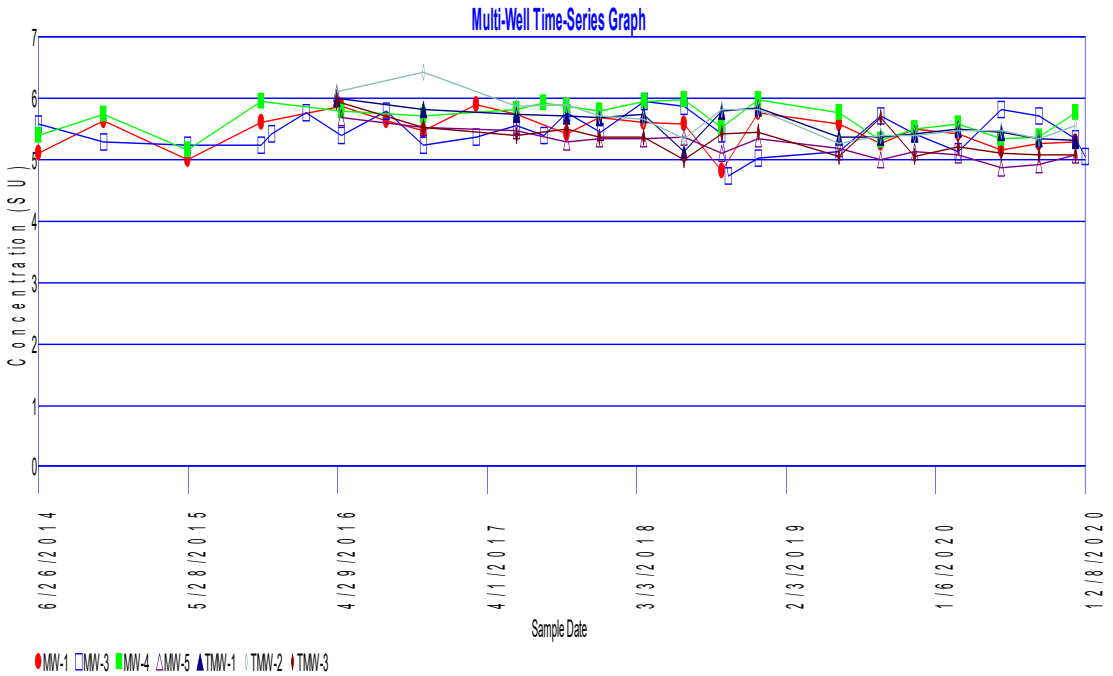
Nickel



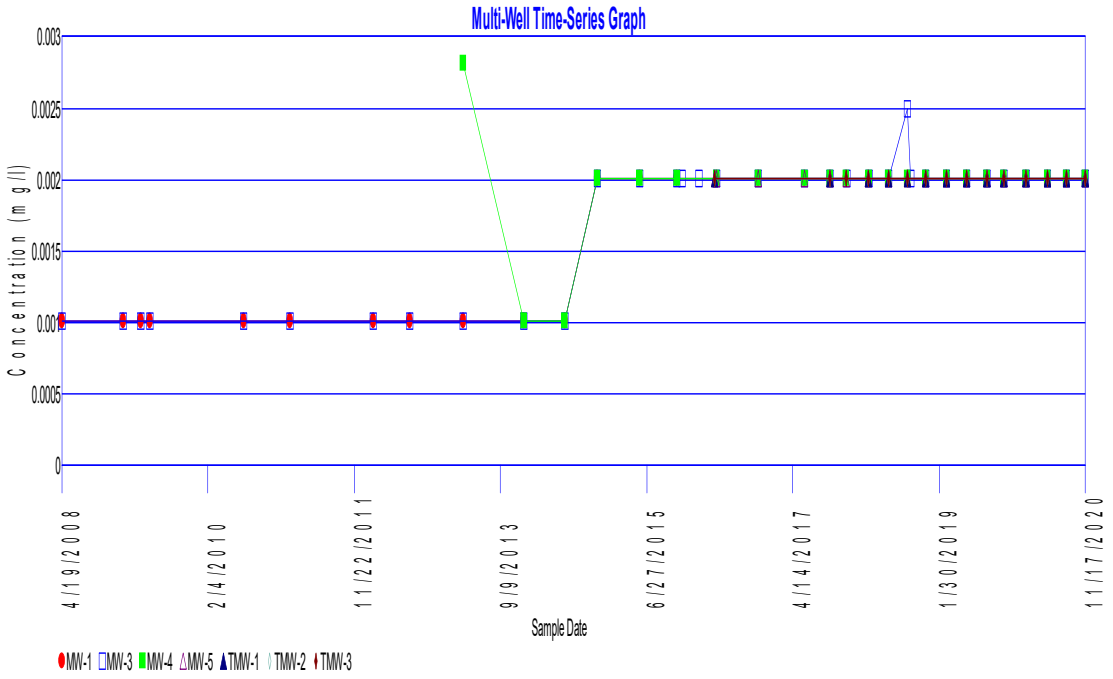
Nitrate


Multi-Well Time-Series Graph
30
25
20
15
10
5
0
Concentration (mg/l)
7/16/2010
1/6/2012
6/29/2013
12/20/2014
6/12/2016
12/3/2017
5/27/2019
11/17/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

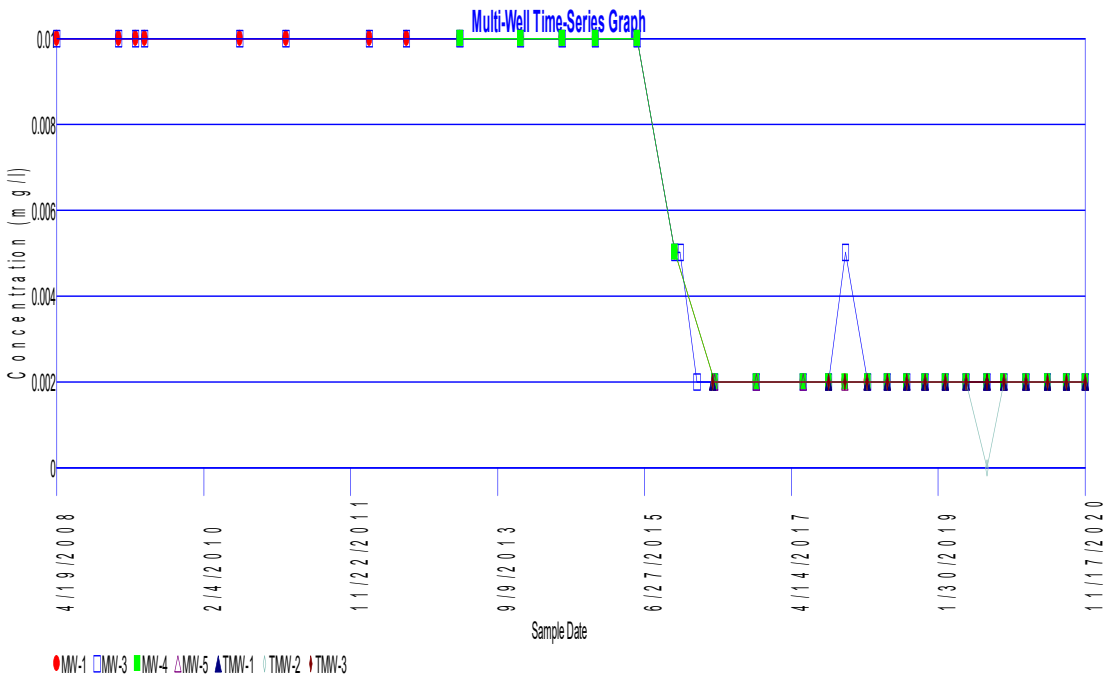
pH


Multi-Well Time-Series Graph
7
6
5
4
3
2
1
0
Concentration (SU)
6/26/2014
5/28/2015
4/29/2016
4/1/2017
3/3/2018
2/3/2019
1/6/2020
12/8/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

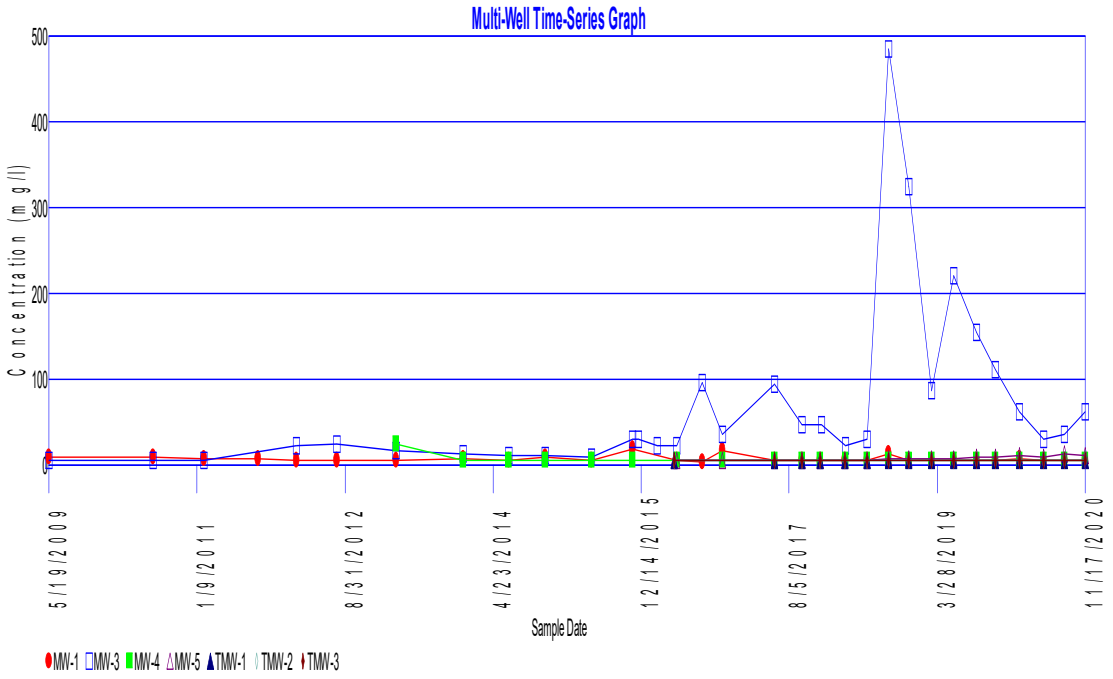
Selenium



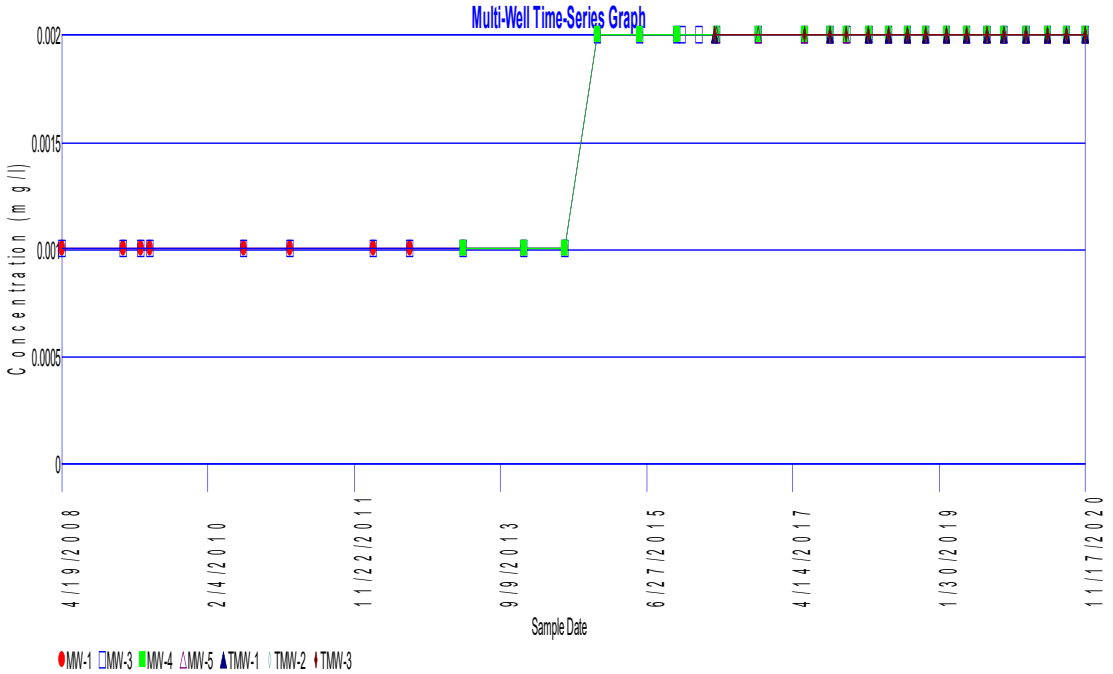
Silver



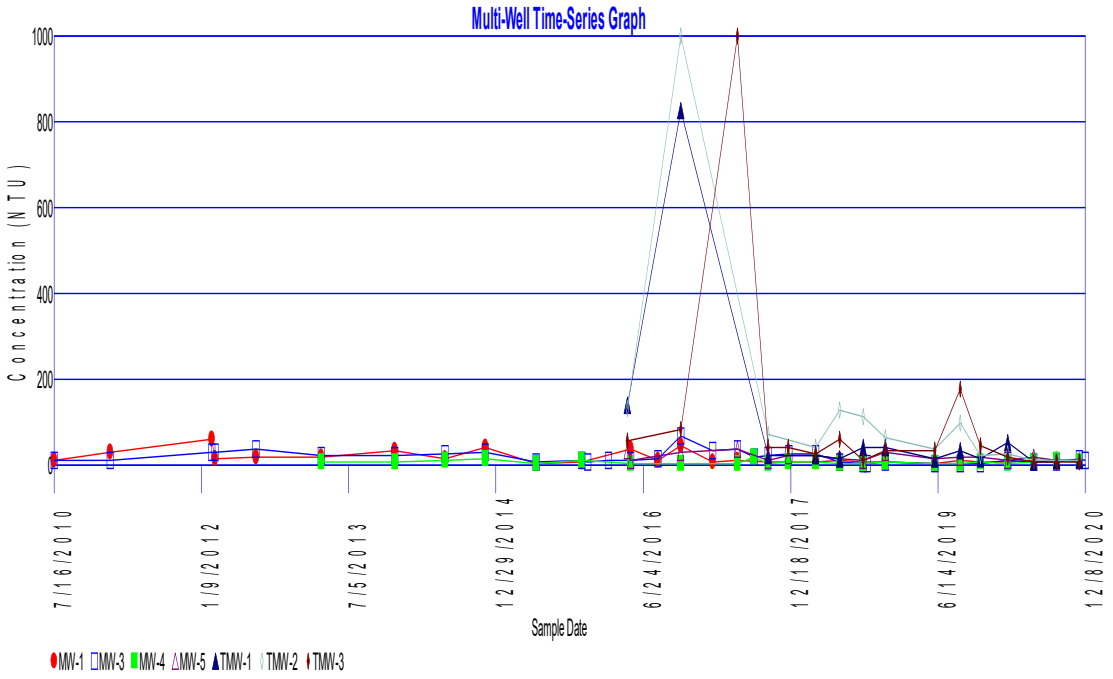
Sulfate



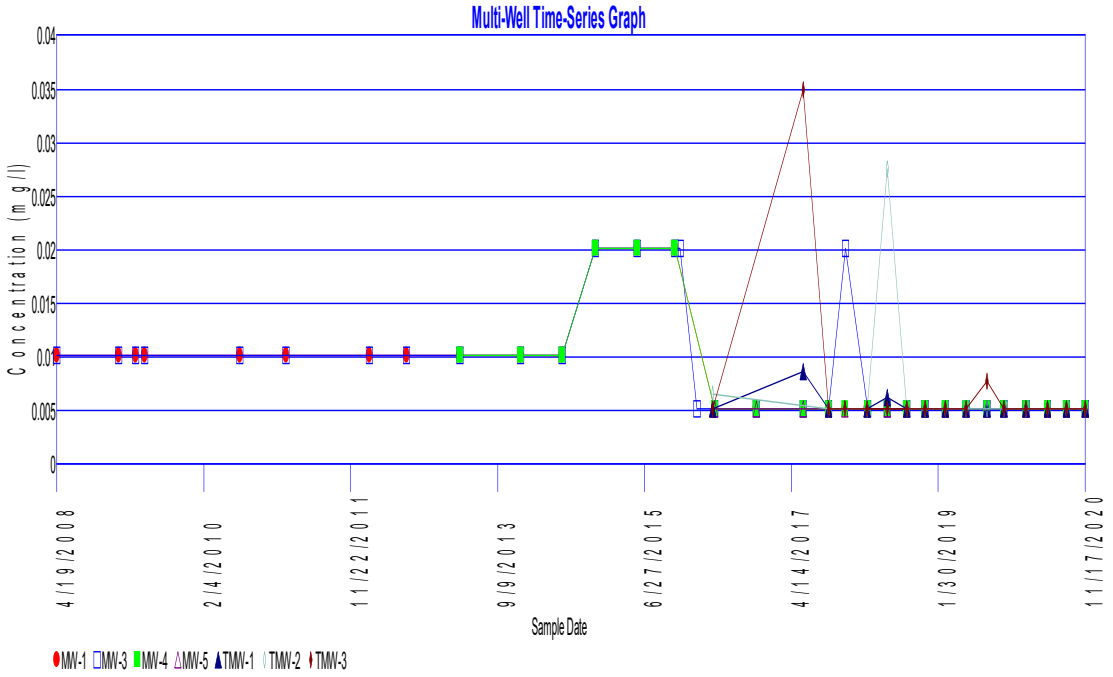
Thallium



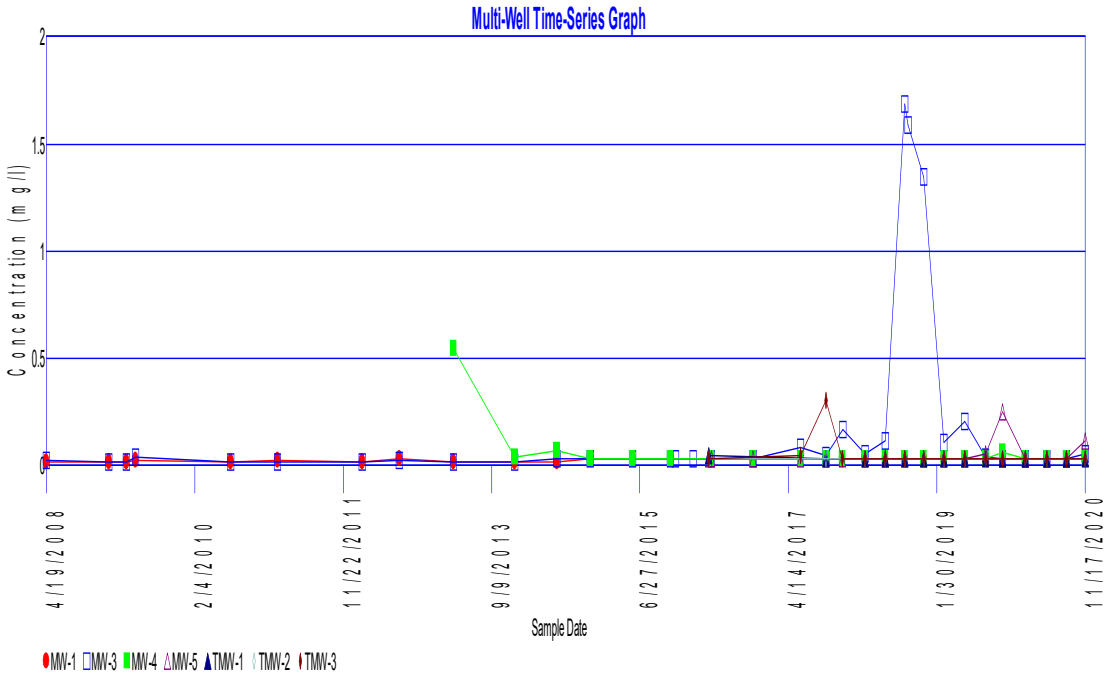
Turbidity



Vanadium



Zinc


Multi-Well Time-Series Graph
2
1.5
1
0.5
0
Concentration (mg/l)
4/19/2008
2/4/2010
11/22/2011
9/9/2013
6/27/2015
4/14/2017
1/30/2019
11/17/2020
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 = 15 for 31 measurements

Sum of b values = 0.152642
Sample Standard Deviation = 0.0291131
W Statistic = 0.916329

5% Critical value of 0.929 exceeds 0.916329
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 is less than 0.916329
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride

Location: MW-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 16 for 32 measurements

Sum of b values = 5.04264
Sample Standard Deviation = 0.996843
W Statistic = 0.825468

5% Critical value of 0.93 exceeds 0.825468
Evidence of non-normality at 95% level of significance

1% Critical value of 0.904 exceeds 0.825468
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 = 15 for 31 measurements

Sum of b values = 0.0665689
Sample Standard Deviation = 0.0131018
W Statistic = 0.860522

5% Critical value of 0.929 exceeds 0.860522
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 exceeds 0.860522
Evidence of non-normality 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 = 15 for 31 measurements

Sum of b values = 0.15177
Sample Standard Deviation = 0.0438868
W Statistic = 0.398643

5% Critical value of 0.929 exceeds 0.398643
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 exceeds 0.398643
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 = 15 for 31 measurements

Sum of b values = 0.00307314
Sample Standard Deviation = 0.000677979
W Statistic = 0.684874

5% Critical value of 0.929 exceeds 0.684874
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 exceeds 0.684874
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

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

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 15 for 31 measurements

Sum of b values = 4.70605
Sample Standard Deviation = 0.902649
W Statistic = 0.906053

5% Critical value of 0.929 exceeds 0.906053
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 is less than 0.906053
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

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

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 16 for 32 measurements

Sum of b values = 1.71278
Sample Standard Deviation = 0.320702
W Statistic = 0.92011

5% Critical value of 0.93 exceeds 0.92011
Evidence of non-normality at 95% level of significance

1% Critical value of 0.904 is less than 0.92011
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

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

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 15 for 31 measurements

Sum of b values = 1.72278
Sample Standard Deviation = 0.322519
W Statistic = 0.951101

5% Critical value of 0.929 is less than 0.951101
Data is normally distributed at 95% level of significance

1% Critical value of 0.902 is less than 0.951101
Data is normally distributed 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 = 15 for 31 measurements

Sum of b values = 3.56442
Sample Standard Deviation = 0.843553
W Statistic = 0.595156

5% Critical value of 0.929 exceeds 0.595156
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 exceeds 0.595156
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 = 15 for 31 measurements

Sum of b values = 5.56789
Sample Standard Deviation = 1.08629
W Statistic = 0.875726

5% Critical value of 0.929 exceeds 0.875726
Evidence of non-normality at 95% level of significance

1% Critical value of 0.902 exceeds 0.875726
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Cobalt

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

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

Baseline Samples	Date	Result
	4/19/2008	-3.44202
	1/21/2009	-3.50656
	4/9/2009	-3.14656
	5/19/2009	-2.8824
	7/16/2010	-3.35241
	2/8/2011	-3.47377
	2/17/2012	-3.64966
	7/31/2012	-3.57555
	3/27/2013	-3.32424
	12/23/2013	-3.57555
	6/26/2014	-3.32424
	11/21/2014	-3.07911
	5/28/2015	-3.19418
	11/11/2015	-3.66126
	5/9/2016	-3.17725
	11/10/2016	-3.93223
	6/8/2017	-3.37553
	9/28/2017	-3.2114
	12/11/2017	-3.19175
	3/21/2018	-3.15825
	6/19/2018	-3.88246
	9/12/2018	-3.92207
	12/4/2018	-3.56137
	3/5/2019	-3.23145
	6/4/2019	-3.19175
	9/5/2019	-2.57308
	11/20/2019	-3.41428
	2/27/2020	-2.59964
	6/2/2020	-3.14191
	8/26/2020	-3.16061

From 30 baseline samples
Baseline mean = -3.33042
Baseline std Dev = 0.325854

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 = 30 (background observations) - 1
t(0.95, 30) = 1.69913

Date	Samples	Mean	Interval	Significant
11/17/2020	1	-3.53702	[0, -2.7676]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Arsenic

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) = 30
Maximum Baseline Concentration = 0.1
Confidence Level = 96.8%
False Positive Rate = 3.2%

Baseline Measurem	Date	Value
	4/19/2008	0.024
	1/21/2009	0.072
	4/9/2009	0.067
	5/19/2009	0.064
	7/16/2010	0.074
	2/8/2011	0.086
	2/17/2012	0.093
	7/31/2012	0.089
	3/27/2013	0.049
	12/23/2013	0.1
	6/26/2014	0.063
	11/21/2014	0.059
	5/28/2015	0.0604
	11/11/2015	0.0469
	5/9/2016	0.05
	11/10/2016	0.0286
	6/8/2017	0.0571
	9/28/2017	0.0199
	12/11/2017	0.0573
	3/21/2018	0.0101
	6/19/2018	0.0063
	9/12/2018	0.0184
	12/4/2018	0.0254
	3/5/2019	0.00449
	6/4/2019	0.0194
	9/5/2019	0.0176
	11/20/2019	0.0176
	2/27/2020	0.00807
	6/2/2020	0.0174
	8/26/2020	0.0244

Date	Count	Mean	Significant
11/17/2020	1	0.00513	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Chloride

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

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 5.68
Confidence Level = 96.8%
False Positive Rate = 3.2%

Baseline Measurem	Date	Value
	4/19/2008	2
	1/21/2009	2.9
	4/9/2009	1.9
	5/19/2009	2.8
	7/16/2010	2.8
	2/8/2011	2.6
	2/17/2012	2.1
	7/31/2012	2.2
	3/27/2013	1.8
	12/23/2013	1.5
	6/26/2014	2.9
	11/21/2014	3.9
	5/28/2015	2.01
	11/11/2015	3.97
	5/9/2016	2.12
	8/18/2016	2.4
	11/10/2016	4.59
	6/8/2017	5.68
	9/28/2017	4.11
	12/11/2017	2.31
	3/21/2018	2.1
	6/19/2018	2.24
	9/12/2018	4.94
	12/4/2018	1.67
	3/5/2019	2.11
	6/4/2019	2.15
	9/5/2019	2.84
	11/20/2019	2.52
	2/27/2020	1.95
	6/2/2020	2.27

Date	Count	Mean	Significant
11/17/2020	1	2.48	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 = 36.6667%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 0.2
Confidence Level = 96.8%
False Positive Rate = 3.2%

Baseline Measurem	Date	Value
	4/19/2008	ND<0.02
	1/21/2009	ND<0.02
	4/9/2009	0.2
	5/19/2009	0.17
	7/16/2010	ND<0.02
	2/8/2011	ND<0.02
	2/17/2012	ND<0.02
	7/31/2012	ND<0.02
	3/27/2013	ND<0.02
	12/23/2013	ND<0.02
	6/26/2014	ND<0.02
	11/21/2014	ND<0.02
	5/28/2015	ND<0.02
	11/11/2015	0.0112
	5/9/2016	0.00512
	11/10/2016	0.0112
	6/8/2017	0.00418
	9/28/2017	0.00445
	12/11/2017	0.00652
	3/21/2018	0.00658
	6/19/2018	0.00637
	9/12/2018	0.00839
	12/4/2018	0.00744
	3/5/2019	0.00638
	6/4/2019	0.0088
	9/5/2019	0.00686
	11/20/2019	0.00468
	2/27/2020	0.00803
	6/2/2020	0.0063
	8/26/2020	0.00512

Date	Count	Mean	Significant
11/17/2020	1	0.00632	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Mercury

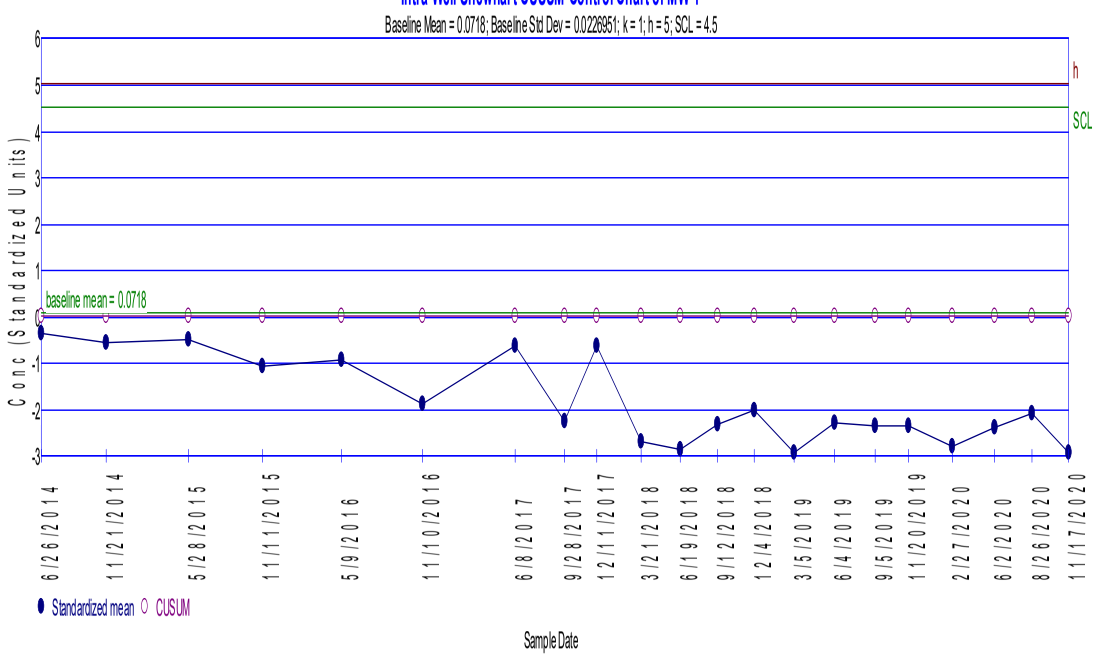
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 33.3333%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 0.00319
Confidence Level = 96.8%
False Positive Rate = 3.2%

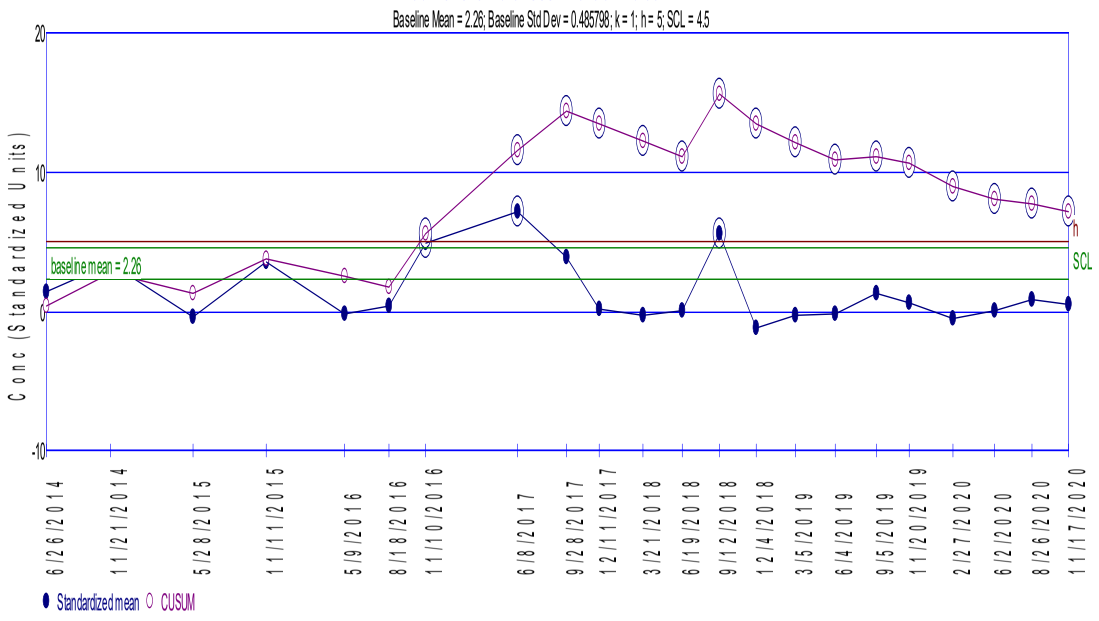
Baseline Measurem	Date	Value
	4/19/2008	ND<0.0002
	1/21/2009	0.00045
	4/9/2009	ND<0.0002
	5/19/2009	ND<0.0002
	7/16/2010	0.0005
	2/8/2011	0.00024
	2/17/2012	0.00083
	7/31/2012	0.00063
	3/27/2013	0.00028
	12/23/2013	0.00077
	6/26/2014	ND<0.0002
	11/21/2014	ND<0.0002
	5/28/2015	ND<0.0002
	11/11/2015	ND<0.0002
	5/9/2016	0.000858
	11/10/2016	ND<0.0002
	6/8/2017	0.000222
	9/28/2017	ND<0.0002
	12/11/2017	0.000473
	3/21/2018	0.000651
	6/19/2018	0.00319
	9/12/2018	0.000244
	12/4/2018	0.00101
	3/5/2019	0.000922
	6/4/2019	0.000889
	9/5/2019	0.00108
	11/20/2019	0.00121
	2/27/2020	0.000796
	6/2/2020	0.000888
	8/26/2020	ND<0.0002

Date	Count	Mean	Significant
11/17/2020	1	0.00256	FALSE

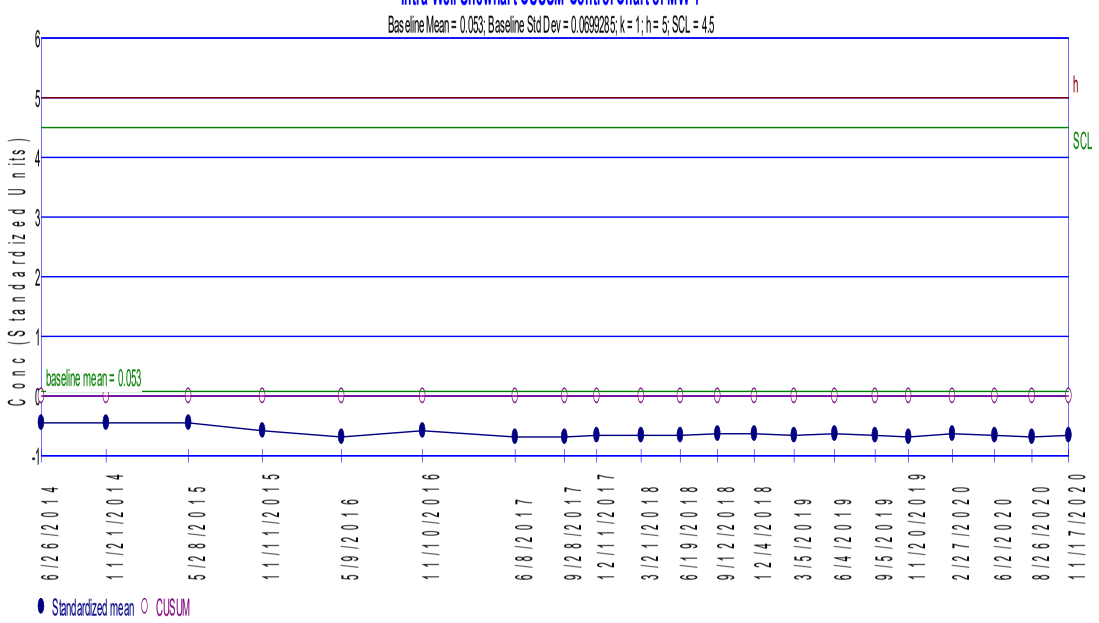
Arsenic



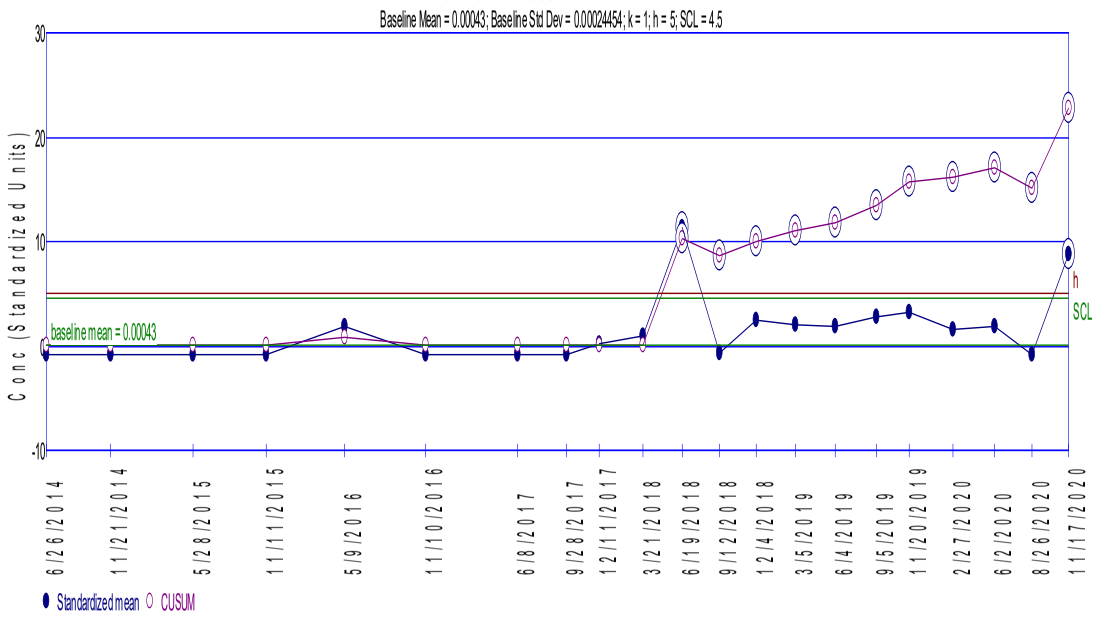
Chloride



Nickel



Mercury



Wilcoxon Non-Parametric Analysis (Intra-Well)

Parameter: Mercury

Location: MW-1

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

Total non detects is 10
Non detect rank is 5.5

Wilcoxon Ranks

Group	Date	Conc.	Rank
Baseline Values	4/19/2008	ND<0.0002	5.5
	1/21/2009	0.00045	15
	4/9/2009	ND<0.0002	5.5
	5/19/2009	ND<0.0002	5.5
Comparison Values	7/16/2010	0.0005	17
	2/8/2011	0.00024	12
	2/17/2012	0.00083	22
	7/31/2012	0.00063	18
	3/27/2013	0.00028	14
	12/23/2013	0.00077	20
	6/26/2014	ND<0.0002	5.5
	11/21/2014	ND<0.0002	5.5
	5/28/2015	ND<0.0002	5.5
	11/11/2015	ND<0.0002	5.5
	5/9/2016	0.000858	23
	11/10/2016	ND<0.0002	5.5
	6/8/2017	0.000222	11
	9/28/2017	ND<0.0002	5.5
	12/11/2017	0.000473	16
	3/21/2018	0.000651	19
	6/19/2018	0.00319	31
	9/12/2018	0.000244	13
	12/4/2018	0.00101	27
	3/5/2019	0.000922	26
	6/4/2019	0.000889	25
	9/5/2019	0.00108	28
	11/20/2019	0.00121	29
	2/27/2020	0.000796	21
	6/2/2020	0.000888	24
	8/26/2020	ND<0.0002	5.5
	11/17/2020	0.00256	30

The Wilcoxon Statistic is 86.5
The Expected value is is 54
The Standard Deviation is 16.9706
The Z Score is 1.88562
The Standard Deviation adjusted for ties is 16.6859
The Z Score adjusted for ties is 1.91779
1.88562 < 2.326 indicating no statistical significance at 1% level
1.91779 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

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 = 148

Data Set Standard Deviation = 1.18606
Numerator = 8632.87
Denominator = 29107.1
W Statistic = 0.296589 = 8632.87 / 29107.1

5% Critical value of 0.976 exceeds 0.296589
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.296589
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 = 149

Data Set Standard Deviation = 0.0845134
Numerator = 64.1867
Denominator = 149.526
W Statistic = 0.429267 = 64.1867 / 149.526

5% Critical value of 0.976 exceeds 0.429267
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.429267
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 = 150

Data Set Standard Deviation = 0.031521
Numerator = 3.07981
Denominator = 21.1271
W Statistic = 0.145775 = 3.07981 / 21.1271

5% Critical value of 0.976 exceeds 0.145775
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.145775
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 = 159

Data Set Standard Deviation = 59.8308
Numerator = 4.78015e+007
Denominator = 8.55766e+007
W Statistic = 0.558582 = 4.78015e+007 / 8.55766e+007

5% Critical value of 0.976 exceeds 0.558582
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.558582
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 = 148

Data Set Standard Deviation = 0.0140331
Numerator = 0.994373
Denominator = 4.07464
W Statistic = 0.244039 = 0.994373 / 4.07464

5% Critical value of 0.976 exceeds 0.244039
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.244039
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 = 148

Data Set Standard Deviation = 0.0152376
Numerator = 3.18117
Denominator = 4.80414
W Statistic = 0.662172 = 3.18117 / 4.80414

5% Critical value of 0.976 exceeds 0.662172
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.662172
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 119

Data Set Standard Deviation = 0.0618323
Numerator = 23.9523
Denominator = 50.3218
W Statistic = 0.475983 = 23.9523 / 50.3218

5% Critical value of 0.976 exceeds 0.475983
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.475983
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 = 150

Data Set Standard Deviation = 0.0263648
Numerator = 5.42605
Denominator = 14.7804
W Statistic = 0.367112 = 5.42605 / 14.7804

5% Critical value of 0.976 exceeds 0.367112
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.367112
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 150

Data Set Standard Deviation = 53.1112
Numerator = 1.58662e+007
Denominator = 5.99805e+007
W Statistic = 0.264522 = 1.58662e+007 / 5.99805e+007

5% Critical value of 0.976 exceeds 0.264522
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.264522
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 = 150

Data Set Standard Deviation = 0.218356
Numerator = 192.12
Denominator = 1013.83
W Statistic = 0.189498 = 192.12 / 1013.83

5% Critical value of 0.976 exceeds 0.189498
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.189498
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 = 148

Data Set Standard Deviation = 1.23781
Numerator = 27620.1
Denominator = 31702.4
W Statistic = 0.87123 = 27620.1 / 31702.4

5% Critical value of 0.976 exceeds 0.87123
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.87123
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 = 149

Data Set Standard Deviation = 0.929627
Numerator = 17495.3
Denominator = 18091.9
W Statistic = 0.967026 = 17495.3 / 18091.9

5% Critical value of 0.976 exceeds 0.967026
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 is less than 0.967026
Data is normally distributed 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 = 150

Data Set Standard Deviation = 1.19032
Numerator = 11444.8
Denominator = 30127.5
W Statistic = 0.379879 = 11444.8 / 30127.5

5% Critical value of 0.976 exceeds 0.379879
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.379879
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 = 159

Data Set Standard Deviation = 1.31583
Numerator = 40588
Denominator = 41390.6
W Statistic = 0.980608 = 40588 / 41390.6

5% Critical value of 0.976 is less than 0.980608
Data is normally distributed at 95% level of significance

1% Critical value of 0.967 is less than 0.980608
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 = 148

Data Set Standard Deviation = 0.941161
Numerator = 13742.9
Denominator = 18327.9
W Statistic = 0.749837 = 13742.9 / 18327.9

5% Critical value of 0.976 exceeds 0.749837
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.749837
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 = 148

Data Set Standard Deviation = 1.40376
Numerator = 33146.7
Denominator = 40772.5
W Statistic = 0.812967 = 33146.7 / 40772.5

5% Critical value of 0.976 exceeds 0.812967
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.812967
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 119

Data Set Standard Deviation = 0.533856
Numerator = 2156.82
Denominator = 3751.22
W Statistic = 0.574963 = 2156.82 / 3751.22

5% Critical value of 0.976 exceeds 0.574963
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.574963
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 = 150

Data Set Standard Deviation = 1.2443
Numerator = 27758
Denominator = 32921.9
W Statistic = 0.843146 = 27758 / 32921.9

5% Critical value of 0.976 exceeds 0.843146
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.843146
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 = 150

Data Set Standard Deviation = 1.19715
Numerator = 20438.1
Denominator = 30474.6
W Statistic = 0.670661 = 20438.1 / 30474.6

5% Critical value of 0.976 exceeds 0.670661
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.670661
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 = 150

Data Set Standard Deviation = 0.971607
Numerator = 11618.8
Denominator = 20073.3
W Statistic = 0.578818 = 11618.8 / 20073.3

5% Critical value of 0.976 exceeds 0.578818
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.578818
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Inter-Well Comparison

Parameter: Chloride

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

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

Background Samples = 32
Background Mean = 0.939785
Background Std Dev = 0.320702

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 = 32 (background observations) - 1
t(0.991667, 32) = 2.5499

Well MW-3

Date	Samples	Mean	Interval	Significant
11/17/2020	1	2.92852	[0, 1.77022]	TRUE

Well MW-4

Date	Samples	Mean	Interval	Significant
11/17/2020	1	2.20166	[0, 1.77022]	TRUE

Well MW-5

Date	Samples	Mean	Interval	Significant
11/17/2020	1	4.31482	[0, 1.77022]	TRUE

Well TMW-1

Date	Samples	Mean	Interval	Significant
11/17/2020	1	3.19048	[0, 1.77022]	TRUE

Well TMW-2

Date	Samples	Mean	Interval	Significant
11/17/2020	1	3.627	[0, 1.77022]	TRUE

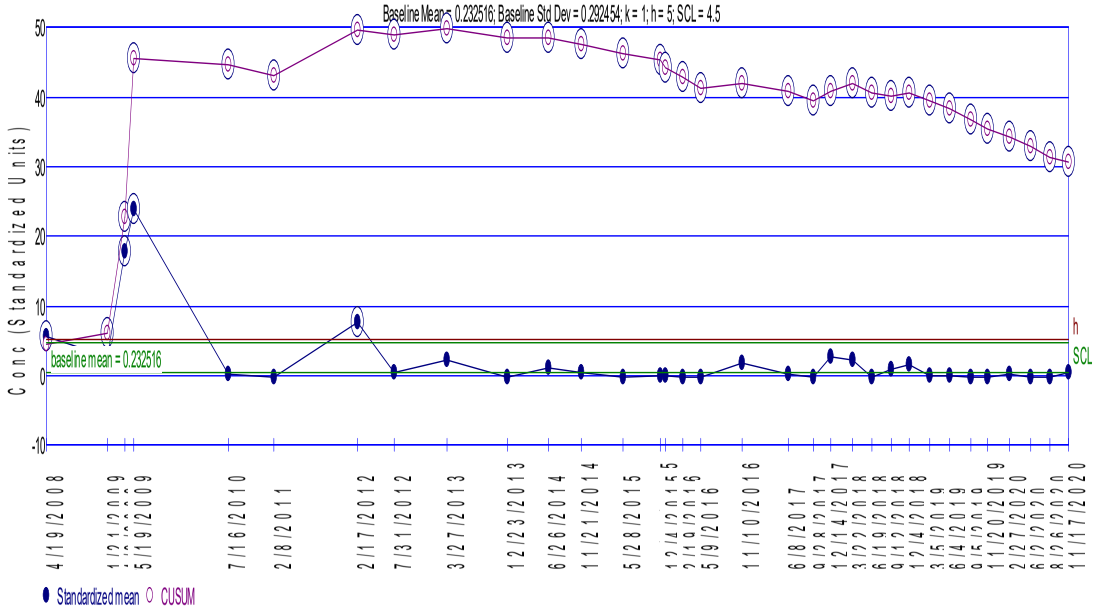
Well TMW-3

Date	Samples	Mean	Interval	Significant
11/17/2020	1	4.14155	[0, 1.77022]	TRUE

Aluminum

Inter-Well Shewhart-CUSUM Control Chart of MW-3

Baseline Mean = 0.232516; Baseline Std Dev = 0.292454; k = 1; h = 5; SCL = 4.5

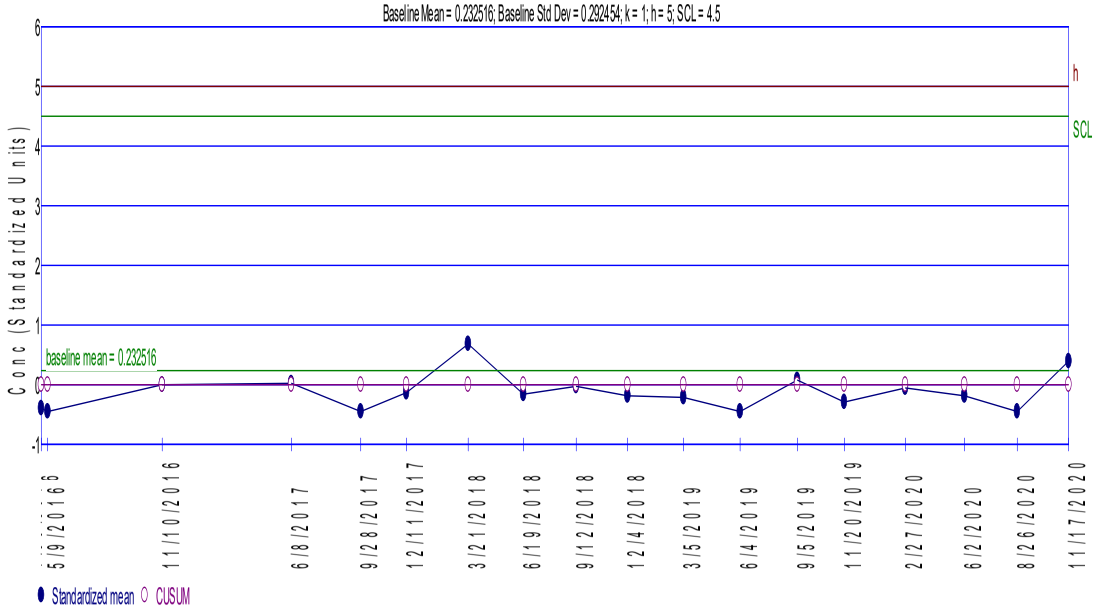


Sample Date

Aluminum

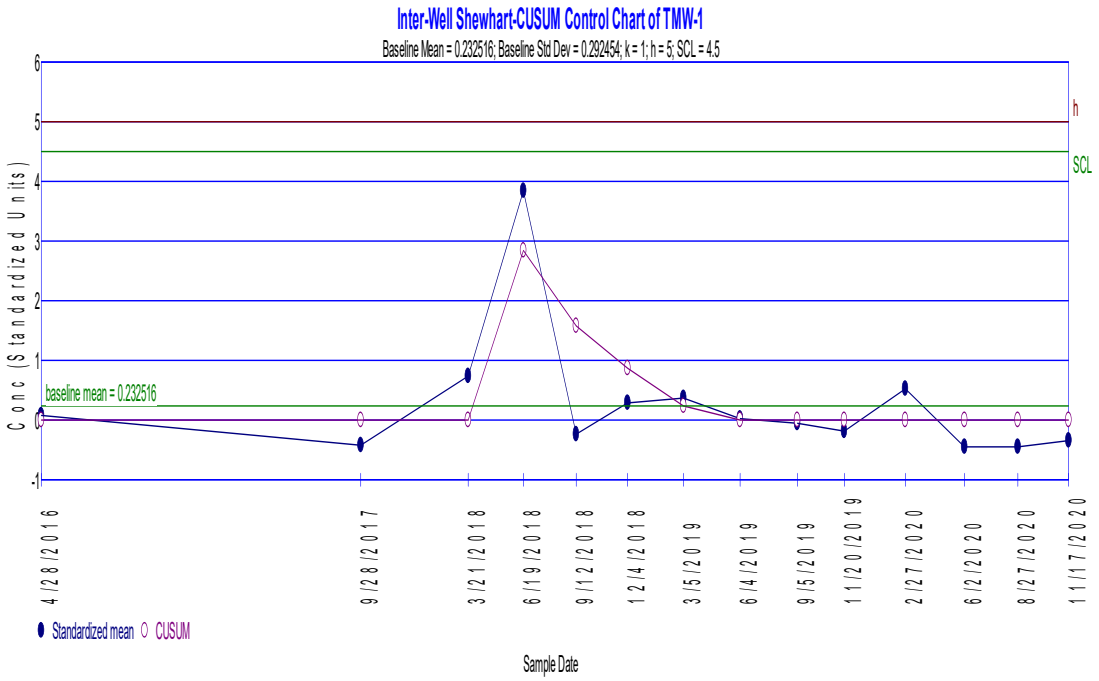
Inter-Well Shewhart-CUSUM Control Chart of MW-5

Baseline Mean = 0.232516; Baseline Std Dev = 0.292454; k = 1; h = 5; SCL = 4.5

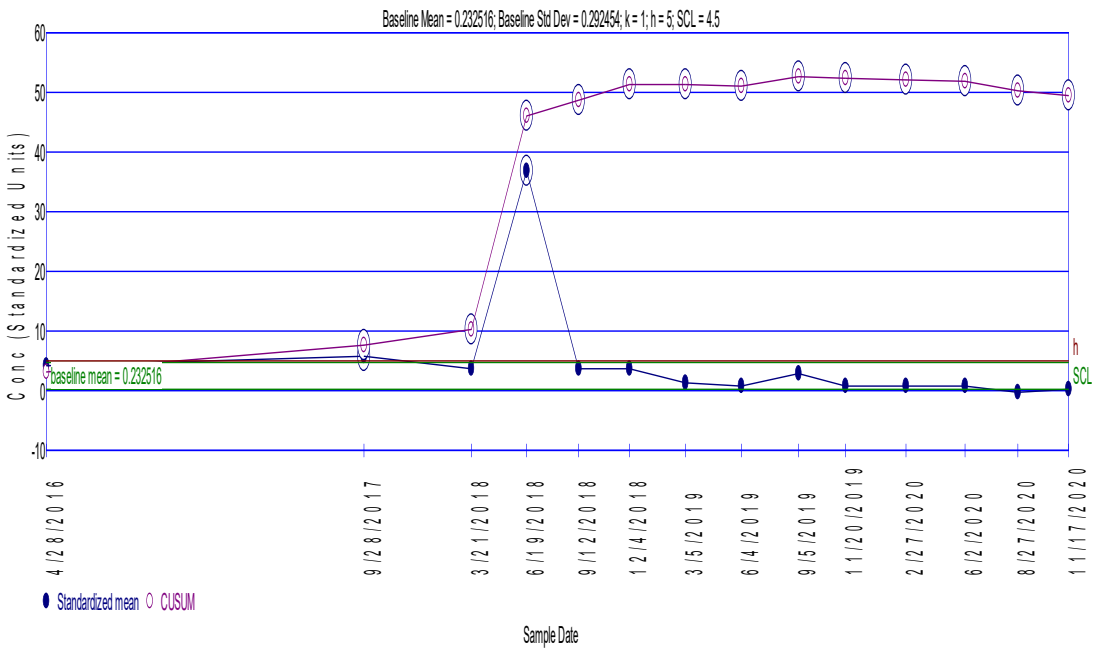


Sample Date

Aluminum



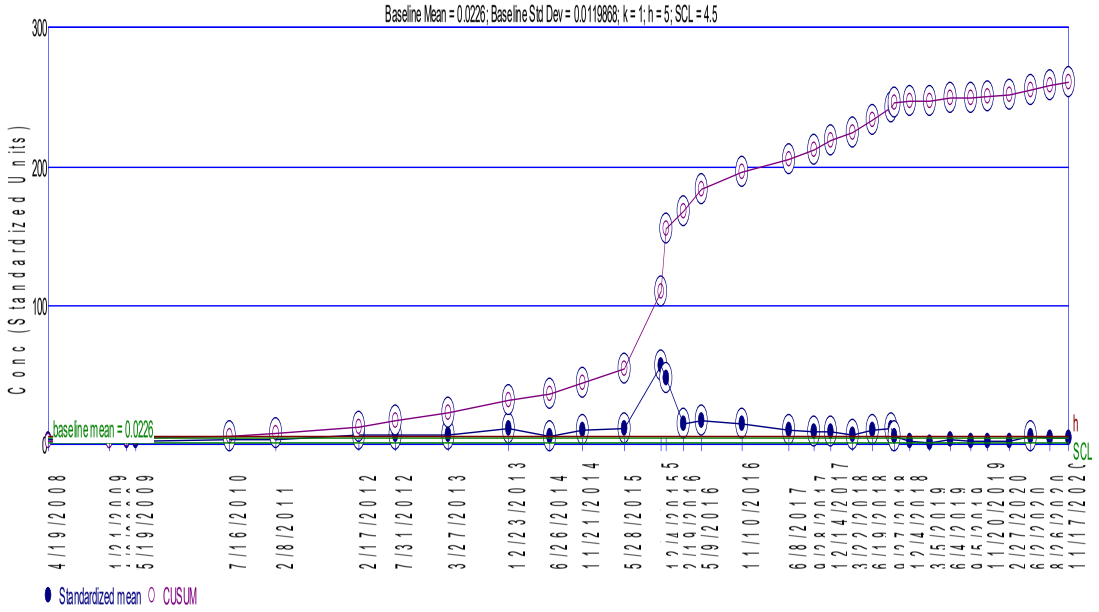
Aluminum



Barium

Inter-Well Shewhart-CUSUM Control Chart of MW-3

Baseline Mean = 0.0226; Baseline Std Dev = 0.0119868; k = 1; h = 5; SCL = 4.5

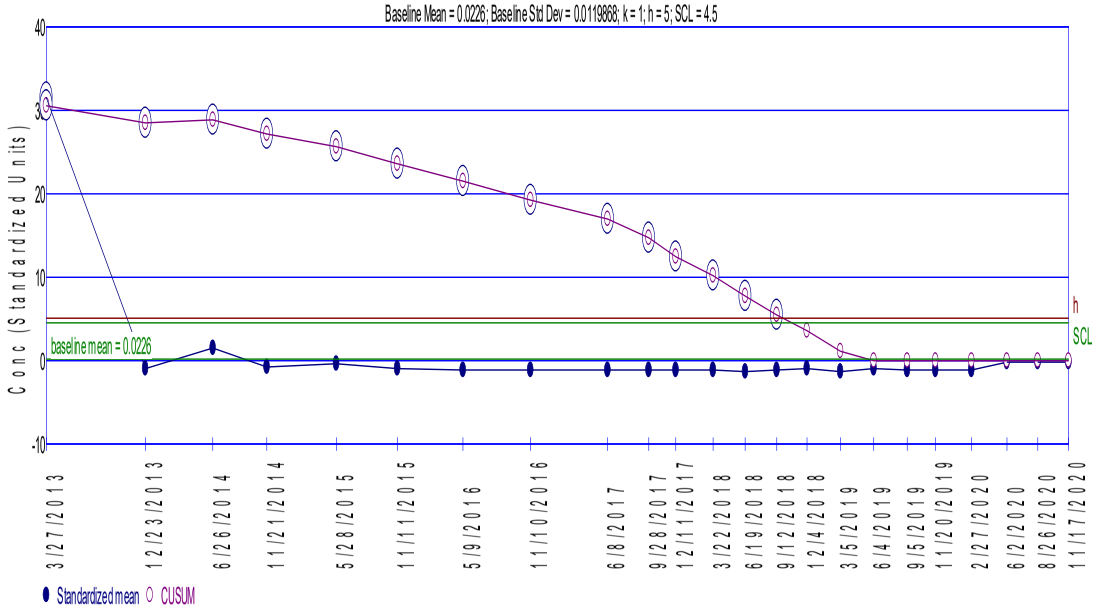


Sample Date

Barium

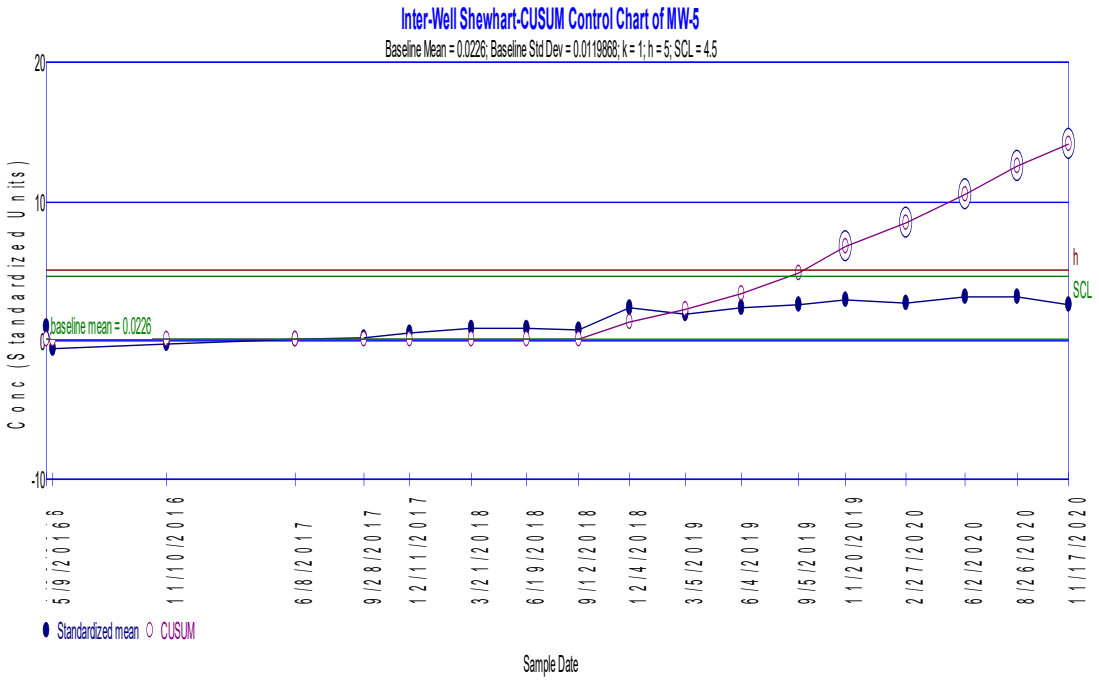
Inter-Well Shewhart-CUSUM Control Chart of MW-4

Baseline Mean = 0.0226; Baseline Std Dev = 0.0119868; k = 1; h = 5; SCL = 4.5

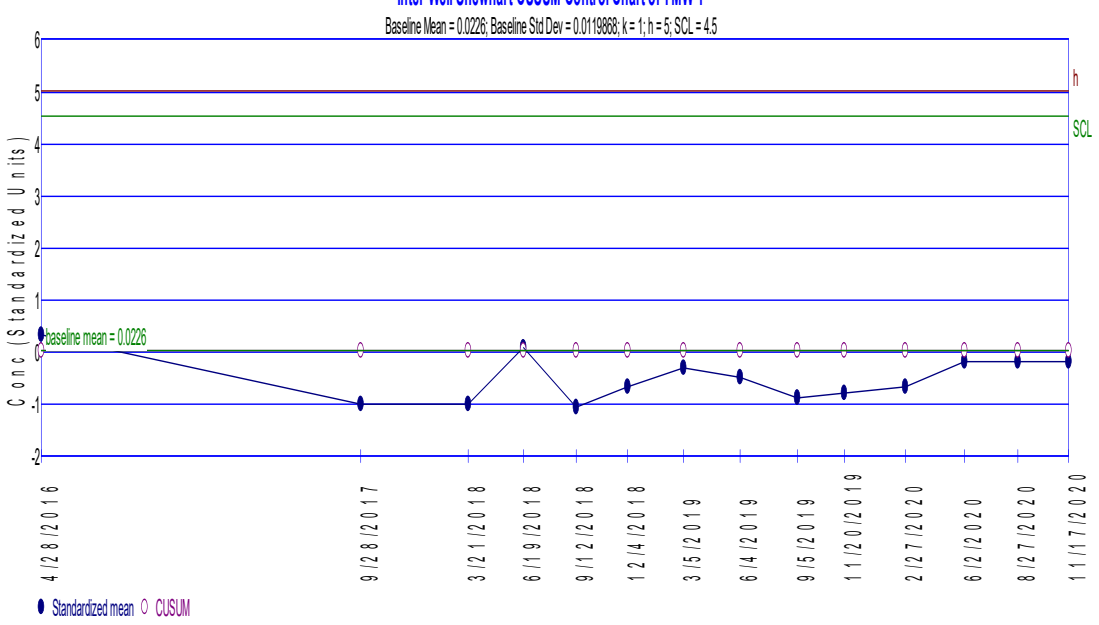


Sample Date

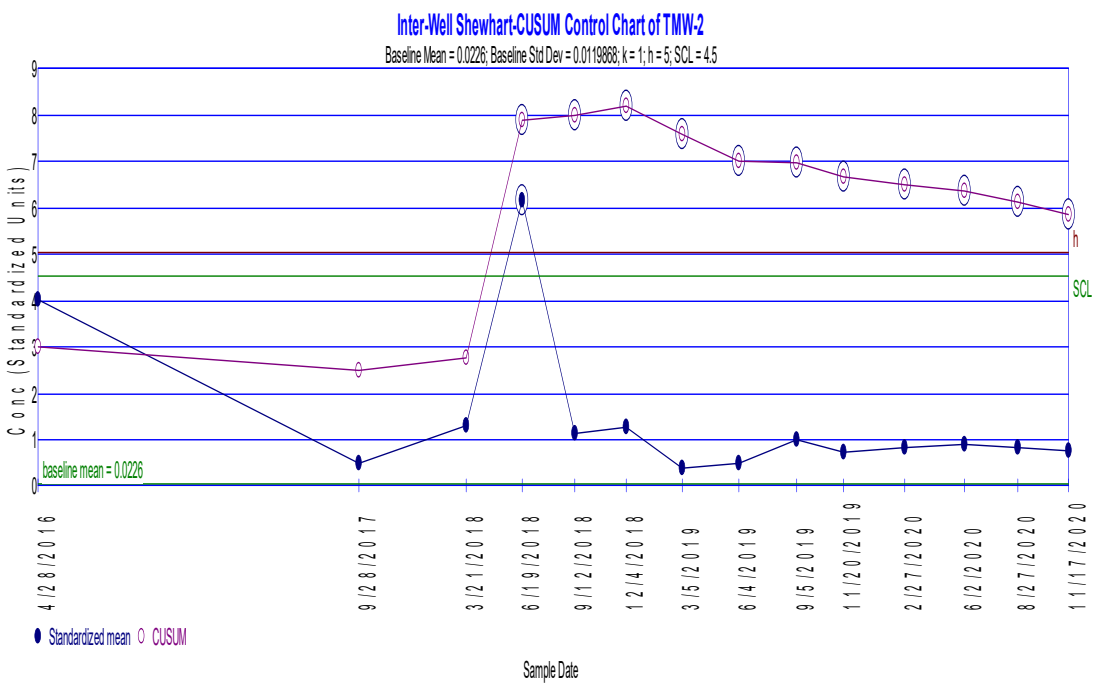
Barium



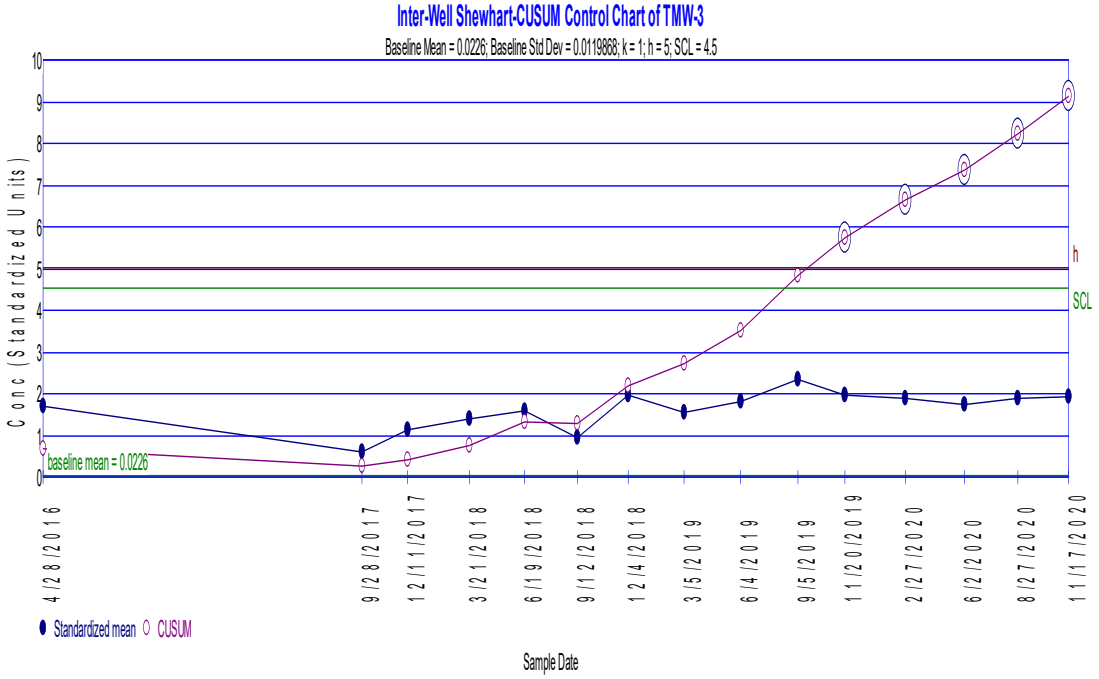
Barium



Barium



Barium



Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Total Cadmium

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

Total Percent Non-Detects = 87.3333%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 30
Maximum Background Value = 0.001
Confidence Level = 83.3%
False Positive Rate = 16.7%

Location	Date	Count	Mean	Significant
MW-3	**12/8/2020**	**1**	**0.00906**	**TRUE**
MW-4	11/17/2020	1	0.001	FALSE
MW-5	11/17/2020	1	0.001	FALSE
TMW-1	11/17/2020	1	0.001	FALSE
TMW-2	11/17/2020	1	0.001	FALSE
TMW-3	11/17/2020	1	0.001	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Chromium

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

Total Percent Non-Detects = 74.3243%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 31
Maximum Background Value = 0.12
Confidence Level = 83.8%
False Positive Rate = 16.2%

Location	Date	Count	Mean	Significant
MW-3	11/17/2020	1	0.002	FALSE
MW-4	11/17/2020	1	0.002	FALSE
MW-5	11/17/2020	1	0.00391	FALSE
TMW-1	11/17/2020	1	0.002	FALSE
TMW-2	11/17/2020	1	0.002	FALSE
TMW-3	11/17/2020	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 = 59.4595%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 31
Maximum Background Value = 0.0763
Confidence Level = 83.8%
False Positive Rate = 16.2%

Location	Date	Count	Mean	Significant
MW-3	11/17/2020	1	0.00444	FALSE
MW-4	11/17/2020	1	0.002	FALSE
MW-5	11/17/2020	1	0.002	FALSE
TMW-1	11/17/2020	1	0.002	FALSE
TMW-2	11/17/2020	1	0.002	FALSE
TMW-3	11/17/2020	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 = 85.7143%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 21
Maximum Background Value = 0.178
Confidence Level = 77.8%
False Positive Rate = 22.2%

Location	Date	Count	Mean	Significant
MW-3	**11/17/2020**	**1**	**0.179**	**TRUE**
MW-4	11/17/2020	1	0.15	FALSE
MW-5	11/17/2020	1	0.15	FALSE
TMW-1	11/17/2020	1	0.15	FALSE
TMW-2	11/17/2020	1	0.15	FALSE
TMW-3	11/17/2020	1	0.15	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Nickel

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

Total Percent Non-Detects = 60%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 31
Maximum Background Value = 0.2
Confidence Level = 83.8%
False Positive Rate = 16.2%

Location	Date	Count	Mean	Significant
MW-3	11/17/2020	1	0.00708	FALSE
MW-4	11/17/2020	1	0.002	FALSE
MW-5	11/17/2020	1	0.00713	FALSE
TMW-1	11/17/2020	1	0.002	FALSE
TMW-2	11/17/2020	1	0.002	FALSE
TMW-3	11/17/2020	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sulfate

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

Total Percent Non-Detects = 64.6667%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 30
Maximum Background Value = 18.8
Confidence Level = 83.3%
False Positive Rate = 16.7%

Location	Date	Count	Mean	Significant
MW-3	**11/17/2020**	**1**	**61.4**	**TRUE**
MW-4	11/17/2020	1	5	FALSE
MW-5	11/17/2020	1	11.2	FALSE
TMW-1	11/17/2020	1	5	FALSE
TMW-2	11/17/2020	1	5	FALSE
TMW-3	11/17/2020	1	5	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Zinc

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

Total Percent Non-Detects = 68%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 31
Maximum Background Value = 0.0281
Confidence Level = 83.8%
False Positive Rate = 16.2%

Location	Date	Count	Mean	Significant
MW-3	**11/17/2020**	**1**	**0.0507**	**TRUE**
MW-4	11/17/2020	1	0.025	FALSE
MW-5	**11/17/2020**	**1**	**0.11**	**TRUE**
TMW-1	11/17/2020	1	0.025	FALSE
TMW-2	11/17/2020	1	0.025	FALSE
TMW-3	11/17/2020	1	0.025	FALSE

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: MW-3

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

95% Confidence Level

S Statistic = 38 - 72 = -34

Tied GrouValue		Members
1	0.1	5

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 300
B = 0
C = 60
D = 0
E = 20
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 476.667
Z-Score = -1.51149
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.51149| <= 1.97737 indicating no evidence of a 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 = 48 - 69 = -21

Tied GrouValue		Members
1	0.1	3

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 489.667
Z-Score = -0.903815
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.903815| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-1

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

95% Confidence Level

S Statistic = 25 - 52 = -27

Tied GrouValue		Members
1	0.1	2

Time Period	Observations
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 4836
b = 15444
c = 312
Group Variance = 267.667
Z-Score = -1.58919
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.58919| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-2

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

95% Confidence Level

S Statistic = 8 - 70 = -62

Tied GrouValue	Members

Time Period	Observations
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	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 = -3.72154
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.72154 < -1.65463 indicating a downward 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 = 37 - 99 = -62

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 10608
b = 36720
c = 544
Group Variance = 589.333
Z-Score = -2.51275
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.51275 < -1.65463 indicating a downward 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 = 82 - 35 = 47

Tied GrouValue	Members
1 0.02	3

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 489.667
Z-Score = 2.07878
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.07878 > 1.65463 indicating an upward 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 = 110 - 10 = 100

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 4.45723
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.45723 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-1

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

95% Confidence Level

S Statistic = 53 - 22 = 31

Tied GrouValue	Members
1 0.02	3

Time Period	Observations
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 4836
b = 15444
c = 312
Group Variance = 265
Z-Score = 1.84289
Comparison Level at 95% confidence level = 1.65463 (upward trend)
1.84289 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: TMW-2

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

95% Confidence Level

S Statistic = 30 - 48 = -18

Tied GrouValue	Members

Time Period	Observations
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	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 = -1.03715
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.03715| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: TMW-3

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

95% Confidence Level

S Statistic = 69 - 21 = 48

Tied GrouValue		Members
1	0.0451	2

Time Period	Observations
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 332.667
Z-Score = 2.57687
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.57687 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium
Location: MW-3

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

95% Confidence Level

S Statistic = 72 - 99 = -27

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1
12/8/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 14706
b = 52326
c = 684
Group Variance = 817
Z-Score = -0.909625
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.909625| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-3

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

95% Confidence Level

S Statistic = 24 - 95 = -71

Tied GrouValue		Members
1	23.9	2

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 492.333
Z-Score = -3.15478
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.15478 < -1.65463 indicating a downward 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 = 103 - 17 = 86

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 3.82691
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.82691 > 1.65463 indicating an upward 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 = 101 - 18 = 83

Tied GrouValue	Members
1 83.5	2

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 492.333
Z-Score = 3.69559
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.69559 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-1

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

95% Confidence Level

S Statistic = 118 - 2 = 116

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 5.17759
Comparison Level at 95% confidence level = 1.65463 (upward trend)
5.17759 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-2

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

95% Confidence Level

S Statistic = 99 - 21 = 78

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 3.46673
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.46673 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-3

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

95% Confidence Level

S Statistic = 112 - 8 = 104

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/27/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 4.63732
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.63732 > 1.65463 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 = 74 - 40 = 34

Tied GrouValue		Members
1	0.002	4

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 156
B = 0
C = 24
D = 0
E = 12
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 484.667
Z-Score = 1.49897
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.49897| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Cobalt
Location: MW-3

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

95% Confidence Level

S Statistic = 61 - 38 = 23

Tied GrouValue		Members
1	0.002	7

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 798
B = 0
C = 210
D = 0
E = 42
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 449
Z-Score = 1.03824
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.03824| <= 1.97737 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 = 65 - 55 = 10

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = 0.405203
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.405203| <= 1.97737 indicating no evidence of a 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 = 78 - 55 = 23

Tied GrouValue		Members
1	0.002	3

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 10608
b = 36720
c = 544
Group Variance = 585.667
Z-Score = 0.90907
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.90907| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Nickel

Location: MW-5

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

95% Confidence Level

S Statistic = 61 - 58 = 3

Tied GrouValue		Members
1	0.00651	2

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 492.333
Z-Score = 0.0901364
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.0901364| <= 1.97737 indicating no evidence of a 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 = 59 - 60 = -1

Tied GrouValue		Members
1	46.2	2

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 492.333
Z-Score = 0
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-5

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

95% Confidence Level

S Statistic = 107 - 3 = 104

Tied GrouValue		Members
1	5	5

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 300
B = 0
C = 60
D = 0
E = 20
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 476.667
Z-Score = 4.71769
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.71769 > 1.65463 indicating an upward 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 = 56 - 79 = -23

Tied GrouValue		Members
1	0.025	2

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 10608
b = 36720
c = 544
Group Variance = 588.333
Z-Score = -0.907008
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.907008| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Zinc

Location: MW-5

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

95% Confidence Level

S Statistic = 47 - 7 = 40

Tied GrouValue		Members
1	0.025	12

Time Period	Observations
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1
6/2/2020	1
8/26/2020	1
11/17/2020	1

There are 0 time periods with multiple data

A = 3828
B = 0
C = 1320
D = 0
E = 132
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 280.667
Z-Score = 2.32793
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.32793 > 1.65463 indicating an upward trend

APPENDIX C
LABORATORY ANALYTICAL REPORTS & FIELD INFORMATION LOGS

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 01, 2020

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1287271
Samples Received:	11/18/2020
Project Number:	181-364
Description:	Former EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 117 Seaboard Ln. Suite E100 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

TABLE OF CONTENTS

MW-1 L1287271-01 GW

Collected by: AB/AB | Collected date/time: 11/17/20 10:15 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:19	11/25/20 09:19	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 14:33	12/01/20 14:33	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 18:47	11/24/20 18:47	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:45	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/18/20 23:07	11/18/20 23:07	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:00	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:43	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:19	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:33	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/23/20 23:21	11/23/20 23:21	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 08:19	MTJ	Mt. Juliet, TN

MW-3 L1287271-02 GW

Collected by: AB/AB | Collected date/time: 11/17/20 14:40 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:23	11/25/20 09:23	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 14:40	12/01/20 14:40	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 18:49	11/24/20 18:49	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:45	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 00:10	11/19/20 00:10	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:03	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:46	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:23	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:36	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/23/20 23:42	11/23/20 23:42	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 08:32	MTJ	Mt. Juliet, TN

MW-4 L1287271-03 GW

Collected by: AB/AB | Collected date/time: 11/17/20 11:30 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:26	11/25/20 09:26	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 15:48	12/01/20 15:48	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 18:56	11/24/20 18:56	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:46	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 00:26	11/19/20 00:26	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:05	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:48	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:26	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:40	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 00:02	11/24/20 00:02	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 08:44	MTJ	Mt. Juliet, TN

MW-5 L1287271-04 GW

Collected by: AB/AB | Collected date/time: 11/17/20 13:15 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:40	11/25/20 09:40	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 14:47	12/01/20 14:47	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 18:57	11/24/20 18:57	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:46	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 00:42	11/19/20 00:42	ELN	Mt. Juliet, TN

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

MW-5 L1287271-04 GW

Collected by: AB/AB | Collected date/time: 11/17/20 13:15 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:08	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:51	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:40	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:43	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 00:23	11/24/20 00:23	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 08:56	MTJ	Mt. Juliet, TN

TMW-1 L1287271-05 GW

Collected by: AB/AB | Collected date/time: 11/17/20 12:30 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:43	11/25/20 09:43	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 14:53	12/01/20 14:53	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 18:59	11/24/20 18:59	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:46	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 00:58	11/19/20 00:58	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:10	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:54	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:43	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:53	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 00:44	11/24/20 00:44	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 09:09	MTJ	Mt. Juliet, TN

TMW-2 L1287271-06 GW

Collected by: AB/AB | Collected date/time: 11/17/20 11:35 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:46	11/25/20 09:46	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 15:18	12/01/20 15:18	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 19:01	11/24/20 19:01	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:46	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 01:46	11/19/20 01:46	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:13	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 21:57	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:46	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 13:57	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 01:05	11/24/20 01:05	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 09:22	MTJ	Mt. Juliet, TN

TMW-3 L1287271-07 GW

Collected by: AB/AB | Collected date/time: 11/17/20 10:15 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:50	11/25/20 09:50	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 15:26	12/01/20 15:26	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 19:02	11/24/20 19:02	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:47	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 02:02	11/19/20 02:02	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:15	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 22:00	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:50	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 14:00	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 01:25	11/24/20 01:25	JCP	Mt. Juliet, TN

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

TMW-3 L1287271-07 GW

Collected by: AB/AB | Collected date/time: 11/17/20 10:15 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 09:34	MTJ	Mt. Juliet, TN

DUPLICATE L1287271-08 GW

Collected by: AB/AB | Collected date/time: 11/17/20 00:00 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:53	11/25/20 09:53	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 15:32	12/01/20 15:32	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 19:04	11/24/20 19:04	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:47	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 02:18	11/19/20 02:18	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:18	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 22:03	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:53	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 14:03	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/24/20 01:46	11/24/20 01:46	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1578880	1	11/19/20 11:52	11/20/20 09:47	MTJ	Mt. Juliet, TN

FIELD BLANK L1287271-09 GW

Collected by: AB/AB | Collected date/time: 11/17/20 12:20 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1581081	1	11/25/20 09:56	11/25/20 09:56	JPD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1581424	1	12/01/20 15:55	12/01/20 15:55	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1580846	1	11/24/20 19:07	11/24/20 19:07	DGR	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1581678	1	11/24/20 10:31	11/24/20 15:47	LRP	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1578720	1	11/19/20 02:34	11/19/20 02:34	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1578876	1	11/24/20 11:14	11/25/20 08:20	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1581077	1	11/24/20 22:24	11/25/20 22:05	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1581081	1	11/24/20 23:45	11/25/20 09:56	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1582380	1	11/25/20 10:30	11/25/20 14:07	TM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/23/20 22:19	11/23/20 22:19	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1579623	1	11/20/20 07:14	11/21/20 00:39	MTJ	Mt. Juliet, TN

TRIP BLANK L1287271-10 GW

Collected by: AB/AB | Collected date/time: 11/17/20 00:00 | Received date/time: 11/18/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1581368	1	11/23/20 20:56	11/23/20 20:56	JCP	Mt. Juliet, TN

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 Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	17.8		2.50	1	11/25/2020 09:19	WG1581081

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	30.1		20.0	1	12/01/2020 14:33	WG1581424

Sample Narrative:
L1287271-01 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 18:47	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:45	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/18/2020 23:07	WG1578720
Chloride	2.48		1.00	1	11/18/2020 23:07	WG1578720
Fluoride	ND		0.150	1	11/18/2020 23:07	WG1578720
Nitrate	ND		0.100	1	11/18/2020 23:07	WG1578720
Sulfate	ND		5.00	1	11/18/2020 23:07	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	0.00258		0.000200	1	11/25/2020 08:00	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:43	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.190		0.100	1	11/25/2020 09:19	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:33	WG1582380
Arsenic	0.00513		0.00200	1	11/25/2020 09:19	WG1581081
Barium	ND		0.0200	1	11/25/2020 09:19	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:19	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:19	WG1581081
Calcium	3.25		1.00	1	11/25/2020 09:19	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:19	WG1581081
Cobalt	0.0291		0.00200	1	11/25/2020 09:19	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:19	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	5.36		0.100	1	11/25/2020 09:19	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:19	WG1581081
Magnesium	2.36		1.00	1	11/25/2020 09:19	WG1581081
Manganese	0.486		0.00500	1	11/25/2020 09:19	WG1581081
Nickel	0.00632		0.00200	1	11/25/2020 09:19	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:19	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:19	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:19	WG1581081
Sodium	2.59		2.00	1	11/25/2020 09:19	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:19	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:19	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:19	WG1581081

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	11/23/2020 23:21	WG1581368
Acrylonitrile	ND		0.0100	1	11/23/2020 23:21	WG1581368
Benzene	ND		0.00100	1	11/23/2020 23:21	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/23/2020 23:21	WG1581368
Bromodichloromethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
Bromoform	ND		0.00100	1	11/23/2020 23:21	WG1581368
Bromomethane	ND	J4	0.00500	1	11/23/2020 23:21	WG1581368
Carbon disulfide	ND		0.00100	1	11/23/2020 23:21	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/23/2020 23:21	WG1581368
Chlorobenzene	ND		0.00100	1	11/23/2020 23:21	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
Chloroethane	ND		0.00500	1	11/23/2020 23:21	WG1581368
Chloroform	ND		0.00500	1	11/23/2020 23:21	WG1581368
Chloromethane	ND		0.00250	1	11/23/2020 23:21	WG1581368
Dibromomethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/23/2020 23:21	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/23/2020 23:21	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/23/2020 23:21	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/23/2020 23:21	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 23:21	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/23/2020 23:21	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 23:21	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 23:21	WG1581368
Ethylbenzene	ND		0.00100	1	11/23/2020 23:21	WG1581368
2-Hexanone	ND		0.0100	1	11/23/2020 23:21	WG1581368
Iodomethane	ND		0.0100	1	11/23/2020 23:21	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/23/2020 23:21	WG1581368
Methylene Chloride	ND		0.00500	1	11/23/2020 23:21	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/23/2020 23:21	WG1581368
Styrene	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
Tetrachloroethene	ND		0.00100	1	11/23/2020 23:21	WG1581368
Toluene	ND		0.00100	1	11/23/2020 23:21	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/23/2020 23:21	WG1581368
Trichloroethene	ND		0.00100	1	11/23/2020 23:21	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/23/2020 23:21	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/23/2020 23:21	WG1581368
Vinyl acetate	ND		0.0100	1	11/23/2020 23:21	WG1581368
Vinyl chloride	ND		0.00100	1	11/23/2020 23:21	WG1581368
Xylenes, Total	ND		0.00300	1	11/23/2020 23:21	WG1581368
(S) Toluene-d8	*98.5*		*80.0-120*		*11/23/2020 23:21*	WG1581368
(S) 4-Bromofluorobenzene	*92.6*		*77.0-126*		*11/23/2020 23:21*	WG1581368
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*11/23/2020 23:21*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 08:19	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 08:19	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	76.2		2.50	1	11/25/2020 09:23	WG1581081

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	12/01/2020 14:40	WG1581424

Sample Narrative:
L1287271-02 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 18:49	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:45	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 00:10	WG1578720
Chloride	18.7		1.00	1	11/19/2020 00:10	WG1578720
Fluoride	0.179		0.150	1	11/19/2020 00:10	WG1578720
Nitrate	0.302		0.100	1	11/19/2020 00:10	WG1578720
Sulfate	61.4		5.00	1	11/19/2020 00:10	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:03	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:46	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.284		0.100	1	11/25/2020 09:23	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:36	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:23	WG1581081
Barium	0.0709		0.0200	1	11/25/2020 09:23	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:23	WG1581081
Cadmium	0.00816		0.00100	1	11/25/2020 09:23	WG1581081
Calcium	19.2		1.00	1	11/25/2020 09:23	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:23	WG1581081
Cobalt	0.00445		0.00200	1	11/25/2020 09:23	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:23	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.172		0.100	1	11/25/2020 09:23	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:23	WG1581081
Magnesium	6.86		1.00	1	11/25/2020 09:23	WG1581081
Manganese	0.545		0.00500	1	11/25/2020 09:23	WG1581081
Nickel	0.00708		0.00200	1	11/25/2020 09:23	WG1581081
Potassium	6.28		2.00	1	11/25/2020 09:23	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:23	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:23	WG1581081
Sodium	7.35		2.00	1	11/25/2020 09:23	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:23	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:23	WG1581081
Zinc	0.0507		0.0250	1	11/25/2020 09:23	WG1581081

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	11/23/2020 23:42	WG1581368
Acrylonitrile	ND		0.0100	1	11/23/2020 23:42	WG1581368
Benzene	ND		0.00100	1	11/23/2020 23:42	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/23/2020 23:42	WG1581368
Bromodichloromethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
Bromoform	ND		0.00100	1	11/23/2020 23:42	WG1581368
Bromomethane	ND	J4	0.00500	1	11/23/2020 23:42	WG1581368
Carbon disulfide	ND		0.00100	1	11/23/2020 23:42	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/23/2020 23:42	WG1581368
Chlorobenzene	ND		0.00100	1	11/23/2020 23:42	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
Chloroethane	ND		0.00500	1	11/23/2020 23:42	WG1581368
Chloroform	ND		0.00500	1	11/23/2020 23:42	WG1581368
Chloromethane	ND		0.00250	1	11/23/2020 23:42	WG1581368
Dibromomethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/23/2020 23:42	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/23/2020 23:42	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/23/2020 23:42	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/23/2020 23:42	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 23:42	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/23/2020 23:42	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 23:42	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 23:42	WG1581368
Ethylbenzene	ND		0.00100	1	11/23/2020 23:42	WG1581368
2-Hexanone	ND		0.0100	1	11/23/2020 23:42	WG1581368
Iodomethane	ND		0.0100	1	11/23/2020 23:42	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/23/2020 23:42	WG1581368
Methylene Chloride	ND		0.00500	1	11/23/2020 23:42	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/23/2020 23:42	WG1581368
Styrene	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
Tetrachloroethene	ND		0.00100	1	11/23/2020 23:42	WG1581368
Toluene	ND		0.00100	1	11/23/2020 23:42	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/23/2020 23:42	WG1581368
Trichloroethene	ND		0.00100	1	11/23/2020 23:42	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/23/2020 23:42	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/23/2020 23:42	WG1581368
Vinyl acetate	ND		0.0100	1	11/23/2020 23:42	WG1581368
Vinyl chloride	ND		0.00100	1	11/23/2020 23:42	WG1581368
Xylenes, Total	ND		0.00300	1	11/23/2020 23:42	WG1581368
(S) Toluene-d8	*94.1*		*80.0-120*		*11/23/2020 23:42*	WG1581368
(S) 4-Bromofluorobenzene	*93.0*		*77.0-126*		*11/23/2020 23:42*	WG1581368
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*11/23/2020 23:42*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 08:32	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 08:32	WG1578880

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	26.7		2.50	1	11/25/2020 09:26	WG1581081

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	12/01/2020 15:48	WG1581424

Sample Narrative:
L1287271-03 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 18:56	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:46	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 00:26	WG1578720
Chloride	9.04		1.00	1	11/19/2020 00:26	WG1578720
Fluoride	ND		0.150	1	11/19/2020 00:26	WG1578720
Nitrate	0.900		0.100	1	11/19/2020 00:26	WG1578720
Sulfate	ND		5.00	1	11/19/2020 00:26	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:05	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:48	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	11/25/2020 09:26	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:40	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:26	WG1581081
Barium	ND		0.0200	1	11/25/2020 09:26	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:26	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:26	WG1581081
Calcium	5.58		1.00	1	11/25/2020 09:26	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:26	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:26	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:26	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	4.94		0.100	1	11/25/2020 09:26	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:26	WG1581081
Magnesium	3.10		1.00	1	11/25/2020 09:26	WG1581081
Manganese	0.0587		0.00500	1	11/25/2020 09:26	WG1581081
Nickel	ND		0.00200	1	11/25/2020 09:26	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:26	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:26	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:26	WG1581081
Sodium	3.94		2.00	1	11/25/2020 09:26	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:26	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:26	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:26	WG1581081

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	11/24/2020 00:02	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 00:02	WG1581368
Benzene	ND		0.00100	1	11/24/2020 00:02	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 00:02	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 00:02	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 00:02	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 00:02	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 00:02	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 00:02	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 00:02	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 00:02	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 00:02	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 00:02	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:02	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 00:02	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 00:02	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:02	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 00:02	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:02	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:02	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 00:02	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 00:02	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 00:02	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 00:02	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 00:02	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 00:02	WG1581368
Styrene	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 00:02	WG1581368
Toluene	ND		0.00100	1	11/24/2020 00:02	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 00:02	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 00:02	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 00:02	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 00:02	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 00:02	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 00:02	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 00:02	WG1581368
(S) Toluene-d8	*98.4*		*80.0-120*		*11/24/2020 00:02*	WG1581368
(S) 4-Bromofluorobenzene	*94.6*		*77.0-126*		*11/24/2020 00:02*	WG1581368
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*11/24/2020 00:02*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 08:44	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 08:44	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	90.6		2.50	1	11/25/2020 09:40	WG1581081

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	12/01/2020 14:47	WG1581424

Sample Narrative:
L1287271-04 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 18:57	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:46	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 00:42	WG1578720
Chloride	74.8		1.00	1	11/19/2020 00:42	WG1578720
Fluoride	ND		0.150	1	11/19/2020 00:42	WG1578720
Nitrate	1.30		0.100	1	11/19/2020 00:42	WG1578720
Sulfate	11.2		5.00	1	11/19/2020 00:42	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:08	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:51	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.344		0.100	1	11/25/2020 09:40	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:43	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:40	WG1581081
Barium	0.0531		0.0200	1	11/25/2020 09:40	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:40	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:40	WG1581081
Calcium	17.2		1.00	1	11/25/2020 09:40	WG1581081
Chromium	0.00391		0.00200	1	11/25/2020 09:40	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:40	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:40	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Iron	0.287		0.100	1	11/25/2020 09:40	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:40	WG1581081
Magnesium	11.5		1.00	1	11/25/2020 09:40	WG1581081
Manganese	0.235		0.00500	1	11/25/2020 09:40	WG1581081
Nickel	0.00714		0.00200	1	11/25/2020 09:40	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:40	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:40	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:40	WG1581081
Sodium	19.8		2.00	1	11/25/2020 09:40	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:40	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:40	WG1581081
Zinc	0.110		0.0250	1	11/25/2020 09:40	WG1581081

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	11/24/2020 00:23	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 00:23	WG1581368
Benzene	ND		0.00100	1	11/24/2020 00:23	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 00:23	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 00:23	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 00:23	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 00:23	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 00:23	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 00:23	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 00:23	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 00:23	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 00:23	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 00:23	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:23	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 00:23	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 00:23	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:23	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 00:23	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:23	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:23	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 00:23	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 00:23	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 00:23	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 00:23	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 00:23	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 00:23	WG1581368
Styrene	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 00:23	WG1581368
Toluene	ND		0.00100	1	11/24/2020 00:23	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 00:23	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 00:23	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 00:23	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 00:23	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 00:23	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 00:23	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 00:23	WG1581368
(S) Toluene-d8	*97.1*		*80.0-120*		*11/24/2020 00:23*	WG1581368
(S) 4-Bromofluorobenzene	*94.8*		*77.0-126*		*11/24/2020 00:23*	WG1581368
(S) 1,2-Dichloroethane-d4	*109*		*70.0-130*		*11/24/2020 00:23*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 08:56	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 08:56	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	44.8		2.50	1	11/25/2020 09:43	WG1581081

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	12/01/2020 14:53	WG1581424

Sample Narrative:
L1287271-05 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 18:59	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:46	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 00:58	WG1578720
Chloride	24.3		1.00	1	11/19/2020 00:58	WG1578720
Fluoride	ND		0.150	1	11/19/2020 00:58	WG1578720
Nitrate	1.72		0.100	1	11/19/2020 00:58	WG1578720
Sulfate	ND		5.00	1	11/19/2020 00:58	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:10	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:54	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.126		0.100	1	11/25/2020 09:43	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:53	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:43	WG1581081
Barium	ND		0.0200	1	11/25/2020 09:43	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:43	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:43	WG1581081
Calcium	12.2		1.00	1	11/25/2020 09:43	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:43	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:43	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:43	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.242		0.100	1	11/25/2020 09:43	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:43	WG1581081
Magnesium	3.47		1.00	1	11/25/2020 09:43	WG1581081
Manganese	0.00552		0.00500	1	11/25/2020 09:43	WG1581081
Nickel	ND		0.00200	1	11/25/2020 09:43	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:43	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:43	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:43	WG1581081
Sodium	3.83		2.00	1	11/25/2020 09:43	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:43	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:43	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:43	WG1581081

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	11/24/2020 00:44	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 00:44	WG1581368
Benzene	ND		0.00100	1	11/24/2020 00:44	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 00:44	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 00:44	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 00:44	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 00:44	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 00:44	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 00:44	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 00:44	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 00:44	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 00:44	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 00:44	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 00:44	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 00:44	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 00:44	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:44	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 00:44	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:44	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 00:44	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 00:44	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 00:44	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 00:44	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 00:44	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 00:44	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 00:44	WG1581368
Styrene	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 00:44	WG1581368
Toluene	ND		0.00100	1	11/24/2020 00:44	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 00:44	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 00:44	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 00:44	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 00:44	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 00:44	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 00:44	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 00:44	WG1581368
(S) Toluene-d8	*103*		*80.0-120*		*11/24/2020 00:44*	WG1581368
(S) 4-Bromofluorobenzene	*96.1*		*77.0-126*		*11/24/2020 00:44*	WG1581368
(S) 1,2-Dichloroethane-d4	*111*		*70.0-130*		*11/24/2020 00:44*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 09:09	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 09:09	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	54.4		2.50	1	11/25/2020 09:46	WG1581081

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	12/01/2020 15:18	WG1581424

Sample Narrative:
L1287271-06 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 19:01	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:46	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 01:46	WG1578720
Chloride	37.6		1.00	1	11/19/2020 01:46	WG1578720
Fluoride	ND		0.150	1	11/19/2020 01:46	WG1578720
Nitrate	0.830		0.100	1	11/19/2020 01:46	WG1578720
Sulfate	ND		5.00	1	11/19/2020 01:46	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:13	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 21:57	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.235		0.100	1	11/25/2020 09:46	WG1581081
Antimony	ND		0.00400	1	11/25/2020 13:57	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:46	WG1581081
Barium	0.0313		0.0200	1	11/25/2020 09:46	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:46	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:46	WG1581081
Calcium	13.6		1.00	1	11/25/2020 09:46	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:46	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:46	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:46	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.153		0.100	1	11/25/2020 09:46	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:46	WG1581081
Magnesium	4.98		1.00	1	11/25/2020 09:46	WG1581081
Manganese	ND		0.00500	1	11/25/2020 09:46	WG1581081
Nickel	ND		0.00200	1	11/25/2020 09:46	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:46	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:46	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:46	WG1581081
Sodium	5.63		2.00	1	11/25/2020 09:46	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:46	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:46	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:46	WG1581081

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	11/24/2020 01:05	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 01:05	WG1581368
Benzene	ND		0.00100	1	11/24/2020 01:05	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 01:05	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 01:05	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 01:05	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 01:05	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 01:05	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 01:05	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 01:05	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 01:05	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 01:05	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 01:05	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:05	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 01:05	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 01:05	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:05	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 01:05	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:05	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:05	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 01:05	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 01:05	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 01:05	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 01:05	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 01:05	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 01:05	WG1581368
Styrene	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 01:05	WG1581368
Toluene	ND		0.00100	1	11/24/2020 01:05	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 01:05	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 01:05	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 01:05	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 01:05	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 01:05	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 01:05	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 01:05	WG1581368
(S) Toluene-d8	*102*		*80.0-120*		*11/24/2020 01:05*	WG1581368
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*11/24/2020 01:05*	WG1581368
(S) 1,2-Dichloroethane-d4	*108*		*70.0-130*		*11/24/2020 01:05*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 09:22	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 09:22	WG1578880

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	81.2		2.50	1	11/25/2020 09:50	WG1581081

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	12/01/2020 15:26	WG1581424

Sample Narrative:
L1287271-07 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 19:02	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:47	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 02:02	WG1578720
Chloride	62.9		1.00	1	11/19/2020 02:02	WG1578720
Fluoride	ND		0.150	1	11/19/2020 02:02	WG1578720
Nitrate	5.35		0.100	1	11/19/2020 02:02	WG1578720
Sulfate	ND		5.00	1	11/19/2020 02:02	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:15	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 22:00	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	11/25/2020 09:50	WG1581081
Antimony	ND		0.00400	1	11/25/2020 14:00	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:50	WG1581081
Barium	0.0454		0.0200	1	11/25/2020 09:50	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:50	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:50	WG1581081
Calcium	21.2		1.00	1	11/25/2020 09:50	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:50	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:50	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:50	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	ND		0.100	1	11/25/2020 09:50	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:50	WG1581081
Magnesium	6.86		1.00	1	11/25/2020 09:50	WG1581081
Manganese	0.00985		0.00500	1	11/25/2020 09:50	WG1581081
Nickel	ND		0.00200	1	11/25/2020 09:50	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:50	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:50	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:50	WG1581081
Sodium	13.7		2.00	1	11/25/2020 09:50	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:50	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:50	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:50	WG1581081

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	11/24/2020 01:25	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 01:25	WG1581368
Benzene	ND		0.00100	1	11/24/2020 01:25	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 01:25	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 01:25	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 01:25	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 01:25	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 01:25	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 01:25	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 01:25	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 01:25	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 01:25	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 01:25	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:25	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 01:25	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 01:25	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:25	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 01:25	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:25	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:25	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 01:25	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 01:25	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 01:25	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 01:25	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 01:25	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 01:25	WG1581368
Styrene	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 01:25	WG1581368
Toluene	ND		0.00100	1	11/24/2020 01:25	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 01:25	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 01:25	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 01:25	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 01:25	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 01:25	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 01:25	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 01:25	WG1581368
(S) Toluene-d8	*95.8*		*80.0-120*		*11/24/2020 01:25*	WG1581368
(S) 4-Bromofluorobenzene	*94.6*		*77.0-126*		*11/24/2020 01:25*	WG1581368
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*11/24/2020 01:25*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 09:34	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 09:34	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	76.5		2.50	1	11/25/2020 09:53	WG1581081

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	12/01/2020 15:32	WG1581424

Sample Narrative:
L1287271-08 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 19:04	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:47	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 02:18	WG1578720
Chloride	18.3		1.00	1	11/19/2020 02:18	WG1578720
Fluoride	0.180		0.150	1	11/19/2020 02:18	WG1578720
Nitrate	0.268	T8	0.100	1	11/19/2020 02:18	WG1578720
Sulfate	61.4		5.00	1	11/19/2020 02:18	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:18	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 22:03	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.339		0.100	1	11/25/2020 09:53	WG1581081
Antimony	ND		0.00400	1	11/25/2020 14:03	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:53	WG1581081
Barium	0.0710		0.0200	1	11/25/2020 09:53	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:53	WG1581081
Cadmium	0.00817		0.00100	1	11/25/2020 09:53	WG1581081
Calcium	19.3		1.00	1	11/25/2020 09:53	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:53	WG1581081
Cobalt	0.00460		0.00200	1	11/25/2020 09:53	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:53	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.187		0.100	1	11/25/2020 09:53	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:53	WG1581081
Magnesium	6.91		1.00	1	11/25/2020 09:53	WG1581081
Manganese	0.549		0.00500	1	11/25/2020 09:53	WG1581081
Nickel	0.00664		0.00200	1	11/25/2020 09:53	WG1581081
Potassium	6.36		2.00	1	11/25/2020 09:53	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:53	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:53	WG1581081
Sodium	7.39		2.00	1	11/25/2020 09:53	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:53	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:53	WG1581081
Zinc	0.0484		0.0250	1	11/25/2020 09:53	WG1581081

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	11/24/2020 01:46	WG1581368
Acrylonitrile	ND		0.0100	1	11/24/2020 01:46	WG1581368
Benzene	ND		0.00100	1	11/24/2020 01:46	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/24/2020 01:46	WG1581368
Bromodichloromethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
Bromoform	ND		0.00100	1	11/24/2020 01:46	WG1581368
Bromomethane	ND	J4	0.00500	1	11/24/2020 01:46	WG1581368
Carbon disulfide	ND		0.00100	1	11/24/2020 01:46	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/24/2020 01:46	WG1581368
Chlorobenzene	ND		0.00100	1	11/24/2020 01:46	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
Chloroethane	ND		0.00500	1	11/24/2020 01:46	WG1581368
Chloroform	ND		0.00500	1	11/24/2020 01:46	WG1581368
Chloromethane	ND		0.00250	1	11/24/2020 01:46	WG1581368
Dibromomethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/24/2020 01:46	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/24/2020 01:46	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/24/2020 01:46	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/24/2020 01:46	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:46	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/24/2020 01:46	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:46	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/24/2020 01:46	WG1581368
Ethylbenzene	ND		0.00100	1	11/24/2020 01:46	WG1581368
2-Hexanone	ND		0.0100	1	11/24/2020 01:46	WG1581368
Iodomethane	ND		0.0100	1	11/24/2020 01:46	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/24/2020 01:46	WG1581368
Methylene Chloride	ND		0.00500	1	11/24/2020 01:46	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/24/2020 01:46	WG1581368
Styrene	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
Tetrachloroethene	ND		0.00100	1	11/24/2020 01:46	WG1581368
Toluene	ND		0.00100	1	11/24/2020 01:46	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368

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

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/24/2020 01:46	WG1581368
Trichloroethene	ND		0.00100	1	11/24/2020 01:46	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/24/2020 01:46	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/24/2020 01:46	WG1581368
Vinyl acetate	ND		0.0100	1	11/24/2020 01:46	WG1581368
Vinyl chloride	ND		0.00100	1	11/24/2020 01:46	WG1581368
Xylenes, Total	ND		0.00300	1	11/24/2020 01:46	WG1581368
(S) Toluene-d8	*103*		*80.0-120*		*11/24/2020 01:46*	WG1581368
(S) 4-Bromofluorobenzene	*93.5*		*77.0-126*		*11/24/2020 01:46*	WG1581368
(S) 1,2-Dichloroethane-d4	*107*		*70.0-130*		*11/24/2020 01:46*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/20/2020 09:47	WG1578880
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/20/2020 09:47	WG1578880

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

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	ND		2.50	1	11/25/2020 09:56	WG1581081

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	12/01/2020 15:55	WG1581424

Sample Narrative:
L1287271-09 WG1581424: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	11/24/2020 19:07	WG1580846

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		20.0	1	11/24/2020 15:47	WG1581678

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	11/19/2020 02:34	WG1578720
Chloride	ND		1.00	1	11/19/2020 02:34	WG1578720
Fluoride	ND		0.150	1	11/19/2020 02:34	WG1578720
Nitrate	ND		0.100	1	11/19/2020 02:34	WG1578720
Sulfate	ND		5.00	1	11/19/2020 02:34	WG1578720

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	11/25/2020 08:20	WG1578876

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	11/25/2020 22:05	WG1581077

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	11/25/2020 09:56	WG1581081
Antimony	ND		0.00400	1	11/25/2020 14:07	WG1582380
Arsenic	ND		0.00200	1	11/25/2020 09:56	WG1581081
Barium	ND		0.0200	1	11/25/2020 09:56	WG1581081
Beryllium	ND		0.00200	1	11/25/2020 09:56	WG1581081
Cadmium	ND		0.00100	1	11/25/2020 09:56	WG1581081
Calcium	ND		1.00	1	11/25/2020 09:56	WG1581081
Chromium	ND		0.00200	1	11/25/2020 09:56	WG1581081
Cobalt	ND		0.00200	1	11/25/2020 09:56	WG1581081
Copper	ND		0.00500	1	11/25/2020 09:56	WG1581081

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	ND		0.100	1	11/25/2020 09:56	WG1581081
Lead	ND		0.00500	1	11/25/2020 09:56	WG1581081
Magnesium	ND		1.00	1	11/25/2020 09:56	WG1581081
Manganese	ND		0.00500	1	11/25/2020 09:56	WG1581081
Nickel	ND		0.00200	1	11/25/2020 09:56	WG1581081
Potassium	ND		2.00	1	11/25/2020 09:56	WG1581081
Selenium	ND		0.00200	1	11/25/2020 09:56	WG1581081
Silver	ND		0.00200	1	11/25/2020 09:56	WG1581081
Sodium	ND		2.00	1	11/25/2020 09:56	WG1581081
Thallium	ND		0.00200	1	11/25/2020 09:56	WG1581081
Vanadium	ND		0.00500	1	11/25/2020 09:56	WG1581081
Zinc	ND		0.0250	1	11/25/2020 09:56	WG1581081

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	11/23/2020 22:19	WG1581368
Acrylonitrile	ND		0.0100	1	11/23/2020 22:19	WG1581368
Benzene	ND		0.00100	1	11/23/2020 22:19	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/23/2020 22:19	WG1581368
Bromodichloromethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
Bromoform	ND		0.00100	1	11/23/2020 22:19	WG1581368
Bromomethane	ND	J4	0.00500	1	11/23/2020 22:19	WG1581368
Carbon disulfide	ND		0.00100	1	11/23/2020 22:19	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/23/2020 22:19	WG1581368
Chlorobenzene	ND		0.00100	1	11/23/2020 22:19	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
Chloroethane	ND		0.00500	1	11/23/2020 22:19	WG1581368
Chloroform	ND		0.00500	1	11/23/2020 22:19	WG1581368
Chloromethane	ND		0.00250	1	11/23/2020 22:19	WG1581368
Dibromomethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/23/2020 22:19	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/23/2020 22:19	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/23/2020 22:19	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/23/2020 22:19	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 22:19	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/23/2020 22:19	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 22:19	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 22:19	WG1581368
Ethylbenzene	ND		0.00100	1	11/23/2020 22:19	WG1581368
2-Hexanone	ND		0.0100	1	11/23/2020 22:19	WG1581368
Iodomethane	ND		0.0100	1	11/23/2020 22:19	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/23/2020 22:19	WG1581368
Methylene Chloride	ND		0.00500	1	11/23/2020 22:19	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/23/2020 22:19	WG1581368
Styrene	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
Tetrachloroethene	ND		0.00100	1	11/23/2020 22:19	WG1581368
Toluene	ND		0.00100	1	11/23/2020 22:19	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	11/23/2020 22:19	WG1581368
Trichloroethene	ND		0.00100	1	11/23/2020 22:19	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/23/2020 22:19	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/23/2020 22:19	WG1581368
Vinyl acetate	ND		0.0100	1	11/23/2020 22:19	WG1581368
Vinyl chloride	ND		0.00100	1	11/23/2020 22:19	WG1581368
Xylenes, Total	ND		0.00300	1	11/23/2020 22:19	WG1581368
(S) Toluene-d8	*104*		*80.0-120*		*11/23/2020 22:19*	WG1581368
(S) 4-Bromofluorobenzene	*97.9*		*77.0-126*		*11/23/2020 22:19*	WG1581368
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*11/23/2020 22:19*	WG1581368

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	11/21/2020 00:39	WG1579623
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	11/21/2020 00:39	WG1579623

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

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	11/23/2020 20:56	WG1581368
Acrylonitrile	ND		0.0100	1	11/23/2020 20:56	WG1581368
Benzene	ND		0.00100	1	11/23/2020 20:56	WG1581368
Bromochloromethane	ND	J4	0.00100	1	11/23/2020 20:56	WG1581368
Bromodichloromethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
Bromoform	ND		0.00100	1	11/23/2020 20:56	WG1581368
Bromomethane	ND	J4	0.00500	1	11/23/2020 20:56	WG1581368
Carbon disulfide	ND		0.00100	1	11/23/2020 20:56	WG1581368
Carbon tetrachloride	ND		0.00100	1	11/23/2020 20:56	WG1581368
Chlorobenzene	ND		0.00100	1	11/23/2020 20:56	WG1581368
Chlorodibromomethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
Chloroethane	ND		0.00500	1	11/23/2020 20:56	WG1581368
Chloroform	ND		0.00500	1	11/23/2020 20:56	WG1581368
Chloromethane	ND		0.00250	1	11/23/2020 20:56	WG1581368
Dibromomethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	11/23/2020 20:56	WG1581368
1,2-Dibromoethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,2-Dichlorobenzene	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,4-Dichlorobenzene	ND		0.00100	1	11/23/2020 20:56	WG1581368
trans-1,4-Dichloro-2-butene	ND		0.00250	1	11/23/2020 20:56	WG1581368
1,1-Dichloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,2-Dichloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,1-Dichloroethene	ND		0.00100	1	11/23/2020 20:56	WG1581368
cis-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 20:56	WG1581368
trans-1,2-Dichloroethene	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,2-Dichloropropane	ND		0.00100	1	11/23/2020 20:56	WG1581368
cis-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 20:56	WG1581368
trans-1,3-Dichloropropene	ND		0.00100	1	11/23/2020 20:56	WG1581368
Ethylbenzene	ND		0.00100	1	11/23/2020 20:56	WG1581368
2-Hexanone	ND		0.0100	1	11/23/2020 20:56	WG1581368
Iodomethane	ND		0.0100	1	11/23/2020 20:56	WG1581368
2-Butanone (MEK)	ND		0.0100	1	11/23/2020 20:56	WG1581368
Methylene Chloride	ND		0.00500	1	11/23/2020 20:56	WG1581368
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	11/23/2020 20:56	WG1581368
Styrene	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,1,1,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,1,2,2-Tetrachloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
Tetrachloroethene	ND		0.00100	1	11/23/2020 20:56	WG1581368
Toluene	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,1,1-Trichloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
1,1,2-Trichloroethane	ND		0.00100	1	11/23/2020 20:56	WG1581368
Trichloroethene	ND		0.00100	1	11/23/2020 20:56	WG1581368
Trichlorofluoromethane	ND		0.00500	1	11/23/2020 20:56	WG1581368
1,2,3-Trichloropropane	ND		0.00250	1	11/23/2020 20:56	WG1581368
Vinyl acetate	ND		0.0100	1	11/23/2020 20:56	WG1581368
Vinyl chloride	ND		0.00100	1	11/23/2020 20:56	WG1581368
Xylenes, Total	ND		0.00300	1	11/23/2020 20:56	WG1581368
(S) Toluene-d8	*105*		*80.0-120*		*11/23/2020 20:56*	WG1581368
(S) 4-Bromofluorobenzene	*99.6*		*77.0-126*		*11/23/2020 20:56*	WG1581368
(S) 1,2-Dichloroethane-d4	*108*		*70.0-130*		*11/23/2020 20:56*	WG1581368

Method Blank (MB)

(MB) R3599205-1 12/01/20 14:23

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	U		8.45	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1287735-22 Original Sample (OS) • Duplicate (DUP)

(OS) L1287735-22 12/01/20 15:00 • (DUP) R3599205-2 12/01/20 15:09

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	154	152	1	1.51		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

L1288554-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1288554-01 12/01/20 18:11 • (DUP) R3599205-4 12/01/20 18:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	79.4	72.4	1	9.23		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3599205-3 12/01/20 15:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	96.2	96.2	90.0-110	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3597161-1 11/24/20 18:34

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.117	0.250

L1287269-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1287269-01 11/24/20 18:42 • (DUP) R3597161-5 11/24/20 18:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	17.0	16.8	5	1.15		10

L1287271-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1287271-09 11/24/20 19:07 • (DUP) R3597161-7 11/24/20 19:09

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

Laboratory Control Sample (LCS)

(LCS) R3597161-2 11/24/20 18:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.86	105	90.0-110	

L1287253-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287253-01 11/24/20 18:37 • (MS) R3597161-3 11/24/20 18:39 • (MSD) R3597161-4 11/24/20 18:41

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 %
Ammonia Nitrogen	5.00	8.74	13.2	13.6	90.0	97.5	1	90.0-110	E	E	2.79	10

L1287271-08 Original Sample (OS) • Matrix Spike (MS)

(OS) L1287271-08 11/24/20 19:04 • (MS) R3597161-6 11/24/20 19:06

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	5.17	103	1	90.0-110	

Method Blank (MB)

(MB) R3597008-1 11/24/20 15:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		11.7	20.0

L1287233-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1287233-07 11/24/20 15:45 • (DUP) R3597008-5 11/24/20 15:45

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

L1287271-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1287271-05 11/24/20 15:46 • (DUP) R3597008-6 11/24/20 15:46

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

Laboratory Control Sample (LCS)

(LCS) R3597008-2 11/24/20 15:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	500	505	101	90.0-110	

L1287230-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287230-15 11/24/20 15:43 • (MS) R3597008-3 11/24/20 15:43 • (MSD) R3597008-4 11/24/20 15:43

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	500	ND	526	520	105	104	1	80.0-120			1.11	20

Method Blank (MB)

(MB) R3595084-1 11/18/20 22:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.353	1.00
Chloride	U		0.379	1.00
Fluoride	U		0.0640	0.150
Nitrate	U		0.0480	0.100
Sulfate	U		0.594	5.00

L1287271-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1287271-09 11/19/20 02:34 • (DUP) R3595084-5 11/19/20 02:49

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	ND	1	0.000		15
Chloride	ND	ND	1	0.000		15
Fluoride	ND	ND	1	0.000		15
Nitrate	ND	ND	1	0.000		15
Sulfate	ND	ND	1	0.000		15

Laboratory Control Sample (LCS)

(LCS) R3595084-2 11/18/20 22:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	40.1	100	80.0-120	
Chloride	40.0	39.2	98.1	80.0-120	
Fluoride	8.00	8.45	106	80.0-120	
Nitrate	8.00	8.14	102	80.0-120	
Sulfate	40.0	40.7	102	80.0-120	

L1287271-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287271-01 11/18/20 23:07 • (MS) R3595084-3 11/18/20 23:23 • (MSD) R3595084-4 11/18/20 23:38

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 %
Bromide	50.0	ND	51.7	52.3	103	105	1	80.0-120			1.10	15
Chloride	50.0	2.48	53.7	54.3	102	104	1	80.0-120			1.02	15
Fluoride	5.00	ND	5.32	5.39	106	108	1	80.0-120			1.35	15
Nitrate	5.00	ND	5.18	5.21	104	104	1	80.0-120			0.662	15
Sulfate	50.0	ND	54.6	55.1	104	105	1	80.0-120			0.936	15

Method Blank (MB)

(MB) R3597298-1 11/25/20 07:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3597298-2 11/25/20 07:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00293	97.7	80.0-120	

L1287233-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287233-01 11/25/20 07:32 • (MS) R3597298-3 11/25/20 07:35 • (MSD) R3597298-4 11/25/20 07:37

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	0.00294	0.00290	98.0	96.7	1	75.0-125			1.37	20

Method Blank (MB)

(MB) R3597769-1 11/25/20 21:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0200	0.200

Laboratory Control Sample (LCS)

(LCS) R3597769-2 11/25/20 21:11

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.968	96.8	80.0-120	

L1287230-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287230-09 11/25/20 21:14 • (MS) R3597769-4 11/25/20 21:20 • (MSD) R3597769-5 11/25/20 21:23

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 %
Boron	1.00	ND	1.06	1.06	99.0	98.4	1	75.0-125			0.511	20

Method Blank (MB)

(MB) R3597272-1 11/25/20 08:57

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.0185	0.100
Arsenic	U		0.000180	0.00200
Barium	U		0.000381	0.0200
Beryllium	U		0.000190	0.00200
Cadmium	U		0.000150	0.00100
Calcium	U		0.0936	1.00
Chromium	U		0.00124	0.00200
Copper	U		0.00151	0.00500
Cobalt	U		0.0000596	0.00200
Iron	U		0.0281	0.100
Lead	U		0.000849	0.00500
Magnesium	U		0.0735	1.00
Manganese	U		0.000704	0.00500
Nickel	U		0.000816	0.00200
Potassium	U		0.108	2.00
Selenium	U		0.000300	0.00200
Silver	U		0.0000700	0.00200
Sodium	U		0.376	2.00
Thallium	U		0.000121	0.00200
Vanadium	U		0.000664	0.00500
Zinc	U		0.00302	0.0250

Laboratory Control Sample (LCS)

(LCS) R3597272-2 11/25/20 09:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum	5.00	4.82	96.5	80.0-120	
Arsenic	0.0500	0.0477	95.4	80.0-120	
Barium	0.0500	0.0479	95.7	80.0-120	
Beryllium	0.0500	0.0480	96.0	80.0-120	
Cadmium	0.0500	0.0511	102	80.0-120	
Calcium	5.00	4.88	97.6	80.0-120	
Chromium	0.0500	0.0502	100	80.0-120	
Copper	0.0500	0.0487	97.4	80.0-120	
Cobalt	0.0500	0.0504	101	80.0-120	
Iron	5.00	4.91	98.2	80.0-120	
Lead	0.0500	0.0483	96.5	80.0-120	
Magnesium	5.00	4.84	96.7	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3597272-2 11/25/20 09:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Manganese	0.0500	0.0496	99.3	80.0-120	
Nickel	0.0500	0.0511	102	80.0-120	
Potassium	5.00	4.68	93.6	80.0-120	
Selenium	0.0500	0.0502	100	80.0-120	
Silver	0.0500	0.0493	98.6	80.0-120	
Sodium	5.00	5.02	100	80.0-120	
Thallium	0.0500	0.0462	92.4	80.0-120	
Vanadium	0.0500	0.0498	99.7	80.0-120	
Zinc	0.500	0.477	95.5	80.0-120	

L1287249-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287249-11 11/25/20 09:03 • (MS) R3597272-4 11/25/20 09:10 • (MSD) R3597272-5 11/25/20 09:13

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.00	5.08	99.4	101	1	75.0-125			1.66	20
Arsenic	0.0500	ND	0.0496	0.0501	99.3	100	1	75.0-125			0.914	20
Barium	0.0500	ND	0.0496	0.0502	98.4	99.5	1	75.0-125			1.11	20
Beryllium	0.0500	ND	0.0481	0.0492	96.1	98.3	1	75.0-125			2.26	20
Cadmium	0.0500	ND	0.0519	0.0534	104	107	1	75.0-125			2.72	20
Calcium	5.00	ND	5.21	5.27	101	102	1	75.0-125			1.14	20
Chromium	0.0500	ND	0.0531	0.0538	106	108	1	75.0-125			1.35	20
Copper	0.0500	ND	0.0491	0.0498	98.3	99.5	1	75.0-125			1.22	20
Cobalt	0.0500	ND	0.0520	0.0535	104	107	1	75.0-125			2.86	20
Potassium	5.00	ND	4.89	5.01	97.7	100	1	75.0-125			2.41	20
Iron	5.00	ND	5.20	5.21	104	104	1	75.0-125			0.205	20
Lead	0.0500	ND	0.0504	0.0513	101	103	1	75.0-125			1.82	20
Magnesium	5.00	ND	4.99	5.08	99.9	102	1	75.0-125			1.77	20
Manganese	0.0500	ND	0.0522	0.0540	103	107	1	75.0-125			3.48	20
Nickel	0.0500	ND	0.0529	0.0538	106	108	1	75.0-125			1.71	20
Selenium	0.0500	ND	0.0512	0.0531	102	106	1	75.0-125			3.64	20
Silver	0.0500	ND	0.0503	0.0517	101	103	1	75.0-125			2.61	20
Sodium	5.00	ND	5.35	5.53	107	111	1	75.0-125			3.33	20
Thallium	0.0500	ND	0.0482	0.0495	96.4	99.0	1	75.0-125			2.60	20
Vanadium	0.0500	ND	0.0518	0.0528	104	106	1	75.0-125			1.89	20
Zinc	0.500	ND	0.500	0.508	100	102	1	75.0-125			1.60	20

Method Blank (MB)

(MB) R3597439-1 11/25/20 13:13

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Antimony	U		0.00103	0.00400

Laboratory Control Sample (LCS)

(LCS) R3597439-2 11/25/20 13:16

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Antimony	0.0500	0.0487	97.4	80.0-120	

L1287282-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1287282-02 11/25/20 13:20 • (MS) R3597439-4 11/25/20 13:26 • (MSD) R3597439-5 11/25/20 13:30

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Antimony	0.0500	ND	0.0497	0.0510	99.4	102	1	75.0-125			2.56	20

Method Blank (MB)

(MB) R3597095-2 11/23/20 20:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0113	0.0500
Acrylonitrile	U		0.000671	0.0100
Benzene	U		0.0000941	0.00100
Bromodichloromethane	U		0.000136	0.00100
Bromochloromethane	U		0.000128	0.00100
Bromoform	U		0.000129	0.00100
Bromomethane	U		0.000605	0.00500
Carbon disulfide	U		0.0000962	0.00100
Carbon tetrachloride	U		0.000128	0.00100
Chlorobenzene	U		0.000116	0.00100
Chlorodibromomethane	U		0.000140	0.00100
Chloroethane	U		0.000192	0.00500
Chloroform	U		0.000111	0.00500
Chloromethane	U		0.000960	0.00250
1,2-Dibromo-3-Chloropropane	U		0.000276	0.00500
1,2-Dibromoethane	U		0.000126	0.00100
Dibromomethane	U		0.000122	0.00100
1,2-Dichlorobenzene	U		0.000107	0.00100
1,4-Dichlorobenzene	U		0.000120	0.00100
trans-1,4-Dichloro-2-butene	U		0.000467	0.00250
1,1-Dichloroethane	U		0.000100	0.00100
1,2-Dichloroethane	U		0.0000819	0.00100
1,1-Dichloroethene	U		0.000188	0.00100
cis-1,2-Dichloroethene	U		0.000126	0.00100
trans-1,2-Dichloroethene	U		0.000149	0.00100
1,2-Dichloropropane	U		0.000149	0.00100
cis-1,3-Dichloropropene	U		0.000111	0.00100
trans-1,3-Dichloropropene	U		0.000118	0.00100
Ethylbenzene	U		0.000137	0.00100
2-Hexanone	U		0.000787	0.0100
Iodomethane	U		0.00600	0.0100
2-Butanone (MEK)	U		0.00119	0.0100
Methylene Chloride	U		0.000430	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.000478	0.0100
Styrene	U		0.000118	0.00100
1,1,1,2-Tetrachloroethane	U		0.000147	0.00100
1,1,2,2-Tetrachloroethane	U		0.000133	0.00100
Tetrachloroethene	U		0.000300	0.00100
Toluene	U		0.000278	0.00100
1,1,1-Trichloroethane	U		0.000149	0.00100

Method Blank (MB)

(MB) R3597095-2 11/23/20 20:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000158	0.00100
Trichloroethene	U		0.000190	0.00100
Trichlorofluoromethane	U		0.000160	0.00500
1,2,3-Trichloropropane	U		0.000237	0.00250
Vinyl acetate	U		0.000692	0.0100
Vinyl chloride	U		0.000234	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	*102*			*80.0-120*
(S) 4-Bromofluorobenzene	*94.1*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*107*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3597095-1 11/23/20 19:54

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	0.0250	0.0264	106	19.0-160	
Acrylonitrile	0.0250	0.0260	104	55.0-149	
Benzene	0.00500	0.00437	87.4	70.0-123	
Bromodichloromethane	0.00500	0.00458	91.6	75.0-120	
Bromochloromethane	0.00500	0.00616	123	76.0-122	J4
Bromoform	0.00500	0.00440	88.0	68.0-132	
Bromomethane	0.00500	0.00830	166	10.0-160	J4
Carbon disulfide	0.00500	0.00436	87.2	61.0-128	
Carbon tetrachloride	0.00500	0.00463	92.6	68.0-126	
Chlorobenzene	0.00500	0.00478	95.6	80.0-121	
Chlorodibromomethane	0.00500	0.00476	95.2	77.0-125	
Chloroethane	0.00500	0.00484	96.8	47.0-150	
Chloroform	0.00500	0.00444	88.8	73.0-120	
Chloromethane	0.00500	0.00294	58.8	41.0-142	
1,2-Dibromo-3-Chloropropane	0.00500	0.00453	90.6	58.0-134	
1,2-Dibromoethane	0.00500	0.00531	106	80.0-122	
Dibromomethane	0.00500	0.00477	95.4	80.0-120	
1,2-Dichlorobenzene	0.00500	0.00475	95.0	79.0-121	
1,4-Dichlorobenzene	0.00500	0.00518	104	79.0-120	
trans-1,4-Dichloro-2-butene	0.00500	0.00562	112	33.0-144	
1,1-Dichloroethane	0.00500	0.00440	88.0	70.0-126	
1,2-Dichloroethane	0.00500	0.00537	107	70.0-128	
1,1-Dichloroethene	0.00500	0.00427	85.4	71.0-124	

Laboratory Control Sample (LCS)

(LCS) R3597095-1 11/23/20 19:54

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
cis-1,2-Dichloroethene	0.00500	0.00436	87.2	73.0-120	
trans-1,2-Dichloroethene	0.00500	0.00423	84.6	73.0-120	
1,2-Dichloropropane	0.00500	0.00451	90.2	77.0-125	
cis-1,3-Dichloropropene	0.00500	0.00453	90.6	80.0-123	
trans-1,3-Dichloropropene	0.00500	0.00470	94.0	78.0-124	
Ethylbenzene	0.00500	0.00453	90.6	79.0-123	
2-Hexanone	0.0250	0.0238	95.2	67.0-149	
Iodomethane	0.0250	0.0318	127	33.0-147	
2-Butanone (MEK)	0.0250	0.0247	98.8	44.0-160	
Methylene Chloride	0.00500	0.00418	83.6	67.0-120	
4-Methyl-2-pentanone (MIBK)	0.0250	0.0239	95.6	68.0-142	
Styrene	0.00500	0.00455	91.0	73.0-130	
1,1,1,2-Tetrachloroethane	0.00500	0.00465	93.0	75.0-125	
1,1,2,2-Tetrachloroethane	0.00500	0.00431	86.2	65.0-130	
Tetrachloroethene	0.00500	0.00572	114	72.0-132	
Toluene	0.00500	0.00446	89.2	79.0-120	
1,1,1-Trichloroethane	0.00500	0.00474	94.8	73.0-124	
1,1,2-Trichloroethane	0.00500	0.00437	87.4	80.0-120	
Trichloroethene	0.00500	0.00503	101	78.0-124	
Trichlorofluoromethane	0.00500	0.00593	119	59.0-147	
1,2,3-Trichloropropane	0.00500	0.00539	108	73.0-130	
Vinyl acetate	0.0250	0.0214	85.6	11.0-160	
Vinyl chloride	0.00500	0.00463	92.6	67.0-131	
Xylenes, Total	0.0150	0.0144	96.0	79.0-123	
(S) Toluene-d8			*97.2*	*80.0-120*	
(S) 4-Bromofluorobenzene			*97.2*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*109*	*70.0-130*	

Method Blank (MB)

(MB) R3595620-1 11/20/20 04:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000536	0.0000200
1,2-Dibromo-3-Chloropropane	U		0.00000748	0.0000200

L1287022-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1287022-02 11/20/20 05:24 • (DUP) R3595620-3 11/20/20 05:12

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

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

(LCS) R3595620-4 11/20/20 07:27 • (LCSD) R3595620-5 11/20/20 10:10

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	0.000253	0.000250	101	100	60.0-140			1.19	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000227	0.000226	90.8	90.4	60.0-140			0.441	20

L1287022-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1287022-03 11/20/20 04:59 • (MS) R3595620-2 11/20/20 04:47

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	0.000104	104	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000930	93.0	1	72.0-148	

Method Blank (MB)

(MB) R3596438-1 11/20/20 22:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000536	0.0000200
1,2-Dibromo-3-Chloropropane	U		0.00000748	0.0000200

L1287754-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1287754-04 11/20/20 23:22 • (DUP) R3596438-3 11/20/20 23:09

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

Laboratory Control Sample (LCS)

(LCS) R3596438-4 11/21/20 01:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ethylene Dibromide	0.000250	0.000276	110	60.0-140	
1,2-Dibromo-3-Chloropropane	0.000250	0.000258	103	60.0-140	

L1287754-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1287754-02 11/20/20 22:58 • (MS) R3596438-2 11/20/20 22:45

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	0.000134	134	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.000118	118	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

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

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J4	The associated batch QC was outside the established quality control range for accuracy.
T8	Sample(s) received past/too close to holding time expiration.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Email To: pcampbell@cecinc.com

Report to: Philip Campbell

Project Description: Former EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: 615-333-7797

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Alex Black / Adrian Davis

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature):

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 ___

Pace Analytical® National Center for Testing & Innovation

U287271

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

D104

Table #

Acctnum: CEC
Template: T133579
Prelogin: P810068
PM: 526 - Chris McCord
PB: 11/13/20 EDD
Shipped Via: Courier

Analysis / Container / Preservative

Pres Chk			0			2				
WetChem 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs										Remarks	Sample # (lab only)
MW-1	G	GW		11/17/20	1015	10	X	X	X	X	X	X	X				-01
MW-3	|	GW		|	1440	10	X	X	X	X	X	X	X				-02
MW-4	|	GW		|	1130	10	X	X	X	X	X	X	X				-03
MW-5	|	GW		|	1315	10	X	X	X	X	X	X	X				-04
TMW-1	|	GW		|	1230	10	X	X	X	X	X	X	X				-05
TMW-2	|	GW		|	1135	10	X	X	X	X	X	X	X				-06
TMW-3	|	GW		|	1015	10	X	X	X	X	X	X	X				-07
DUPLICATE	|	GW		|	—	10	X	X	X	X	X	X	X				-08
FIELD BLANK	|	GW		|	1220	10	X	X	X		X	X	X				-09
~~EQUIPMENT BLANK~~		GW					10	~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~				

* 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
Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).

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: X N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No, HCl / MeoH, TBR	If preservation required by Login: Date/Time
	11/18/20	10:20		2	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.2 °C Bottles Received: 90	
	11-18-20	14:30			
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11/18 Time: 14:30	Hold: Condition: NCF / OK

Civil & Environmental Consultants - TN

117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: Former EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: 615-333-7797

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P.O. #

Collected by (signature):

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

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
TRIP BLANK	—	GW	—	11/17/20	—	1								X				-10

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

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

SDG # L1287271

Table #

Acctnum: CEC

Template: T133579

Prelogin: P810068

PM: 526 - Chris McCord

PB: 11/13/20

Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:**WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier X

Tracking #

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	11/18/20	10:20	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	11.18.20	14:30	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No HCl / MeoH TBR

Temp: 2.2-1-2.4 °C Bottles Received: AJ 513 40

Date: 11/18 Time: 14:30

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 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**	40s Sunny
DATE & TIME	11/17/2020 950	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	A. Baugh / A. Black
TOTAL WELL DEPTH (feet)	30.5	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	22.38	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	8.12	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	1.0	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	22.38	956	15.3	5.94	61.5	49.9	5.63	202.7	13.12
.25	22.48	1000	15.5	5.25	46.5	38.0	2.67	214.0	7.78
.4	22.48	1004	15.4	5.20	44.8	36.6	2.38	214.0	8.49
.75	22.48	1008	15.9	5.17	44.6	36.8	2.04	229.5	6.92
1.0	22.55	1012	16.0	5.28	49.4	40.9	1.67	169.1	7.12

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.0	22.55	1015	16.0	5.28	49.4	40.9	1.67	169.1	7.12

Preservatives Used	See COC	**Sample Charateristics (Odor, Color)**	clear ; odorless
Number of Containers	See CoC	**Sampler Signature**	A Baugh

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	Yes
Lock Condition	good	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good	**Well Clear of Weeds/Accessible?**	Dirt mounded in front of well gate, difficult to open

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	50s Sunny
DATE & TIME	11/17/2020 1045	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	A. Baugh / A. Black
TOTAL WELL DEPTH (feet)	10	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	7.97	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	2.03	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	N

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	7.97	~~1055~~ 1050	17.4	5.86	286.3	244.8	3.54	190.0	3.99
Preservatives Used	N/A			**Sample Charateristics (Odor, Color)**			N/A		
Number of Containers	N/A			**Sampler Signature**			A Baugh		

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	Yes
Lock Condition	good	**Fittings/Well Head Condition**	N/A
Pad/Casing Quality	fair	**Well Clear of Weeds/Accessible?**	Yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	50s Sunny
DATE & TIME	11/17/2020 1330	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Baugh / A. Black
TOTAL WELL DEPTH (feet)	27	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	19.66	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	Yes
WATER COLUMN (feet)	7.34	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	3.9	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	19.66	1334	18.3	5.73	764.0	235.4	4.24	243.3	11.0
.6	20.54	1338	19.3	5.34	315.0	280.0	1.15	232.6	10.5
.85	20.84	1342	19.4	5.43	283.8	252.7	.61	229.5	21.6
1.1	21.15	1346	19.3	5.42	309.1	272.1	.42	231.9	18.2
1.5	21.41	1350	19.3	5.41	329.1	293.4	.37	234.8	13.3
1.8	21.49	1354	19.2	5.38	331.0	294.5	.25	237.1	17.4
2.1	21.80	1358	19.2	5.37	324.4	288.6	.33	239.2	36.1
2.3	21.85	1402	19.2	5.35	314.6	279.8	.49	242.1	25.1
2.4	22.0	1406	19.2	5.35	300.1	266.7	.79	242.6	43.8
2.75	22.0	1410	18.7	5.34	300.1	264.0	.87	243.8	44.4
2.85	21.7	1414	18.7	5.33	295.0	259.2	.98	245.7	33.7
2.95	21.7	1418	18.7	5.33	276.7	243.5	1.62	246.6	30.6

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.9	20.8	1440	18.5	5.31	249.4	218.9	2.37	253.8	14.0
Preservatives Used	See CoC			**Sample Charateristics (Odor, Color)**			Tan color		
Number of Containers	See CoC			**Sampler Signature**			A Baugh		

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes
Lock Condition	good	**Fittings/Well Head Condition**	good
Pad/Casing Quality	fair	**Well Clear of Weeds/Accessible?**	Briars & weeds around well

MW-3 11/17/20 EWS 4220

Gallons	DTW	Time	°C	pH	Sp cond	Cond	DO	ORP	NTU
3.1	21.5	1422	18.5	5.33	267.0	233.9	2.00	242.8	23.0
3.3	21.3	1426	18.6	5.31	260.8	228.6	2.28	250.0	18.1
3.5	21.2	1430	18.6	5.31	257.3	225.1	2.31	251.1	14.8
3.7	21.0	1434	18.5	5.31	252.5	221.1	2.40	252.5	13.3
3.9	20.8	1438	18.5	5.31	249.4	218.9	2.37	253.8	14.0

Sampled @ 1440

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-4
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	50s Sunny
DATE & TIME	11/17/2020 1100	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Baugh / A. Black
TOTAL WELL DEPTH (feet)	23.1	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	11.38	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	11.72	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	2.0	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	11.38	1110	17.0	6.00	845	765	3.71	211.9	168
.75	11.45	1114	17.1	5.88	82.2	69.8	2.67	198.3	94.3
1.0	11.45	1118	17.1	5.84	82.2	69.8	2.77	197.7	22.8
1.5	11.45	1122	17.2	5.82	82.1	69.9	2.70	196.2	14.99
1.75	11.45	1126	17.2	5.78	87.2	70.0	2.65	194.0	10.18
2.0	11.45	1130	17.2	5.75	81.8	69.0	2.60	192.4	4.89

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.0	11.45	1130	17.2	5.75	81.8	69.0	2.60	192.4	4.89

Preservatives Used	See COC	**Sample Charateristics (Odor, Color)**	light orange Suspended solids
Number of Containers	See COC	**Sampler Signature**	A. Baugh

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes
Lock Condition	Good	**Fittings/Well Head Condition**	Good
Pad/Casing Quality	Covered in grass/silt	**Well Clear of Weeds/Accessible?**	Tree down on fence

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-5
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	50s Sunny
DATE & TIME	11/17/2020 1145	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Baugh / A. Black
TOTAL WELL DEPTH (feet)	33.85	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	9.11	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	24.74	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	5.0	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	9.11	1202	17.1	5.42	386.1	327.9	3.30	183.5	62.1
.5	9.63	1206	17.1	5.12	377.1	317.6	1.93	204.1	43.98
.75	9.85	1210	17.1	4.87	361.5	302.0	.58	226.1	38.79
1.25	9.85	1214	17.1	4.77	354.7	301.4	.62	242.3	31.6
1.6	9.9	1218	17.2	4.77	351.0	298.5	.66	248.3	28.6
1.8	9.46	1222	17.1	4.80	349.8	296.1	.70	249.3	22.8
2.0	9.90	1226	17.2	4.85	346.0	294.0	.74	250.4	26.9
2.25	9.90	1230	17.1	9.91	343.4	291.8	.78	249.4	22.4
2.50	9.90	1234	17.1	4.95	342.1	290.7	.83	249.4	19.6
2.75	9.90	1238	17.1	4.96	341.1	289.9	.86	249.6	18.2
3.0	9.90	1242	17.2	4.98	339.5	288.8	.90	249.8	16.3
3.25	9.9	1246	17.2	5.00	337.0	286.4	.97	250.8	15.3

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
5.0	9.90	1315	17.2	5.05	329.0	279.6	1.11	255.2	9.48
Preservatives Used	See COC			**Sample Charateristics (Odor, Color)**			tan odor		
Number of Containers	See COC			**Sampler Signature**			A Baugh		

WELL DATA

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

MW-5 11/17/20 EVS 4220

Gallons	DTW	Time	°C	pH	Sp cond	Cond	DO	ORP	NTU
3.5	9.90	1250	17.1	5.00	334.9	284.1	1.03	252.7	13.7
3.75	9.90	1254	17.1	5.01	333.7	283.1	1.05	252.8	13.1
4.0	9.90	1258	17.1	5.01	333.1	283.0	1.08	254.0	12.7
4.25	9.90	1302	17.1	5.02	331.1	281.1	1.12	254.0	12.1
4.5	9.90	1306	17.1	5.02	330.5	280.8	1.13	255.4	11.4
4.75	9.90	1310	17.1	5.04	329.2	279.6	1.11	255.6	9.81
5.0	9.90	1314	17.2	5.05	329.0	279.6	1.11	256.2	9.48

Sampled @
1315

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	TMW-1
LOCATION	Camden, TN	TEMPERATURE & WEATHER	60s, Sunny
DATE & TIME	11/17/20 1150	EVENT FREQUENCY	Quarterly
PURGE METHOD	Low-flow	FIELD REPRESENTATIVE	A. Black
TOTAL WELL DEPTH (feet)	32.50	SAMPLING EQUIPMENT	Bladder Pump
DEPTH TO WATER (feet)	6.76	IS SAMPLE EQUIPMENT DEDICATED?	Yes
CASING DIAMETER (Inches)	2	DUPLICATE COLLECTED?	N
WATER COLUMN (feet)	25.74	FIELD BLANK COLLECTED?	Y 1220
PURGE VOLUME (gallons)	1.75	EQUIPMENT BLANK COLLECTED?	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	6.76	1155	16.6	5.69	129.3	108.6	5.51	404.4	69.3
0.5	9.16	1205	16.6	5.31	127.1	115.0	4.06	406.7	35.1
1.1	9.29	1215	16.6	5.20	137.4	115.4	3.97	407.7	16.6
1.75	9.37	1225	16.7	5.30	136.5	114.9	3.88	405.1	8.57

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.75	9.37	1230	16.7	5.30	136.5	114.9	3.88	405.1	8.57

Preservatives Used	See COC	Sample Charateristics (Odor, Color)	Clear
Number of Containers	10	Sampler Signature	

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	Yes
Lock Condition	No lock	Fittings/Well Head Condition	good
Pad/Casing Quality	No pad / casing good	Well Clear of Weeds/Accessible?	Fair

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 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**	60s, sunny
DATE & TIME	11/17/20 1035	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Mack
TOTAL WELL DEPTH (feet)	27.50	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	11.25	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	16.25	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	2.25	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	11.25	1040	16.6	5.70	84.8	71.5	7.46	370.7	8.81
0.5	13.17	1050	16.4	5.45	160.4	133.7	8.73	389.7	28.6
0.9	13.24	1100	16.2	5.52	161.3	134.6	8.94	401.2	52.8
1.25	13.24	1110	16.2	5.48	164.9	137.1	9.09	405.3	22.9
1.75	13.24	1120	16.3	5.54	167.6	139.5	9.22	405.5	14.8
2.25	13.24	1130	16.2	5.54	169.1	141.0	9.26	408.4	8.49

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.25	13.24	1135	16.2	5.54	169.1	141.0	9.26	408.4	8.49
Preservatives Used	See COC			**Sample Charateristics (Odor, Color)**			Clear		
Number of Containers	10			**Sampler Signature**			[signature]		

WELL DATA

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

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	60s, Sunny
DATE & TIME	11/17/20 0925	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Black
TOTAL WELL DEPTH (feet)	28.00	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	9.70	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	18.30	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	2.25	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	9.70	0942	16.3	4.92	333.2	277.1	1.65	406.3	306
1.0	10.77	0952	16.3	5.13	294.4	245.3	1.47	354.5	31.6
1.7	10.89	1002	16.4	5.08	291.5	242.9	1.35	352.1	12.1
2.25	10.92	1012	16.3	5.06	290.0	241.6	1.33	355.2	4.53

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.25	10.92	1015	16.3	5.06	290.0	241.6	1.33	355.2	4.53

Preservatives Used	See CoC	**Sample Charateristics (Odor, Color)**	Clear
Number of Containers	10	**Sampler Signature**	

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes / casing broken
Lock Condition	Good	**Fittings/Well Head Condition**	fair
Pad/Casing Quality	No pad / casing (PVC) broken at ground level	**Well Clear of Weeds/Accessible?**	Fair

* DTW Measurements taken at top of casing even though broken at ground.

EQUIPMENT CALIBRATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	A. Black	
LOCATION	EVS Landfill	
DATE AND TIME	11/16/20 0800	
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus / HACH 2100Q	
Equipment Serial #	YSI #3 / HACH #7	

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	2/21	4.00	102.9	160 to 180	N	3.99	Y
7	9/24	7.02	-64.0	+/-50	Y	7.04	Y
10	12/24	10.04	-229.8	-160 to -180	N	10.03	Y

Temperature Calibration Check

Cert. Thermometer Value (deg C)	Meter Value (deg C)
21.6	21.0

DO Calibration

Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
770.8	769.3	99.6	101.2	Y

Specific Conductivity Calibration

Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)
~~1314~~ 1413	9/21	1371	1413

ORP Calibration

ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
220	7/21	236.9	237.0

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

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EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	A. Black	
LOCATION	EWS CF	
DATE AND TIME	11/16/20 1430	
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro. DDS	
Equipment Serial #	YSI PRO #1	

pH Calibration							
pH buffer Callbration 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	2/21	4.00	154.5	160 to 180	N	4.03	Y
7	2/24	7.01	-18.3	+/-50	Y	7.05	Y
10	12/24	10.03	-187.6	-160 to -180	N	10.02	Y

Temperature Calibration Check	
Cert. Thermometer Value (deg C)	Meter Value (deg C)
22.4	22.2

DO Calibration				
Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
769.1	748.6	98.5	98.4	Y

Specific Conductivity Calibration				ORP Calibration			
Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)	ORP Callbration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
1413	9/21	1376	1377	220	3/21	227.0	227.2

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				

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 16, 2020

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1294741
Samples Received:	12/09/2020
Project Number:	181-364
Description:	Former EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 117 Seaboard Ln. Suite E100 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

TABLE OF CONTENTS

MW-3 L1294741-01 GW

Collected by: Philip Campbell
Collected date/time: 12/08/20 17:10
Received date/time: 12/09/20 15:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020A	WG1590984	1	12/12/20 19:24	12/13/20 19:20	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1591268	1	12/14/20 22:50	12/15/20 14:18	LAT	Mt. Juliet, TN

DUPLICATE L1294741-02 GW

Collected by: Philip Campbell
Collected date/time: 12/08/20 00:00
Received date/time: 12/09/20 15:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020A	WG1591268	1	12/14/20 22:50	12/15/20 14:22	LAT	Mt. Juliet, TN

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

Chris McCord
Project Manager

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Cadmium	0.00906		0.00100	1	12/15/2020 14:18	WG1591268
Cadmium,Dissolved	0.00789		0.00100	1	12/13/2020 19:20	WG1590984

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Cadmium	0.00901		0.00100	1	12/15/2020 14:22	WG1591268

Method Blank (MB)

(MB) R3603064-1 12/13/20 18:26

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Cadmium,Dissolved	U		0.000150	0.00100

Laboratory Control Sample (LCS)

(LCS) R3603064-2 12/13/20 18:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Cadmium,Dissolved	0.0500	0.0449	89.8	80.0-120	

L1293901-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1293901-02 12/13/20 18:33 • (MS) R3603064-4 12/13/20 18:39 • (MSD) R3603064-5 12/13/20 18:43

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cadmium,Dissolved	0.0500	ND	0.0451	0.0451	90.3	90.2	1	75.0-125			0.113	20

Method Blank (MB)

(MB) R3603705-1 12/15/20 12:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Cadmium	U		0.000150	0.00100

Laboratory Control Sample (LCS)

(LCS) R3603705-2 12/15/20 12:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Cadmium	0.0500	0.0507	101	80.0-120	

L1294669-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294669-10 12/15/20 12:18 • (MS) R3603705-4 12/15/20 12:25 • (MSD) R3603705-5 12/15/20 12:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cadmium	0.0500	ND	0.0517	0.0516	103	102	1	75.0-125			0.110	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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

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, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
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]	KY90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-20-18
Maine	TN00003	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	998093910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

117 Seaboard Ln., Ste. E-100

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Report to: ~~Keri Clayton~~ Philip Campbell

Email To: ~~kclayton@cecinc.com~~ pcampbell@cecinc.com

Project Description: Former EWS Camden Class II LF

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

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

Client Project # ~~171873~~ 181-364

Lab Project # ~~CEC-171873~~ CEC-181364

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 X Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Chain of Custody Page 1 of 1

Pace Analytical® National Center for Testing & Innovation

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

SDG # 129474

J133

Acctnum: CEC

Template: ~~T125643~~ T33579

Prelogin: ~~P752585~~ P816068

PM: 526 - Chris McCord

PB: BF 1/27/20

Shipped Via: FedEX Ground

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	CDDG 250mlHDPE-NoPres Dissolved Cadmium	CDG 250mlHDPE-HNO3 - Method 6020 Total Cadmium	Pres Chk	Remarks	Sample # (lab only)
~~MW-1~~ ~~12-8-20~~	~~Grab~~	~~WW~~				2	X	X			
MW-3	Grab	GW	-	12-8-20	1710	2	X	X			-01
Duplicate	Grab	GW	-	12-8-20	-	1		X			-02

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

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
RAD Screen <0.5 mR/hr:		✓ Y ___ N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip Campbell	12-9-20	12:15	AM	A2XH
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.1 °C Bottles Received: 3
AM	12-9-20	15:05		
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 12/9/20 Time: 1505

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 · 800-763-2326 · www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	cloudy, 48°F
DATE & TIME	12-8-20 / 16:00	**EVENT FREQUENCY**	Quarterly - RE-sample mw-3-dd.
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	Phillip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	19.55	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	Yes
WATER COLUMN (feet)	7.45	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1 vol = 1.22 gallons 3.95 total purged	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	19.87	16:21	17.8	4.81	332.7	286.9	1.84	253.7	40.7
0.5	19.95	16:26	17.9	4.94	330.6	285.6	1.45	234.4	15.4
1.0	20.56	16:31	18.3	4.98	312.7	272.4	1.14	221.2	20.2
1.25	20.65	16:36	17.6	5.00	305.0	262.3	1.12	214.1	34.2
1.75	20.65	16:41	18.0	5.00	311.3	269.7	1.13	207.4	25.9
2.15	20.65	16:46	17.9	5.02	303.6	262.4	1.03	202.8	18.7
2.50	20.65	16:51	17.9	5.02	303.6	261.9	1.00	200.5	16.1
2.90	20.65	16:56	17.9	5.03	301.8	260.8	0.99	197.2	13.7
3.25	20.65	17:01	17.9	5.04	300.8	259.7	0.97	194.6	11.3
3.65	20.65	17:06	17.9	5.04	300.3	259.6	0.95	193.3	12.2
3.95	20.65	17:10	17.9	5.04	300.1	259.5	0.95	193.2	10.8

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.95	20.65	17:10	17.9	5.04	300.1	259.5	0.95	193.2	10.8

Preservatives Used	HNO_3	**Sample Charateristics (Odor, Color)**	Clear, No odor
Number of Containers	1	**Sampler Signature**	Phil P. Campbell

* ↓ 11.2 NTU after sample collection.

WELL DATA

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

EQUIPMENT CALIBRATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	Philip Campbell
LOCATION	Former EWS LF
DATE AND TIME	12-7-20 / 16:00
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus
Equipment Serial #	3

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	09/21	4.05	173	160 to 180	Y	4.00	yes
7	10/21	7.04	-25	+/-50	Y	7.01	yes
10	10/21	9.96	-178	-160 to -180	Y	10.0	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?

Specific Conductivity Calibration

Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)
~~1413~~ 1413	09/21	1425	1413

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				

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 21, 2020

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1294865
Samples Received:	12/10/2020
Project Number:	181-364
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 117 Seaboard Ln. Suite E100 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

TABLE OF CONTENTS

IWC-L L1294865-01 GW

Collected by: Brad Curtis
Collected date/time: 12/09/20 11:00
Received date/time: 12/10/20 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1591268	1	12/15/20 16:21	12/15/20 16:21	LD	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1592801	1	12/16/20 16:57	12/16/20 16:57	SL	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1593084	500	12/17/20 12:37	12/17/20 12:37	JER	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1593237	20	12/17/20 04:10	12/17/20 08:39	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1589818	100	12/11/20 04:33	12/11/20 04:33	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1589818	1000	12/11/20 04:46	12/11/20 04:46	ELN	Mt. Juliet, TN
Mercury by Method 7470A	WG1589920	1	12/17/20 10:01	12/18/20 12:08	ABL	Mt. Juliet, TN
Mercury by Method 7470A	WG1592748	1	12/17/20 09:53	12/18/20 08:52	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1591702	5	12/15/20 22:51	12/16/20 22:36	EL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1592071	5	12/16/20 00:15	12/16/20 20:58	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1591268	5	12/14/20 22:50	12/15/20 14:35	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1591268	50	12/14/20 22:50	12/15/20 16:21	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1593523	50	12/17/20 13:05	12/17/20 20:29	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1593815	5	12/18/20 11:07	12/18/20 11:07	ADM	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1590328	1	12/11/20 08:48	12/12/20 04:56	MTJ	Mt. Juliet, TN

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

Chris McCord
Project Manager

Additional Information

Analyte	Result	Units
pH (On Site)	3.7	su

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	41400		125	1	12/15/2020 16:21	WG1591268

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	12/16/2020 16:57	WG1592801

Sample Narrative:

L1294865-01 WG1592801: 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	1760		125	500	12/17/2020 12:37	WG1593084

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	11000		400	20	12/17/2020 08:39	WG1593237

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		100	100	12/11/2020 04:33	WG1589818
Chloride	88900		1000	1000	12/11/2020 04:46	WG1589818
Fluoride	ND		15.0	100	12/11/2020 04:33	WG1589818
Nitrate	ND		10.0	100	12/11/2020 04:33	WG1589818
Sulfate	609		500	100	12/11/2020 04:33	WG1589818

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/18/2020 12:08	WG1589920
Mercury,Dissolved	0.000258		0.000200	1	12/18/2020 08:52	WG1592748

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		1.00	5	12/16/2020 20:58	WG1592071
Boron,Dissolved	ND		1.00	5	12/16/2020 22:36	WG1591702

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	360		0.500	5	12/15/2020 14:35	WG1591268
Aluminum,Dissolved	356		5.00	50	12/17/2020 20:29	WG1593523
Antimony	ND		0.200	50	12/15/2020 16:21	WG1591268
Antimony,Dissolved	ND		0.200	50	12/17/2020 20:29	WG1593523
Arsenic	0.306		0.100	50	12/15/2020 16:21	WG1591268
Arsenic,Dissolved	0.224		0.100	50	12/17/2020 20:29	WG1593523
Barium	2.81		1.00	50	12/15/2020 16:21	WG1591268
Barium,Dissolved	2.98		1.00	50	12/17/2020 20:29	WG1593523
Beryllium	ND		0.100	50	12/15/2020 16:21	WG1591268
Beryllium,Dissolved	ND		0.100	50	12/17/2020 20:29	WG1593523
Cadmium	18.8		0.00500	5	12/15/2020 14:35	WG1591268
Cadmium,Dissolved	19.4		0.0500	50	12/17/2020 20:29	WG1593523
Calcium	14300		50.0	50	12/15/2020 16:21	WG1591268
Calcium,Dissolved	14600		50.0	50	12/17/2020 20:29	WG1593523
Chromium	ND		0.100	50	12/15/2020 16:21	WG1591268
Chromium,Dissolved	ND		0.100	50	12/17/2020 20:29	WG1593523
Cobalt	0.472		0.100	50	12/15/2020 16:21	WG1591268
Cobalt,Dissolved	0.478		0.100	50	12/17/2020 20:29	WG1593523
Copper	1.21		0.0250	5	12/15/2020 14:35	WG1591268
Copper,Dissolved	1.97		0.250	50	12/17/2020 20:29	WG1593523
Iron	452		5.00	50	12/15/2020 16:21	WG1591268
Iron,Dissolved	459		5.00	50	12/17/2020 20:29	WG1593523
Lead	0.785		0.250	50	12/15/2020 16:21	WG1591268
Lead,Dissolved	0.798		0.250	50	12/17/2020 20:29	WG1593523
Magnesium	1380		50.0	50	12/15/2020 16:21	WG1591268
Magnesium,Dissolved	1280		50.0	50	12/17/2020 20:29	WG1593523
Manganese	43.0		0.250	50	12/15/2020 16:21	WG1591268
Manganese,Dissolved	49.4		0.250	50	12/17/2020 20:29	WG1593523
Nickel	0.691		0.100	50	12/15/2020 16:21	WG1591268
Nickel,Dissolved	0.647		0.100	50	12/17/2020 20:29	WG1593523
Potassium	14100		100	50	12/15/2020 16:21	WG1591268
Potassium,Dissolved	14200		100	50	12/17/2020 20:29	WG1593523
Selenium	0.568		0.100	50	12/15/2020 16:21	WG1591268
Selenium,Dissolved	0.195		0.100	50	12/17/2020 20:29	WG1593523
Silver	ND		0.100	50	12/15/2020 16:21	WG1591268
Silver,Dissolved	ND		0.100	50	12/17/2020 20:29	WG1593523
Sodium	23800		100	50	12/15/2020 16:21	WG1591268
Sodium,Dissolved	22200		100	50	12/17/2020 20:29	WG1593523
Thallium	ND		0.100	50	12/15/2020 16:21	WG1591268
Thallium,Dissolved	ND		0.100	50	12/17/2020 20:29	WG1593523
Vanadium	ND		0.250	50	12/15/2020 16:21	WG1591268
Vanadium,Dissolved	ND		0.250	50	12/17/2020 20:29	WG1593523
Zinc	190		1.25	50	12/15/2020 16:21	WG1591268
Zinc,Dissolved	201		1.25	50	12/17/2020 20:29	WG1593523

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	2.35		0.250	5	12/18/2020 11:07	WG1593815
Acrylonitrile	ND		0.0500	5	12/18/2020 11:07	WG1593815
Benzene	ND		0.00500	5	12/18/2020 11:07	WG1593815
Bromochloromethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
Bromodichloromethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
Bromoform	ND		0.00500	5	12/18/2020 11:07	WG1593815
Bromomethane	ND		0.0250	5	12/18/2020 11:07	WG1593815
Carbon disulfide	ND		0.00500	5	12/18/2020 11:07	WG1593815

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Carbon tetrachloride	ND		0.00500	5	12/18/2020 11:07	WG1593815
Chlorobenzene	ND		0.00500	5	12/18/2020 11:07	WG1593815
Chlorodibromomethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
Chloroethane	ND		0.0250	5	12/18/2020 11:07	WG1593815
Chloroform	ND		0.0250	5	12/18/2020 11:07	WG1593815
Chloromethane	ND		0.0125	5	12/18/2020 11:07	WG1593815
Dibromomethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,2-Dibromo-3-Chloropropane	ND		0.0250	5	12/18/2020 11:07	WG1593815
1,2-Dibromoethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,2-Dichlorobenzene	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,4-Dichlorobenzene	ND		0.00500	5	12/18/2020 11:07	WG1593815
trans-1,4-Dichloro-2-butene	ND		0.0125	5	12/18/2020 11:07	WG1593815
1,1-Dichloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,2-Dichloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,1-Dichloroethene	ND		0.00500	5	12/18/2020 11:07	WG1593815
cis-1,2-Dichloroethene	ND		0.00500	5	12/18/2020 11:07	WG1593815
trans-1,2-Dichloroethene	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,2-Dichloropropane	ND		0.00500	5	12/18/2020 11:07	WG1593815
cis-1,3-Dichloropropene	ND		0.00500	5	12/18/2020 11:07	WG1593815
trans-1,3-Dichloropropene	ND		0.00500	5	12/18/2020 11:07	WG1593815
Ethylbenzene	ND		0.00500	5	12/18/2020 11:07	WG1593815
2-Hexanone	ND		0.0500	5	12/18/2020 11:07	WG1593815
Iodomethane	ND		0.0500	5	12/18/2020 11:07	WG1593815
2-Butanone (MEK)	0.269		0.0500	5	12/18/2020 11:07	WG1593815
Methylene Chloride	ND		0.0250	5	12/18/2020 11:07	WG1593815
4-Methyl-2-pentanone (MIBK)	ND		0.0500	5	12/18/2020 11:07	WG1593815
Styrene	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,1,1,2-Tetrachloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,1,2,2-Tetrachloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
Tetrachloroethene	ND		0.00500	5	12/18/2020 11:07	WG1593815
Toluene	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,1,1-Trichloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
1,1,2-Trichloroethane	ND		0.00500	5	12/18/2020 11:07	WG1593815
Trichloroethene	ND		0.00500	5	12/18/2020 11:07	WG1593815
Trichlorofluoromethane	ND		0.0250	5	12/18/2020 11:07	WG1593815
1,2,3-Trichloropropane	ND		0.0125	5	12/18/2020 11:07	WG1593815
Vinyl acetate	ND		0.0500	5	12/18/2020 11:07	WG1593815
Vinyl chloride	ND		0.00500	5	12/18/2020 11:07	WG1593815
Xylenes, Total	ND		0.0150	5	12/18/2020 11:07	WG1593815
(S) Toluene-d8	*108*		*80.0-120*		*12/18/2020 11:07*	WG1593815
(S) 4-Bromofluorobenzene	*96.6*		*77.0-126*		*12/18/2020 11:07*	WG1593815
(S) 1,2-Dichloroethane-d4	*118*		*70.0-130*		*12/18/2020 11:07*	WG1593815

Sample Narrative:

L1294865-01 WG1593815: Dilution due to foam.

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000200	1	12/12/2020 04:56	WG1590328
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/12/2020 04:56	WG1590328

Method Blank (MB)

(MB) R3604429-1 12/16/20 16:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	U		8.45	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1294857-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1294857-01 12/16/20 16:24 • (DUP) R3604429-2 12/16/20 16:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	239	241	1	0.577		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L1295990-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1295990-04 12/16/20 21:01 • (DUP) R3604429-5 12/16/20 21:07

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	41.7	34.2	1	19.6		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3604429-3 12/16/20 18:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	102	102	90.0-110	

Sample Narrative:

LCS: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3604429-4 12/16/20 18:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	102	102	90.0-110	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3604733-1 12/17/20 12:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.117	0.250

L1294907-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1294907-01 12/17/20 12:39 • (DUP) R3604733-5 12/17/20 12:41

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.483	0.477	1	1.25		10

L1294996-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1294996-02 12/17/20 13:19 • (DUP) R3604733-7 12/17/20 13:21

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

Laboratory Control Sample (LCS)

(LCS) R3604733-2 12/17/20 12:29

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.05	94.0	90.0-110	

L1294844-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294844-01 12/17/20 12:30 • (MS) R3604733-3 12/17/20 12:32 • (MSD) R3604733-4 12/17/20 12:34

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	5.00	0.557	6.15	5.75	112	104	1	90.0-110	J5		6.82	10

L1294993-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1294993-01 12/17/20 13:16 • (MS) R3604733-6 12/17/20 13:17

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	5.47	105	1	90.0-110	

Method Blank (MB)

(MB) R3604425-1 12/17/20 08:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		11.7	20.0

L1294739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1294739-01 12/17/20 08:36 • (DUP) R3604425-3 12/17/20 08:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	31.9	28.1	1	12.6		20

L1295243-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1295243-01 12/17/20 08:42 • (DUP) R3604425-6 12/17/20 08:42

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	29.8	30.2	1	1.31		20

Laboratory Control Sample (LCS)

(LCS) R3604425-2 12/17/20 08:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	500	502	100	90.0-110	

L1294895-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294895-01 12/17/20 08:39 • (MS) R3604425-4 12/17/20 08:39 • (MSD) R3604425-5 12/17/20 08:40

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 %
COD	500	22.7	532	529	102	101	1	80.0-120			0.536	20

Method Blank (MB)

(MB) R3604134-1 12/10/20 22:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	0.513	J	0.353	1.00
Chloride	U		0.379	1.00
Fluoride	U		0.0640	0.150
Nitrate	U		0.0480	0.100
Sulfate	U		0.594	5.00

L1294846-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1294846-03 12/11/20 01:21 • (DUP) R3604134-5 12/11/20 01:34

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	ND	1	0.0656		15
Fluoride	0.248	0.249	1	0.363		15
Nitrate	1.07	1.07	1	0.757		15
Sulfate	30.9	31.0	1	0.509		15

L1294918-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1294918-01 12/11/20 06:41 • (DUP) R3604134-6 12/11/20 06:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	ND	1	0.0585		15
Chloride	4.62	4.59	1	0.572		15
Fluoride	ND	ND	1	0.000		15
Nitrate	0.985	0.986	1	0.0203		15
Sulfate	12.4	11.6	1	6.48		15

Laboratory Control Sample (LCS)

(LCS) R3604134-2 12/10/20 23:01

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	39.6	99.0	80.0-120	
Chloride	40.0	39.4	98.6	80.0-120	
Fluoride	8.00	8.31	104	80.0-120	
Nitrate	8.00	8.16	102	80.0-120	
Sulfate	40.0	40.3	101	80.0-120	

L1294846-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294846-05 12/11/20 00:05 • (MS) R3604134-3 12/11/20 00:18 • (MSD) R3604134-4 12/11/20 00:30

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	50.3	28.3	99.5	55.5	1	80.0-120		J3 J6	55.9	15
Chloride	50.0	114	159	91.4	90.5	0.000	1	80.0-120	E	J3 J6	54.3	15
Fluoride	5.00	0.165	5.30	2.90	103	54.7	1	80.0-120		J3 J6	58.5	15
Nitrate	5.00	ND	5.05	2.77	101	55.4	1	80.0-120		J3 J6	58.4	15
Sulfate	50.0	6.17	58.3	33.5	104	54.6	1	80.0-120		J3 J6	54.1	15

L1294918-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1294918-03 12/11/20 07:19 • (MS) R3604134-7 12/11/20 07:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	49.6	98.1	1	80.0-120	
Chloride	50.0	5.33	57.1	104	1	80.0-120	
Fluoride	5.00	ND	5.15	100	1	80.0-120	
Nitrate	5.00	ND	5.06	101	1	80.0-120	
Sulfate	50.0	270	308	77.6	1	80.0-120	E V

Method Blank (MB)

(MB) R3605116-1 12/18/20 11:23

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3605116-2 12/18/20 11:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00343	114	80.0-120	

L1294918-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294918-03 12/18/20 11:27 • (MS) R3605116-3 12/18/20 11:35 • (MSD) R3605116-4 12/18/20 11:37

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	0.00333	0.00339	111	113	1	75.0-125			1.60	20

Method Blank (MB)

(MB) R3604992-1 12/18/20 08:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3604992-2 12/18/20 08:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury,Dissolved	0.00300	0.00317	106	80.0-120	

L1295639-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1295639-11 12/18/20 08:46 • (MS) R3604992-3 12/18/20 08:48 • (MSD) R3604992-4 12/18/20 08:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00311	0.00293	104	97.5	1	75.0-125			6.20	20

Method Blank (MB)

(MB) R3604370-1 12/16/20 16:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron,Dissolved	U		0.0200	0.200

Laboratory Control Sample (LCS)

(LCS) R3604370-2 12/16/20 16:11

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron,Dissolved	1.00	0.941	94.1	80.0-120	

L1295299-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1295299-03 12/16/20 16:14 • (MS) R3604370-4 12/16/20 16:19 • (MSD) R3604370-5 12/16/20 16:21

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	1.00	0.986	96.9	95.0	1	75.0-125			1.92	20

Method Blank (MB)

(MB) R3604372-1 12/16/20 20:16

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0200	0.200

Laboratory Control Sample (LCS)

(LCS) R3604372-2 12/16/20 20:18

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.932	93.2	80.0-120	

L1294897-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294897-01 12/16/20 20:21 • (MS) R3604372-4 12/16/20 20:26 • (MSD) R3604372-5 12/16/20 20:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.943	0.945	94.3	94.5	1	75.0-125			0.228	20

Method Blank (MB)

(MB) R3603705-1 12/15/20 12:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.0185	0.100
Antimony	U		0.00103	0.00400
Arsenic	U		0.000180	0.00200
Barium	U		0.000381	0.0200
Beryllium	U		0.000190	0.00200
Cadmium	U		0.000150	0.00100
Calcium	U		0.0936	1.00
Chromium	U		0.00124	0.00200
Copper	U		0.00151	0.00500
Cobalt	U		0.0000596	0.00200
Iron	U		0.0281	0.100
Lead	U		0.000849	0.00500
Magnesium	U		0.0735	1.00
Manganese	U		0.000704	0.00500
Nickel	U		0.000816	0.00200
Potassium	U		0.108	2.00
Selenium	U		0.000300	0.00200
Silver	U		0.0000700	0.00200
Sodium	U		0.376	2.00
Thallium	0.000198	J	0.000121	0.00200
Vanadium	U		0.000664	0.00500
Zinc	U		0.00302	0.0250

Laboratory Control Sample (LCS)

(LCS) R3603705-2 12/15/20 12:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum	5.00	4.94	98.8	80.0-120	
Antimony	0.0500	0.0500	100	80.0-120	
Arsenic	0.0500	0.0481	96.2	80.0-120	
Barium	0.0500	0.0487	97.4	80.0-120	
Beryllium	0.0500	0.0458	91.7	80.0-120	
Cadmium	0.0500	0.0507	101	80.0-120	
Calcium	5.00	4.95	99.0	80.0-120	
Chromium	0.0500	0.0509	102	80.0-120	
Copper	0.0500	0.0485	97.1	80.0-120	
Cobalt	0.0500	0.0505	101	80.0-120	
Iron	5.00	4.95	99.1	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3603705-2 12/15/20 12:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	0.0500	0.0475	95.1	80.0-120	
Magnesium	5.00	5.01	100	80.0-120	
Manganese	0.0500	0.0505	101	80.0-120	
Nickel	0.0500	0.0505	101	80.0-120	
Potassium	5.00	5.01	100	80.0-120	
Selenium	0.0500	0.0495	99.0	80.0-120	
Silver	0.0500	0.0504	101	80.0-120	
Sodium	5.00	5.04	101	80.0-120	
Thallium	0.0500	0.0472	94.3	80.0-120	
Vanadium	0.0500	0.0496	99.1	80.0-120	
Zinc	0.500	0.475	95.0	80.0-120	

L1294669-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294669-10 12/15/20 12:18 • (MS) R3603705-4 12/15/20 12:25 • (MSD) R3603705-5 12/15/20 12:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	0.707	5.48	5.52	95.4	96.3	1	75.0-125			0.812	20
Antimony	0.0500	ND	0.0513	0.0504	103	101	1	75.0-125			1.81	20
Arsenic	0.0500	ND	0.0475	0.0483	94.2	95.9	1	75.0-125			1.80	20
Barium	0.0500	0.0700	0.117	0.118	94.4	96.0	1	75.0-125			0.669	20
Beryllium	0.0500	0.00352	0.0488	0.0488	90.6	90.5	1	75.0-125			0.134	20
Cadmium	0.0500	ND	0.0517	0.0516	103	102	1	75.0-125			0.110	20
Calcium	5.00	1.36	6.18	6.22	96.3	97.1	1	75.0-125			0.633	20
Chromium	0.0500	ND	0.0497	0.0508	99.5	102	1	75.0-125			2.01	20
Copper	0.0500	ND	0.0494	0.0518	94.0	98.6	1	75.0-125			4.60	20
Cobalt	0.0500	0.0188	0.0677	0.0689	97.8	100	1	75.0-125			1.88	20
Potassium	5.00	ND	6.39	6.46	96.9	98.4	1	75.0-125			1.14	20
Iron	5.00	1.41	6.35	6.35	98.7	98.9	1	75.0-125			0.148	20
Lead	0.0500	ND	0.0488	0.0481	95.9	94.5	1	75.0-125			1.44	20
Magnesium	5.00	1.82	6.65	6.70	96.6	97.6	1	75.0-125			0.776	20
Manganese	0.0500	0.0846	0.131	0.134	93.5	98.5	1	75.0-125			1.88	20
Nickel	0.0500	0.0290	0.0776	0.0787	97.2	99.4	1	75.0-125			1.38	20
Selenium	0.0500	ND	0.0499	0.0501	99.8	100	1	75.0-125			0.339	20
Silver	0.0500	ND	0.0499	0.0497	99.8	99.4	1	75.0-125			0.406	20
Sodium	5.00	5.62	10.4	10.4	96.6	95.8	1	75.0-125			0.354	20
Thallium	0.0500	ND	0.0482	0.0477	96.2	95.0	1	75.0-125			1.19	20
Vanadium	0.0500	ND	0.0488	0.0498	97.6	99.5	1	75.0-125			1.95	20
Zinc	0.500	0.142	0.611	0.624	93.8	96.4	1	75.0-125			2.09	20

Method Blank (MB)

(MB) R3604859-1 12/17/20 19:24

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.0243	J	0.0185	0.100
Antimony,Dissolved	U		0.00103	0.00400
Arsenic,Dissolved	U		0.000180	0.00200
Barium,Dissolved	U		0.000381	0.0200
Beryllium,Dissolved	U		0.000190	0.00200
Cadmium,Dissolved	U		0.000150	0.00100
Calcium,Dissolved	U		0.0936	1.00
Chromium,Dissolved	U		0.00124	0.00200
Copper,Dissolved	U		0.00151	0.00500
Cobalt,Dissolved	U		0.0000596	0.00200
Iron,Dissolved	U		0.0281	0.100
Lead,Dissolved	U		0.000849	0.00500
Magnesium,Dissolved	U		0.0735	1.00
Manganese,Dissolved	U		0.000704	0.00500
Nickel,Dissolved	U		0.000816	0.00200
Potassium,Dissolved	U		0.108	2.00
Selenium,Dissolved	U		0.000300	0.00200
Silver,Dissolved	U		0.0000700	0.00200
Sodium,Dissolved	U		0.376	2.00
Thallium,Dissolved	U		0.000121	0.00200
Vanadium,Dissolved	U		0.000664	0.00500
Zinc,Dissolved	U		0.00302	0.0250

Laboratory Control Sample (LCS)

(LCS) R3604859-2 12/17/20 19:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum,Dissolved	5.00	4.96	99.3	80.0-120	
Antimony,Dissolved	0.0500	0.0501	100	80.0-120	
Arsenic,Dissolved	0.0500	0.0501	100	80.0-120	
Barium,Dissolved	0.0500	0.0498	99.6	80.0-120	
Beryllium,Dissolved	0.0500	0.0497	99.4	80.0-120	
Cadmium,Dissolved	0.0500	0.0530	106	80.0-120	
Calcium,Dissolved	5.00	5.17	103	80.0-120	
Chromium,Dissolved	0.0500	0.0527	105	80.0-120	
Copper,Dissolved	0.0500	0.0519	104	80.0-120	
Cobalt,Dissolved	0.0500	0.0523	105	80.0-120	
Iron,Dissolved	5.00	5.09	102	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3604859-2 12/17/20 19:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead,Dissolved	0.0500	0.0499	99.7	80.0-120	
Magnesium,Dissolved	5.00	4.94	98.8	80.0-120	
Manganese,Dissolved	0.0500	0.0519	104	80.0-120	
Nickel,Dissolved	0.0500	0.0533	107	80.0-120	
Potassium,Dissolved	5.00	4.96	99.2	80.0-120	
Selenium,Dissolved	0.0500	0.0521	104	80.0-120	
Silver,Dissolved	0.0500	0.0518	104	80.0-120	
Sodium,Dissolved	5.00	5.20	104	80.0-120	
Thallium,Dissolved	0.0500	0.0468	93.6	80.0-120	
Vanadium,Dissolved	0.0500	0.0510	102	80.0-120	
Zinc,Dissolved	0.500	0.504	101	80.0-120	

L1294973-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1294973-08 12/17/20 19:30 • (MS) R3604859-4 12/17/20 19:37 • (MSD) R3604859-5 12/17/20 19:40

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 %
Aluminum,Dissolved	5.00	ND	4.87	4.97	97.4	99.4	1	75.0-125			1.94	20
Antimony,Dissolved	0.0500	ND	0.0524	0.0513	105	103	1	75.0-125			2.03	20
Arsenic,Dissolved	0.0500	0.00206	0.0520	0.0529	99.9	102	1	75.0-125			1.65	20
Barium,Dissolved	0.0500	0.0256	0.0768	0.0755	102	99.8	1	75.0-125			1.72	20
Beryllium,Dissolved	0.0500	ND	0.0477	0.0468	95.3	93.7	1	75.0-125			1.77	20
Cadmium,Dissolved	0.0500	ND	0.0531	0.0533	106	107	1	75.0-125			0.468	20
Calcium,Dissolved	5.00	34.7	39.0	39.4	87.0	94.9	1	75.0-125			1.01	20
Chromium,Dissolved	0.0500	ND	0.0507	0.0516	101	103	1	75.0-125			1.74	20
Copper,Dissolved	0.0500	ND	0.0512	0.0524	97.1	99.6	1	75.0-125			2.40	20
Cobalt,Dissolved	0.0500	0.00443	0.0546	0.0553	100	102	1	75.0-125			1.40	20
Potassium,Dissolved	5.00	2.81	7.70	7.82	97.7	100	1	75.0-125			1.55	20
Iron,Dissolved	5.00	6.29	11.4	11.2	102	98.7	1	75.0-125			1.61	20
Lead,Dissolved	0.0500	ND	0.0508	0.0500	102	100	1	75.0-125			1.52	20
Magnesium,Dissolved	5.00	21.6	25.9	25.6	86.1	80.1	1	75.0-125			1.17	20
Manganese,Dissolved	0.0500	3.05	3.27	3.18	450	271	1	75.0-125	V	V	2.78	20
Nickel,Dissolved	0.0500	ND	0.0512	0.0523	100	102	1	75.0-125			1.99	20
Selenium,Dissolved	0.0500	ND	0.0516	0.0531	103	106	1	75.0-125			2.85	20
Silver,Dissolved	0.0500	ND	0.0517	0.0505	103	101	1	75.0-125			2.30	20
Sodium,Dissolved	5.00	13.9	18.7	18.4	95.7	89.0	1	75.0-125			1.82	20
Thallium,Dissolved	0.0500	ND	0.0479	0.0494	95.4	98.4	1	75.0-125			3.02	20
Vanadium,Dissolved	0.0500	ND	0.0506	0.0524	101	105	1	75.0-125			3.58	20
Zinc,Dissolved	0.500	ND	0.487	0.500	96.1	98.6	1	75.0-125			2.59	20

Method Blank (MB)

(MB) R3605242-3 12/18/20 10:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0113	0.0500
Acrylonitrile	U		0.000671	0.0100
Benzene	U		0.0000941	0.00100
Bromodichloromethane	U		0.000136	0.00100
Bromochloromethane	U		0.000128	0.00100
Bromoform	U		0.000129	0.00100
Bromomethane	U		0.000605	0.00500
Carbon disulfide	U		0.0000962	0.00100
Carbon tetrachloride	U		0.000128	0.00100
Chlorobenzene	U		0.000116	0.00100
Chlorodibromomethane	U		0.000140	0.00100
Chloroethane	U		0.000192	0.00500
Chloroform	U		0.000111	0.00500
Chloromethane	U		0.000960	0.00250
1,2-Dibromo-3-Chloropropane	U		0.000276	0.00500
1,2-Dibromoethane	U		0.000126	0.00100
Dibromomethane	U		0.000122	0.00100
1,2-Dichlorobenzene	U		0.000107	0.00100
1,4-Dichlorobenzene	U		0.000120	0.00100
trans-1,4-Dichloro-2-butene	U		0.000467	0.00250
1,1-Dichloroethane	U		0.000100	0.00100
1,2-Dichloroethane	U		0.0000819	0.00100
1,1-Dichloroethene	U		0.000188	0.00100
cis-1,2-Dichloroethene	U		0.000126	0.00100
trans-1,2-Dichloroethene	U		0.000149	0.00100
1,2-Dichloropropane	U		0.000149	0.00100
cis-1,3-Dichloropropene	U		0.000111	0.00100
trans-1,3-Dichloropropene	U		0.000118	0.00100
Ethylbenzene	U		0.000137	0.00100
2-Hexanone	U		0.000787	0.0100
Iodomethane	U		0.00600	0.0100
2-Butanone (MEK)	U		0.00119	0.0100
Methylene Chloride	U		0.000430	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.000478	0.0100
Styrene	U		0.000118	0.00100
1,1,1,2-Tetrachloroethane	U		0.000147	0.00100
1,1,2,2-Tetrachloroethane	U		0.000133	0.00100
Tetrachloroethene	U		0.000300	0.00100
Toluene	U		0.000278	0.00100
1,1,1-Trichloroethane	U		0.000149	0.00100

Method Blank (MB)

(MB) R3605242-3 12/18/20 10:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000158	0.00100
Trichloroethene	U		0.000190	0.00100
Trichlorofluoromethane	U		0.000160	0.00500
1,2,3-Trichloropropane	U		0.000237	0.00250
Vinyl acetate	U		0.000692	0.0100
Vinyl chloride	U		0.000234	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	*104*			*80.0-120*
(S) 4-Bromofluorobenzene	*93.2*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*119*			*70.0-130*

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

(LCS) R3605242-1 12/18/20 08:43 • (LCSD) R3605242-2 12/18/20 09:03

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	0.0250	0.0318	0.0330	127	132	19.0-160			3.70	27
Acrylonitrile	0.0250	0.0315	0.0290	126	116	55.0-149			8.26	20
Benzene	0.00500	0.00479	0.00473	95.8	94.6	70.0-123			1.26	20
Bromodichloromethane	0.00500	0.00491	0.00504	98.2	101	75.0-120			2.61	20
Bromochloromethane	0.00500	0.00569	0.00555	114	111	76.0-122			2.49	20
Bromoform	0.00500	0.00580	0.00554	116	111	68.0-132			4.59	20
Bromomethane	0.00500	0.00560	0.00543	112	109	10.0-160			3.08	25
Carbon disulfide	0.00500	0.00408	0.00425	81.6	85.0	61.0-128			4.08	20
Carbon tetrachloride	0.00500	0.00531	0.00520	106	104	68.0-126			2.09	20
Chlorobenzene	0.00500	0.00507	0.00492	101	98.4	80.0-121			3.00	20
Chlorodibromomethane	0.00500	0.00533	0.00529	107	106	77.0-125			0.753	20
Chloroethane	0.00500	0.00561	0.00534	112	107	47.0-150			4.93	20
Chloroform	0.00500	0.00515	0.00515	103	103	73.0-120			0.000	20
Chloromethane	0.00500	0.00495	0.00473	99.0	94.6	41.0-142			4.55	20
1,2-Dibromo-3-Chloropropane	0.00500	0.00550	0.00522	110	104	58.0-134			5.22	20
1,2-Dibromoethane	0.00500	0.00543	0.00537	109	107	80.0-122			1.11	20
Dibromomethane	0.00500	0.00560	0.00549	112	110	80.0-120			1.98	20
1,2-Dichlorobenzene	0.00500	0.00517	0.00470	103	94.0	79.0-121			9.52	20
1,4-Dichlorobenzene	0.00500	0.00500	0.00466	100	93.2	79.0-120			7.04	20
trans-1,4-Dichloro-2-butene	0.00500	0.00436	0.00401	87.2	80.2	33.0-144			8.36	20
1,1-Dichloroethane	0.00500	0.00527	0.00545	105	109	70.0-126			3.36	20
1,2-Dichloroethane	0.00500	0.00587	0.00567	117	113	70.0-128			3.47	20
1,1-Dichloroethene	0.00500	0.00460	0.00449	92.0	89.8	71.0-124			2.42	20

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

(LCS) R3605242-1 12/18/20 08:43 • (LCSD) R3605242-2 12/18/20 09:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.00500	0.00486	0.00478	97.2	95.6	73.0-120			1.66	20
trans-1,2-Dichloroethene	0.00500	0.00482	0.00484	96.4	96.8	73.0-120			0.414	20
1,2-Dichloropropane	0.00500	0.00535	0.00512	107	102	77.0-125			4.39	20
cis-1,3-Dichloropropene	0.00500	0.00465	0.00491	93.0	98.2	80.0-123			5.44	20
trans-1,3-Dichloropropene	0.00500	0.00474	0.00475	94.8	95.0	78.0-124			0.211	20
Ethylbenzene	0.00500	0.00506	0.00497	101	99.4	79.0-123			1.79	20
2-Hexanone	0.0250	0.0256	0.0255	102	102	67.0-149			0.391	20
Iodomethane	0.0250	0.0261	0.0259	104	104	33.0-147			0.769	26
2-Butanone (MEK)	0.0250	0.0300	0.0296	120	118	44.0-160			1.34	20
Methylene Chloride	0.00500	0.00459	0.00472	91.8	94.4	67.0-120			2.79	20
4-Methyl-2-pentanone (MIBK)	0.0250	0.0271	0.0265	108	106	68.0-142			2.24	20
Styrene	0.00500	0.00460	0.00455	92.0	91.0	73.0-130			1.09	20
1,1,1,2-Tetrachloroethane	0.00500	0.00560	0.00519	112	104	75.0-125			7.60	20
1,1,2,2-Tetrachloroethane	0.00500	0.00469	0.00426	93.8	85.2	65.0-130			9.61	20
Tetrachloroethene	0.00500	0.00587	0.00558	117	112	72.0-132			5.07	20
Toluene	0.00500	0.00484	0.00467	96.8	93.4	79.0-120			3.58	20
1,1,1-Trichloroethane	0.00500	0.00531	0.00497	106	99.4	73.0-124			6.61	20
1,1,2-Trichloroethane	0.00500	0.00543	0.00495	109	99.0	80.0-120			9.25	20
Trichloroethene	0.00500	0.00553	0.00568	111	114	78.0-124			2.68	20
Trichlorofluoromethane	0.00500	0.00585	0.00541	117	108	59.0-147			7.82	20
1,2,3-Trichloropropane	0.00500	0.00570	0.00532	114	106	73.0-130			6.90	20
Vinyl acetate	0.0250	0.0137	0.0130	54.8	52.0	11.0-160			5.24	20
Vinyl chloride	0.00500	0.00475	0.00488	95.0	97.6	67.0-131			2.70	20
Xylenes, Total	0.0150	0.0144	0.0141	96.0	94.0	79.0-123			2.11	20
(S) Toluene-d8				*104*	*106*	*80.0-120*				
(S) 4-Bromofluorobenzene				*93.3*	*96.2*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*121*	*123*	*70.0-130*				

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

Method Blank (MB)

(MB) R3603255-1 12/12/20 04:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000536	0.0000200
1,2-Dibromo-3-Chloropropane	U		0.00000748	0.0000200

L1294865-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1294865-01 12/12/20 04:56 • (DUP) R3603255-3 12/12/20 04:43

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

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

(LCS) R3603255-4 12/12/20 07:01 • (LCSD) R3603255-5 12/12/20 09:38

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 %
Ethylene Dibromide	0.000250	0.000256	0.000262	102	105	60.0-140			2.32	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000231	0.000234	92.4	93.6	60.0-140			1.29	20

L1295241-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1295241-01 12/12/20 04:31 • (MS) R3603255-2 12/12/20 04:19

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	0.000105	105	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000893	89.3	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

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

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
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.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
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]	KY90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-20-18
Maine	TN00003	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	998093910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Report to: Philip Campbell

Project Description: EWS Camden Class 2 Landfill

Phone: 615-333-7797

City/State Collected: Camden TN.

Please Circle: PT MT CT ET

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Brad Collins

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature):

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

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Email To: pcampbell@cecinc.com

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___

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SDG # 1294785

D081

TAT

Acctnum: CEC
Template: T133582
Prelogin: P810064
PM: 526 - Chris McCord
PB: 11/13/20
Shipped Via: Courier

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss.Metals 250mlHDPE-NoPres	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	Remarks	Sample # (lab only)
IWC-L															
APWC-L	Grab	GW		12-9-20	11:00a	11	X	X	X	X	X	X	X		01
		GW				11	X	X	X	X	X	X	X		

SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ___

Remarks: **WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE
Tot/Diss Metals=M6020AP1 + Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

Samples returned via: ___ UPS ___ FedEx X Courier ___

Tracking #

pH 3.7 Temp ___

Flow ___ Other ___

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 2.1 -2=1.9 °C Bottles Received: 11

If preservation required by Login: Date/Time

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
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
linquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Date: 12/10 Time: 1545

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

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CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 EQUIPMENT BLANKS

I. SCOPE AND APPLICABILITY: Equipment blanks are collected to assess the adequacy of decontamination procedures and to determine whether sampling equipment and methods are contributing contaminants to samples.

II. PROJECT-SPECIFIC REQUIREMENTS:

WATER TYPES TO BE USED FOR BLANKS: *[distilled water, deionized water, HPLC-grade water, etc.]*

III. METHODOLOGY

A. Review the SOP for the medium sampled to establish the frequency for collection of blanks.

B. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

C. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket.

D. Fill a complete set of sample bottles.

E. Assign the blank a sample number of the same format as the other samples in the series.

F. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock solution depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- ≅ Source of blank water
- ≅ Time and sequence within the sampling event when the blanks were prepared
- ≅ Description of the procedure for preparing the blanks
- ≅ Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY: Trip blanks are prepared to evaluate whether volatile constituents have migrated into samples from the air on-site, during shipping, or at the laboratory.

II. PROJECT-SPECIFIC REQUIREMENTS:

A. Frequency:

B. Other Criteria:

III. METHODOLOGY

A. When ordering bottles from the laboratory for the sampling event, request that trip blanks be sent also.

B. Keep the supplied blanks with the samples being collected throughout the sampling event. Handle the blanks in the same manner as the filled sample vials.

C. Assign the trip blank a sample number of the format used for the sampling event.

D. Return the trip blanks to the laboratory with the samples. Include the samples on the Chain-of-Custody form (SOP 07-02-02). Analysis is typically performed for volatile organic compounds only.

IV. PRECAUTIONS AND COMMON PROBLEMS: None.

V. DOCUMENTATION: Describe handling on the trip blanks in the Trip Report (SOP 07-02-04). Include the sample numbers assigned.

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-02-01 LIQUID DUPLICATES

I. SCOPE AND APPLICABILITY: Duplicate samples are collected to evaluate the precision involved in the sampling effort. Duplicate samples must be collected to be as similar as possible to the original sample. This procedure is applicable of collection of duplicate samples of all liquids and flowable sludges.

II. PROJECT-SPECIFIC REQUIREMENTS:

NUMBER/FREQUENCY OF DUPLICATE SAMPLING:

DUPLICATE NUMBERING SYSTEM: *[Indicate how sample numbers are to be assigned to duplicates, and whether "blind" numbers should be assigned.]*

III. METHODOLOGY

A. Prepare sample bottles for the target sample and its duplicate.

B. Collect the liquid sample in accordance with the appropriate SOP.

C. When filling sample bottles, fill each type of bottle for the sample and duplicate in sequence. Fill both VOA vials, then both metals bottles, etc. This will assure that the duplicate is as similar to the original sample as possible.

D. Preserve the sample and duplicate identically.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Failure to fill bottles alternately between the sample and duplicate may result in poor reproducibility between analyses.

B. Samples with free product or multiple phases present special problems. The phase distribution must be the same in both aliquots.

V. DOCUMENTATION: List the sample and duplicate on the Groundwater Monitoring Data Sheet as separate samples, describing the duplicate in the "Comments" column. If a Groundwater Monitoring Data Sheet is not appropriate, incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-01-01 WATER-LEVEL MEASUREMENT IN MONITORING WELLS

I. SCOPE AND APPLICABILITY: This procedure is applicable to the measurement of water levels in monitoring wells and open boreholes.

II. PROJECT-SPECIFIC REQUIREMENTS

A. REQUIRED READINGS:

B. APPLICABLE METHODS:

III. METHODOLOGY: Water levels should always be recorded to ±0.01 foot. Measurements should be made from a marked point on the inner casing for monitoring wells, and from the ground surface for open boreholes. Equipment should be decontaminated in accordance with SOP 01-01-00 after each measurement. The following methods may be used:

A. CHALKED-TAPE METHOD

1. Check records for historic water levels in the well, if available.

2. Rub the first five feet of a steel surveyor's chain or fiberglass tape with carpenter's chalk.

3. Lower the tape into the well until the end of the tape enters the water.

4. Record the tape footing at the wellhead to within 0.01 feet.

5. Pull the tape out of the well and read the tape footage of the water mark to within 0.01 feet. The difference between the readings is the water level.

B. SOUNDING

1. Attach a small float or hollow-bottom weight or sounder to the end of a tape measure.

2. Lower the sounder into the well and listen for the sound of the weight hitting the water surface.

3. When this is heard, pull the sounder back a few inches and redrop it by 1/4-inch increments until the sound is heard again.

4. Subsequent smaller increments of lowering the sounder will allow water-level measurements to within 0.01 feet.

5. Measure the length from the zero mark on the tape measure to the bottom of the weight. Add this value to all field measurements made with the sounder.

C. ELECTRIC-WATER LEVEL METER (Solinst)

1. Turn the Solinst on by turning the knob clockwise. This knob is also the volume control. Test the Solinst to see if the battery is dead by pushing the button next to the volume knob.If the battery is charged the Solinst will emit an audible tone and the red indicator light will illuminate.
2. Lower the end of the probe into the well or borehole. The probe will cause the unit to emit the tone and illuminate the light when it contacts water.

3. Pull the probe back a few inches and lower the probe in smaller increments until the water level is measured to within 0.01 feet.

4. The water level is read directly from the Solinst tape, and already includes a correction for the length of the probe on the bottom of the tape.

D. INTERFACE PROBE: This is the only reliable method for wells with floating free product.

1. Push the On/Off button to turn unit on. Lower the probe into the liquid. The horn will sound a steady tone and the yellow light will illuminate when the probe contacts an oil product. Slowly raise probe until sound stops, lower until sound is heard again to refine the oil level.

2. Read the tape marking and note as the surface level of product.

3. Slowly lower the probe through the oil product, searching for the oil-water interface. When the probe reaches water the tone will switch from steady to a beeping tone and the red light will illuminate. Slowly move probe up and down to refine the oil/water interface to within 0.01 feet. Read the water level directly from the tape. The length of the probe is already considered.

NOTE: Auto Shutoff Feature: After approximately five minutes of power on, the unit will auto-shut off. A chirping sound will be heard, warning impending shut off. Press

<POWER ON/RENEW> to continue operation. During five minute interval, short "alive" beep is heard.

IV. PRECAUTIONS AND COMMON PROBLEMS:

1. Be sure to allow sufficient time after development, purging or pumping to allow the well to recover to static conditions.

2. Sounding may be difficult with very deep water levels or in noisy conditions because the sound is hard to hear.

3. Measurement of water levels in pumping wells or wells/boreholes with cascading water can be difficult. Installing a narrow PVC access tube inside the well casing can make obtaining accurate readings easier.

4. Free product floating on the water table depresses the natural water level. If a true water level is required, the product of the oil thickness and the oil specific gravity must be added to the oil/water interface elevation.

5. If there is no measurement mark on the well riser, add one in indelible ink.

V. DOCUMENTATION

1. Record water levels in a field notebook or Groundwater Monitoring Data Sheet (SOP 07-02-01). Be sure to record the date and time of the measurement.

2. Data should be incorporated into the Trip Report (SOP 07-02-04). Method of measurement should be reported.

VI. REFERENCES: None

07-01-01 MAINTAINING SAMPLE CHAIN OF CUSTODY

I. SCOPE AND APPLICABILITY: This procedure is to be employed whenever samples are collected for laboratory analysis, and is designed to ensure that sample integrity is maintained. These procedures are necessary to assure that samples are defensible.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

A. SAMPLE CUSTODY: The sampling personnel must maintain custody of the samples until they are delivered to the laboratory, at which time the laboratory takes over the custody record. A sample is considered to be in custody if:

- it is in the investigator's actual possession
- it is in view of the investigator
- it has been placed in a secure area
- a signed custody seal has been placed on the sample container such that the seal would be destroyed if the container was opened.

B. CUSTODY RECORD

1. Complete a Chain-of-Custody Form for each shipping container of samples as described in SOP 07-02-02. Place the white copy of the completed form in the shipping container with the samples, as discussed in SOP 07-01-03.

2. Affix a signed custody seal to secure all samples. Seals may be placed across the lids of individual sample bottles, or on each shipping container of samples. If seals are placed on shipping containers, at least two seals must be used, and they must be placed such that the container cannot be opened without breaking the seals.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. It may be necessary to cover custody seals with clear postal tape to prevent them from falling off.

B. Deliver or fax a copy of the custody form to the Project Manager within 24 hours of shipping the samples so that any errors can be corrected before the laboratory begins processing the samples.

V. DOCUMENTATION

A. The pink copy of the Chain-of-Custody Form should be submitted to the Project Manager as soon as possible after the samples are shipped.

B. The Project Manager or a designee must review the form for completeness and correctness. Any errors should be flagged, and the laboratory should be contacted if errors could affect analysis. The reviewer should initial and date the form, then place it in the Project File.

C. Compliance or problems with custody procedures should be documented in the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA Region IV; 1991. Environmental Compliance Branch, Standard Operating Procedures and Quality Assurance Manual. Athens, Georgia.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.