SECOND QUARTER 2017 GROUNDWATER ASSESSMENT MONITORING REPORT
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Former Environmental Waste Solutions Camden Class II Landfill
TDSWM Permit Number IDL 03-0212
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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EXECUTIVE SUMMARY

This report documents the second quarter 2017 assessment monitoring event which was performed at the former Environmental Waste Solutions, LLC (EWS) Class II Landfill on June 8, 2017. An initial second-quarter groundwater monitoring report documenting the details of the second quarter 2017 event for the former EWS Class II landfill was sent to the Tennessee Department of Environment and Conservation (TDEC) within 60 days of the June 8, 2017 sampling event. After a review of the analytical results from the event, inconsistencies were identified in the laboratory report for the given concentrations for total cadmium for monitoring well MW-4 and the duplicate sample collected at MW-4. Also, the laboratory report initially reported a cadmium concentration in the field blank quality control sample, which was caused by a laboratory contamination error that was confirmed by the laboratory. Additionally, the elevated total cadmium in MW-3 in the June 2017 sample was likely associated with the high sample turbidity. Therefore, a re-sampling event was necessary to confirm that the cadmium levels were not artificially elevated due to elevated turbidity values or laboratory errors. As a result, a resampling event was performed on August 8, 2017. Details regarding the initial sampling results, laboratory quality-control concerns, and the results of the resampling event are described in this report.

The former EWS Camden Class II landfill was registered with the Tennessee Division of Solid Waste Management (TDSWM) with permit number IDL 03-0212. The Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/longitude 88°05'16" W). From April 2008 through November 2015, EWS was in the detection monitoring program and required to monitor groundwater on a semi-annual basis. EWS entered the Assessment Monitoring Program as a result of chloride concentrations reported above the 250 mg/L EPA secondary drinking water standard at monitoring well MW-3 during the November 2015 Semi-Annual Monitoring Event.

The second-quarter monitoring event for 2017 was performed in conformance with the site's Groundwater Quality Assessment Plan (GWQAP), approved by TDEC-TDSWM on April 4, 2016. Groundwater samples were collected by Civil & Environmental Consultants, Inc. (CEC) in June 2017 and August 2017. ESC Lab Sciences (ESC) was the chemical laboratory sub-contracted to perform the groundwater chemical analyses. All permanent groundwater monitoring wells (MW) and temporary monitoring wells (TMW) were sampled during the June 8, 2017 event with the exception of MW-2 (MW-2 routinely yields insufficient volumes of water for sampling purposes) which was replaced by MW-4 in April 2013. However, MW-2 remains in place and will continue to be monitored and tested for field parameters (i.e., pH, conductivity, temperature, turbidity, and dissolved oxygen) and water level data.

Leachate samples were also collected by CEC on June 8, 2017 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" leachate sample locations. The "APWC" sample was collected from the leachate collection system associated with the previous

aluminum processing waste cell, and the "IWC" leachate sample was collected from the leachate collection system associated with the industrial waste cell.

Groundwater samples collected for this sampling event from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were analyzed for the Appendix I list of parameters plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, alkalinity, bromide, chloride, nitrate, sulfate, ammonia, chemical oxygen demand (COD), and boron. Since additional waste streams had been approved for disposal in the EWS Class II Landfill after the original Groundwater Monitoring Plan had been approved in 2008, the TDSWM requested that EWS add the volatile organic compounds (VOCs) included in the Appendix I *Constituents for Groundwater Monitoring* presented in Rule 0400-11-01-.04 (9.) d of the Rules and Regulations Governing Solid Waste Disposal in Tennessee to the existing list of groundwater monitoring constituents. Therefore, EWS began monitoring VOCs across the site in December of 2013.

The reported concentrations of chemicals detected in the wells were reviewed and compared against their respective U.S. EPA Maximum Contaminant Levels (MCLs) and U.S. National Secondary Drinking Water Standard (2DWS). 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 are summarized as follows:

During the initial June 8, 2017 sample event, total cadmium was not detected above the laboratory detection limit of 0.001 mg/l at MW-4 but was reported at a concentration of 0.00236 mg/l in the duplicate sample collected at MW-4. This duplicate concentration is below the MCL for total cadmium (the MCL for total cadmium is 0.005 mg/l). This inconsistency in total cadmium in the original MW-4 sample versus the MW-4 duplicate prompted a re-evaluation of the internal analytical laboratory quality control. Also, the laboratory report initially reported a cadmium concentration in the field blank quality-control sample, which was caused by a laboratory contamination error that was confirmed by the laboratory. Although proper field purging and sample collection procedures were followed in order to obtain representative groundwater samples, the turbidity value at MW-3 during the sample event was 35.9 Nephelometric Turbidity Units (NTUs), which was slightly above 10 NTUs, which is normally considered the minimum goal for groundwater sampling objectives. The elevated total cadmium in MW-3 in the June 2017 sample may have been associated with the higher sample turbidity. Therefore, a re-sampling event was necessary to confirm that the cadmium levels were not artificially elevated due to high sample turbidity values or laboratory errors.

Total cadmium was detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l), which was the first time total cadmium exceeded the MCL. Another follow-up sampling event was carried out at MW-3 on August 8, 2017 in order to re-sample MW-3 to validate the previously reported cadmium concentrations.. The August 8, 2017 re-sample result for total cadmium in MW-3 was 0.0113 mg/l. During this resampling event,

MW-3 was allowed to recharge overnight which yielded a low turbidity sample that was closer to the target maximum reading for turbidity for each sample of 10 NTUs, but was still above that threshold (i.e., 16.6 NTUs). The total cadmium results from the August 8, 2017 event at MW-3 were 60% lower than the concentration that was detected during the sampling event on June 8, 2017. The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance. In contrast, statistical group comparisons, comparing background data to MW-3 data, do not draw any firm conclusions as to whether the increase in total cadmium at MW-3 is indicative of a statistically significant increase in concentrations due to the limited number of cadmium detections above the laboratory detection limit of 0.001 mg/l. Therefore, the results of the current statistical group comparison analyses come from a limited data set since cadmium was first detected in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016 (total cadmium at MW-3=0.00177), which was below the MCL. Similarly, the statistical trend analysis for total zinc at MW-3 during this event (total zinc at MW-3= 0.0769 mg/l) confirmed an increasing trend having statistical significance, but was not indicative of a SSI in concentrations due to the limited number of zinc detections. Zinc has remained below the current laboratory detection limit of 0.025 mg/l since July of 2010. As a result, obtaining more groundwater samples from MW-3 for total cadmium, as well as the other measured constituents (including zinc), is highly recommended.

It is worth noting that although there have been elevated detections of total cadmium in MW-3, the impact location appears to be limited to the MW-3 area since there have been no detections, as of this date, from groundwater samples extracted from temporary monitoring wells TMW-2, and TMW-3 that are immediately down-gradient of MW-3. However, the confirmed detections for total cadmium above the MCL at MW-3 and the accompanying statistically significant trend analysis for total cadmium in MW-3 are of concern and warrant more detailed attention during future quarterly monitoring events.

During this quarterly event, there were also three SSIs over background data for barium (MW-3), chloride (MW-3, MW-4, and MW-5), and sulfate (MW-3). The barium, chloride, and sulfate detections observed in the site monitoring wells were all below their associated MCLs or 2DWS. As previously discussed, statistical trends for cadmium and zinc concentrations for MW-3 exhibited an increase based on historic and current analysis results.

Glossary of Terms

Appendix I	Refers to the required regulatory sample list of groundwater parameters
CEC	Civil & Environmental Consultants, Inc.
Class I Landfill	Municipal Solid Waste Landfill
Class II Landfill	Industrial Waste Landfill
Class IV Landfill	Construction/Demolition Waste Landfill
Class III/IV Landfill	Landscaping and Construction/Demolition Waste Landfill
DML	Construction Demolition Landfill
EPA	Environmental Protection Agency
ESC	ESC Lab Sciences
EWS	Environmental Waste Solutions
GW	Groundwater
HDPE	High Density Polyethylene
HI	Hydrogeologic Investigation
MCL	Maximum Contaminant Level
µS•cm-1	micro-Siemens per centimeter
mg/L	milligrams per Liter
MW	Monitor Well
NPPL	Non-parametric prediction limit analysis
ORP	Oxidation Reduction Potential
POTW	Publically Owned Treatment Works
ppm	parts per million*
PQL	Practical Quantitation Limit
QC	Quality Control
2DWS	Secondary Drinking Water Standard (EPA)
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 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 currently closed and remedial measures are being implemented. Remedial measures currently underway include leachate treatment, storm water management, intermediate landfill cap construction, and miscellaneous construction activities. The former EWS Class II landfill previously received secondary aluminum smelter waste for disposal which included aluminum dross and salt cake, as well as other approved industrial wastes.

2.0 AQUIFER CHARACTERISTICS

2.1 GEOLOGIC AND AQUIFER CHARACTERISTICS

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

2.1.1 Camden and Harriman Formations

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

Groundwater potentiometric data collected from the uppermost water bearing zone across the entire proposed waste area footprint during the 1999 and 2006 hydrogeological investigations indicated that the uppermost aquifer is sloped 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 Class II Landfill consists of monitoring wells MW-1, MW-3, MW-4, and MW-5. 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 as part of the assessment for corrective actions (in response to the elevated chloride concentrations at MW-3) with the primary purpose of delineating groundwater hydrology/hydraulics (potentiometric interpretation) during assessment monitoring; however, groundwater samples for water-quality analyses are also obtained from these wells. MW-2 was also used for potentiometric interpretation during this event along with MW-2 (which has previously been removed from the monitoring network).

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

The integrity of each monitoring well is checked during each sampling event prior to groundwater collection. The physical condition of each wellhead is observed and noted along with the condition and ability of any and all locking mechanisms for each monitoring well. Once the watertight seal is removed from the top of each monitoring well's casing, the well is allowed to de-pressurize. A decontaminated electronic water level indicator probe is slowly lowered into the well to establish the distance between the established top of casing and the elevation of free groundwater. To avoid cross contamination between wells, the water level indicator probe is decontaminated between each well by washing the wetted portion of the probe with Alconox® or Liquinox® detergent and tap water, followed by a tap water rinse and a final deionized water rinse. The distance is then re-checked to ensure that the measurement is of actual static water level and the groundwater is not rising or falling in the monitoring well. The electronic probe is capable of determining this distance to within one-hundredth of one foot (0.01 foot). This distance is written in the site-specific field book or field data sheet as depth-to-water. Upon collection of these data, the electronic water level probe is removed from the monitoring well and decontaminated from contact with the well casing/screen and groundwater.

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 Mean Sea Level Datum of the World Geodetic Survey of 1984. 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 Class II Landfill generally flows from a topographic high north of the landfill towards monitor wells MW-3, MW-4, and MW-5 and temporary monitoring wells TMW-1, TMW-2, and TMW-3.

2.4 POTENTIOMETRIC GRADIENT

The potentiometric surface of the first aquifer occurring beneath the Class II Landfill occurs at approximately twenty-three (23) feet below ground surface at the up-gradient monitor well MW-1 to approximately ten (10) feet below ground surface at monitor well MW-5. The groundwater potentiometric data interpreted from the 1999 and 2006 hydrogeological investigations conducted at the site for the uppermost aquifer indicate that the uppermost water bearing zone generally moves in a southern direction. Comparisons of water bearing zone elevations to static groundwater elevations for both investigations indicate an unconfined aquifer. The

potentiometric gradient calculated from groundwater elevation data collected on June 8, 2017 is approximately 1.16 %.

The potentiometric gradient is calculated according to the following formula:

$$\frac{\text{Highest GW. Contour Elev. – Lowest GW. Contour Elev.}}{\text{Horizontal Distance between the Potentiometric Contours}} * 100 = \text{Pot. Grad.}$$

$$\frac{(390') - (370')}{1{,}730'} * 100 = 1.16\%$$

The above calculation assumes a perpendicular gradient between the potentiometric contours drawn between 390' and 370'. 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

Depth to groundwater measurements were collected using a Solinst® electronic water level indicator, model #122. A YSI Professional Plus® multi-parameter instrument was used to record pH, conductivity, temperature, dissolved oxygen, and 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 PURGING AND COLLECTION OF FIELD PARAMETER VALUES

Groundwater was purged using new polyethylene tubing connected to a peristaltic pump. Sampling was performed using bailers. The bailers were factory decontaminated and sealed so as to prevent environmental cross contamination of the bailers. New nylon twine was fixed to each bailer via a tied knot.

The total volume of groundwater residing in each monitor well was calculated as follows: (1) subtracting the depth to water from the total depth of each well and (2) the depth of water in feet was multiplied by 0.163 gallons per foot in a 2 inch (I.D.) monitor well. The initial amount of purged groundwater was collected in a clean, high-density polyethylene (HDPE) flow-through cell where it was measured for temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential (ORP). The turbidity was measured by collecting a small volume of water and using the Hach® model 2100Q turbidimeter. These values were noted in the site specific field forms.

Groundwater was purged from the monitoring well until one calculated well volume of water passed into the flow-through cell. Once this volume of water was purged, the field chemistry parameters were again measured and recorded in the field forms as V_1 (or recorded as gallons). This procedure for purging groundwater continued for an additional well volume, V_2, if sufficient groundwater was available. After the second purged well volume was observed for field parameter values, the values were checked against values for V_1. If the pH and conductivity values for each volume purged varied no more than 10% from V_1 to V_2 and the temperature stabilized to within one degree Celsius, preparations were made to collect the groundwater sample for submittal to the analytical laboratory. With respect to ground water chemistry, an adequate purge is achieved when the pH and conductivity have stabilized and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTUs). If the field parameters were not stable, the purging procedures continued until either one of the following adequate purge conditions were met:

1. Field stabilization occurred;

2. Well was purged dry- For wells with slow recovery, attempts were made to avoid purging to dryness by slowing the purge rate. In some situations, even with slow purge rates, the well may be pumped dry. This situation generally constitutes 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.

After adequate purge conditions are met, recharging groundwater was collected for analysis as soon as possible after purging, and at least within twenty-four hours. The pH, conductivity, temperature, and turbidity were measured and recorded during collection of the sample from the recovered volume, as the measurements of record for the sampling event.

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

3.3 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 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 inorganics – one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO_3); 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 (H_2SO_4) acid. Due to elevated turbidity values observed during sample collection of temporary monitoring wells, dissolved metals inorganics were collected by field filtering groundwater with a 0.45 micron in-line filter before placing into one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO3). The dissolved metals collected from temporary monitoring wells TMW-1, TMW-2, and TMW-3 were placed on hold at the lab and not analyzed because the total concentrations for the metals obtained from these wells were not elevated.

3.4 QUALITY ASSURANCE AND QUALITY CONTROL

A field blank and a duplicate sample were collected during the monitoring event performed at the EWS Class II Landfill. CEC collected a field blank next to monitoring well MW-3 and a duplicate sample was collected from MW-4. 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. Also, a laboratory supplied trip blank for VOC analysis was prepared and placed in a cooler which was present during groundwater sampling activities. Upon the collection of the final groundwater sample, the trip blank was

placed in a sample cooler and delivered to ESC for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

ESC initially reported the laboratory analytical results to CEC on June 20, 2017. However, after examining the data and comparing the MW-4 and duplicate (MW-4) samples, CEC identified variations in detected constituent concentrations between the two samples, specifically constituents measured using methods 9056A and 6020. Also, various metals detections (including cadmium) were reported in the field blank sample. After these reported data were examined, ESC confirmed that there were some discrepancies and quality-control issues with the reported alkalinity, chloride, fluoride, nitrate, and metals data and delivered the revised analytical report on June 27, 2016.

Laboratory analytical testing of the field blank presented in the revised analytical report revealed that none of the tested constituents were above the Practicable Quantification Limit (PQL). The reported concentrations at MW-4 and the duplicate sample were similar, with the exception of alkalinity, total aluminum, total cadmium, and total zinc. The duplicate sample analysis reported concentrations of alkalinity (22.8 mg/l), total aluminum (0.103 mg/l), total cadmium (0.00236 mg/l), and total zinc (0.0395 mg/l), while MW-4 sample analysis did not indicate the presence of alkalinity, total aluminum, total cadmium and total zinc above each of the respective PQLs. Since ESC confirmed internal lab quality-control issues existed in the reported data, and that metals concentrations were confirmed by ESC using two different methods (6010 and 6020), the reported duplicate sample results for total aluminum, total cadmium, and total zinc may have been elevated due to laboratory quality-control issues. Total cadmium has not previously been detected in MW-4. To confirm the duplicate sample detections from MW-4, MW-4 was re-sampled on August 7, 2017 and analyzed for total cadmium. A duplicate sample was also collected at MW-4 on August 7, 2017. Total cadmium was not detected above the PQL in MW-4 or the duplicate sample collected from MW-4 during the August 7, 2017 re-sample event, which confirmed total cadmium concentrations at MW-4 were below the laboratory PQL. Additional quality – control measures are recommended and will be discussed in Section 7 of this report.

3.5 SAMPLE CHAIN-OF-CUSTODY

A sample Chain-of-Custody (COC) traveled along with the sample kit from ESC to EWS and back to ESC for the initial June 2017 sampling event and the August 2017 re-sample event. The CEC SOP 07-01-01 for maintaining sample Chain of Custody may be found in Appendix D – CEC Standard Operating Procedures.

4.0 LABORATORY ANALYTICAL PROCEDURES

4.1 ANALYTICAL METHODS

All laboratory analyses for the June 2017 groundwater assessment monitoring event and subsequent August 2017 re-sample event, were completed by ESC Lab Sciences in Mt. Juliet, Tennessee. The analytical methods chosen for these monitoring events were in full compliance with the procedures required by the Tennessee Division of Solid Waste Management (TDSWM) and the United States Environmental Protection Agency'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 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 350.1	Ammonia Nitrogen
Method 410.4	Chemical Oxygen Demand (COD)

4.2 LABORATORY ANALYTICAL RESULTS

Groundwater samples were collected by Civil & Environmental Consultants, Inc. (CEC) on June 8, 2017. ESC Lab Sciences (ESC) performed the groundwater analysis and reported the results on June 27, 2016. Leachate samples were also collected by CEC on June 8, 2017 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" leachate sample locations. ESC performed the leachate analysis and reported the results on June 27, 2016. Groundwater samples from MW-3 and MW-4 were collected by CEC on August 7, 2017 (MW-4) and August 8, 2017 (MW-3), and ESC performed the groundwater analysis for total cadmium concentrations and reported the results on August 15, 2017. Copies of the laboratory reports are located in Appendix C – Laboratory Analytical Reports. Constituent values from all inorganic laboratory analyses, along with applicable MCLs or 2DWSs are presented in Table 2 – Analytical Results in Appendix A.

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. ESC complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. Three QC qualifier codes (J3, J4, and Q) were indicated during the laboratory analysis of groundwater samples during the June 8, 2017 monitoring event, which can be viewed along with the Laboratory Analytical Reports in Appendix C. No QC qualifier codes were indicated during the analysis of groundwater samples collected during the August 7 & 8, 2017 re-sample event.

5.0 STATISTICAL ANALYSIS

5.1 APPLICABLE METHODS

The Rules of Tennessee Department of Environment and Conservation, Division of Solid Waste Management Chapter 1200-1-7-.04 states, in part, that each landfill must conduct and report statistical analyses as part of the evaluation of groundwater monitoring data. Statistical analyses of the sampling data was performed on monitoring wells MW-1, MW-3, MW-4, and MW-5. The temporary wells TMW-1, TMW-2, and TMW-3 were installed in response to the elevated chloride concentrations in MW-3 for the purpose of delineating groundwater hydrology/hydraulics during assessment monitoring and for collecting groundwater samples for water-quality analyses. Due to limited water-quality data acquired at this time, statistical analyses using data from these wells has not been performed.

First, the distribution of the data was evaluated for normality. The test of normality was conducted using the Shapiro-Wilks method if N <50 or Shapiro-Francia method if N>50. The normality test was performed for both raw and log-transformed data with replacement of non-detects to half of the corresponding laboratory detection limit. Data determined to be normally distributed were evaluated using parametric prediction interval analysis. Data that were not normally distributed were evaluated using non-parametric statistical methods. Inter-well and intra-well parametric and non-parametric prediction limit analyses (NPPL) were deemed appropriate for this data set. Inter-well analyses compared the concentrations observed at the down-gradient monitoring locations (MW-3, MW-4, and MW-5) to the concentrations observed at the up-gradient monitoring location (MW-1) during this monitoring event. Intra-well analyses was utilized only at MW-1 to compare the concentrations observed during the current groundwater sampling event to the established background data set for MW-1 concentrations.

MW-5 was installed on April 26, 2016 and the initial background sampling event (n=1) occurred on April 28, 2016. After the initial sampling event, MW-5 was sampled on May 9, 2016 (n=2), November 10, 2016 (n=3), and during this event on June 8, 2017 (n=4). At least four separate sampling events are needed at each sampling location in order to establish adequate background data for statistical analyses; therefore, the analytical data for MW-5 were not included in the inter-well statistical analysis during the previous reporting events. Since four separate sampling events have now been completed at MW-5, the data were incorporated into the inter-well statistical analyses for the site during this reporting event.

On August 8, 2017, MW-3 and MW-4 were re-sampled and analyzed for total cadmium. Since the total cadmium detected at MW-3 during the initial June 2017 event was confirmed through re-sample in August 2017, the reported total cadmium concentrations on June 8, 2017 (0.0286 mg/l) and August 8, 2017 (0.0113 mg/l) are both included in this data set for statistical analyses purposes.

The percentage of inter-well background non-detects for each parameter determines the primary statistical method utilized for each parameter. If the percentage of non-detects in the background samples is less than 50%, Shewart-CUSUM control charts are utilized. If more than 50% background non-detects exist for the given parameter, non-parametric inter-well prediction limit analyses was conducted on the data. For this site, based on the high amount of left-censored data (>50% of non-detects), non-parametric inter-well prediction limit analyses was conducted for the data. Additional statistical procedures performed included Mann-Kendall trend analysis and the non-parametric Wilcoxon Rank Sum group comparisons (with non-detects set to the highest reporting limit for the given constituent being analyzed).

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

5.2 STATISTICAL RESULTS

SSIs over background identified for the current monitoring event include total barium at MW-3, chloride at MW-3, MW-4, and MW-5, and sulfate at MW-3. The total barium concentration at MW-3 was 0.134 mg/L during this sampling event, which is less than the previous seven sample results collected at MW-3 since November 21, 2014. Total barium also remains below the maximum contaminant level (MCL) for the primary drinking water standard for barium (2 mg/L).

The chloride concentration reported at MW-3 was 163 mg/L during this sampling event, which was below the 2DWS for chloride concentrations (250 mg/L), and was less than the concentrations reported during the Second Semi-Annual Monitoring Event in November 2015 (458 mg/L), the supplemental re-sampling event (360 mg/L) in December 2015, and the Third Quarter Assessment Monitoring Event in August 2016 (218 mg/L), and similar to the reported concentration reported in March 2017 (164 mg/l). However, the chloride concentration at MW-3 was higher than the sampling event completed in November 2016 (120 mg/l). The chloride concentration observed at MW-4 (6.67 mg/L) indicated an SSI over background during this event. However, the chloride detection at MW-4 is consistent with previous data, is below the 2DWS for chloride concentrations (250 mg/L), and showed a downward trend in chloride concentrations using the Mann-Kendall trend analysis at the 95% confidence level. The chloride concentration observed at MW-5 was 38.4 mg/L, is below the 2DWS for chloride concentrations, and did not indicate a trend in chloride concentrations using the Mann-Kendall trend analyses at the 95% confidence level.

The sulfate concentration observed at MW-3 during this sampling event was 93.7 mg/l. For comparisons, the detected sulfate concentration in November 2016 was 34 mg/L, 95.7 mg/L in August 2016 and 105 mg/L in March 2017. Prior to August 2016, the reported sulfate

concentrations at MW-3 ranged from <5 mg/l to 29.1 mg/l. The reported sulfate concentrations have remained below the 2DWS for sulfate (250 mg/l) for all sampling events to date.

The Mann-Kendall trend analyses at the 95% confidence level was utilized by incorporating current and past groundwater data. Trend analyses revealed an upward trend in barium, total cadmium, chloride, sulfate, and zinc concentrations reported at MW-3. Although the total cadmium (0.0113 mg/l) and zinc (0.0769 mg/l) concentrations reported in MW-3 were not considered SSIs over background detections using the Wilcoxon Rank Sum Non-Parametric Inter-Well Analysis, the Mann-Kendall trend analysis indicated a statistically significant upward trend in total cadmium and total zinc concentrations reported at MW-3. Trend analysis results indicated a downward trend in total barium and chloride detections at MW-4, and no distinct trend in chloride detections at MW-5.

Total cadmium was detected above the MCL at MW-3, during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l). Cadmium was first detected in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016 (total cadmium at MW-3=0.00177), which was below the MCL. Another follow-up sampling event was carried out at MW-3 on August 8, 2017 in order to re-sample MW-3 to supplement the overall number of groundwater data values and to validate the previously observed results. The August 8, 2017 result for total cadmium in MW-3 was 0.0113 mg/l. MW-3 was allowed to recharge overnight which yielded a low turbidity sample that was closer to the target maximum reading for turbidity for each sample of 10 Nephelometric Turbidity Units (NTUs), but the turbidity was still above that threshold value. The results from the August 8, 2017 event were 60% lower than the concentration that was detected during the sampling event in June 8, 2017. The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance. In contrast, statistical group comparisons, comparing background data to MW-3 data, do not draw any firm conclusions as to whether the increase in total cadmium at MW-3 is statistically significant. However, the results of the current statistical group comparison analyses come from a limited data set with few values exceeding the reporting limit. As a result, obtaining more groundwater samples from MW-3 for total cadmium, as well as the other measured constituents, is highly recommended.

It is worth noting that although there have been elevated detections of total cadmium in MW-3, there have been no detections, as of this date, from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3. However, the confirmed detections for total cadmium above the MCL and the accompanying statistically significant trend analysis for total cadmium in MW-3 are of concern and warrant more detailed attention during future quarterly monitoring events.

The chloride, total cadmium, sulfate, and total zinc concentrations at MW-3, MW-4, and MW-5 will continue to be closely monitored and statistically analyzed during future monitoring events.

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

Representative groundwater samples were collected from permanent monitoring wells MW-1, MW-3, MW-4, and MW-5, and temporary monitoring wells TMW-1, TMW-2, and TMW-3. The groundwater samples collected from the permanent monitoring wells were analyzed for the Appendix I list of parameters plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, alkalinity, bromide, chloride, nitrate, sulfate, ammonia, chemical oxygen demand (COD) and boron. The samples collected from the temporary monitoring wells were analyzed for the Appendix I list of parameters plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, alkalinity, bromide, chloride, nitrate, sulfate, and boron.

The results of the Second Quarter Assessment Monitoring Event of 2017 for MW-3 are summarized as follows.

- Total cadmium was detected above the MCL (0.005 mg/l) in MW-3 at a concentration of 0.0286 mg/l on June 8, 2017, which was the first MCL exceedance reported at MW-3. Also, total cadmium was detected above the MCL and at a concentration of 0.0113 mg/l during the confirmation re-sample on August 8, 2017. Although the total cadmium concentrations reported in MW-3 did not trigger an SSI over background detections using Wilcoxon Rank Sum Non-Parametric Inter-Well Analysis, the Mann-Kendall trend analysis revealed a statistically significant upward trend in total cadmium concentrations reported at MW-3. However, due to the confirmed total cadmium detections above the MCL at MW-3, samples from MW-3 will be collected and analyzed for total cadmium and dissolved cadmium concentrations during future quarterly assessment monitoring activities.

  The source of the cadmium detections above the MCL in MW-3 has not been determined at this point. Based on current data, the impact location appears to be limited to the MW-3 area, since there have been no detections from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.

- A statistically significant increase (SSI) was identified for the reported chloride concentration at MW-3 during this event. Chloride concentrations at MW-3 exhibited a statistically significant increasing trend per the Mann-Kendall non-parametric trend procedure. The reported concentration of chloride at MW-3 (164 mg/L) did not exceed the 250 mg/L Secondary Drinking Water Standard, and was less than the concentrations reported during the Second Semi-Annual Monitoring Event in November 2015 (458 mg/L), the supplemental re-sampling event (360 mg/L) in December 2015, and the third quarter monitoring event in August 2016 (218 mg/L). However, the current reported concentration is higher than what was observed during the February 2016 (96.1 mg/L), May 2016 (80.7 mg/L), and November 2016 (120 mg/L) sampling events, and similar to

the previous March 2017 event (105 mg/l). The chloride concentrations at MW-3 will continue to be closely monitored during future quarterly assessment monitoring events.

- Time series graphs prepared for MW-3 indicate a general increasing trend starting in 2014 for chloride, total calcium, total magnesium, total potassium, total sodium, and sulfate.

- The Mann-Kendall trend analysis at the 95% confidence level revealed a statistically significant upward trend in total barium, total cadmium, chloride, sulfate, and total zinc concentrations reported at MW-3 during this event.

- No Volatile Organic Compounds (VOCs) were detected above their respective laboratory Practicable Quantification Limit (PQL) during the monitoring event.

6.1 EWS GROUNDWATER QUALITY RELATIVE TO THE EPA PRIMARY DRINKING WATER STANDARDS

Laboratory analytical results for the groundwater samples collected in June of 2017 from the Former - EWS Class II Landfill indicate that total arsenic in MW-1 and total cadmium in MW-3 were detected at concentrations that exceeded the EPA MCLs.

Total cadmium was detected in MW-3 at a concentration of 0.0286 mg/l. The MCL for total cadmium is 0.005 mg/l. Total cadmium had not been detected above the laboratory PQL (0.001) before November of 2016. Also, total cadmium was detected above the MCL and at a concentration of 0.0113 mg/l during the confirmation re-sample on August 8, 2017. Although the total cadmium concentrations reported in MW-3 did not trigger an SSI over background detections using the Wilcoxon Rank Sum Non-Parametric Inter-Well Analysis, the Mann-Kendall trend analysis produced a statistically significant upward trend in total cadmium concentrations reported at MW-3. Due to the identified total cadmium detections above the MCL at MW-3 in June 2017 and confirmed in August 2017, groundwater samples will be collected from temporary monitoring wells down-gradient from MW-3. Also, surface water samples and sediment samples will be collected at selected locations along Charlie Creek and Cane Creek and analyzed for total and dissolved metals.

Total Arsenic was detected in up-gradient MW-1 at a concentration of 0.0571 mg/l. The MCL for arsenic is 0.01 mg/l. Arsenic has historically been detected at concentrations exceeding the primary drinking water MCL prior to the disposal of waste in the landfill. Laboratory analytical testing of groundwater samples taken from MW-1 during background testing of the groundwater prior to waste placement in the landfill revealed concentrations of arsenic ranging from 0.024 mg/L to 0.072 mg/L. 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 the well.

6.2 EWS GROUNDWATER QUALITY RELATIVE TO THE NATIONAL SECONDARY DRINKING WATER STANDARDS

Laboratory analytical results for the groundwater samples collected in June of 2017 from the Former - EWS Class II Landfill groundwater monitoring well network indicated that three of the site-specific groundwater monitoring list of compounds were detected at concentrations which exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters included iron and manganese in up-gradient well MW-1, aluminum in MW-3 and MW-5, and manganese in down-gradient wells MW-3 and MW-4. Although proper field purging and sample collection procedures were followed in order to obtain representative groundwater samples, the field data collected from the site monitoring wells during this event indicated elevated turbidity values observed at the time of sampling in monitoring wells MW-1 (8.80 NTU), MW-3 (34.8 NTU), and MW-5 (35.9 NTU). The elevated turbidity observed may have contributed to the reported concentrations of aluminum, iron, and manganese.

Total Aluminum concentrations observed in MW-3 (0.226 mg/L) and MW-5 (0.237 mg/L) during the June 2017 sampling event were slightly above the 2DWS (0.2 mg/L). However, the aluminum concentrations observed in MW-3 and MW-5 remain less than the highest concentrations observed in up-gradient well MW-1 (1.2 mg/L) and down-gradient well MW-3 (1.8 mg/L) prior to accepting waste within the landfill. Additionally, aluminum concentrations do not appear to exhibit an increasing trend via time-series graphs, exhibit a downward trend in MW-3 via the Mann-Kendall trend analysis, and do not exhibit any statistically significant trend in MW-5 via Mann-Kendall trend analysis.

Total Iron was detected at a concentration of 26 mg/L in MW-1 and 1.6 mg/L in MW-3 prior to the placement of waste. Iron was detected in MW-1 (13.2 mg/L), MW-3 (0.226 mg/L), MW-4 (0.109 mg/l), and MW-5 (0.92 mg/L) during the June 2017 monitoring event. The reported concentrations were less than the highest concentrations observed prior to placement of waste, do not exhibit a trend via time-series graphs, and do not appear to be the result of landfill operations.

Total Manganese has been consistently detected in up-gradient well MW-1 and the highest reported concentration was observed during the May 2016 monitoring event (0.952 mg/L). Manganese detections were observed in up-gradient MW-1 (0.535 mg/L) and down-gradient site monitoring wells MW-3 (0.311 mg/L), MW-4 (.0223 mg/L), and MW-5 (0.0505 mg/L).

Chloride concentrations exhibit an increasing trend in MW-3 when considering all data accumulated since April 19, 2008. However, the concentrations have been decreasing with time since the November 2015 event. The chloride concentration reported at MW-3 during this sampling event was 163 mg/L, below the 2DWS for chloride concentrations (250 mg/L), and was less than the concentrations reported during the Second Semi-Annual Monitoring Event in November 2015 (458 mg/L), the supplemental re-sampling event (360 mg/L) in December 2015, and the Third Quarter Assessment Monitoring Event in August 2016 (218 mg/L). The chloride concentrations at MW-3 will continue to be closely monitored during future quarterly assessment monitoring events. The chloride concentration observed at MW-4 of 6.67 mg/L is consistent with previous data and is below the 2DWS for chloride concentrations (250 mg/L).

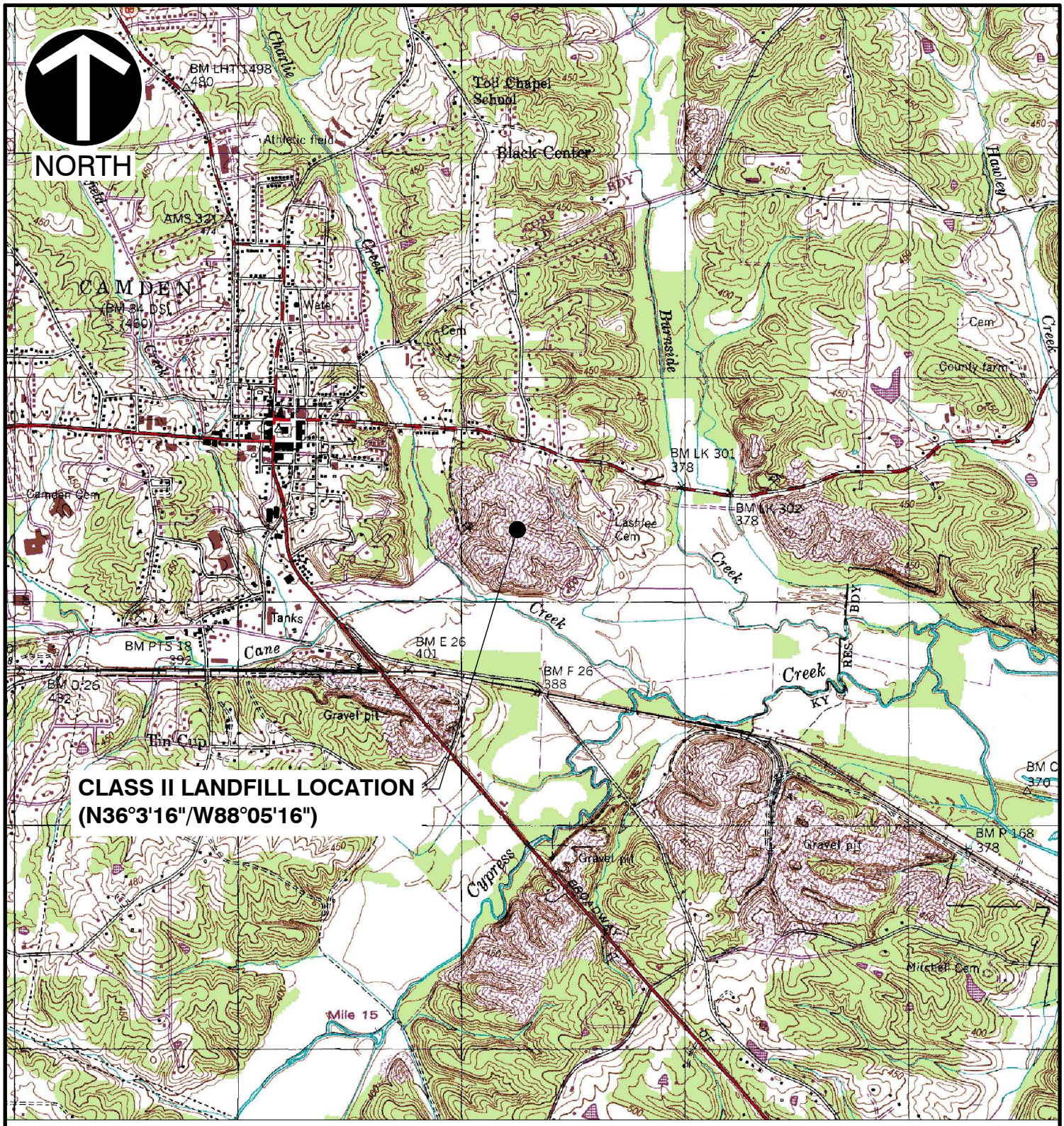
The third quarter assessment monitoring event is tentatively scheduled for September 2017 and will consist of collecting groundwater samples from up-gradient well MW-1 and down-gradient wells MW-3, MW-4, MW-5, TMW-1, TMW-2, TMW-3, and surface water and sediment samples from selected locations along Charlie Creek and Cane Creek. Collected samples will be analyzed for chloride, appendix I metals (total and dissolved), sulfate and additional leachate indicator parameters (alkalinity, ammonia, COD, calcium, iron, magnesium, manganese, potassium, sodium, and nitrate).

7.0 RECOMMENDATIONS

The following recommendations are presented in an effort to effectively identify the source(s) of the elevated total cadmium in MW-3, as well as the sources for elevated total barium, chloride, sulfate, and zinc concentrations in the given wells as detailed in the previous section. In addition, these recommendations are given in an effort to insure the continuance of securing representative groundwater samples and to obtain analytical results with a high-degree of accuracy and precision (i.e., repeatability).

1. It is recommended that dedicated low-flow pumps of the same model type, sourced from a single manufacturer be installed within monitoring wells MW-1, MW-3, MW-4, and MW-5 in order to provide representative, consistent, low-turbidity samples for laboratory analysis. The target maximum reading for turbidity for each sample is 10 NTUs.
2. It is recommended that there be an increase in the frequency of groundwater sampling events to quarterly events for all monitoring wells on the site. In addition, quarterly groundwater samples will be collected from temporary monitoring wells down-gradient from MW-3. Also, surface water samples and sediment samples will be collected at selected locations along Charlie Creek and Cane Creek and analyzed for total and dissolved metals during future quarterly assessment monitoring activities.
3. It is recommended that the chosen analytical laboratories run methods for total and dissolved (both field-filtered and lab filtered) metal constituents, using methods that will produce the lowest reporting limit. In addition to providing direct results for dissolved metals in the rare case where certain groundwater samples have turbidities that are above 10 NTUs, having a growing database of dissolved metal constituents is essential for accuracy if there is a future need for groundwater modeling and/or chemical fingerprinting with statistical correlations.
4. A new area water-well survey should be performed before the end of 2017 in accordance with the TDSWM assessment monitoring requirements.
5. It is recommended that sampling of storm water runoff occur within the on-site storm water basin and from storm water open channels located on the site for total and dissolved metals, including cadmium.
6. It is recommended that monitoring well purge water be collected from all down gradient wells and retained until lab results are received. If cadmium is detected in the analysis, the stored purge water will be disposed of in the on-site leachate treatment system.

APPENDIX A
MAPS & TABLES



REFERENCE

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

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.

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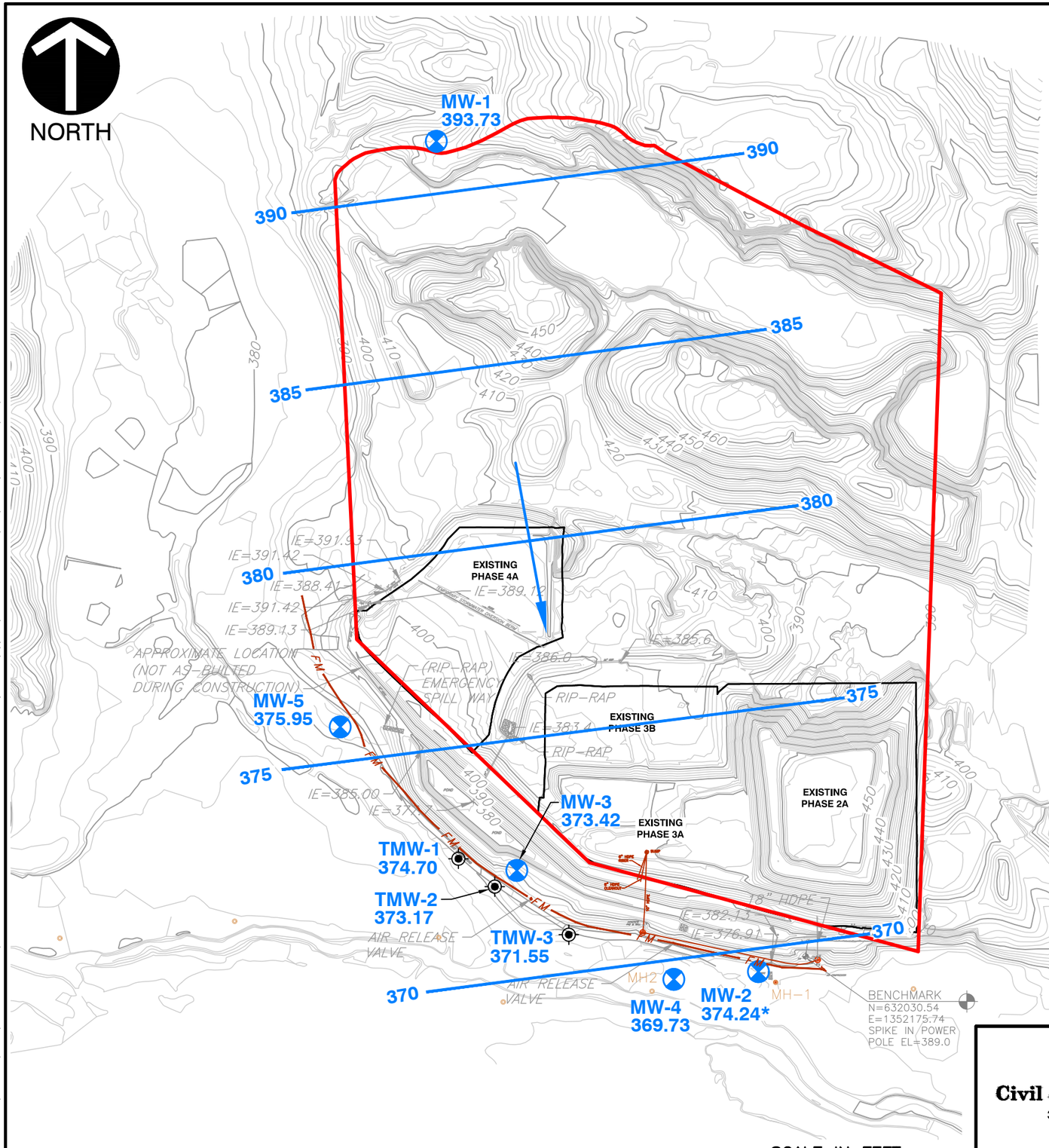
EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	KLU	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	1
DATE:	JULY 2017	DWG SCALE:	1"=2000'	PROJECT NO:	171-873		

P:\2017\171-873\-CADD\Dwg\Groundwater\171-873 SITE LOCATION MAP.dwg{LAYOUT1} LS:(7/18/2017 - pcampbell) - LP: 7/18/2017 1:43 PM



LEGEND

MW1 392.60	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 373.84	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 contour lines 370' and 390'

$$i = \frac{390' - 370'}{1{,}730'} = 0.0116 \text{ ft/ft}$$

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.

*THE POTENTIOMETRIC SURFACE ELEVATION FOR MW-2 WAS ANOMOUSLY HIGH AND EXCLUDED FROM THE POTENTIOMETRIC INTERPRETATION DURING THIS EVENT.

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ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

JUNE 2017
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	PC	CHECKED BY:	MJ	APPROVED BY:	KW*	FIGURE NO.:	2
DATE:	JULY 2017	DWG SCALE:	1"=250'	PROJECT NO:	171-873		

Table 1

Environmental Waste Solutions Camden Class II Landfill IDL 03-0212

Field Parameters and Potentiometric Data - June 8, 2017

Monitoring Well/ Piezometric Well	Date	Sample Time	Top of Casing Elevation (Feet MSL)	Bottom of Well Elevation (Feet)	Well Diameter (Feet)	Well Volume Gallons	Depth to Water (Feet)	Potentiometric Surface (Feet MSL)	Temperature (˚C)	Conductivity (micromhos/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (Millivolts)	Turbidity (NTU)
MW-1	6/8/2017	9:55	416.47	385.97	0.17	1.3	22.74	393.73	16.5	83.4	5.72	0.66	35.2	8.8
MW-2*	6/8/2017	NS	380.35	367.70	0.17	1.1	6.11	374.24	20.2	224.9	6.26	8.30	159.2	>1000
MW-3	6/8/2017	15:15	392.90	369.66	0.17	0.6	19.48	373.42	16.3	670.0	5.53	2.90	201.2	34.8
MW-3 (re-sample)	8/8/2017	8:02	392.90	369.66	0.17	0.6	19.48	373.42	16.7	710.0	5.37	3.23	126.4	16.6
MW-4	6/8/2017	14:45	381.47	358.37	0.17	1.9	11.74	369.73	15.5	54.3	5.79	2.88	165.4	3.05
MW-4 (re-sample)	8/7/2017	16:20	381.47	358.37	0.17	1.9	11.80	369.67	16.7	81.6	5.90	3.27	104.0	16.70
MW-5	6/8/2017	11:15	385.25	351.40	0.17	4.2	9.30	375.95	16.0	150.9	5.46	2.39	203.1	35.9
TMW-1**	6/8/2017	13:30	381.19	348.99	0.085	1.1	6.49	374.70	16.2	66.7	5.73	6.93	179.2	343.0
TMW-2**	6/8/2017	13:50	384.27	356.77	0.085	0.7	11.10	373.17	16.0	60.7	5.85	8.60	198.5	>1000
TMW-3**	6/8/2017	14:15	381.37	353.37	0.085	0.8	9.82	371.55	16.0	176.6	5.37	2.30	217.9	>1000
Leachate (IWC-L)	6/8/2017	16:30	NA	NA	NA	NA	NA	NA	26.6	71,330	4.89	0.57	62.7	NS
Leachate (Smelter Cell)	6/8/2017	16:00	NA	NA	NA	NA	NA	NA	38.2	380,037	9.39	0.13	6.1	NS

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

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

**- TMW locations are temporary monitoring wells installed as part of the groundwater quality assessment plan, only water levels, field parameters, alkalinity, bromide, fluoride, nitrate, sulfate, metals, and chloride were sampled

NS= Not Sampled

NA= Not Applicable.

Table 2
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212
Inorganic Analytical Data -June 2017

		MW-1	MW-3	MW-3 (re-sample)	MW-4	MW-4 (re-sample)	MW-5	TMW-1	TMW-2	TMW-3	Leachate IWC-L	Leachate-Smelter Cell
		6/8/2017	6/8/2017	8/8/2017	6/8/2017	8/7/2017	6/8/2017	6/8/2017	6/8/2017	6/8/2017	6/8/2017	6/8/2017
Parameter	**MCL (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)**
Alkalinity	-	**35.2**	**26.2**	NS	<20	NS	**47**	76.2	<20	<20	<20	**6,580**
Ammonia Nitrogen	-	<0.1	**11.9**	NS	<0.1	NS	<0.1	NS	NS	NS	**369**	**7,300**
COD	-	<10	**19.4**	NS	<10	NS	<10	NS	NS	NS	**1,390**	**9,840**
Boron	-	<0.2	<0.2	NS	<0.2	NS	<0.2	<0.2	<0.2	<0.2	<1	**9.22**
Bromide	-	<1	<1	NS	<1	NS	<1	<1	<1	<1	<1	**77**
Chloride	250 [2]	**5.68**	**163**	NS	**6.67**	NS	**38.4**	**8.82**	**44.5**	**10.3**	**24,200**	**63,600**
Fluoride	2 [2]	**0.178**	**0.208**	NS	<0.1	NS	<0.1	<0.1	<0.1	<0.1	<50	<0.1
Nitrate	10	<0.1	**3.23**	NS	**0.160**	NS Q	**0.994**	**1.31**	**3.58**	**0.618**	**0.193** Q	<0.1
Sulfate	250 [2]	<5	**93.7**	NS	<5	NS	<5	<5	<5	<5	<5	**1,090**
Aluminum	0.2 [2]	<0.1	**0.226**	NS	<0.1	NS	**0.237**	**1.04**	<0.1	**10.5**	**29.0**	<0.9
Antimony	0.006	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	<0.002	<0.002	**0.0585**
Arsenic	0.01	**0.0571**	<0.002	NS	<0.002	NS	<0.002	**0.0022**	<0.002	**0.0074**	**0.113**	<0.018
Barium	-	**0.0146**	**0.134**	NS	**0.00749**	NS	**0.0224**	**0.0272**	**0.0329**	**0.127**	**0.692**	**1.34**
Beryllium	0.004	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	<0.002	<0.04	<0.018
Cadmium	0.005	<0.001	**0.0286**	**0.0113**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**155**	**0.15**
Calcium	-	**2.73**	**38.9**	NS	**3.96**	NS	**10.2**	**7.49**	**15.5**	**7.15**	**2,560**	**277**
Chromium	0.1	<0.002	<0.002	NS	<0.002	NS	<0.002	**0.0102**	<0.002	**0.0311**	<0.04	<0.018
Cobalt	-	**0.0342**	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	**0.0108**	**0.728**	**0.041**
Copper	1.3	<0.005	<0.005	NS	<0.005	NS	<0.005	**0.0153**	<0.005	**0.0199**	**2.99**	**4.4**
Iron	0.3 [2]	**13.2**	**0.226**	NS	**0.109**	NS	**0.92**	**3.29**	<0.1	**21.5**	**142**	<0.9
Lead	0.015	<0.002	<0.002	NS	<0.002	NS	<0.002	**0.00398**	<0.002	**0.0131**	**0.045**	<0.18
Magnesium	-	**2.27**	**17.8**	NS	**2.58**	NS	**5.58**	**2.11**	**5.32**	**3.04**	**1,340**	<9
Manganese	0.05 [2]	**0.776**	**0.555**	NS	**0.013**	NS	**0.045**	**0.0986**	**0.0385**	**0.326**	**286**	**0.181**
Nickel	0.10 [1]	**0.00418**	**0.00231**	NS	<0.002	NS	**0.00338**	**0.00251**	<0.002	**0.00777**	**0.639**	**0.503**
Potassium	-	<1	**25.8**	NS	<1	NS	<1	**1.5**	**1.42**	**1.32**	**3,400**	**48,600**
Selenium	0.05	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	**<0.002**	**0.262**	<0.18
Silver	0.10 [2]	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	<0.002	<0.002	<0.018
Sodium	-	**2.93**	**60.1**	NS	**3.67**	NS	**10.1**	**4.52**	**9.09**	**3.31**	**5,850**	**74,700**
Thallium	0.002	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	<0.002	<0.04	<0.18
Vanadium	-	<0.005	<0.005	NS	<0.005	NS	<0.005	**0.00858**	<0.005	**0.0348**	<0.1	<0.045
Zinc	5 [2]	<0.025	**0.0769**	NS	<0.025	NS	<0.025	<0.025	<0.025	**0.0399**	**1,980**	**38.4**
Mercury	0.002	**0.000222**	<0.0002	NS	<0.0002	NS	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002

Notes:
MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards
[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)
Bold text indicates laboratory analytical detections above the practical quantitation level
Dark gray shaded text indicates detection above respective MCL
Light gray shaded text indicates detection above respective Non-Enforceable National Secondary Drinking Water Standard.
Q: (ESC)- Additional QC Info: The sample was prepared and/or analyzed past recommended holdint time. Concentrations should be considered minimum values.

Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212
Inorganic Analytical Data -June 2017

Intra-Well Statistical Summary								
Constituent	Well	% Non Detects	Normality	Intra-well NPPL	Intra-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI
Arsenic	MW-1	0.00	parametric	--	Pass	--	--	No
Barium	MW-1	0.00	non-parametric	--	--	Pass	--	No
Cobalt	MW-1	0.00	parametric	--	Pass	--	--	No
Fluoride	MW-1	85.71	non-parametric	**Fail**	--	--	Pass	No
Nickel	MW-1	66.67	non-parametric	Pass	--	--	--	No
Mercury	MW-1	44.44	non-parametric	Pass	--	--	--	No

Inter-Well Statistical Summary									
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI	Mann-Kendall Trend Analysis
Aluminum	MW-3	15	non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Barium	MW-3	0	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
	MW-4		non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Cadmium	MW-3	93.88	non-parametric	**Fail**	--	--	Pass	No	**Upward Trend**
Chloride	MW-3	0	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
	MW-4		non-parametric	--	--	**Fail**	**Fail**	**Yes**	Downward Trend
	MW-5		non-parametric	--	--	**Fail**	**Fail**	**Yes**	No Trend
Nickel	MW-3	74.51	non-parametric	Pass	--	--	--	No	Downward Trend
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Sulfate	MW-3	40.81	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
Zinc	MW-3	50.98	non-parametric	**Fail**	--	--	Pass	No	**Upward Trend**

APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

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 = 9 for 18 measurements

Sum of b values = 0.0866175
Sample Standard Deviation = 0.0213848
W Statistic = 0.965057

5% Critical value of 0.897 is less than 0.965057
Data is normally distributed at 95% level of significance

1% Critical value of 0.858 is less than 0.965057
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
Location: MW-1
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 9 for 18 measurements

Sum of b values = 0.060552
Sample Standard Deviation = 0.0192146
W Statistic = 0.584178

5% Critical value of 0.897 exceeds 0.584178
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.584178
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 = 9 for 18 measurements

Sum of b values = 0.0351432
Sample Standard Deviation = 0.00871255
W Statistic = 0.957068

5% Critical value of 0.897 is less than 0.957068
Data is normally distributed at 95% level of significance

1% Critical value of 0.858 is less than 0.957068
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
Location: MW-1
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 3 for 7 measurements

Sum of b values = 0.0486174
Sample Standard Deviation = 0.0294812
W Statistic = 0.453253

5% Critical value of 0.803 exceeds 0.453253
Evidence of non-normality at 95% level of significance

1% Critical value of 0.73 exceeds 0.453253
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 = 9 for 18 measurements

Sum of b values = 0.153344
Sample Standard Deviation = 0.0548356
W Statistic = 0.459999

5% Critical value of 0.897 exceeds 0.459999
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.459999
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 = 9 for 18 measurements

Sum of b values = 0.000908727
Sample Standard Deviation = 0.000254038
W Statistic = 0.7527

5% Critical value of 0.897 exceeds 0.7527
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.7527
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
Location: MW-1
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 9 for 18 measurements

Sum of b values = 1.67803
Sample Standard Deviation = 0.470339
W Statistic = 0.748737

5% Critical value of 0.897 exceeds 0.748737
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.748737
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
Location: MW-1
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 3 for 7 measurements

Sum of b values = 0.791442
Sample Standard Deviation = 0.479924
W Statistic = 0.453253

5% Critical value of 0.803 exceeds 0.453253
Evidence of non-normality at 95% level of significance

1% Critical value of 0.73 exceeds 0.453253
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Nickel
Location: MW-1
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 9 for 18 measurements

Sum of b values = 3.08122
Sample Standard Deviation = 1.00306
W Statistic = 0.555063

5% Critical value of 0.897 exceeds 0.555063
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.555063
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 = 9 for 18 measurements

Sum of b values = 3.32567
Sample Standard Deviation = 0.900442
W Statistic = 0.802414

5% Critical value of 0.897 exceeds 0.802414
Evidence of non-normality at 95% level of significance

1% Critical value of 0.858 exceeds 0.802414
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

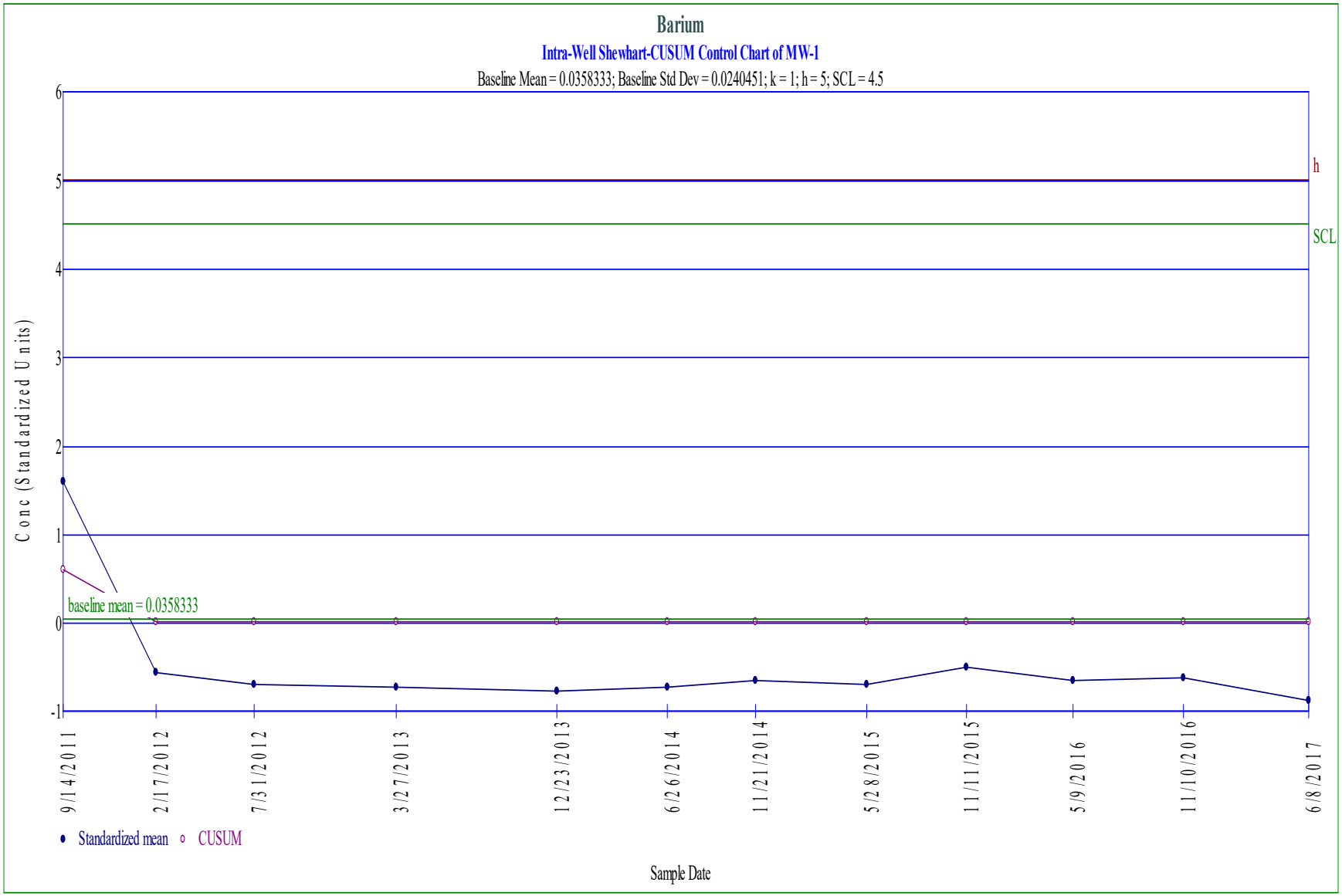
Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	0.024
	1/21/2009	0.072
	4/9/2009	0.067
	5/19/2009	0.064
	7/16/2010	0.074
	2/8/2011	0.086
	9/14/2011	0.091
	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

From 17 baseline samples
Baseline mean = 0.0657
Baseline std Dev = 0.0219437

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 = 17 (background observations) - 1
t(0.95, 17) = 1.74588

Date	Samples	Mean	Interval	Significant
6/8/2017	1	0.0571	[0, 0.105122]	FALSE


Barium
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.0358333; Baseline Std Dev = 0.0240451; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.0358333
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1
Parameter: Cobalt
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

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

Baseline Samples	Date	Result
	4/19/2008	0.032
	1/21/2009	0.03
	4/9/2009	0.043
	5/19/2009	0.056
	7/16/2010	0.035
	2/8/2011	0.031
	9/14/2011	0.029
	2/17/2012	0.026
	7/31/2012	0.028
	3/27/2013	0.036
	12/23/2013	0.028
	6/26/2014	0.036
	11/21/2014	0.046
	5/28/2015	0.041
	11/11/2015	0.0257
	5/9/2016	0.0417
	11/10/2016	0.0196

From 17 baseline samples
Baseline mean = 0.0343529
Baseline std Dev = 0.00898061

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 = 17 (background observations) - 1
t(0.95, 17) = 1.74588

Date	Samples	Mean	Interval	Significant
6/8/2017	1	0.0342	[0, 0.0504866	FALSE

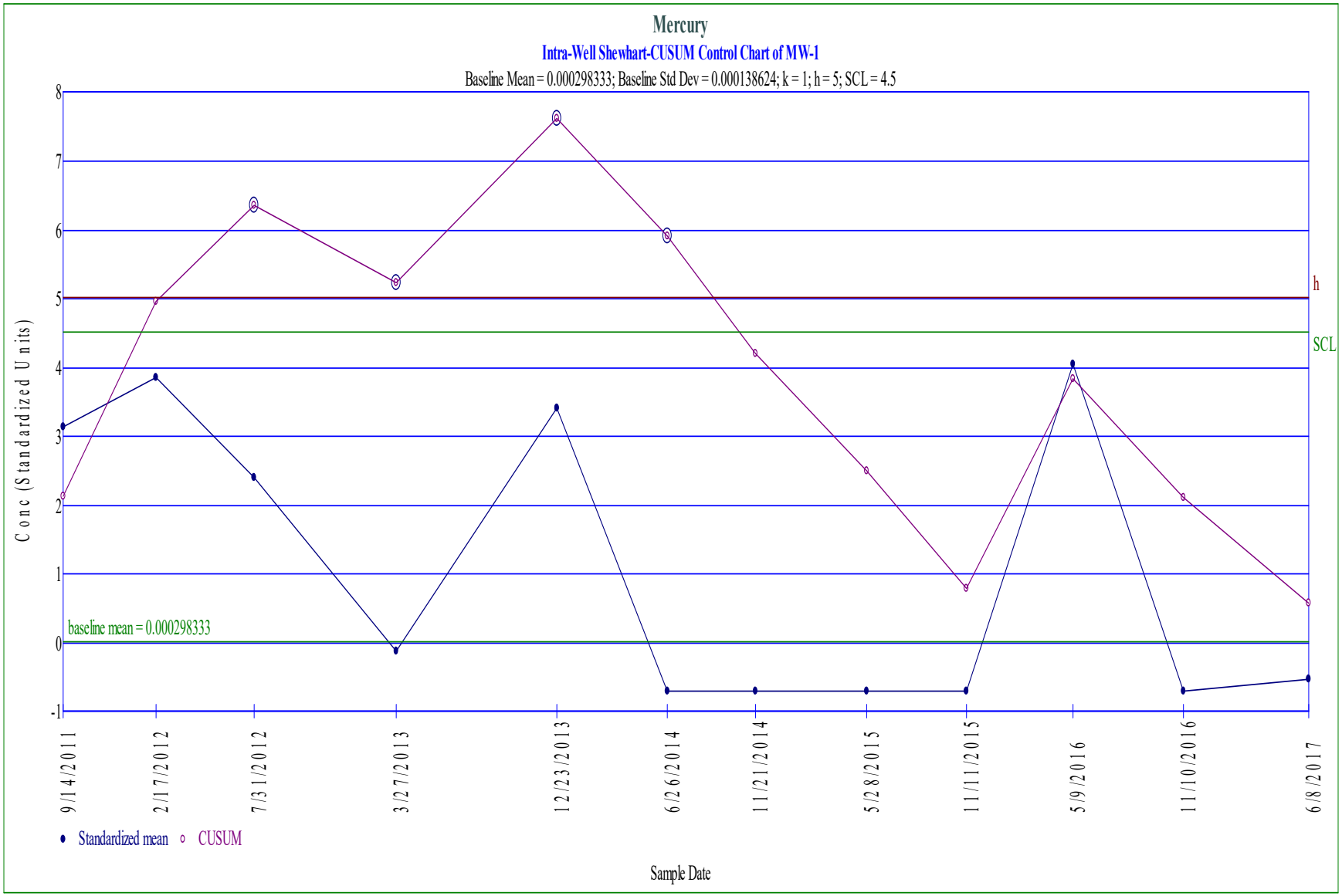
Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 100%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 6
Maximum Baseline Concentration = 0.1
Confidence Level = 85.7%
False Positive Rate = 14.3%

Baseline Measurements	Date	Value
	4/19/2008	ND<0.1
	1/21/2009	ND<0.1
	4/9/2009	ND<0.1
	5/19/2009	ND<0.1
	5/9/2016	ND<0.1
	11/10/2016	ND<0.1

Date	Count	Mean	Significant
6/8/2017	**1**	**0.178**	**TRUE**


Mercury
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.000298333; Baseline Std Dev = 0.000138624; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
8
7
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.000298333
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

Wilcoxon Non-Parametric Analysis (Intra-Well)

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

Total non detects is 6
Non detect rank is 3.5

Wilcoxon Ranks

Group	Date	Conc.	Rank
Baseline Values	4/19/2008	ND<0.1	3.5
	1/21/2009	ND<0.1	3.5
	4/9/2009	ND<0.1	3.5
	5/19/2009	ND<0.1	3.5
Comparison Values	5/9/2016	ND<0.1	3.5
	11/10/2016	ND<0.1	3.5
	6/8/2017	0.178	7

The Wilcoxon Statistic is 8
The Expected value is is 6
The Standard Deviation is 2.82843
The Z Score is 0.53033
The Standard Deviation adjusted for ties is 1.73205
The Z Score adjusted for ties is 0.866025
0.53033 < 2.326 indicating no statistical significance at 1% level
0.866025 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

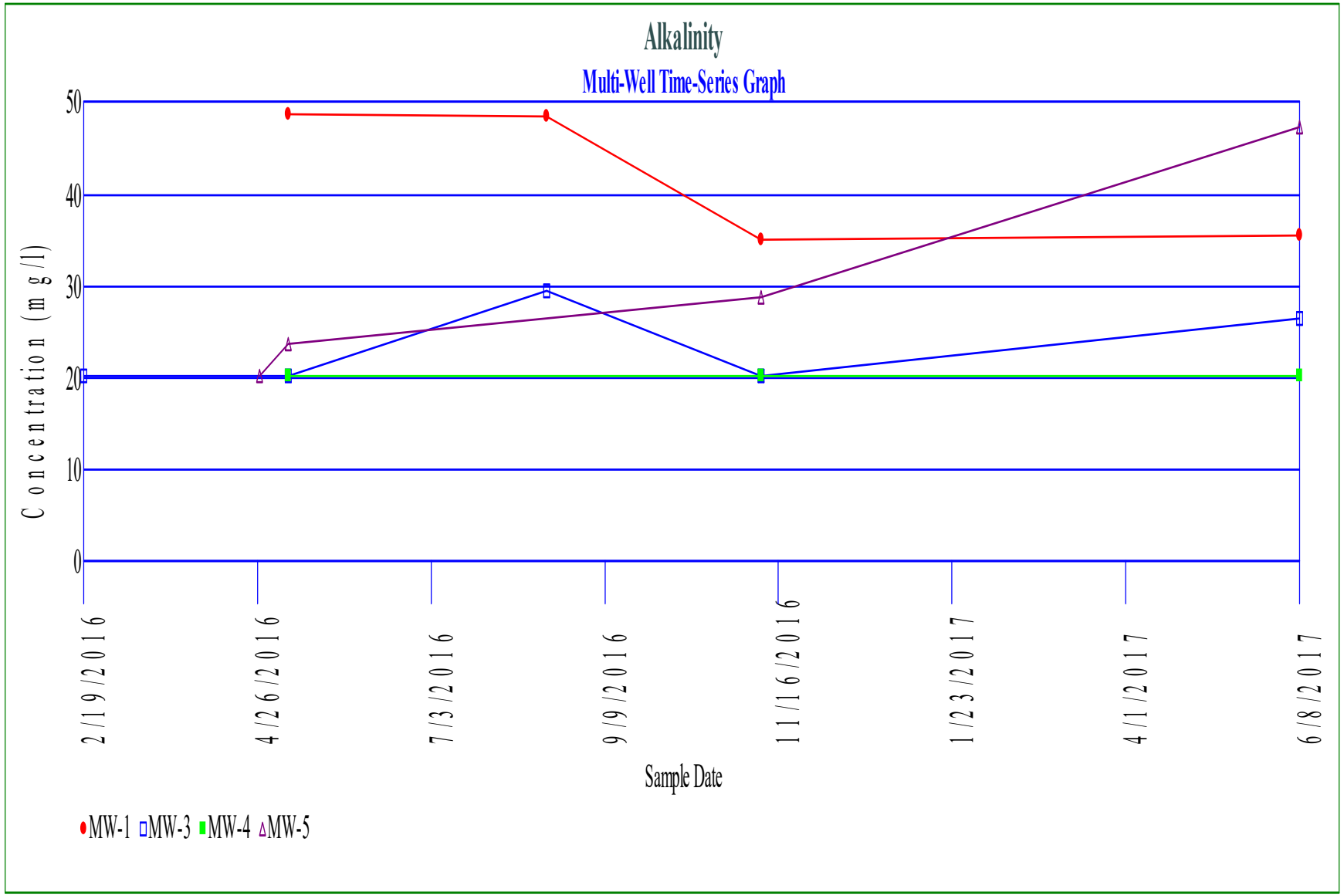
Non-Parametric Prediction Interval

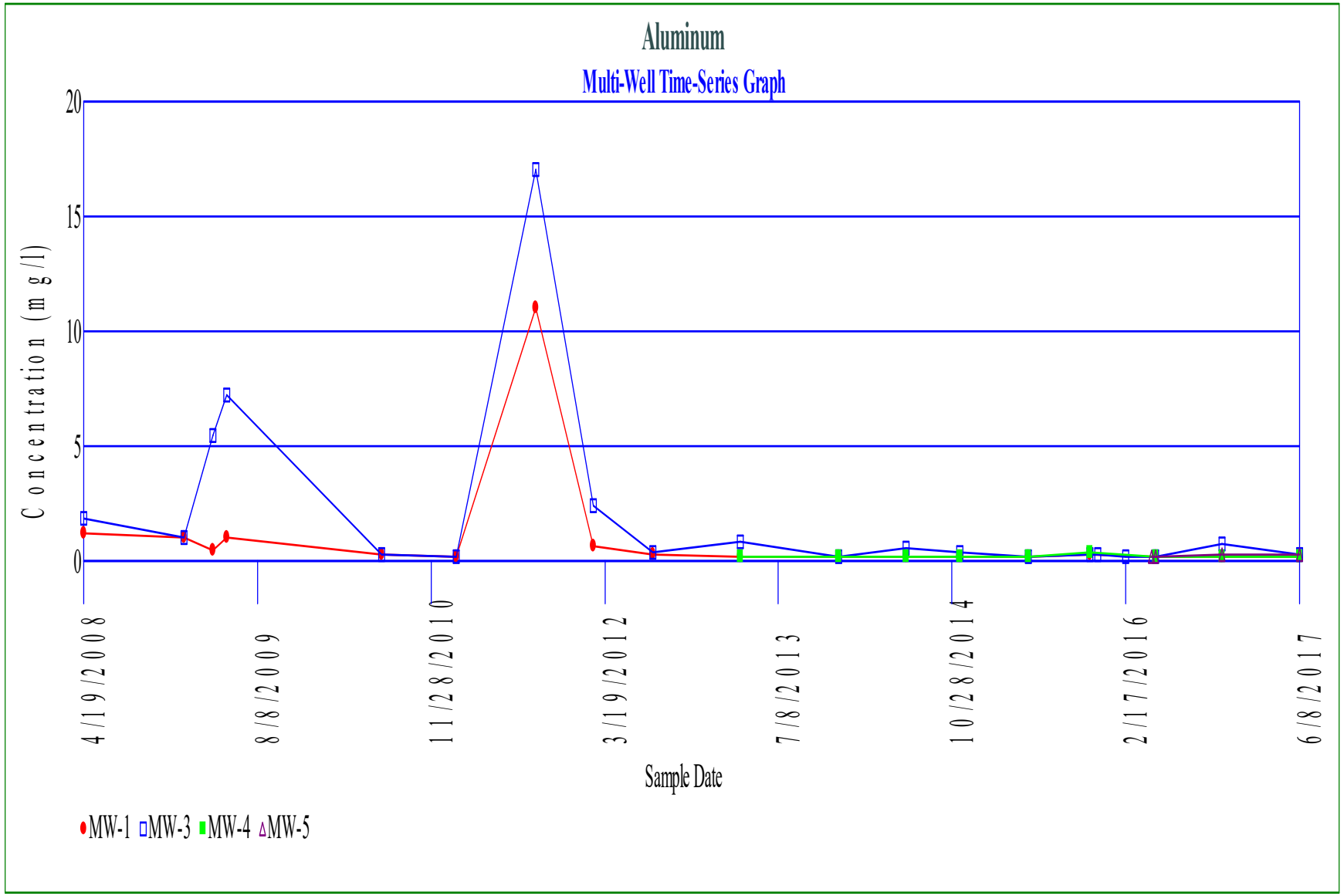
Intra-Well Comparison for MW-1
Parameter: Nickel
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

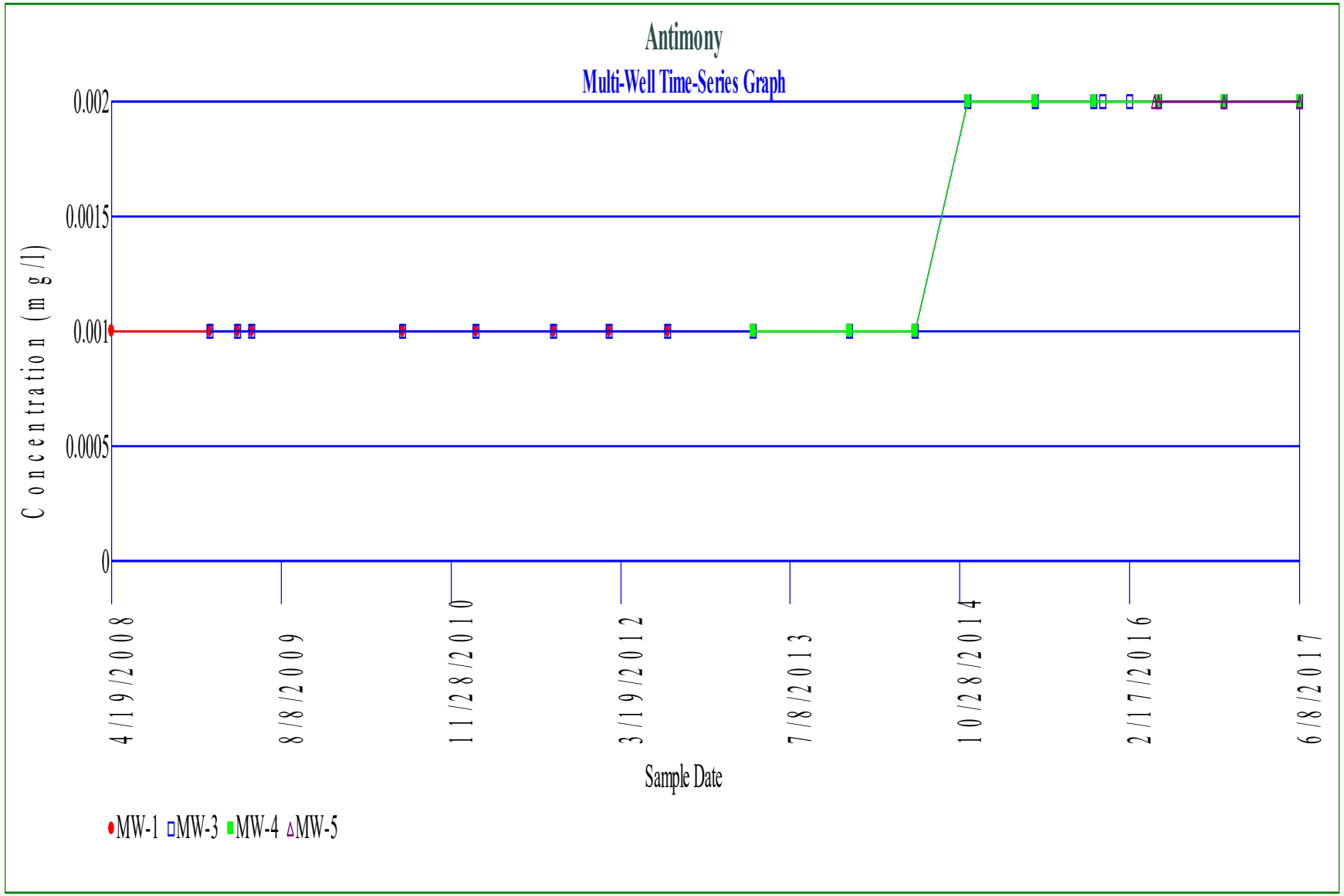
Total Percent Non-Detects = 70.5882%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 17
Maximum Baseline Concentration = 0.2
Confidence Level = 94.4%
False Positive Rate = 5.6%

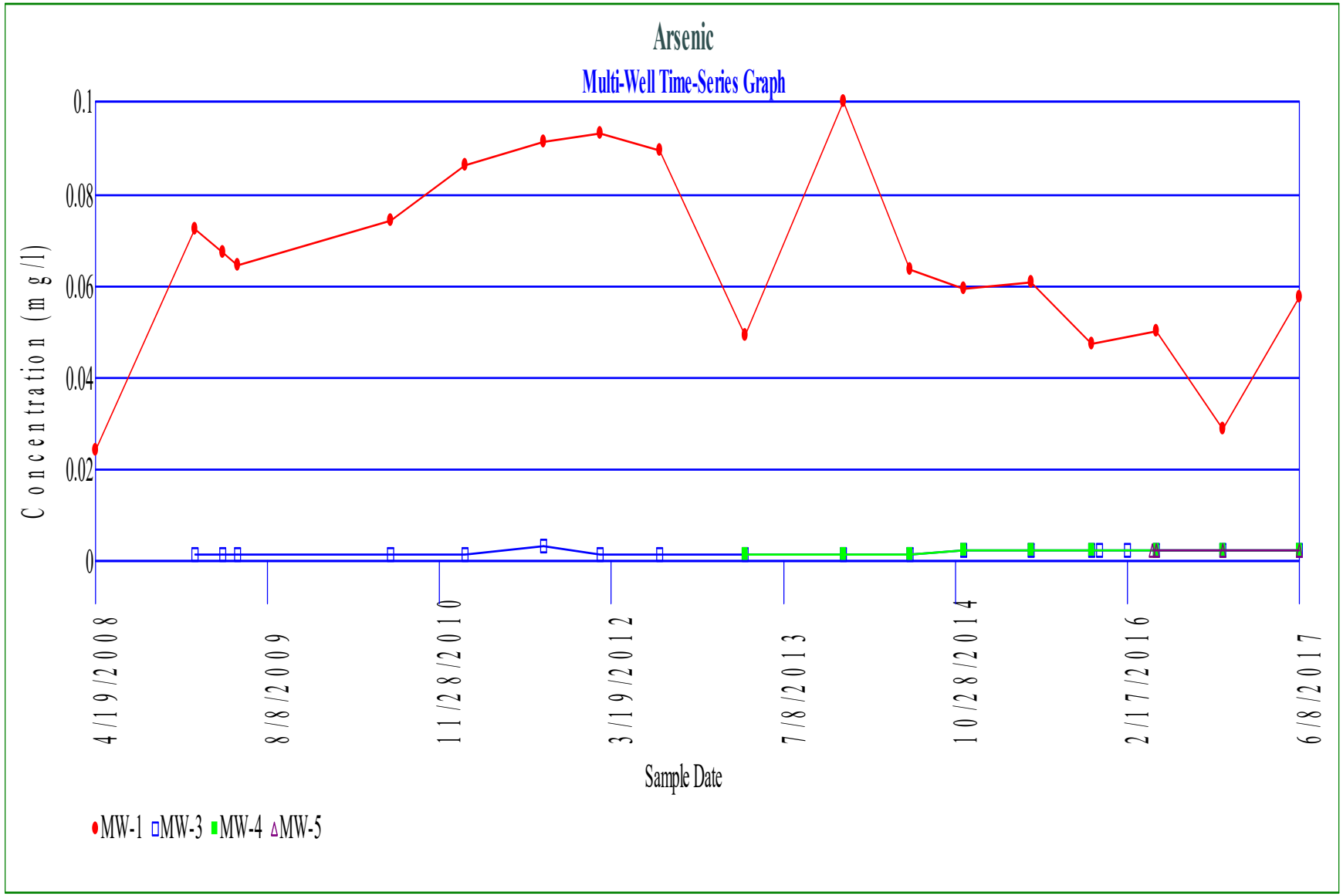
Baseline Measurements	Date	Value
	4/19/2008	ND<0.02
	1/21/2009	ND<0.02
	4/9/2009	0.2
	5/19/2009	0.17
	7/16/2010	ND<0.02
	2/8/2011	ND<0.02
	9/14/2011	ND<0.02
	2/17/2012	ND<0.02
	7/31/2012	ND<0.02
	3/27/2013	ND<0.02
	12/23/2013	ND<0.02
	6/26/2014	ND<0.02
	11/21/2014	ND<0.02
	5/28/2015	ND<0.02
	11/11/2015	0.0112
	5/9/2016	0.00512
	11/10/2016	0.0112

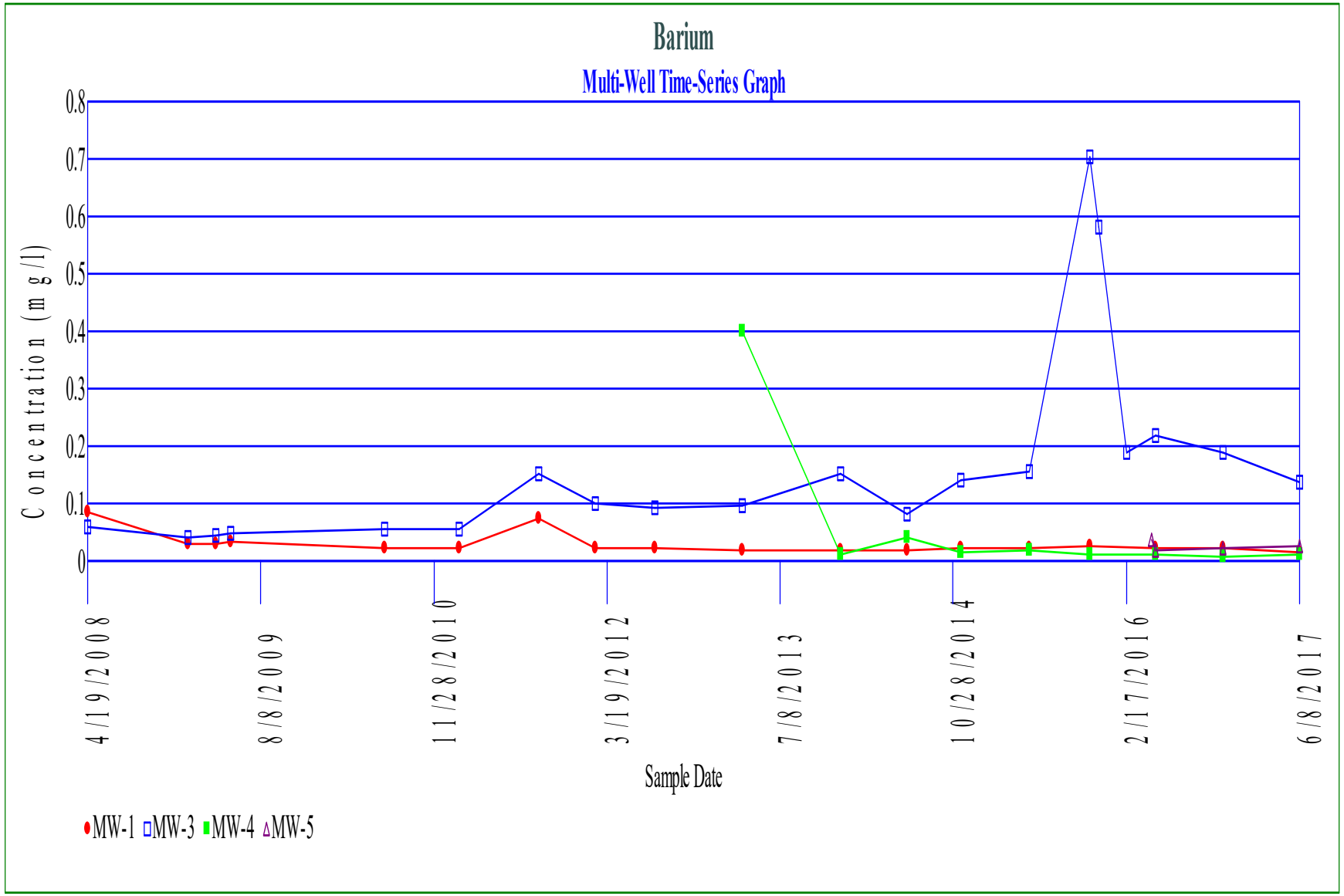
Date	Count	Mean	Significant
6/8/2017	1	0.00418	FALSE

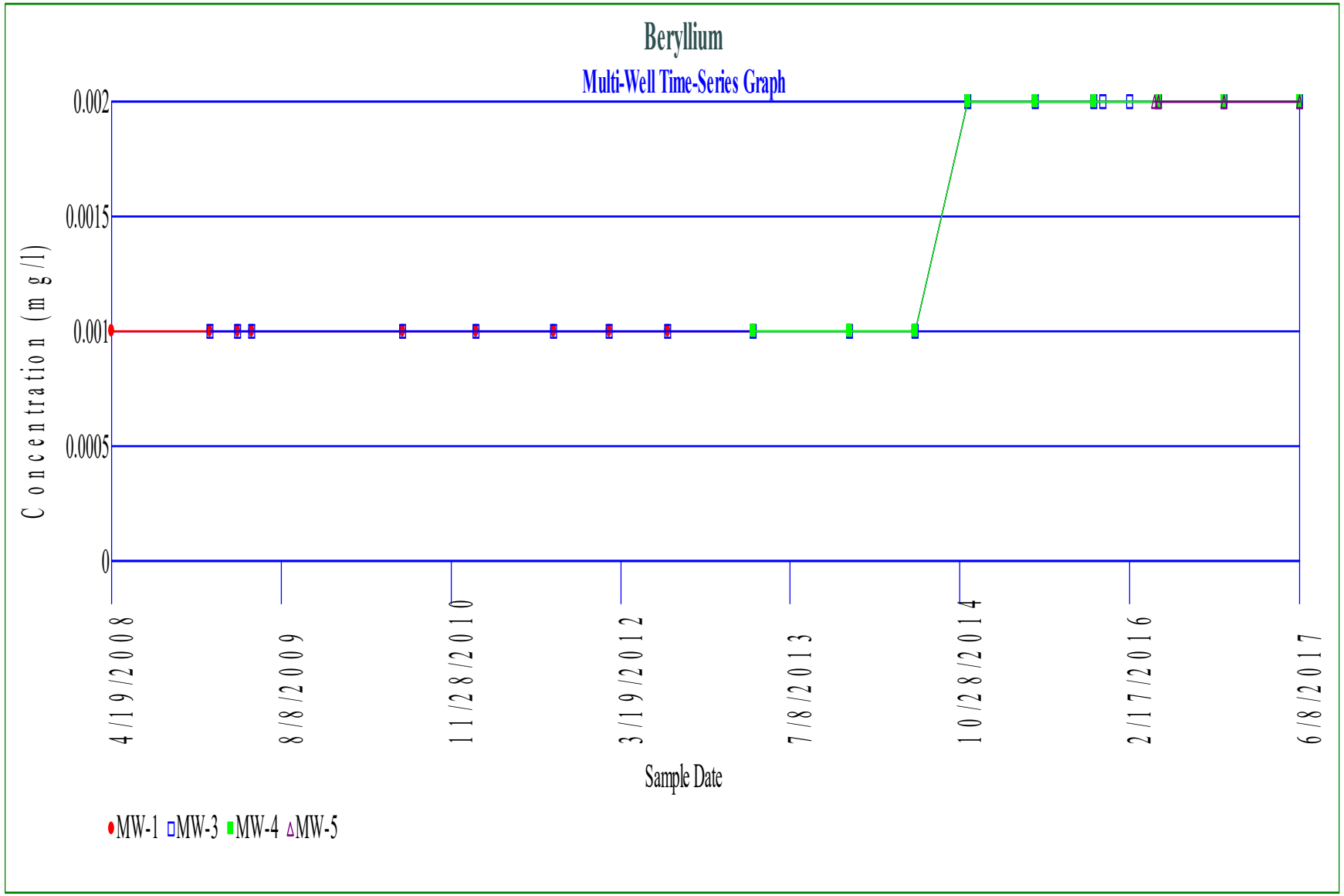

Alkalinity
Multi-Well Time-Series Graph
50
40
30
20
10
0
Concentration (mg/l)
2/19/2016
4/26/2016
7/3/2016
9/9/2016
11/16/2016
1/23/2017
4/1/2017
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

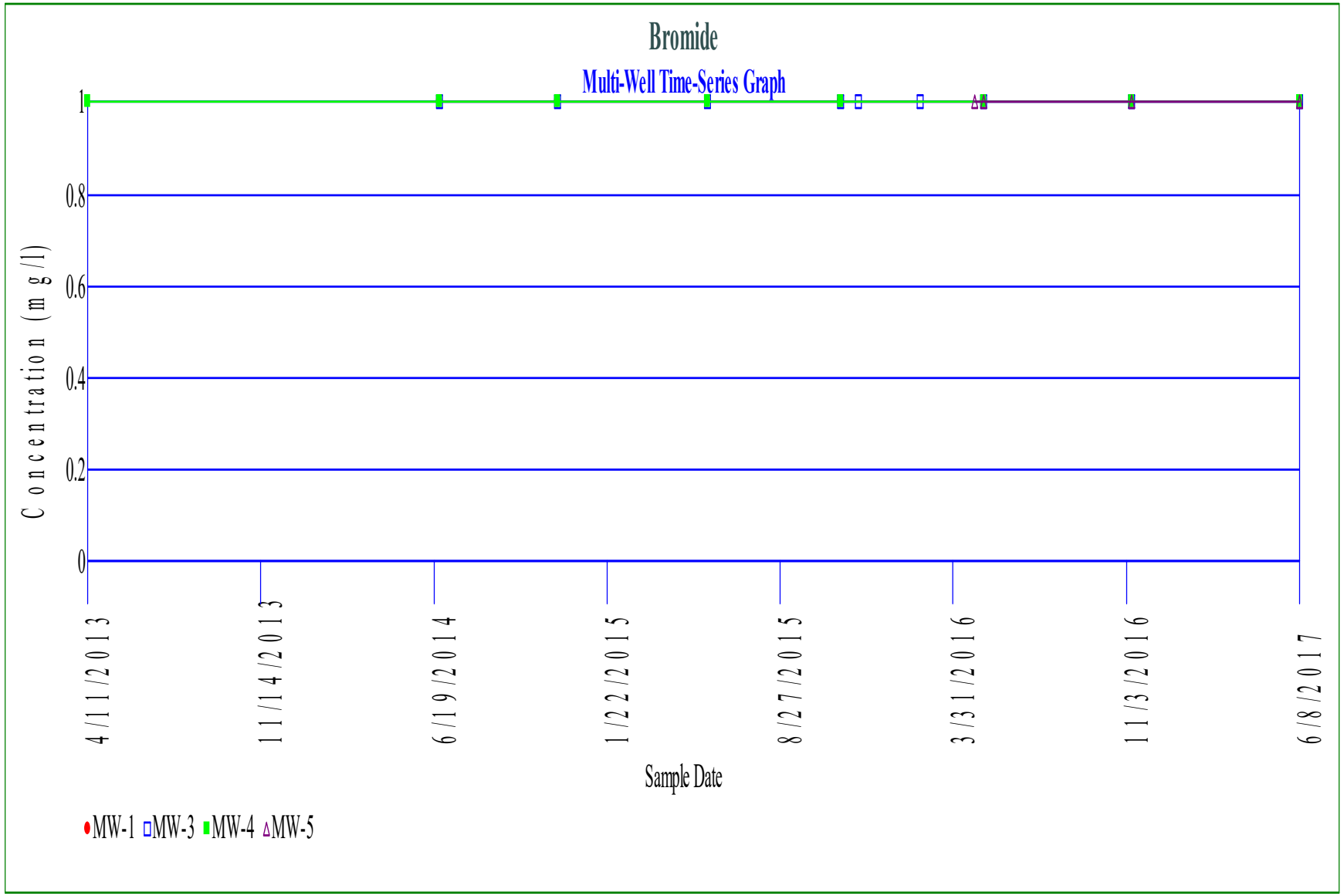

Aluminum
Multi-Well Time-Series Graph
Concentration (mg/l)
20
15
10
5
0
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

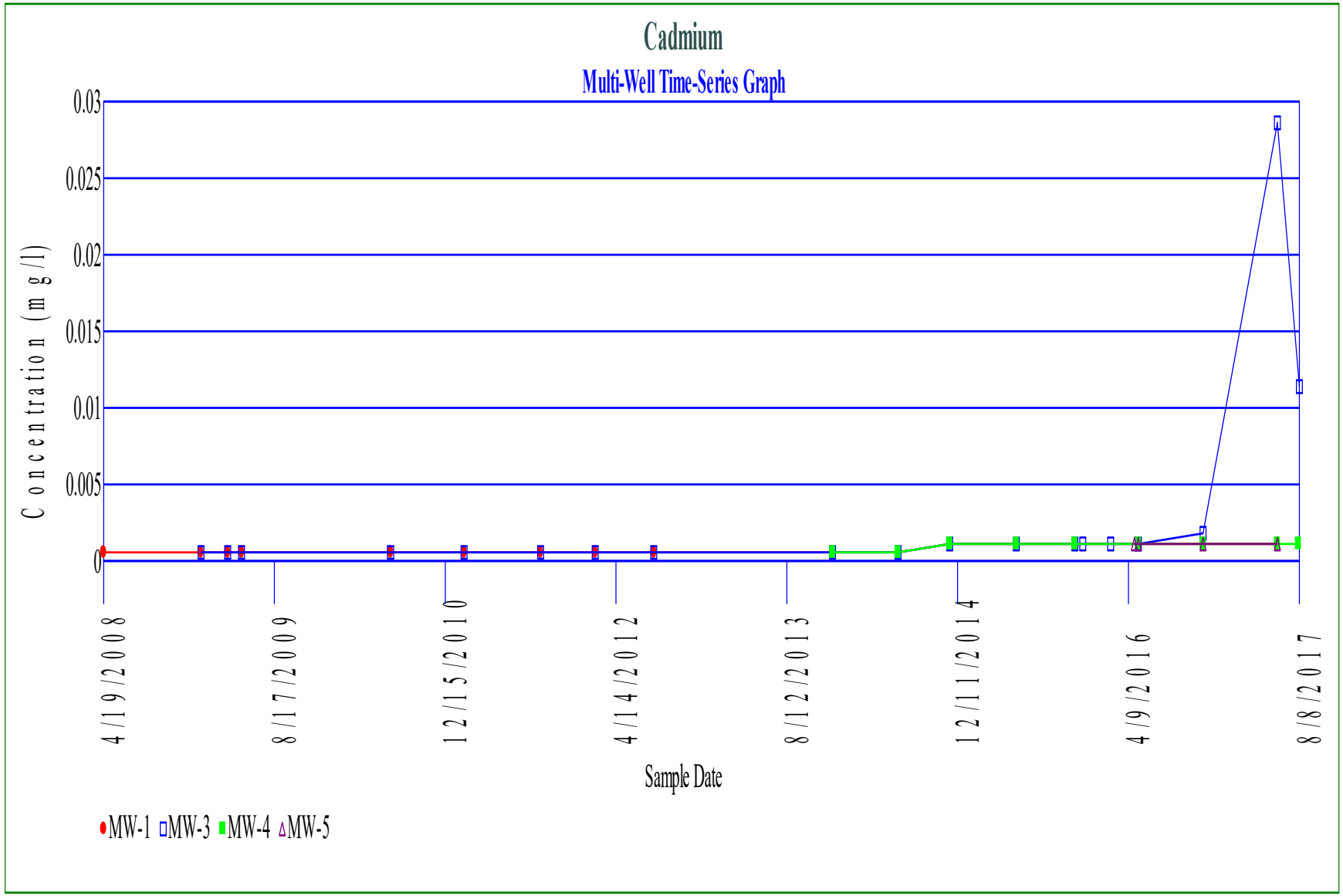

Antimony
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

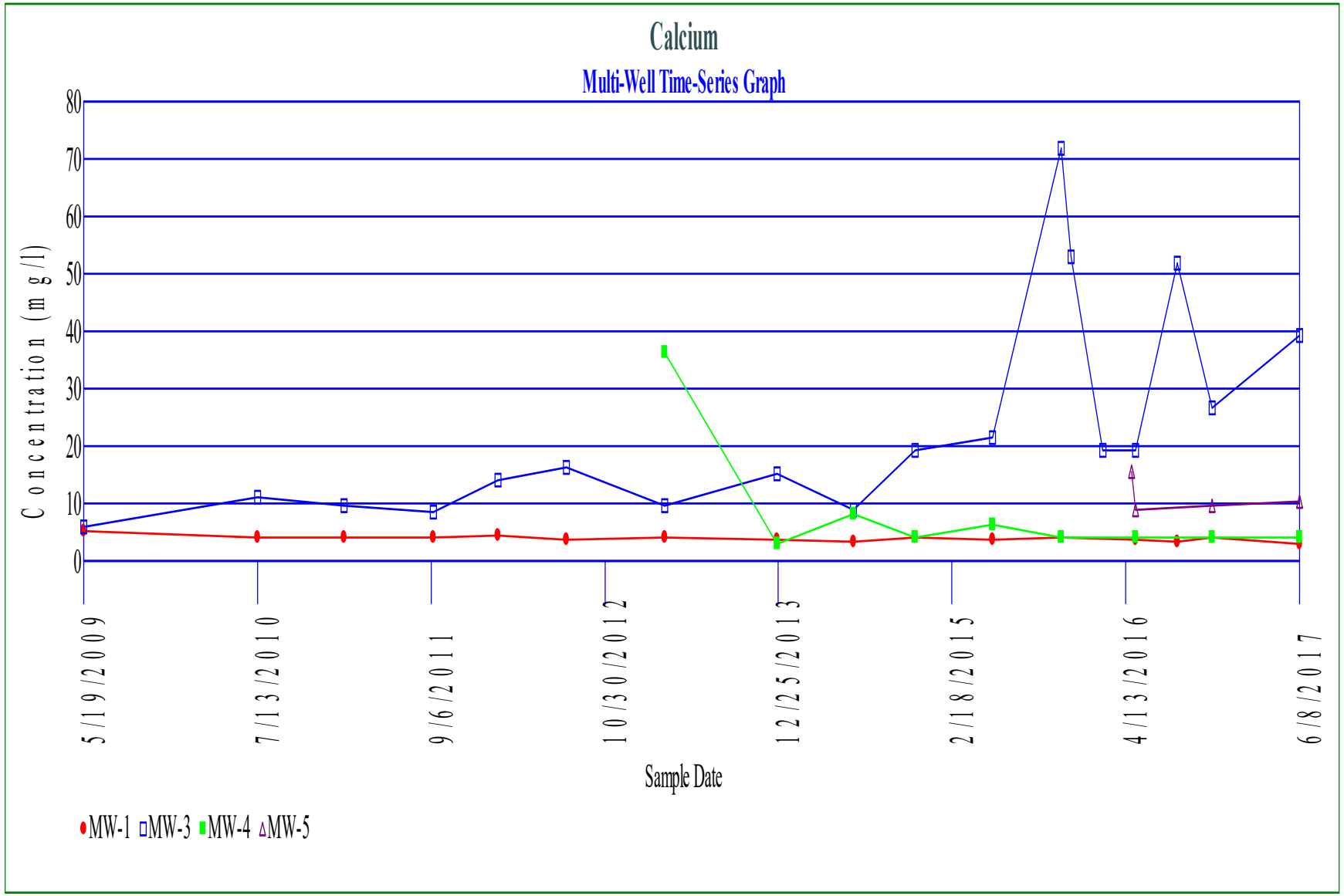

Arsenic
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

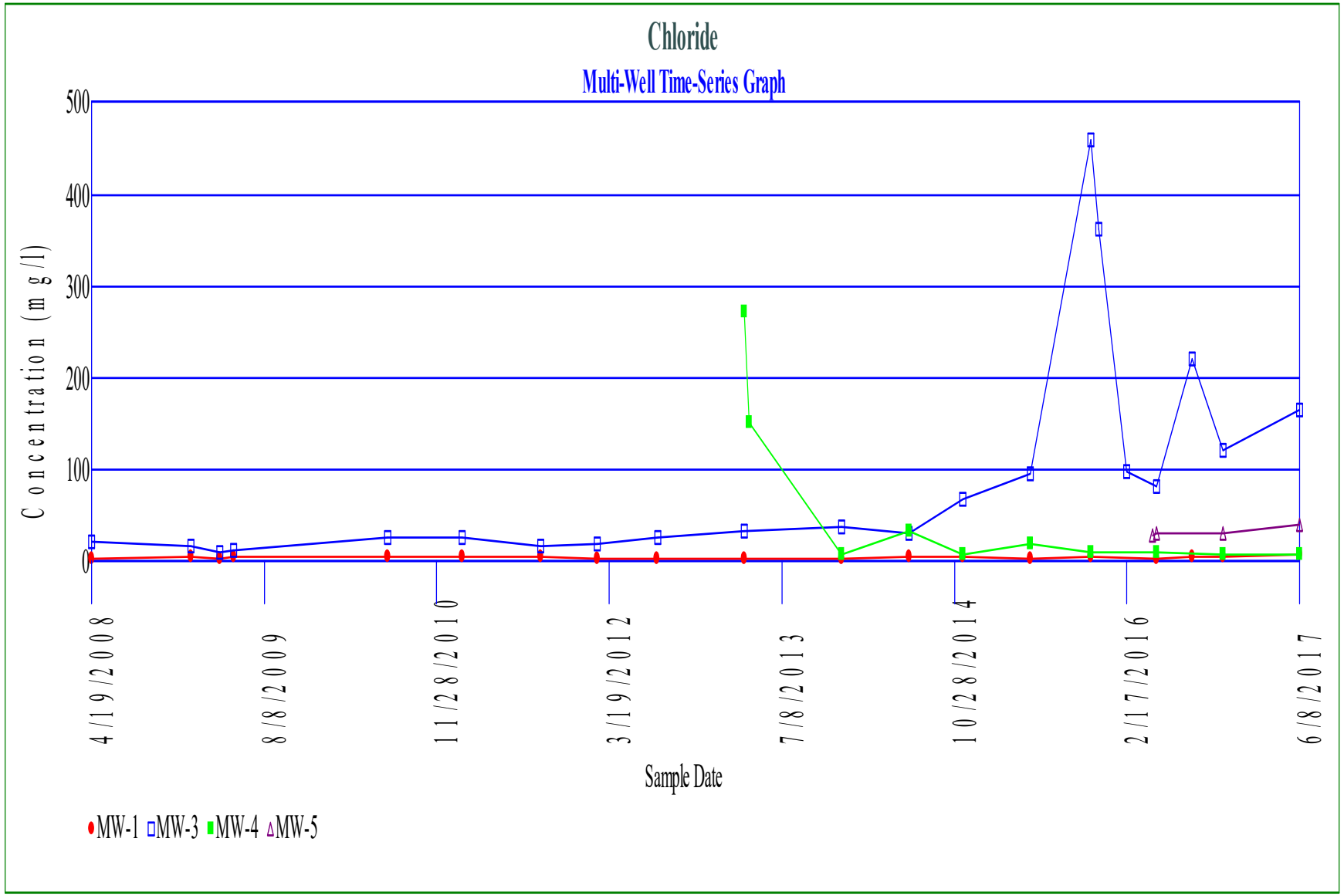

Barium
Multi-Well Time-Series Graph
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

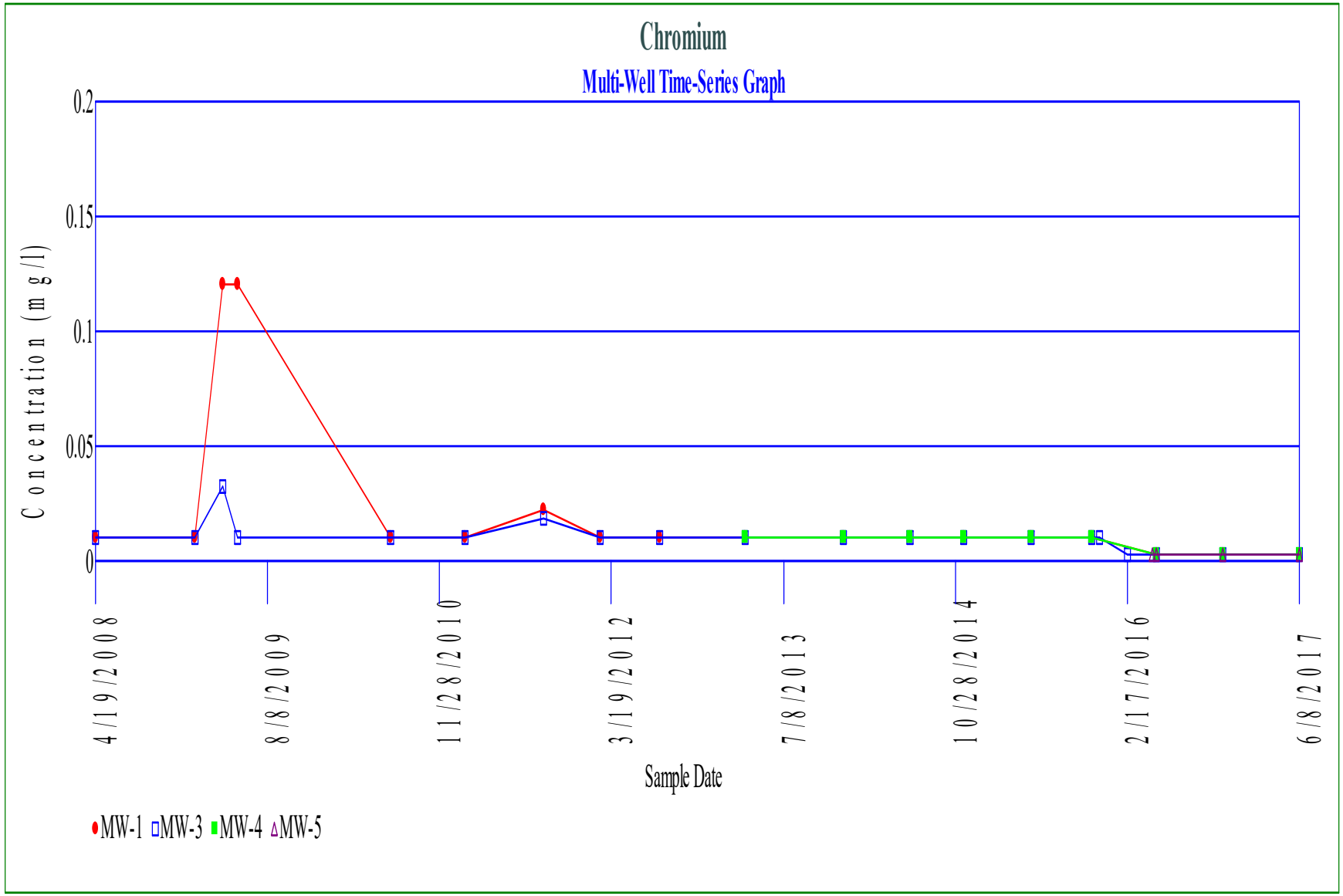

Beryllium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

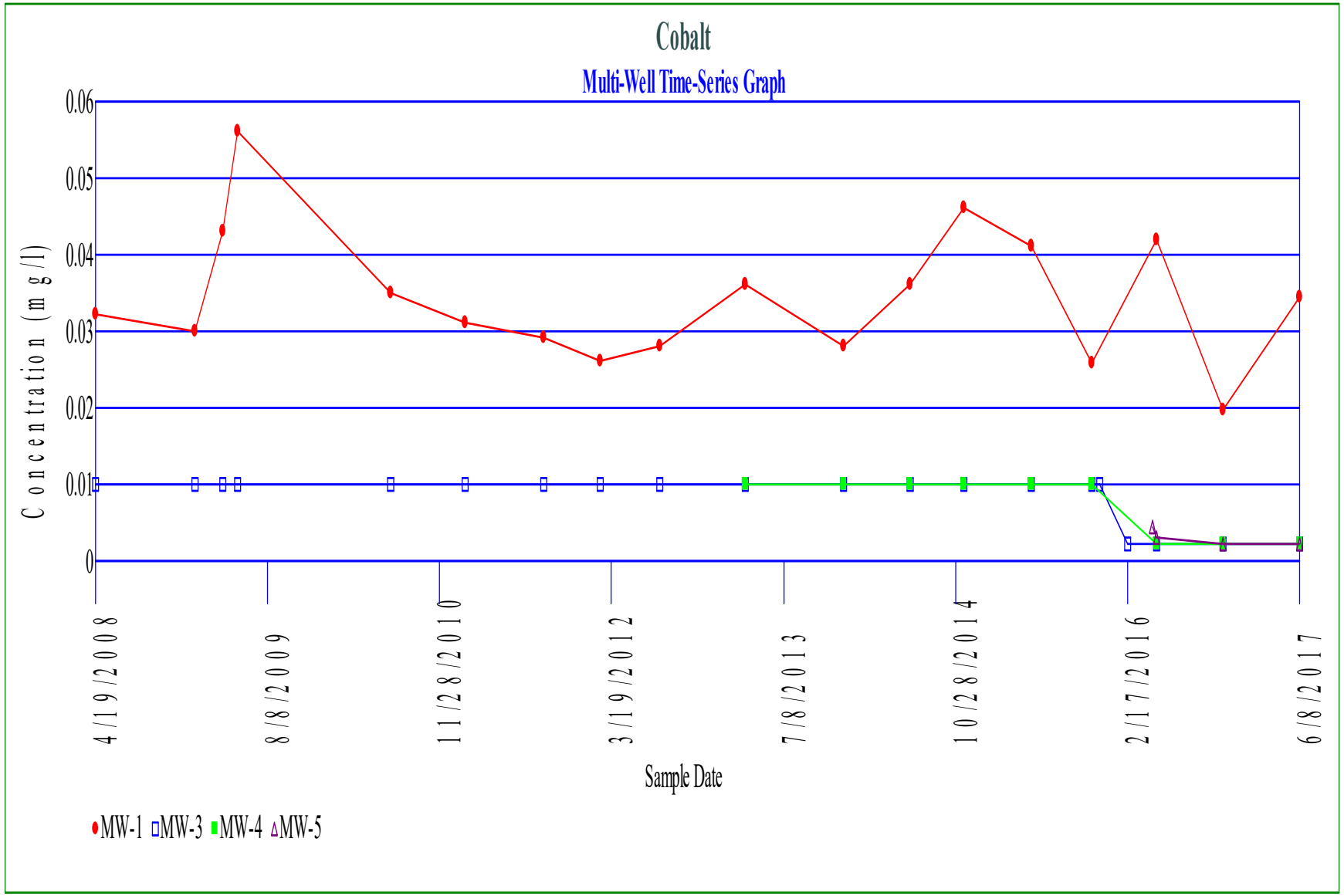

Bromide
Multi-Well Time-Series Graph
Concentration (mg/l)
1
0.8
0.6
0.4
0.2
0
4/11/2013
11/14/2013
6/19/2014
12/22/2015
8/27/2015
3/31/2016
11/3/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

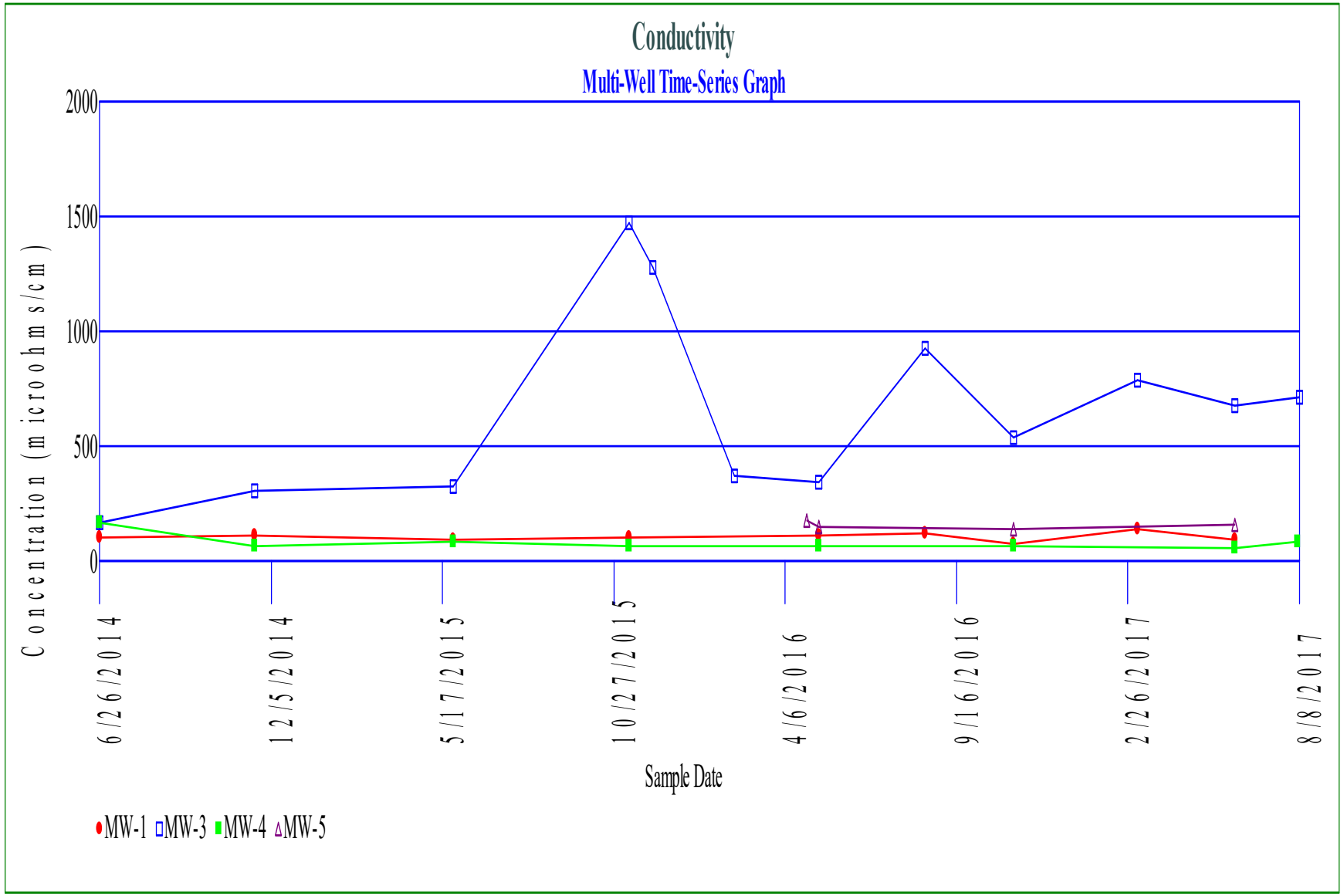

Cadmium
Multi-Well Time-Series Graph
0.03
0.025
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
8/17/2009
12/15/2010
4/14/2012
8/12/2013
12/11/2014
4/9/2016
8/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

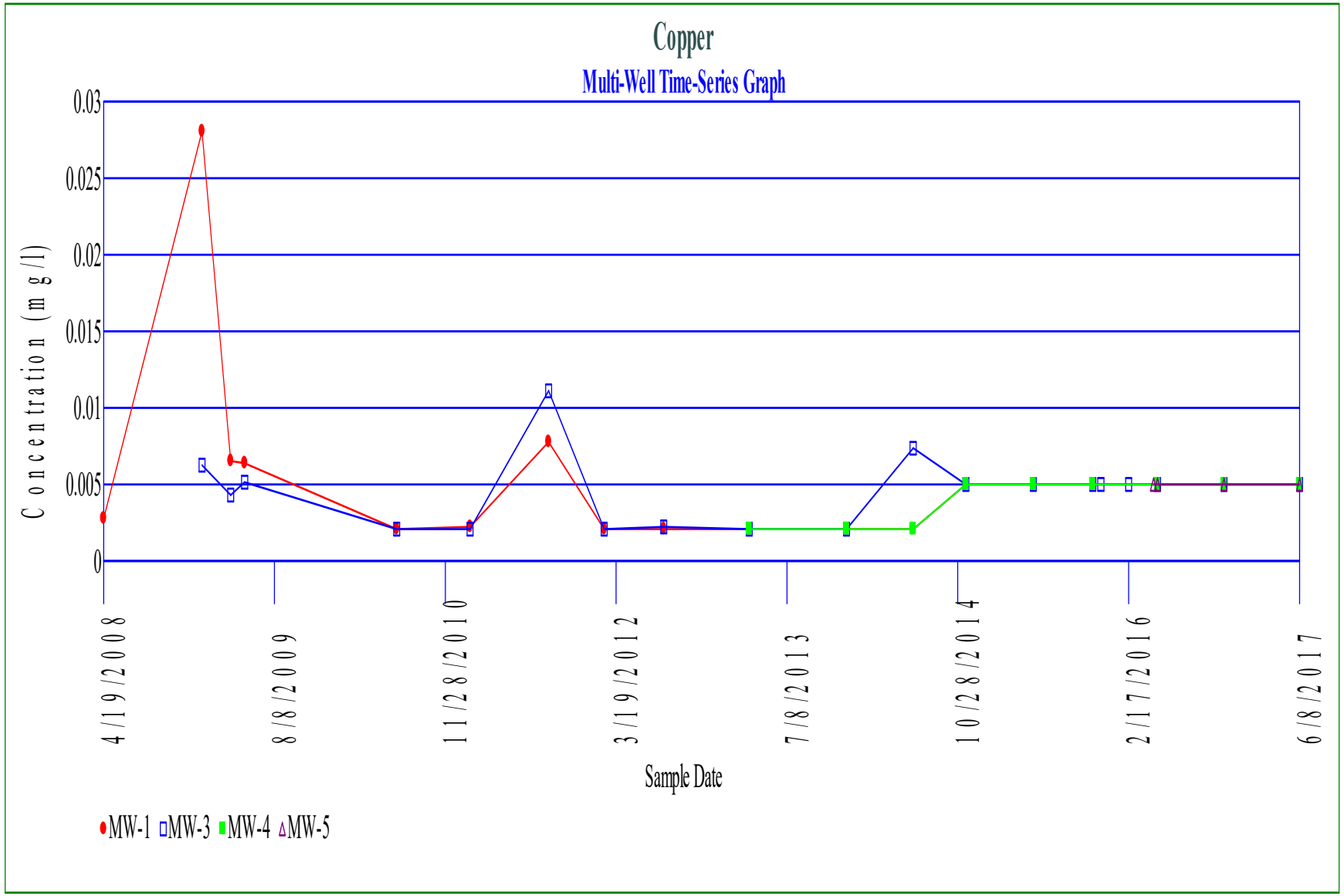

Calcium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
7/13/2010
9/6/2011
10/30/2012
12/25/2013
2/18/2015
4/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

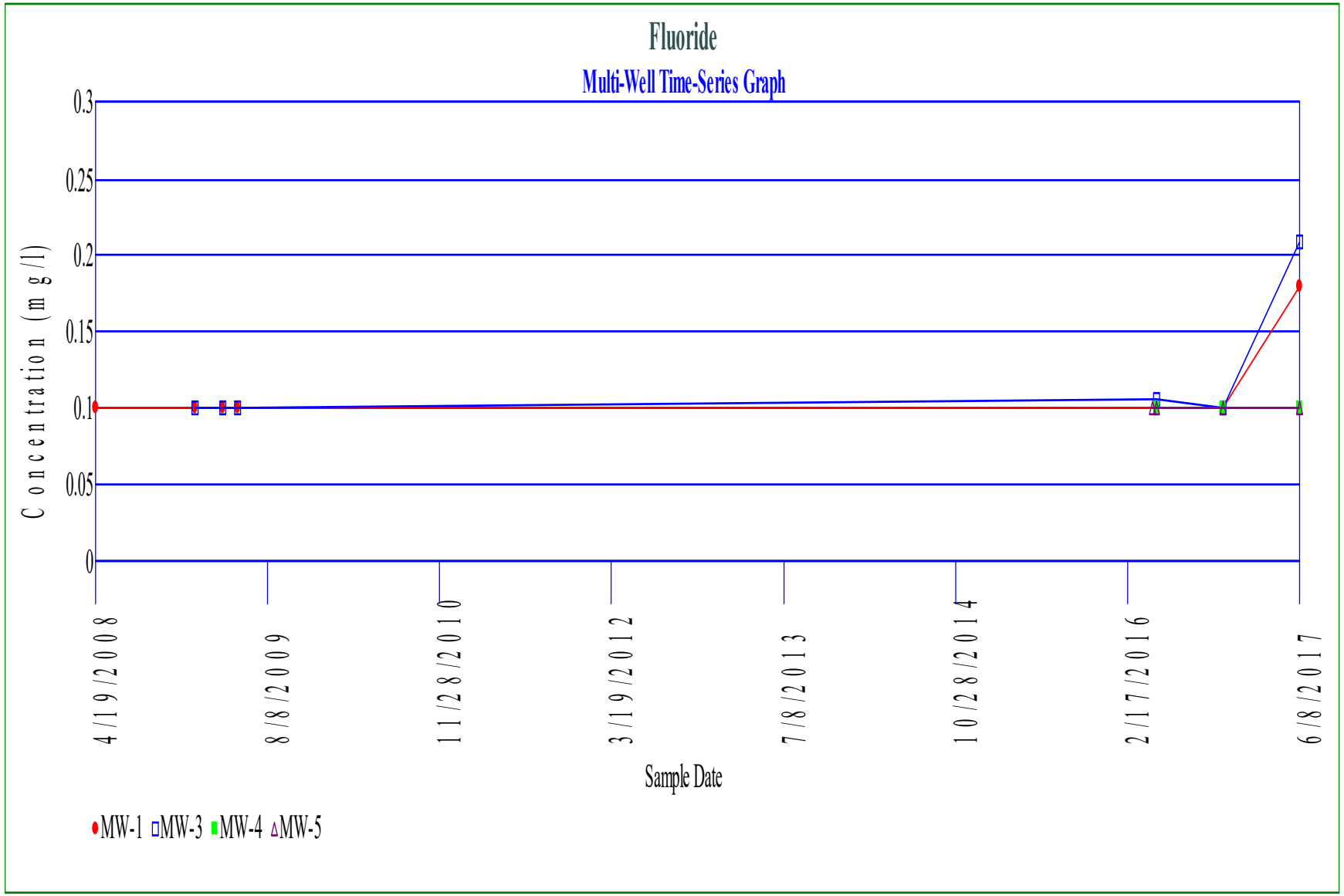

Chloride
Multi-Well Time-Series Graph
500
400
300
200
100
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

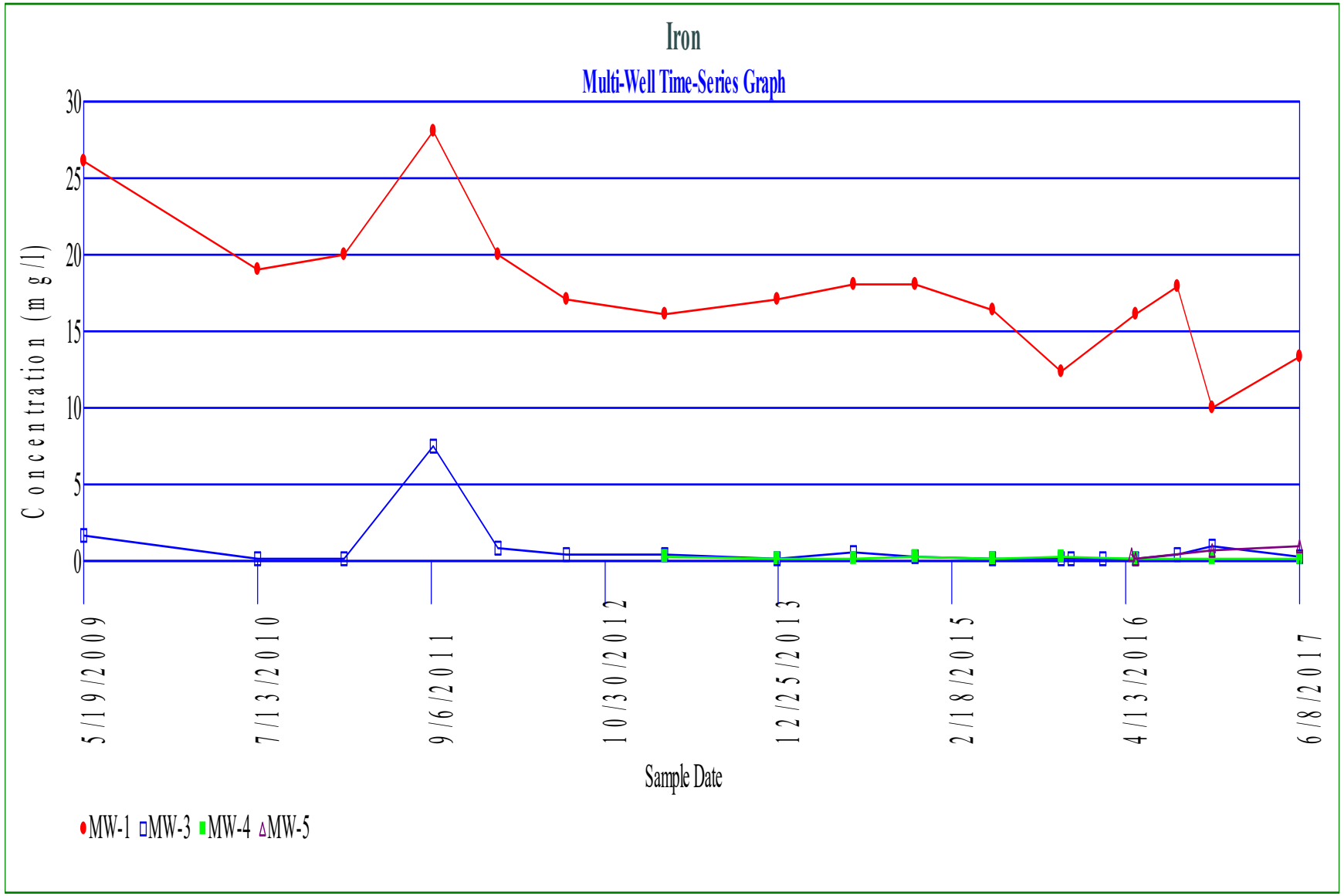

Chromium
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

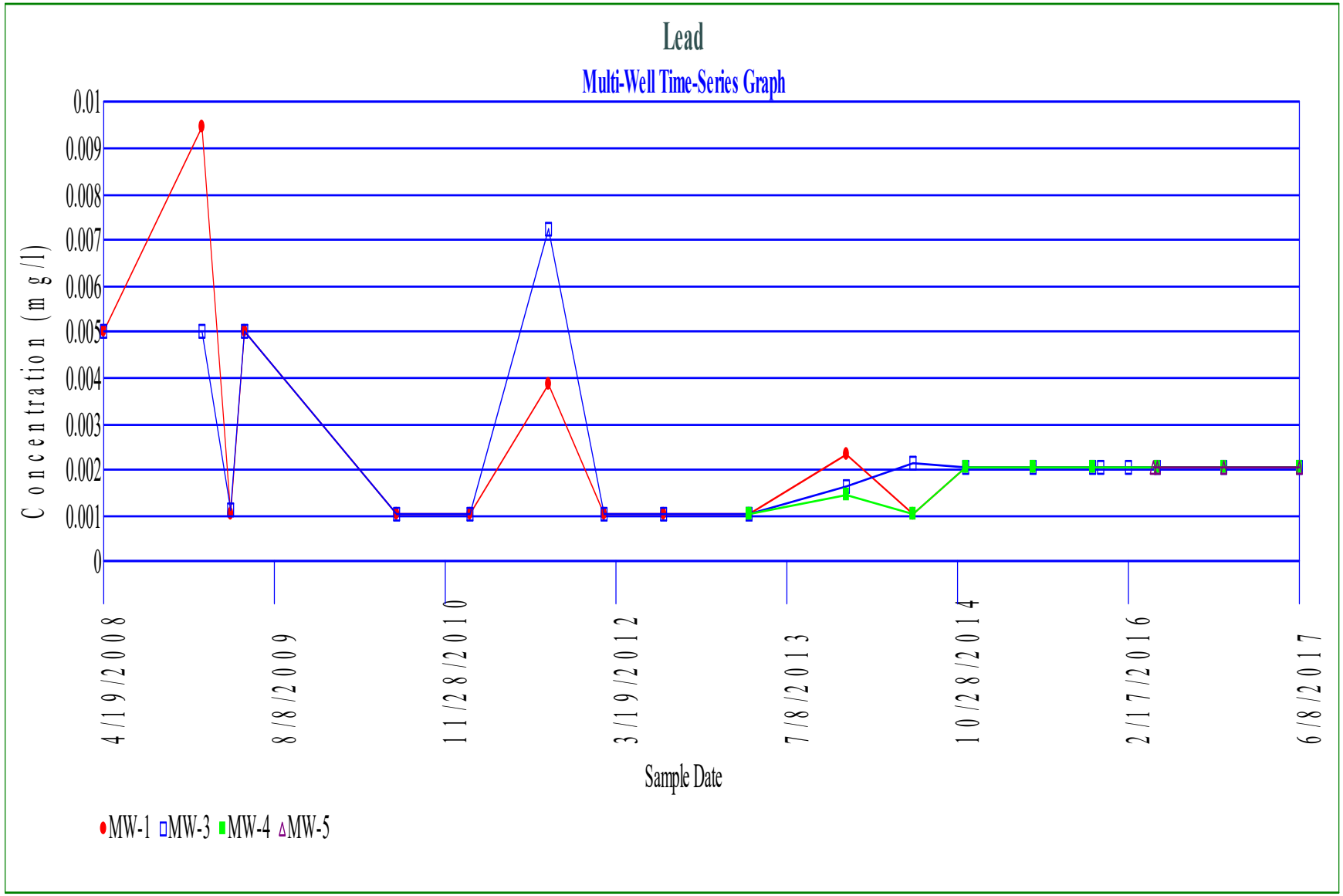

Cobalt
Multi-Well Time-Series Graph
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

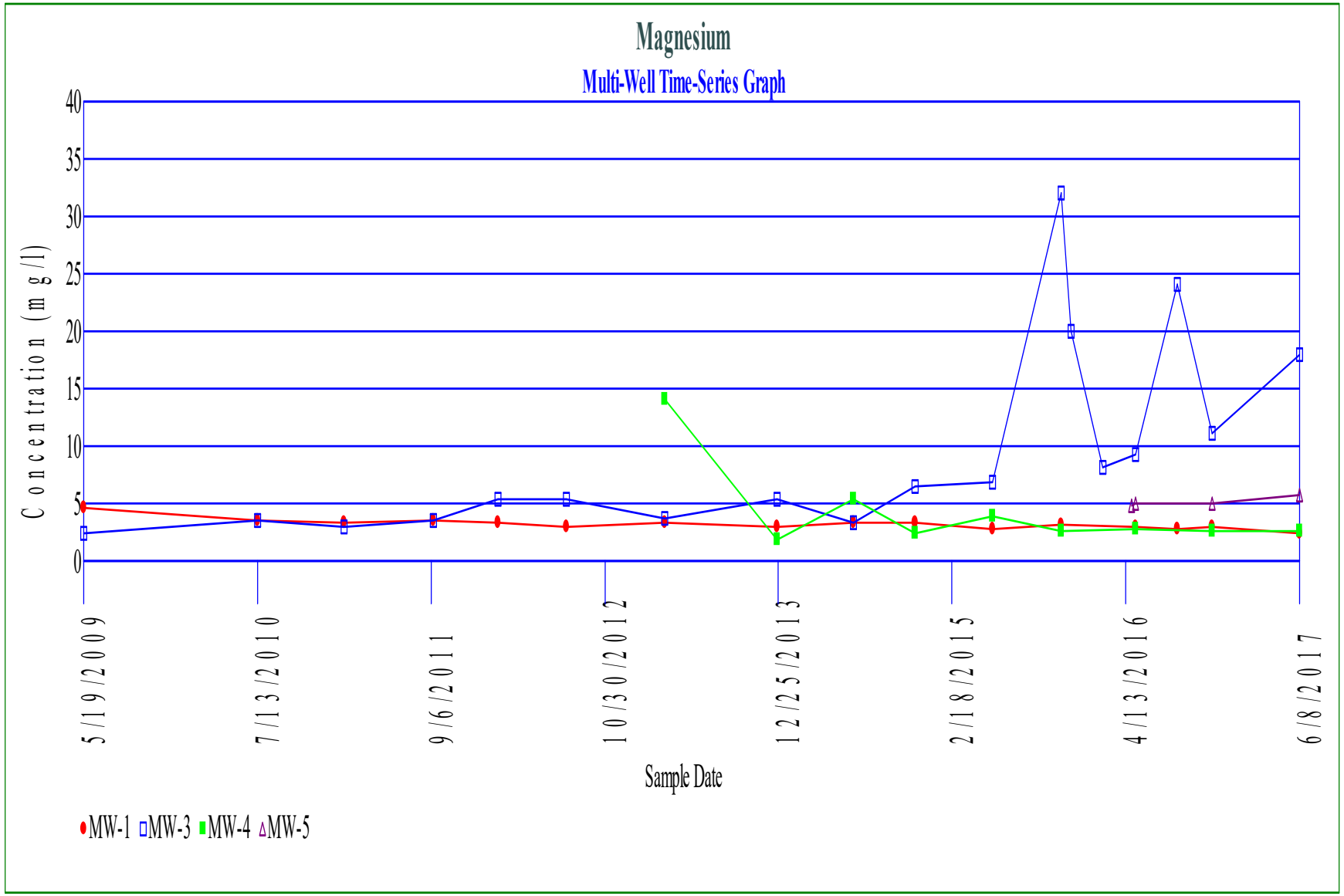

Conductivity
Multi-Well Time-Series Graph
2000
1500
1000
500
0
Concentration (microohms/cm)
6/26/2014
12/5/2014
5/17/2015
10/27/2015
4/6/2016
9/16/2016
2/26/2017
8/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

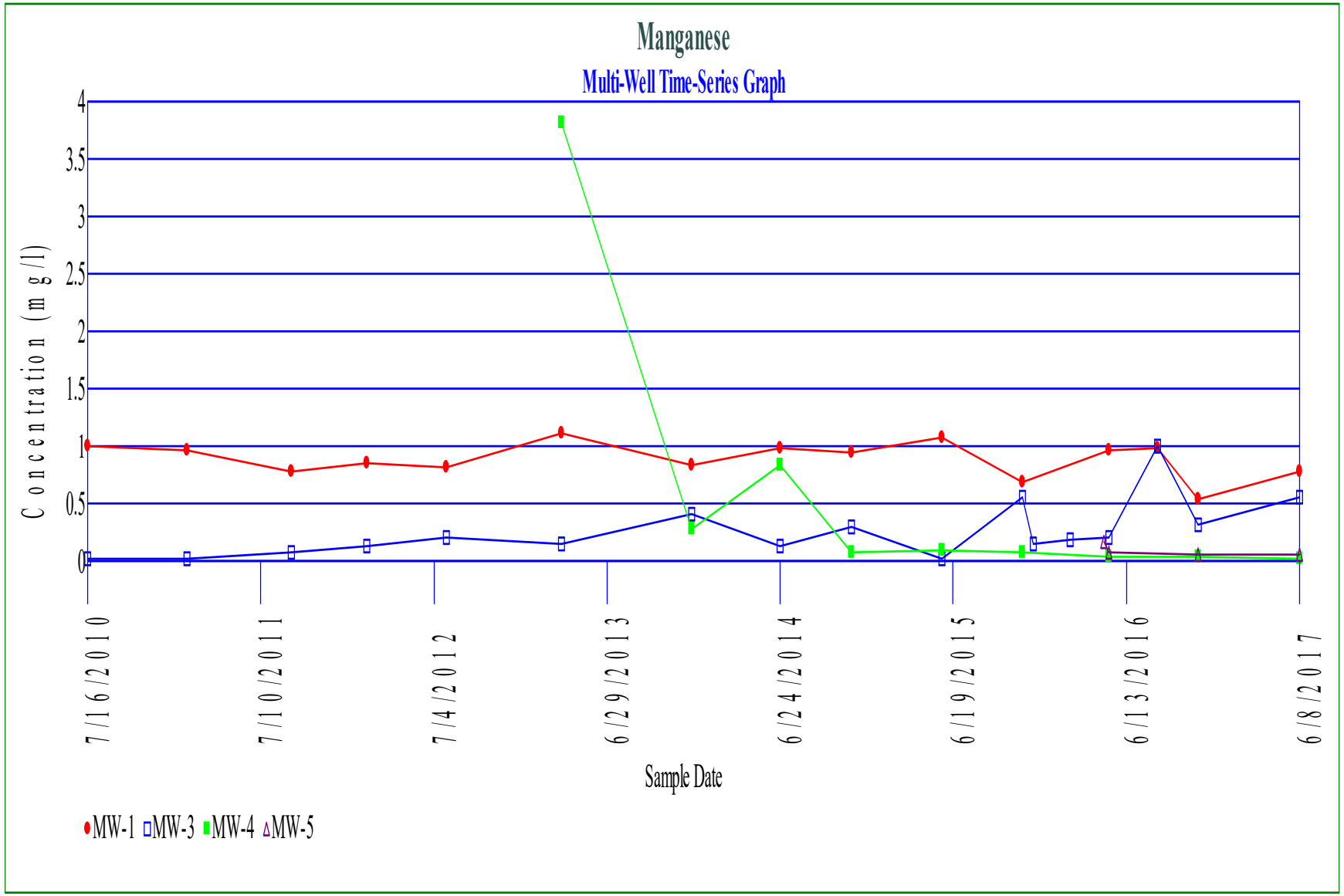

Copper
Multi-Well Time-Series Graph
0.03
0.025
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

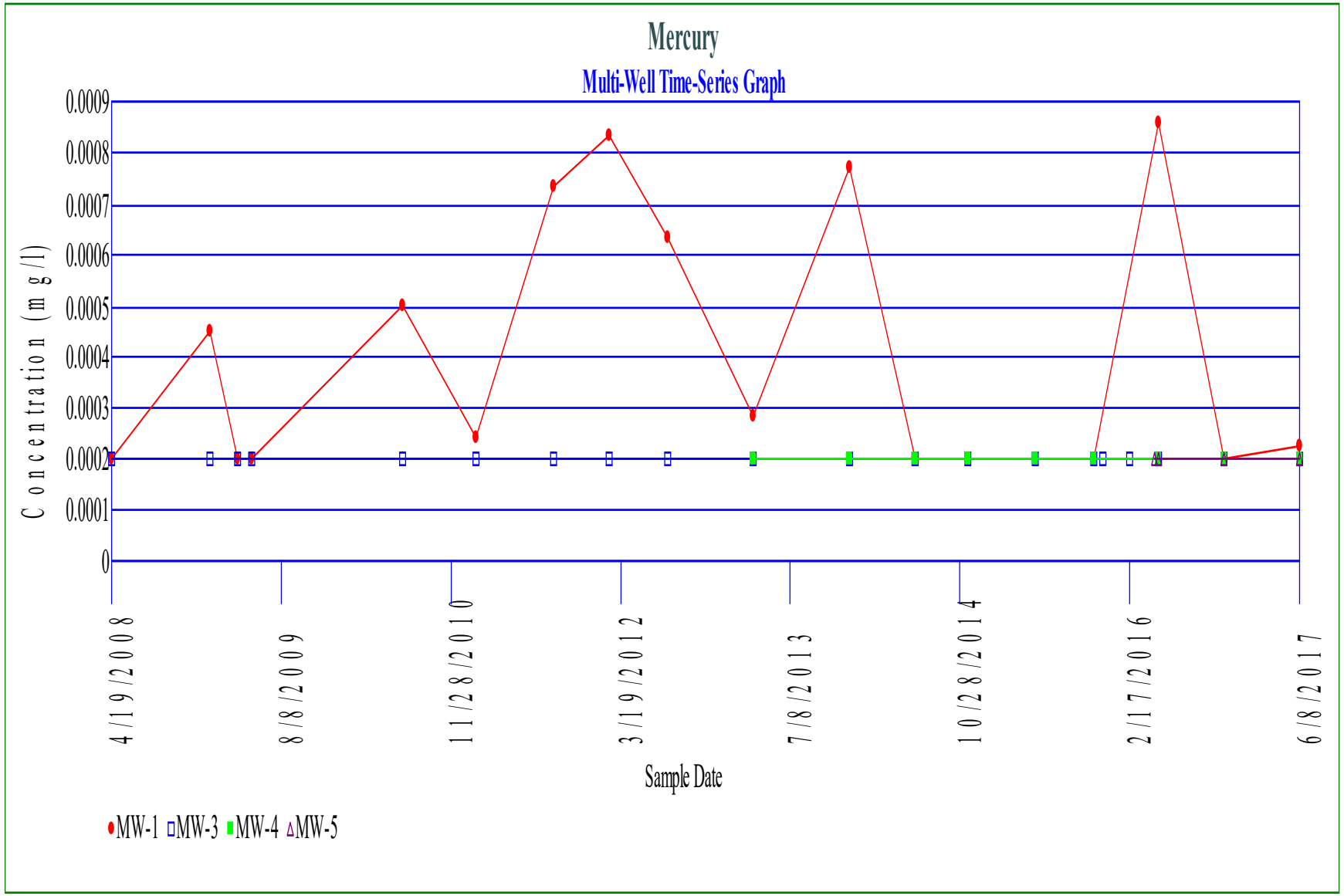

Fluoride
Multi-Well Time-Series Graph
0.3
0.25
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

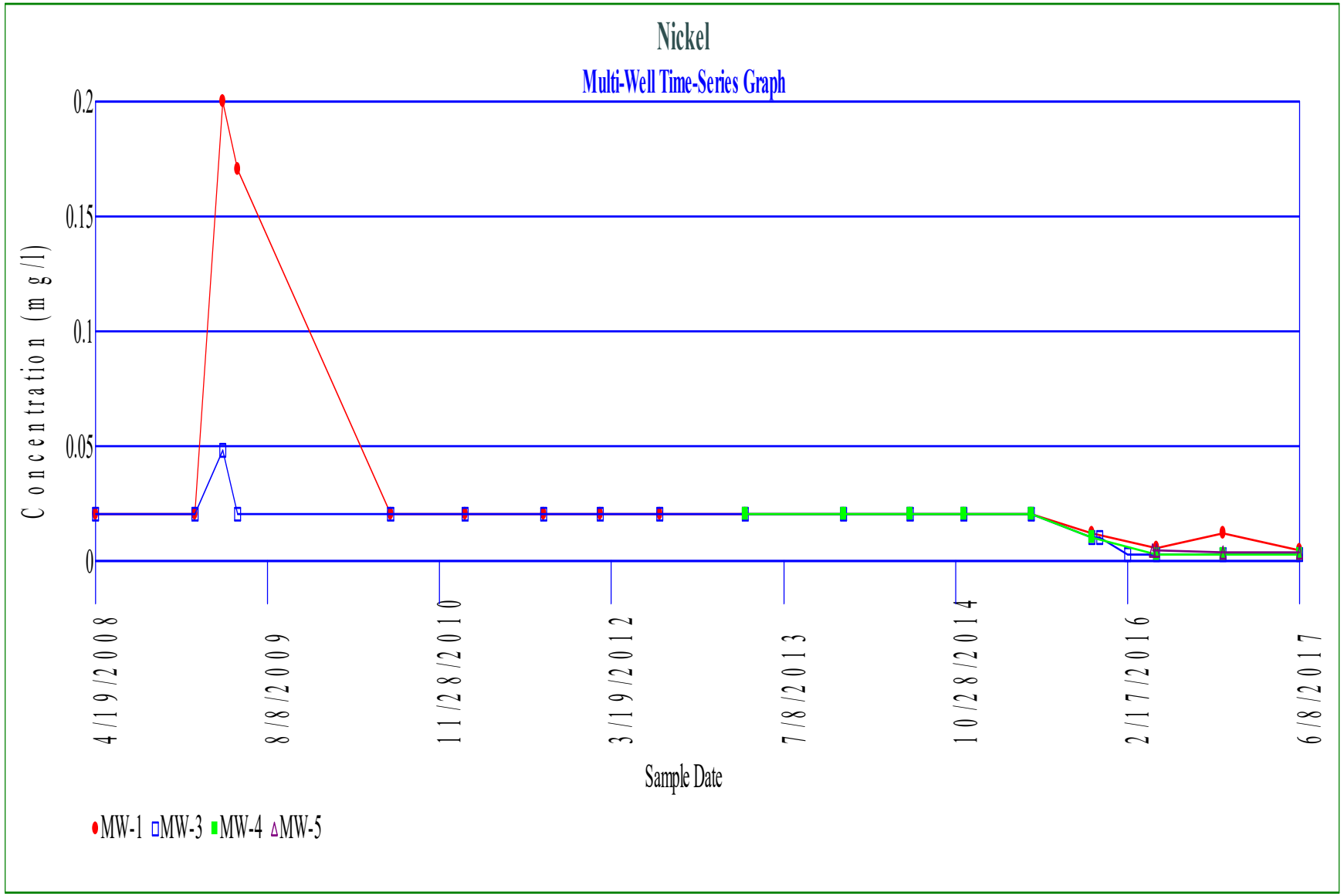

Iron
Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
5/19/2009
7/13/2010
9/6/2011
10/30/2012
12/25/2013
2/18/2015
4/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

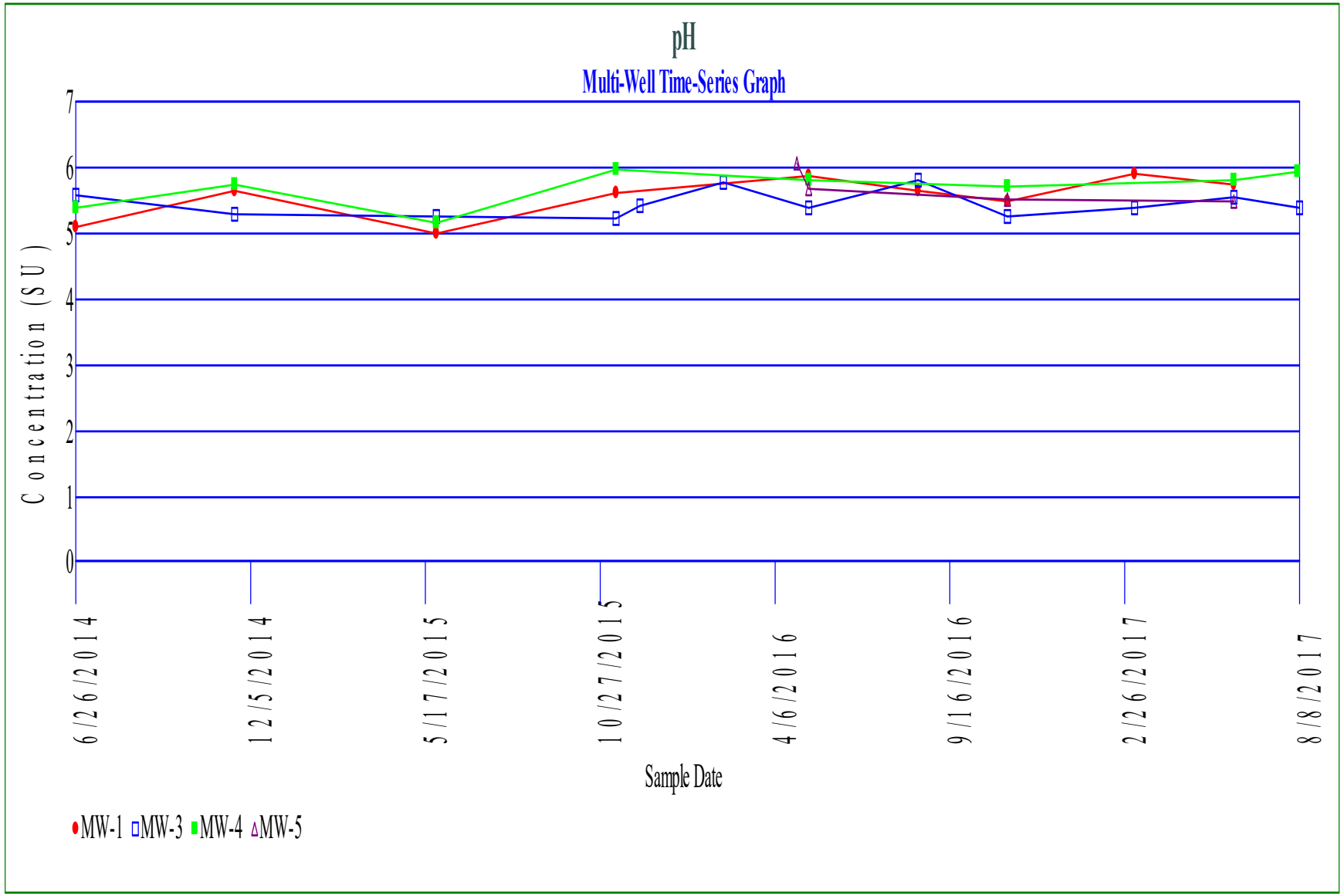

Lead
Multi-Well Time-Series Graph
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

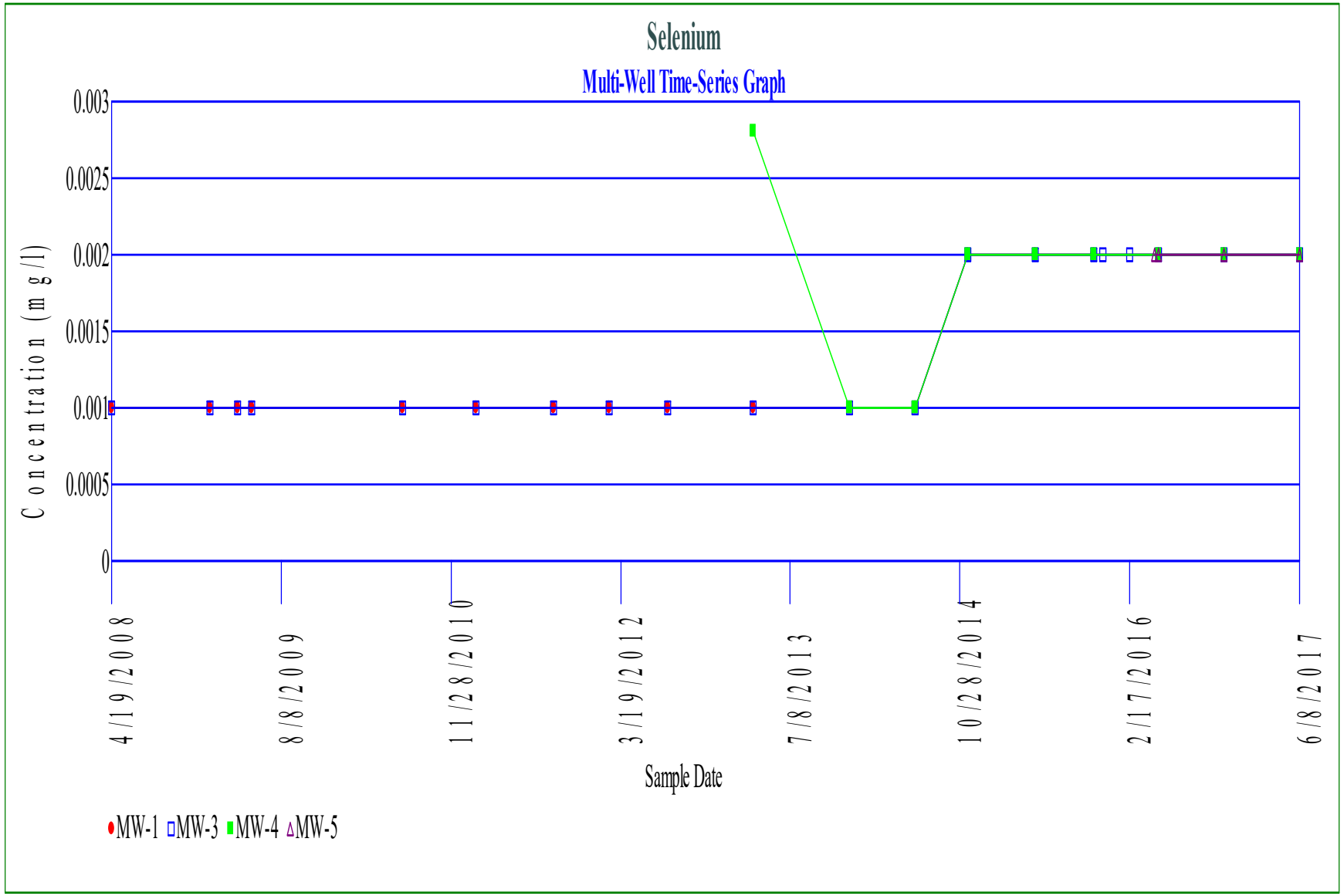

Magnesium
Multi-Well Time-Series Graph
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
5/19/2009
7/13/2010
9/6/2011
10/30/2012
12/25/2013
2/18/2015
4/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

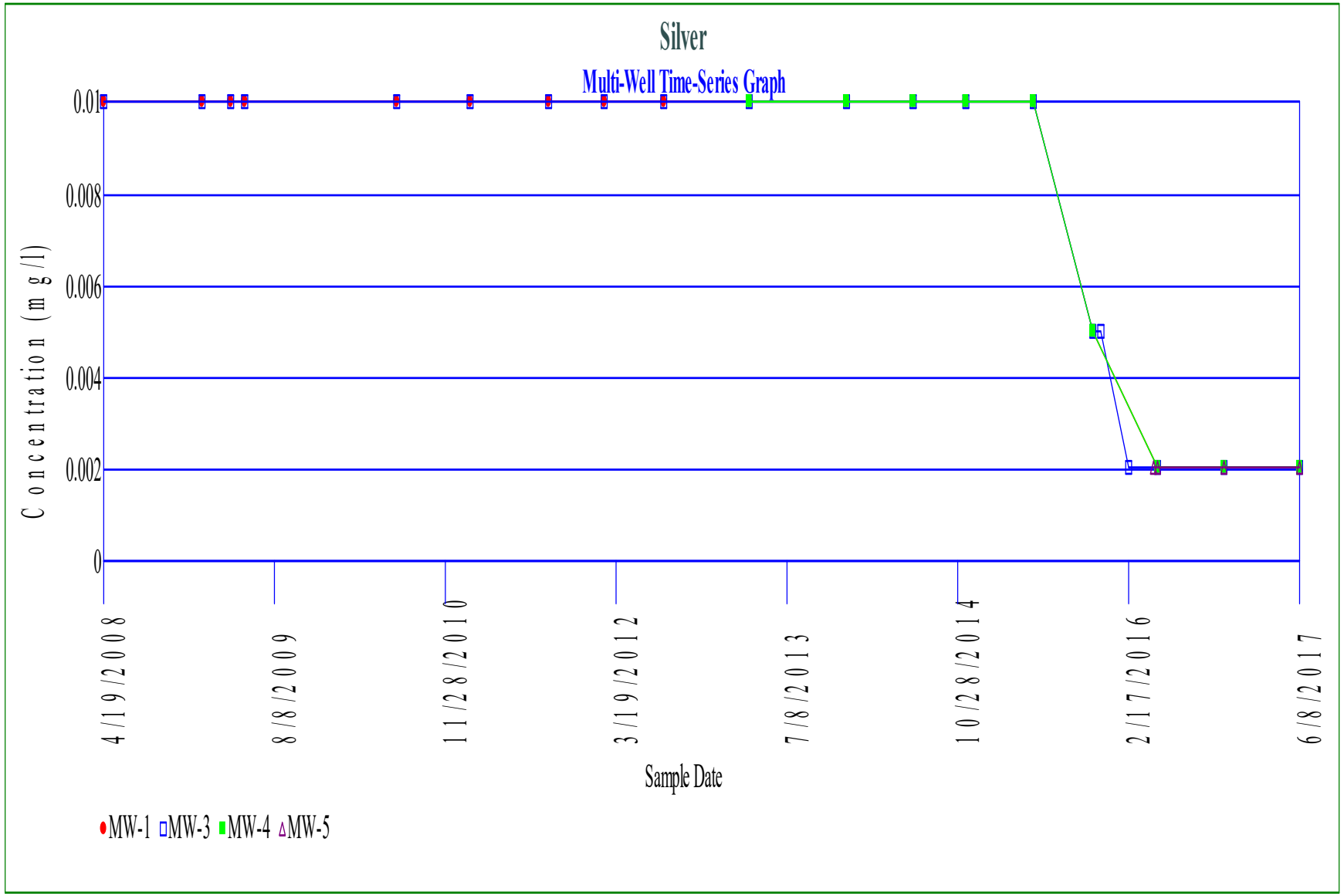

Manganese
Multi-Well Time-Series Graph
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
7/16/2010
7/10/2011
7/4/2012
6/29/2013
6/24/2014
6/19/2015
6/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

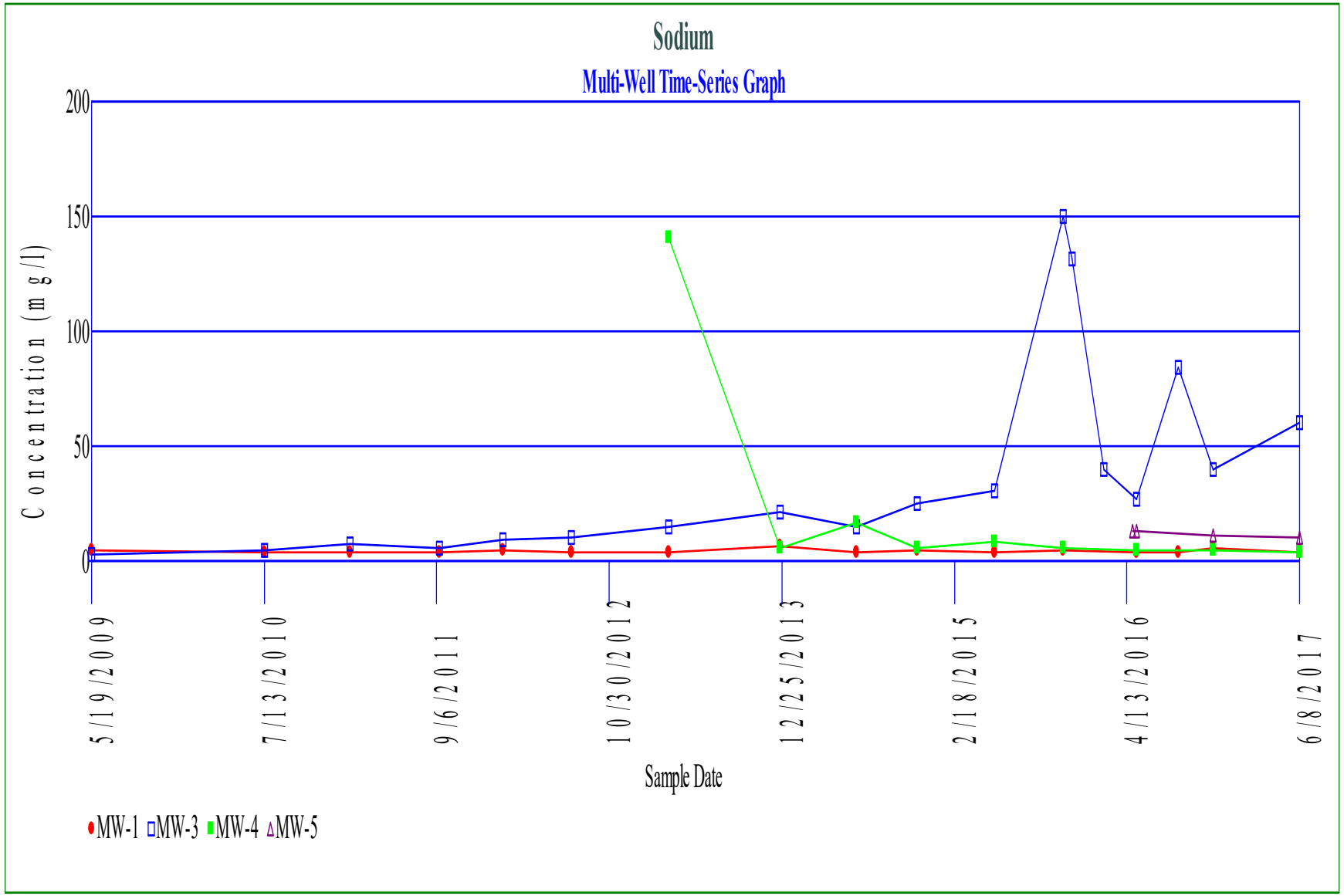

Mercury
Multi-Well Time-Series Graph
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

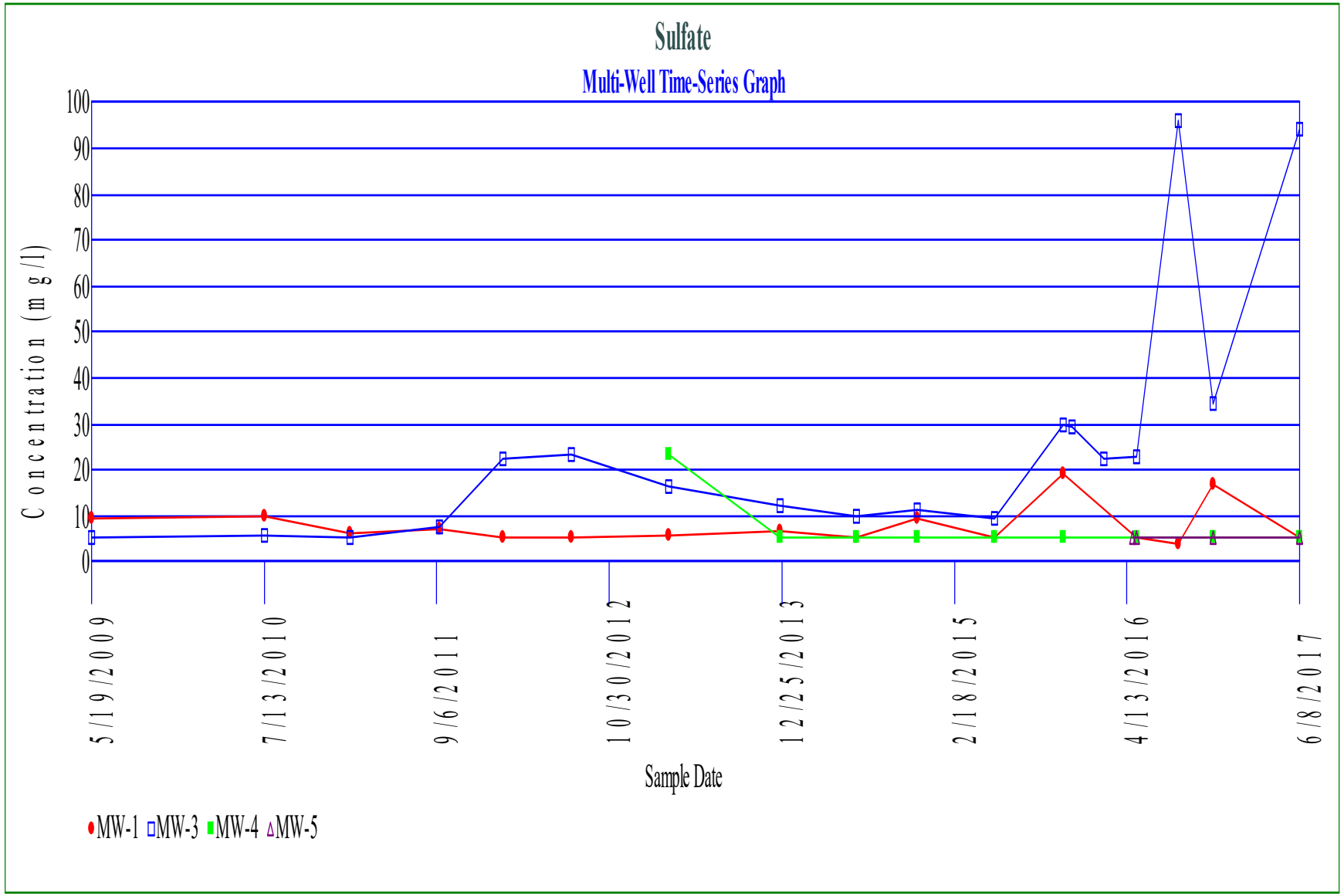

Nickel
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

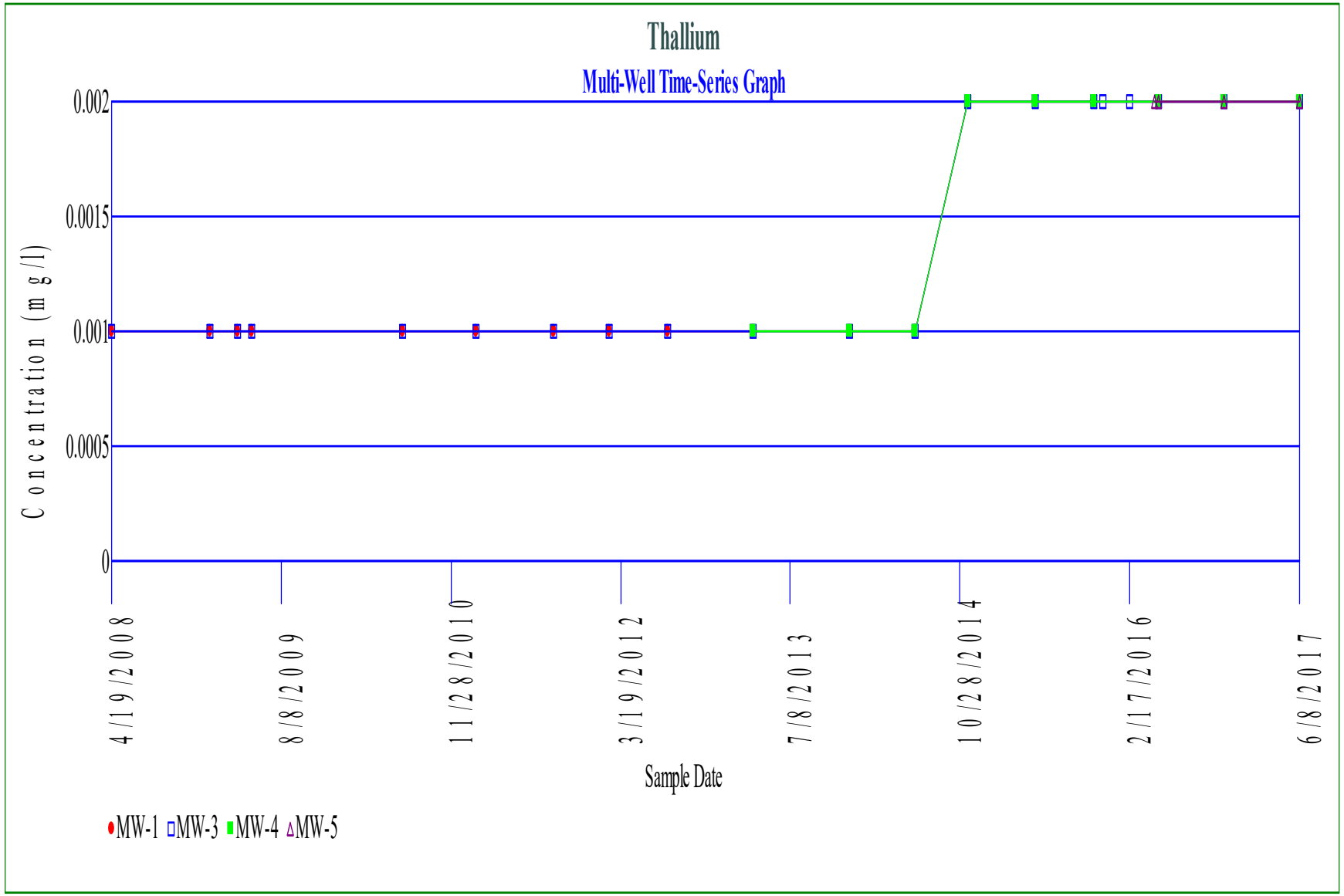

pH
Multi-Well Time-Series Graph
Concentration (SU)
7
6
5
4
3
2
1
0
6/26/2014
12/5/2014
5/17/2015
10/27/2015
4/6/2016
9/16/2016
2/26/2017
8/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

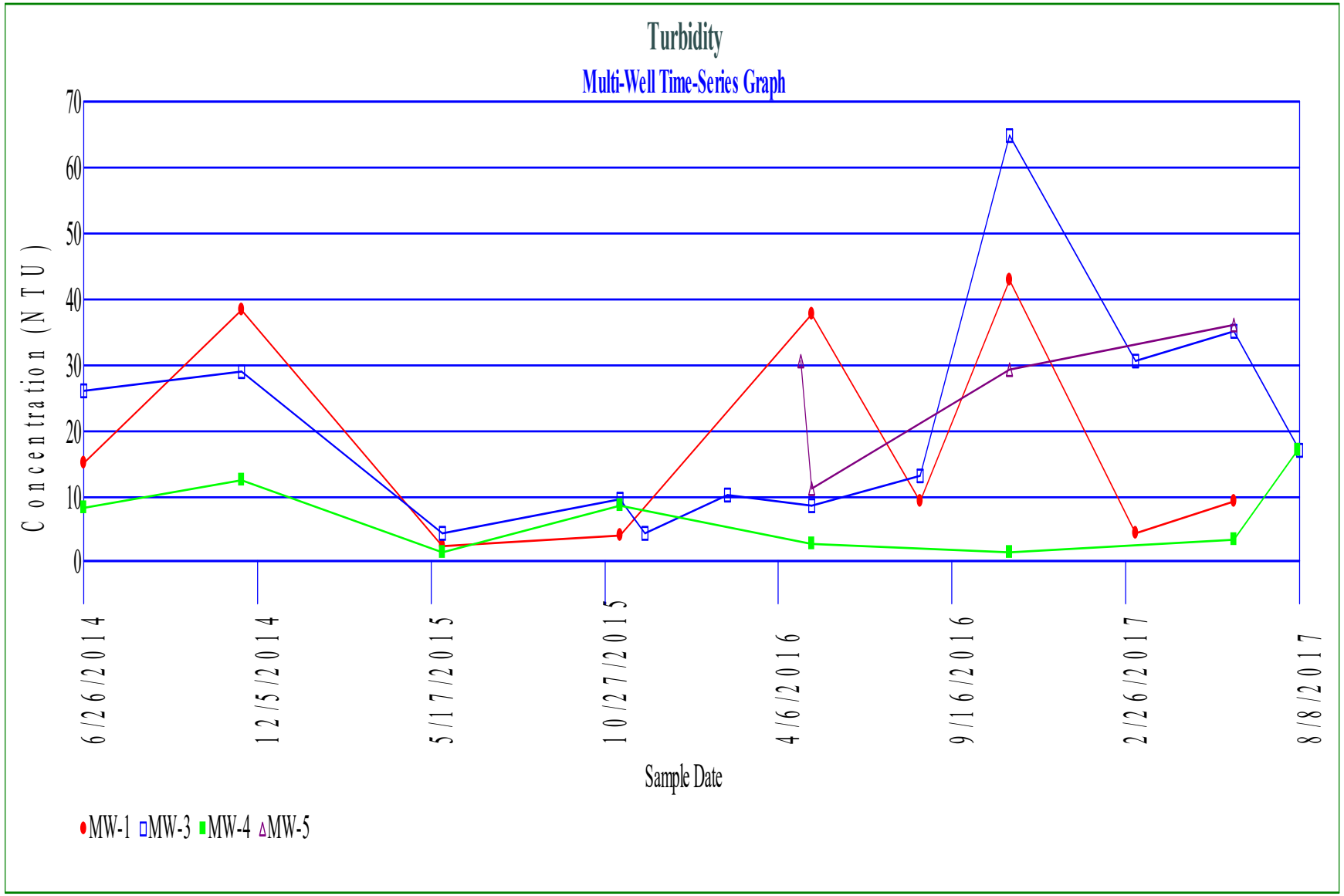

Selenium
Multi-Well Time-Series Graph
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

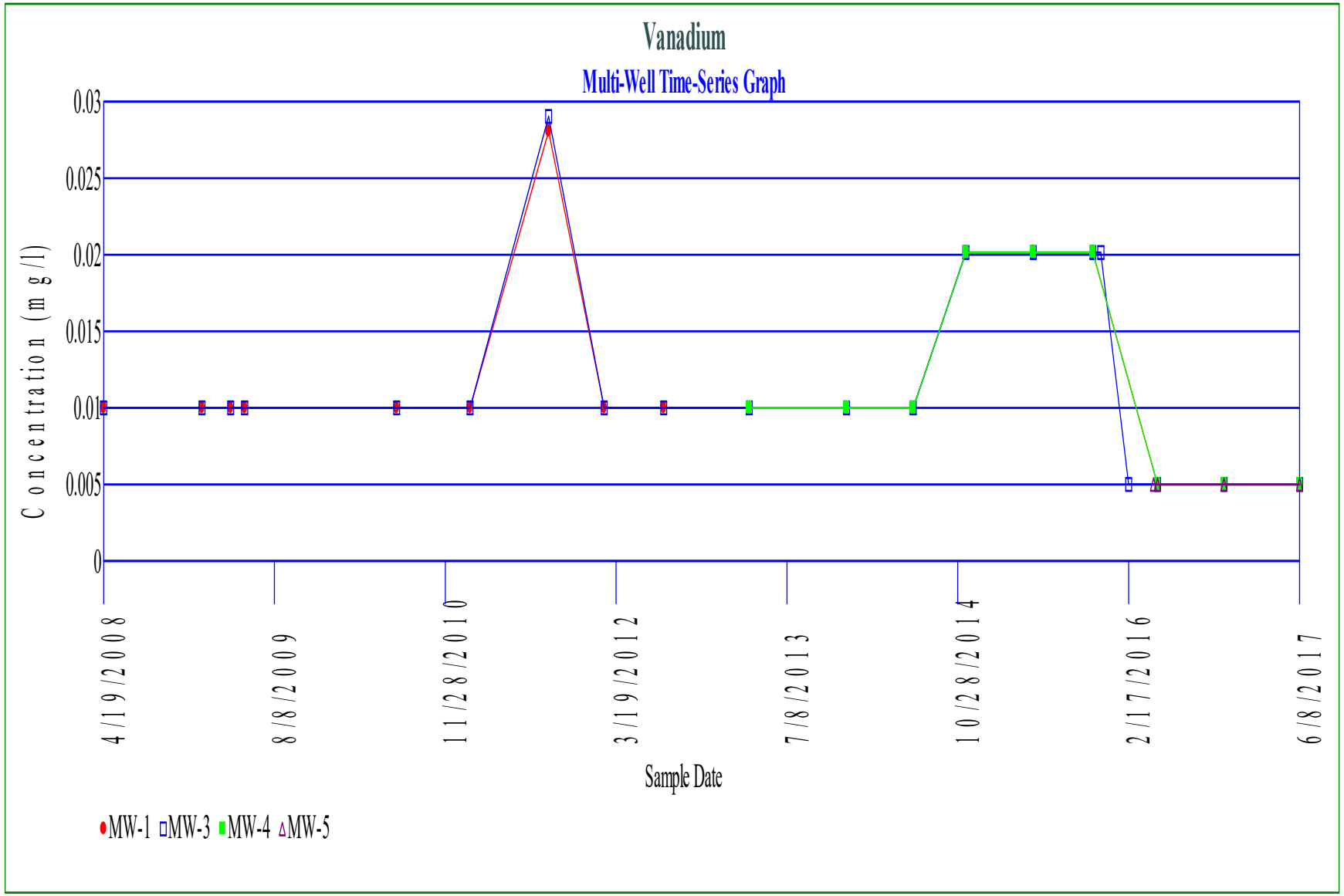

Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

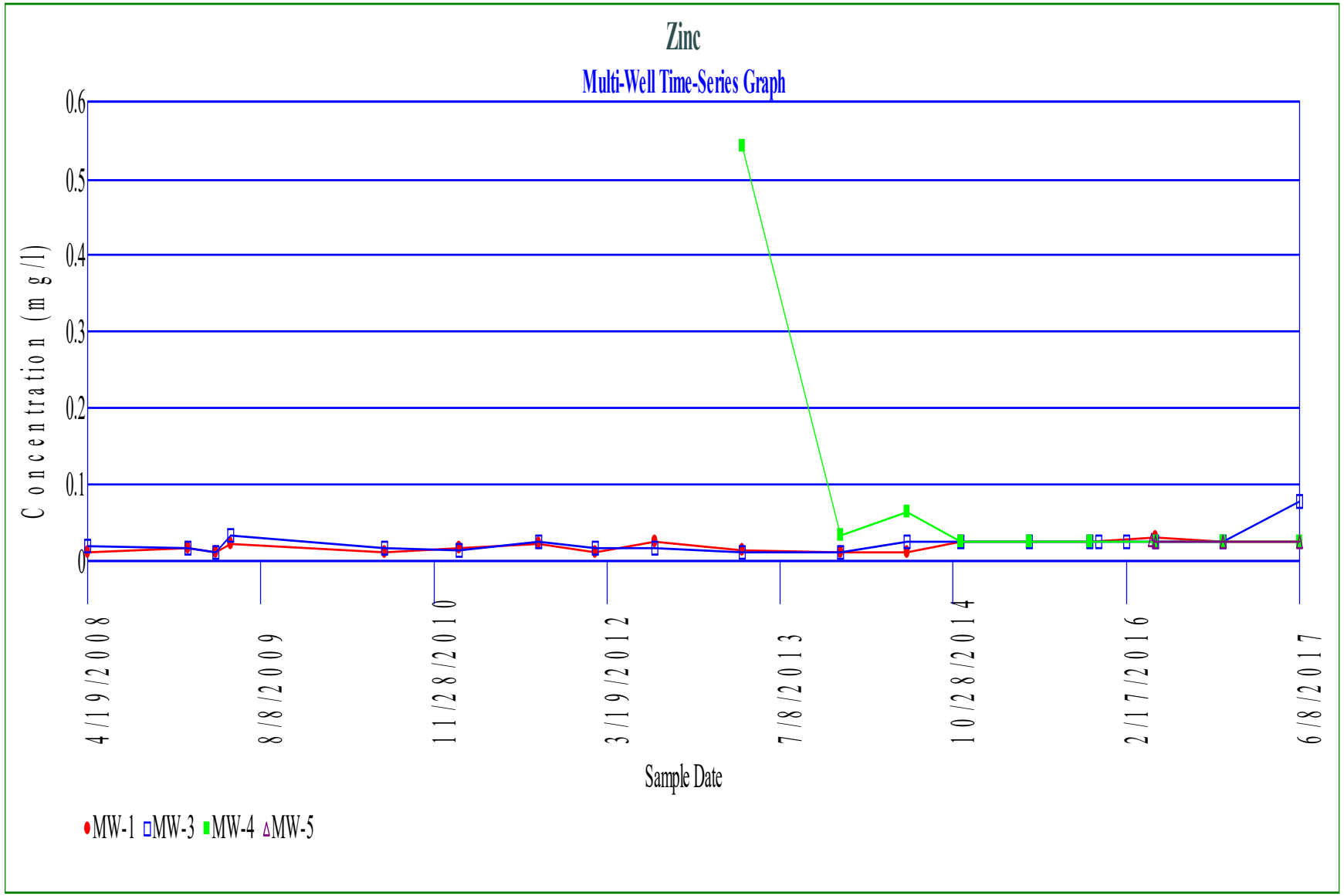

Sodium
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
7/13/2010
9/6/2011
10/30/2012
12/25/2013
2/18/2015
4/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5


Sulfate
Multi-Well Time-Series Graph
Concentration (mg/l)
100
90
80
70
60
50
40
30
20
10
0
5/19/2009
7/13/2010
9/6/2011
10/30/2012
12/25/2013
2/18/2015
4/13/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5


Thallium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5


Turbidity
Multi-Well Time-Series Graph
70
60
50
40
30
20
10
0
Concentration (NTU)
6/26/2014
12/5/2014
5/17/2015
10/27/2015
4/6/2016
9/16/2016
2/26/2017
8/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5


Vanadium
Multi-Well Time-Series Graph
0.03
0.025
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5


Zinc
Multi-Well Time-Series Graph
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentration (mg/l)
4/19/2008
8/8/2009
11/28/2010
3/19/2012
7/8/2013
10/28/2014
2/17/2016
6/8/2017
Sample Date
MW-1
MW-3
MW-4
MW-5

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 = 51

Data Set Standard Deviation = 2.97495
Numerator = 7079.44
Denominator = 19786.7
W Statistic = 0.357788 = 7079.44 / 19786.7

5% Critical value of 0.954 exceeds 0.357788
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.357788
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 = 51

Data Set Standard Deviation = 1.55854
Numerator = 4743.2
Denominator = 5430.62
W Statistic = 0.873417 = 4743.2 / 5430.62

5% Critical value of 0.954 exceeds 0.873417
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.873417
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 = 51

Data Set Standard Deviation = 0.134903
Numerator = 22.2694
Denominator = 40.6871
W Statistic = 0.547332 = 22.2694 / 40.6871

5% Critical value of 0.954 exceeds 0.547332
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.547332
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 = 51

Data Set Standard Deviation = 1.12755
Numerator = 2707.58
Denominator = 2842.39
W Statistic = 0.952571 = 2707.58 / 2842.39

5% Critical value of 0.954 exceeds 0.952571
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 is less than 0.952571
Data is normally distributed 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 = 54

Data Set Standard Deviation = 90.9998
Numerator = 1.1209e+007
Denominator = 2.08944e+007
W Statistic = 0.536459 = 1.1209e+007 / 2.08944e+007

5% Critical value of 0.958 exceeds 0.536459
Evidence of non-normality at 95% level of significance

1% Critical value of 0.94 exceeds 0.536459
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 = 54

Data Set Standard Deviation = 1.58266
Numerator = 6015.91
Denominator = 6320.1
W Statistic = 0.95187 = 6015.91 / 6320.1

5% Critical value of 0.958 exceeds 0.95187
Evidence of non-normality at 95% level of significance

1% Critical value of 0.94 is less than 0.95187
Data is normally distributed 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 = 51

Data Set Standard Deviation = 0.0345783
Numerator = 0.955748
Denominator = 2.67313
W Statistic = 0.357539 = 0.955748 / 2.67313

5% Critical value of 0.954 exceeds 0.357539
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.357539
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 = 51

Data Set Standard Deviation = 1.03188
Numerator = 1792.08
Denominator = 2380.53
W Statistic = 0.752807 = 1792.08 / 2380.53

5% Critical value of 0.954 exceeds 0.752807
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.752807
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 = 51

Data Set Standard Deviation = 0.0733968
Numerator = 2.20953
Denominator = 12.0439
W Statistic = 0.183456 = 2.20953 / 12.0439

5% Critical value of 0.954 exceeds 0.183456
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.183456
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 = 51

Data Set Standard Deviation = 0.739946
Numerator = 861.409
Denominator = 1224.09
W Statistic = 0.703713 = 861.409 / 1224.09

5% Critical value of 0.954 exceeds 0.703713
Evidence of non-normality at 95% level of significance

1% Critical value of 0.935 exceeds 0.703713
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cadmium
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 24 for 49 measurements

Sum of b values = 0.0146233
Sample Standard Deviation = 0.00423066
W Statistic = 0.248904

5% Critical value of 0.947 exceeds 0.248904
Evidence of non-normality at 95% level of significance

1% Critical value of 0.929 exceeds 0.248904
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cadmium
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 24 for 49 measurements

Sum of b values = 4.52817
Sample Standard Deviation = 0.884973
W Statistic = 0.545438

5% Critical value of 0.947 exceeds 0.545438
Evidence of non-normality at 95% level of significance

1% Critical value of 0.929 exceeds 0.545438
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

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

Sum of b values = 92.6981
Sample Standard Deviation = 18.9558
W Statistic = 0.519878

5% Critical value of 0.946 exceeds 0.519878
Evidence of non-normality at 95% level of significance

1% Critical value of 0.928 exceeds 0.519878
Evidence of non-normality at 99% level of significance

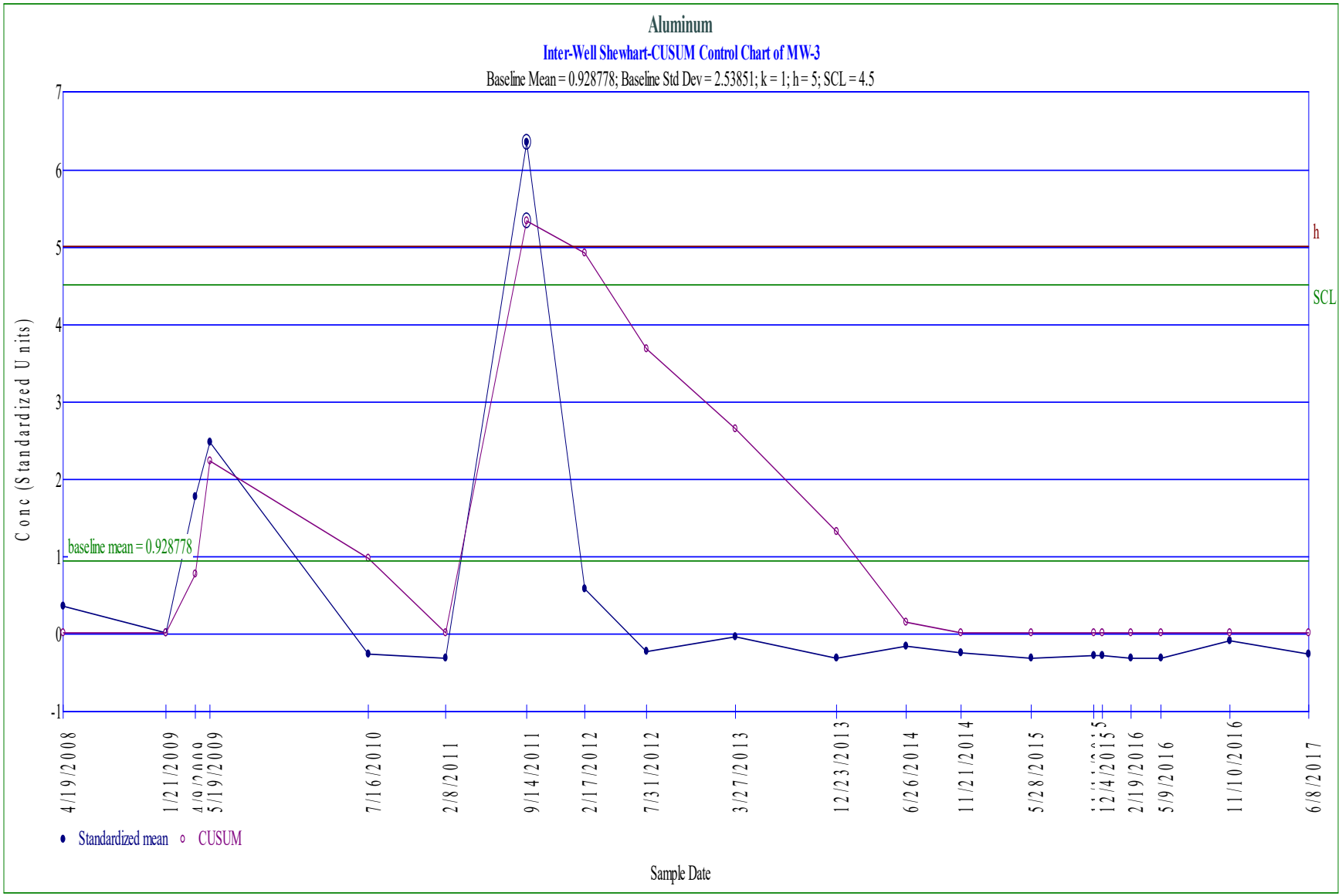
Shapiro-Wilks Test of Normality

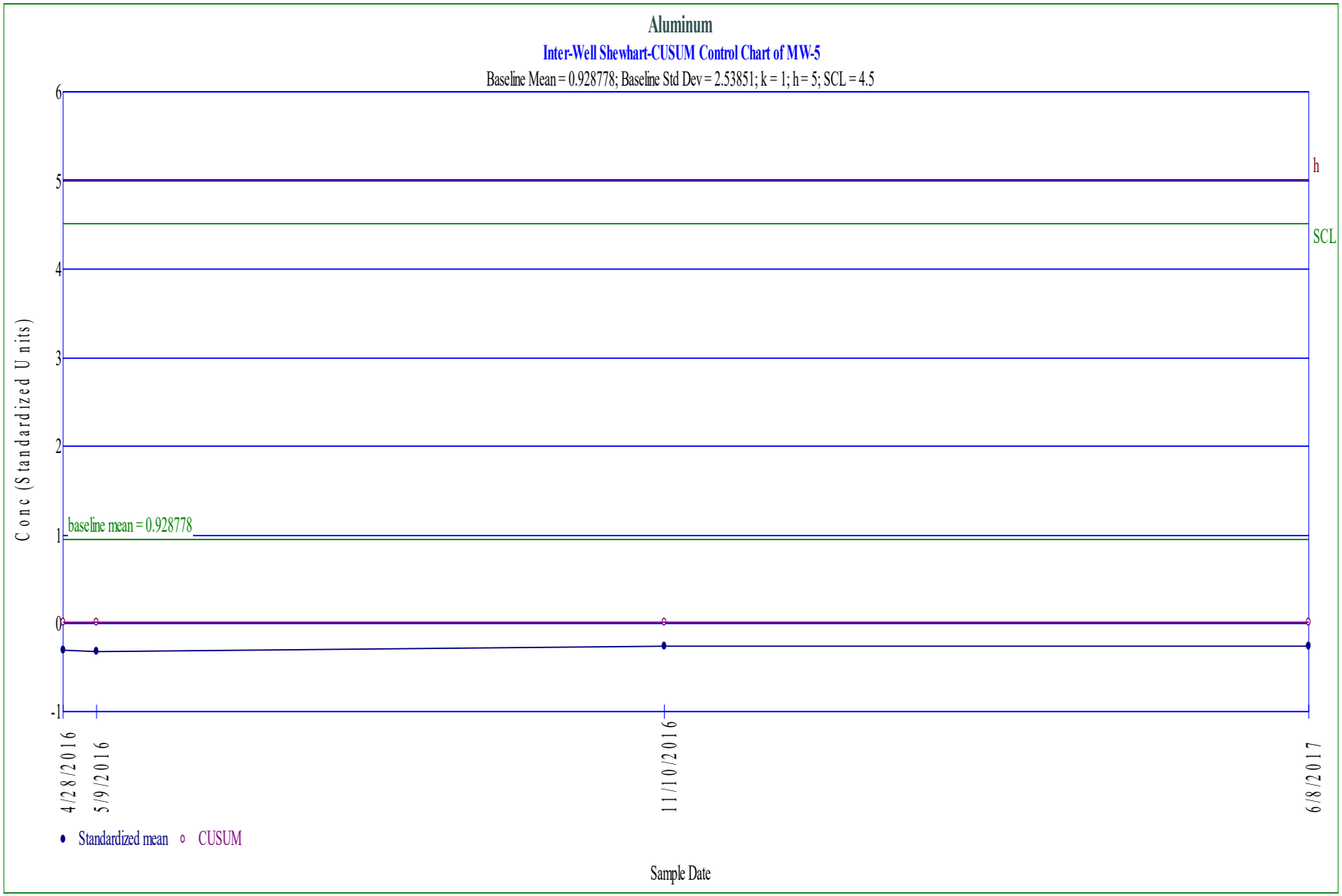
Parameter: Sulfate
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 23 for 47 measurements

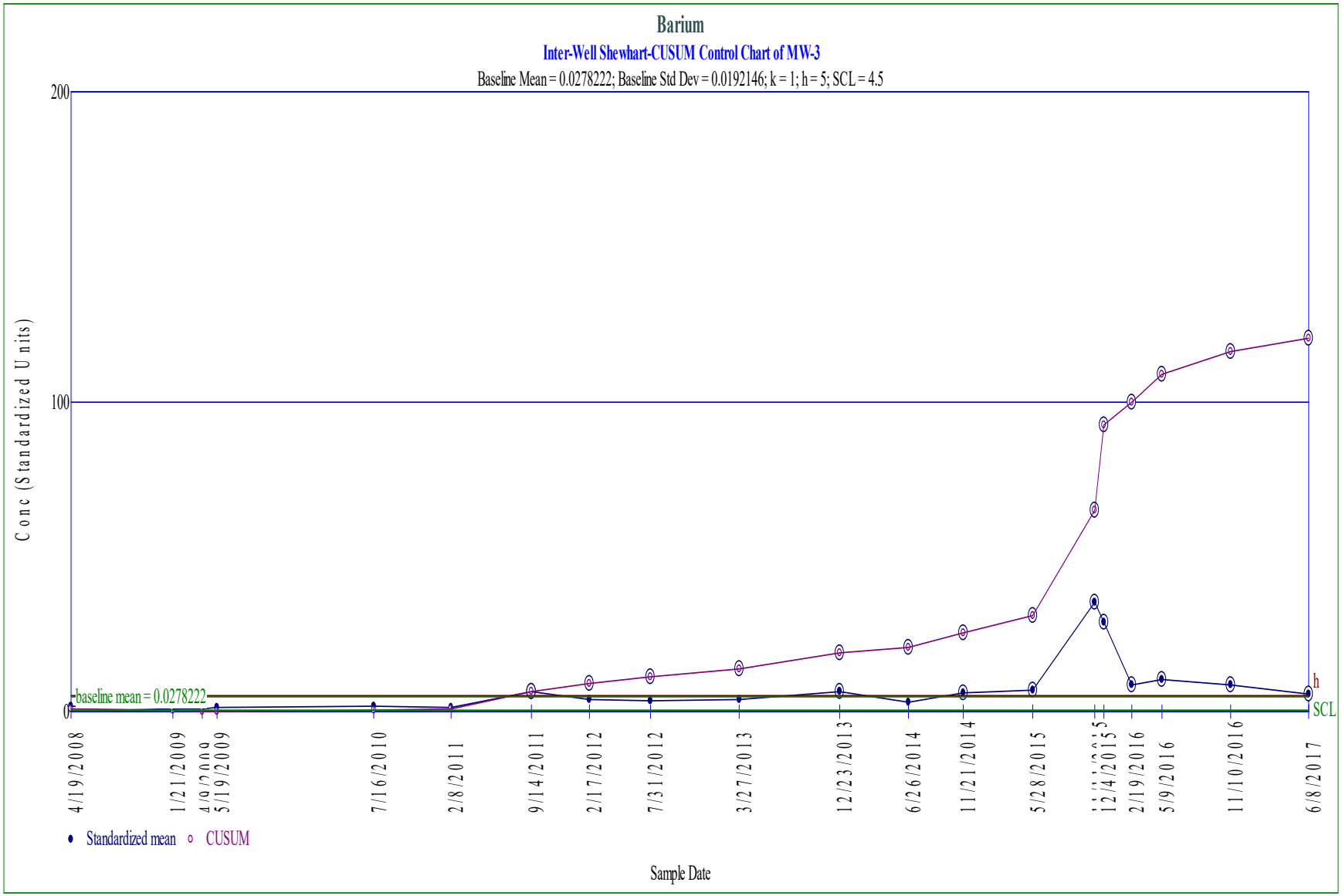
Sum of b values = 6.6002
Sample Standard Deviation = 1.06441
W Statistic = 0.835871

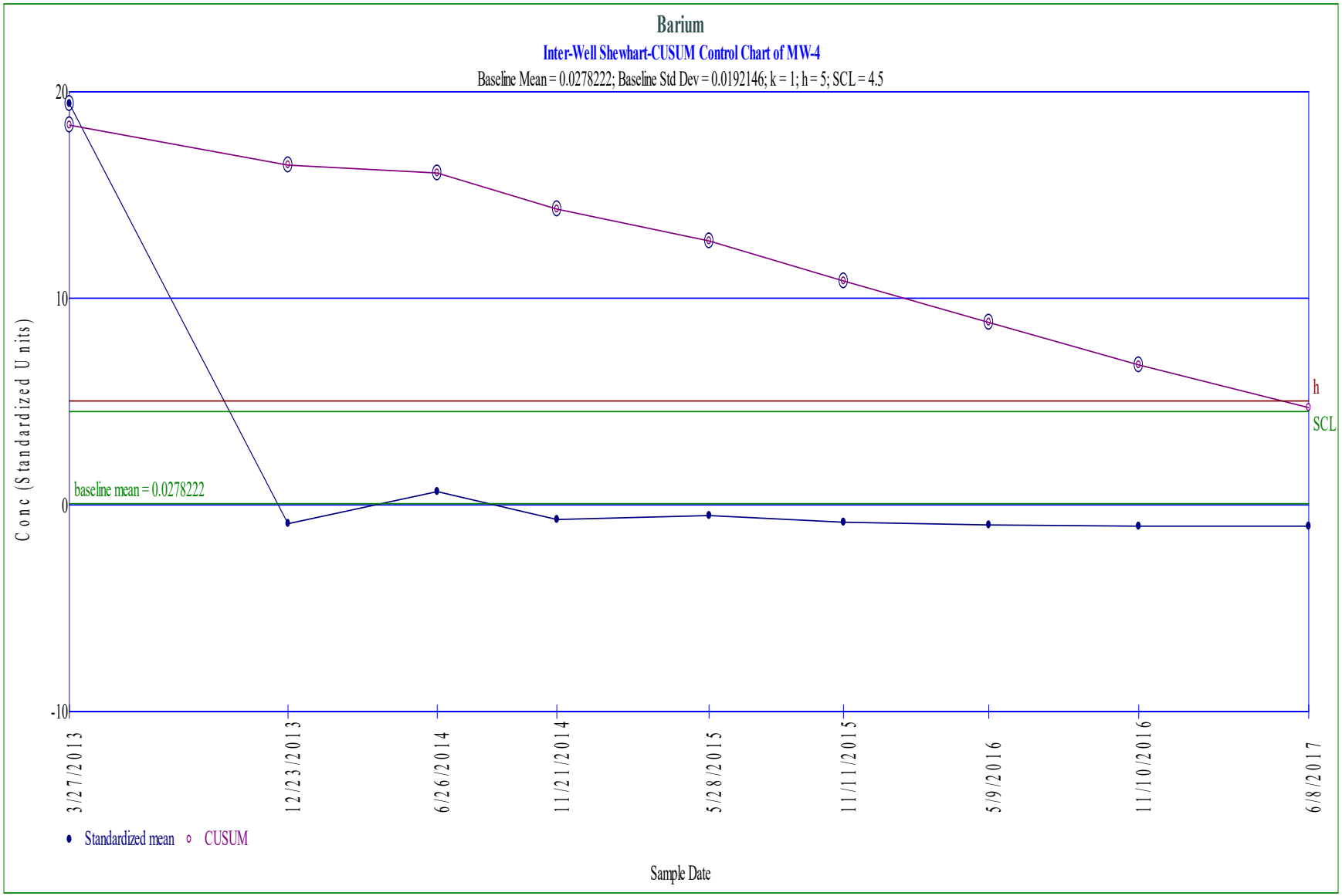
5% Critical value of 0.946 exceeds 0.835871
Evidence of non-normality at 95% level of significance

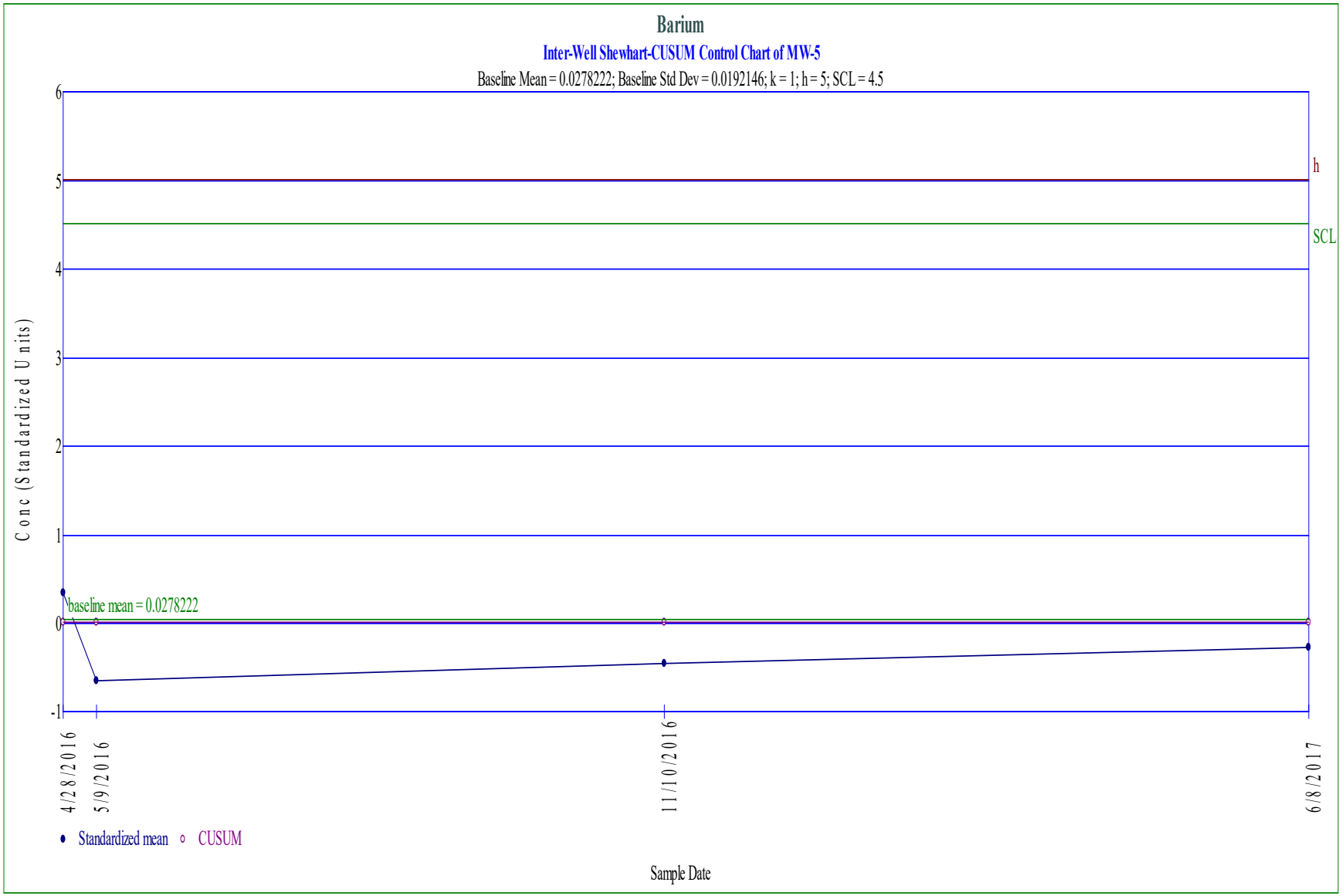
1% Critical value of 0.928 exceeds 0.835871
Evidence of non-normality at 99% level of significance

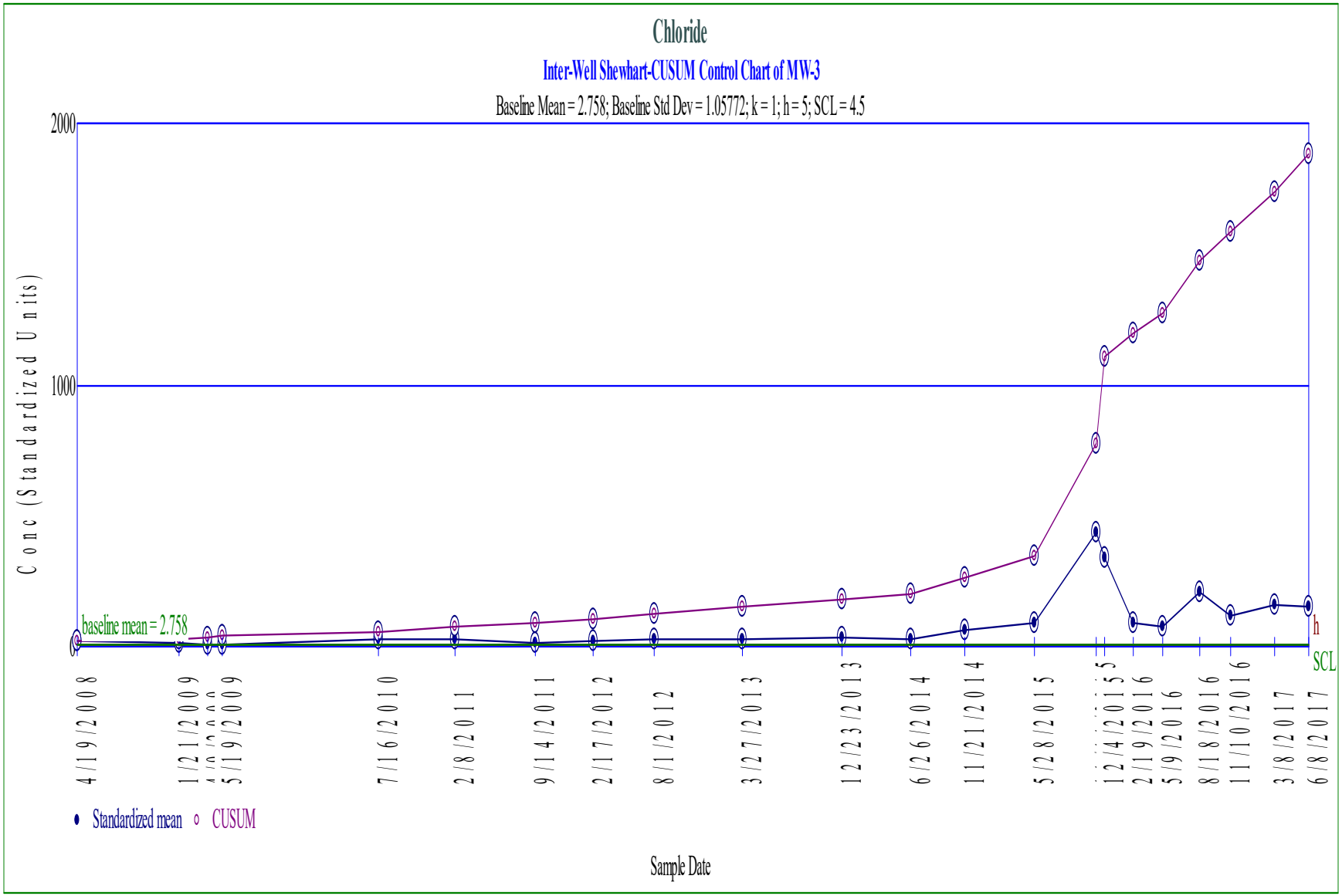

Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.928778; Baseline Std Dev = 2.53851; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
baseline mean = 0.928778
h
SCL
Standardized mean
CUSUM
Sample Date
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017

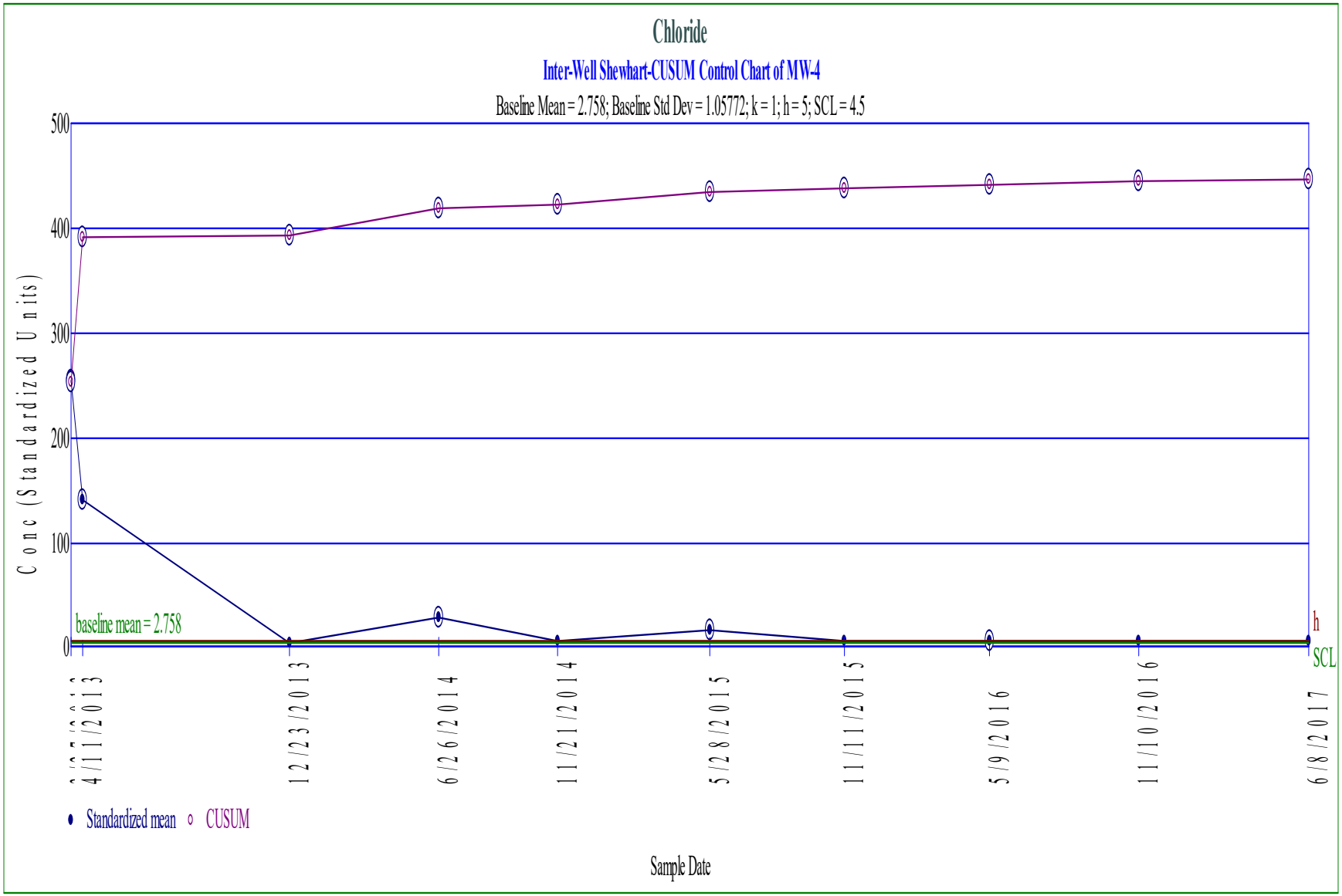

Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.928778; Baseline Std Dev = 2.53851; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.928778
4/28/2016
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

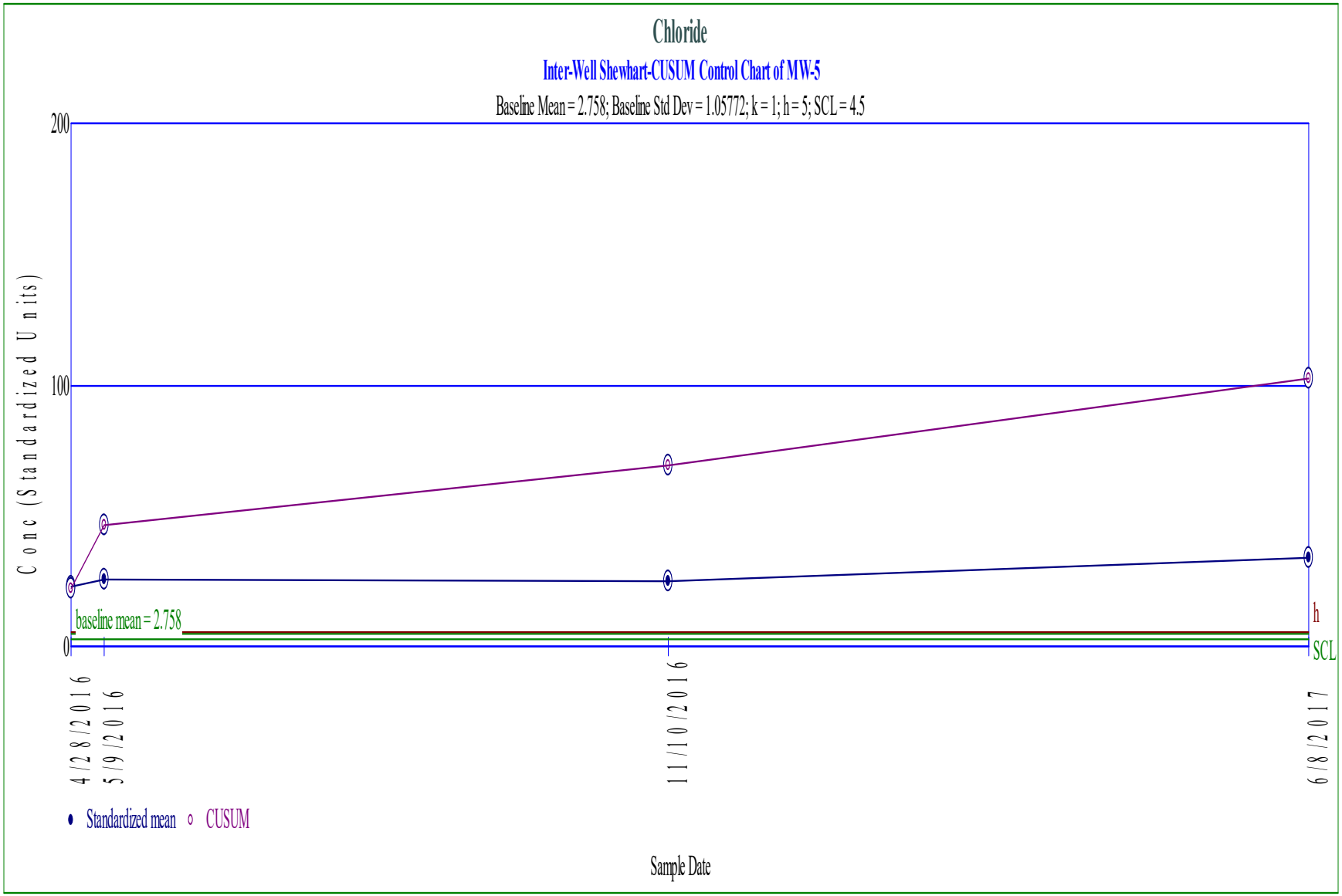

Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.0278222; Baseline Std Dev = 0.0192146; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
200
100
0
baseline mean = 0.0278222
h
SCL
4/19/2008
1/21/2009
4/9/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

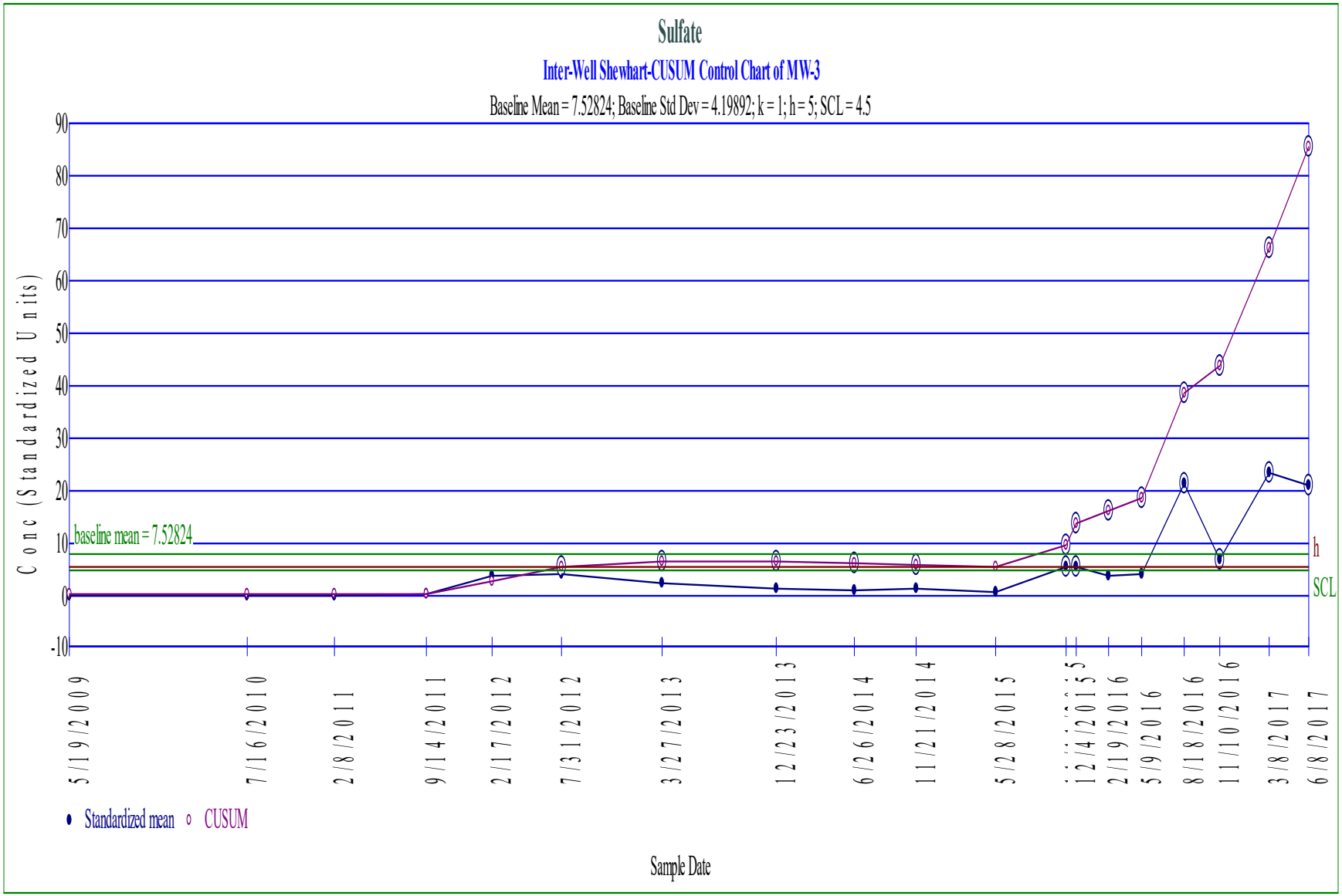

Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 0.0278222; Baseline Std Dev = 0.0192146; k = 1; h = 5; SCL = 4.5
20
10
0
-10
Conc (Standardized Units)
h
SCL
baseline mean = 0.0278222
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

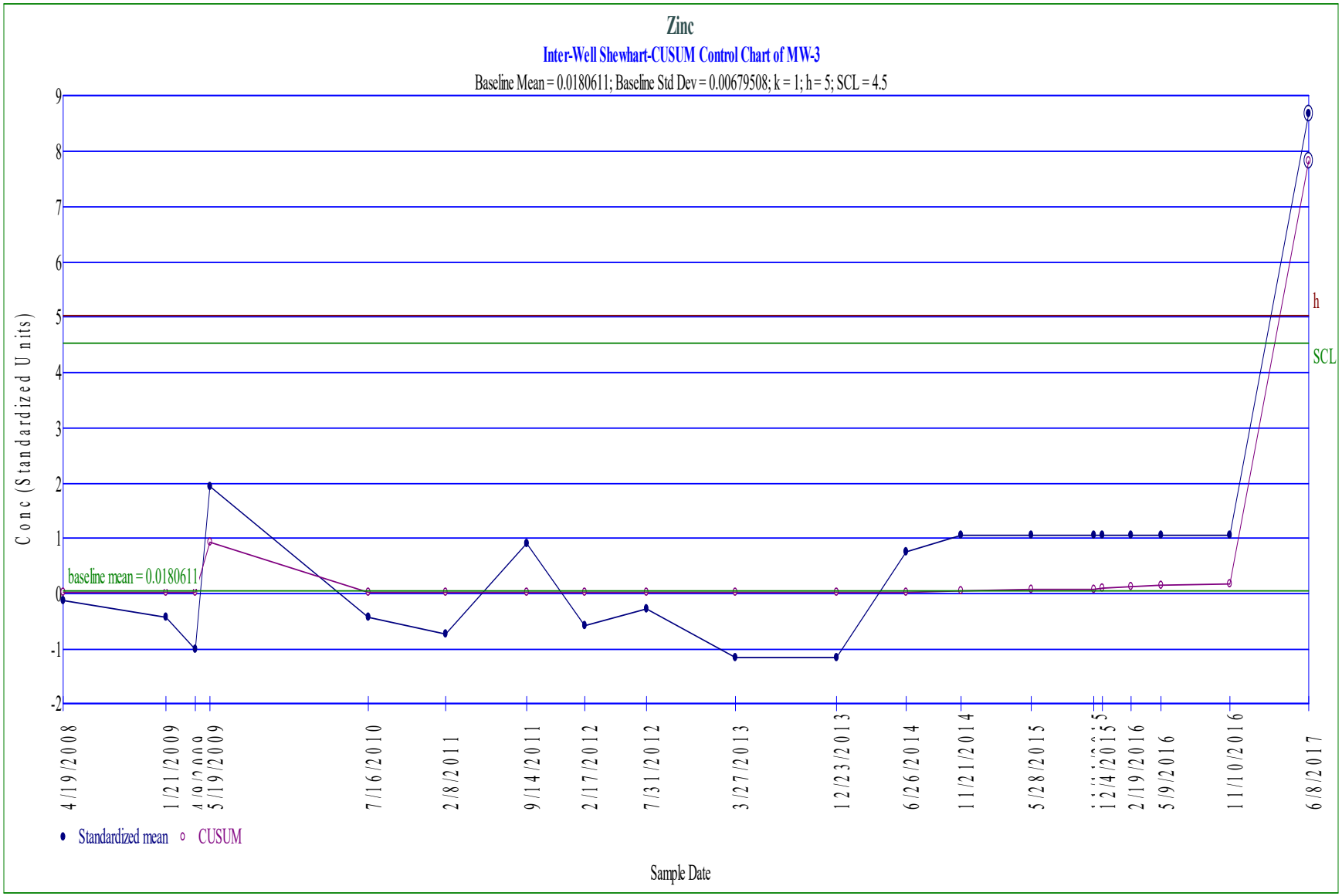

Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.0278222; Baseline Std Dev = 0.0192146; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.0278222
4/28/2016
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 2.758; Baseline Std Dev = 1.05772; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
2000
1000
0
baseline mean = 2.758
h
SCL
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
8/1/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
3/8/2017
6/8/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 2.758; Baseline Std Dev = 1.05772; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
500
400
300
200
100
0
baseline mean = 2.758
h
SCL
4/11/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 2.758; Baseline Std Dev = 1.05772; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
200
100
0
baseline mean = 2.758
h
SCL
4/28/2016
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date


Sulfate
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 7.52824; Baseline Std Dev = 4.19892; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
90
80
70
60
50
40
30
20
10
0
-10
baseline mean = 7.52824
h
SCL
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
3/8/2017
6/8/2017
Standardized mean
CUSUM
Sample Date


Zinc
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.0180611; Baseline Std Dev = 0.00679508; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
9
8
7
6
5
4
3
2
1
0
-1
-2
h
SCL
baseline mean = 0.0180611
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
Standardized mean
CUSUM
Sample Date

Non-Parametric Prediction Interval

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

Total Percent Non-Detects = 93.8776%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 17
Maximum Background Value = 0.001
Confidence Level = 85%
False Positive Rate = 15%

Location	Date	Count	Mean	Significant
MW-3	**8/8/2017**	**1**	**0.0113**	**TRUE**
MW-4	8/7/2017	1	0.001	FALSE
MW-5	6/8/2017	1	0.001	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Nickel

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 74.5098%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 18
Maximum Background Value = 0.2
Confidence Level = 85.7%
False Positive Rate = 14.3%

Location	Date	Count	Mean	Significant
MW-3	6/8/2017	1	0.00231	FALSE
MW-4	6/8/2017	1	0.002	FALSE
MW-5	6/8/2017	1	0.00338	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Zinc

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 50.9804%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 18
Maximum Background Value = 0.0281
Confidence Level = 85.7%
False Positive Rate = 14.3%

Location	Date	Count	Mean	Significant
MW-3	**6/8/2017**	**1**	**0.0769**	**TRUE**
MW-4	6/8/2017	1	0.025	FALSE
MW-5	6/8/2017	1	0.025	FALSE

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Barium

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 0

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.084	25
	1/21/2009	0.028	14
	4/9/2009	0.028	15
	5/19/2009	0.033	16
	7/16/2010	0.021	10
	2/8/2011	0.021	11
	9/14/2011	0.074	23
	2/17/2012	0.022	12
	7/31/2012	0.019	6
	3/27/2013	0.018	3
	12/23/2013	0.017	2
	6/26/2014	0.018	4
	11/21/2014	0.02	7
	5/28/2015	0.0188	5
	11/11/2015	0.0237	13
	5/9/2016	0.02	8
	11/10/2016	0.0207	9
	6/8/2017	0.0146	1
MW-3	4/19/2008	0.056	22
	1/21/2009	0.039	17
	4/9/2009	0.043	18
	5/19/2009	0.047	19
	7/16/2010	0.055	21
	2/8/2011	0.052	20
	9/14/2011	0.15	31
	2/17/2012	0.097	28
	7/31/2012	0.091	26
	3/27/2013	0.094	27
	12/23/2013	0.15	32
	6/26/2014	0.079	24

11/21/2014	0.14	30
5/28/2015	0.152	33
11/11/2015	0.701	38
12/4/2015	0.579	37
2/19/2016	0.186	34
5/9/2016	0.218	36
11/10/2016	0.188	35
6/8/2017	0.134	29

The Wilcoxon Statistic is 347
The Expected value is is 180
The Standard Deviation is 34.2053
The Z Score is 4.86767
The Standard Deviation adjusted for ties is 34.2053
The Z Score adjusted for ties is 4.86767
4.86767 > 2.326 indicating statistical significance at 1% level
4.86767 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Cadmium

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 33
Non detect rank is 17

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	ND<0.0005	17
	1/21/2009	ND<0.0005	17
	4/9/2009	ND<0.0005	17
	5/19/2009	ND<0.0005	17
	7/16/2010	ND<0.0005	17
	2/8/2011	ND<0.0005	17
	9/14/2011	ND<0.0005	17
	2/17/2012	ND<0.0005	17
	7/31/2012	ND<0.0005	17
	12/23/2013	ND<0.0005	17
	6/26/2014	ND<0.0005	17
	11/21/2014	ND<0.001	17
	5/28/2015	ND<0.001	17
	11/11/2015	ND<0.001	17
	5/9/2016	ND<0.001	17
	11/10/2016	ND<0.001	17
	6/8/2017	ND<0.001	17
MW-3	1/21/2009	ND<0.0005	17
	4/9/2009	ND<0.0005	17
	5/19/2009	ND<0.0005	17
	7/16/2010	ND<0.0005	17
	2/8/2011	ND<0.0005	17
	9/14/2011	ND<0.0005	17
	2/17/2012	ND<0.0005	17
	7/31/2012	ND<0.0005	17
	12/23/2013	ND<0.0005	17
	6/26/2014	ND<0.0005	17
	11/21/2014	ND<0.001	17
	5/28/2015	ND<0.001	17
	11/11/2015	ND<0.001	17

12/4/2015	ND<0.001	17
2/19/2016	ND<0.001	17
5/9/2016	ND<0.001	17
11/10/2016	0.00177	34
6/8/2017	0.0286	36
8/8/2017	0.0113	35

The Wilcoxon Statistic is 187
The Expected value is is 161.5
The Standard Deviation is 31.5581
The Z Score is 0.792188
The Standard Deviation adjusted for ties is 15.1301
The Z Score adjusted for ties is 1.65234
0.792188 < 2.326 indicating no statistical significance at 1% level
1.65234 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0

Non detect rank is 0

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	5
	1/21/2009	2.9	14
	4/9/2009	1.9	4
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	7
	7/31/2012	2.2	9
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	6
	11/11/2015	3.97	18
	5/9/2016	2.12	8
	8/18/2016	2.4	10
	11/10/2016	4.59	19
	3/8/2017	1.89	3
	6/8/2017	5.68	20
MW-3	4/19/2008	20	26
	1/21/2009	14	23
	4/9/2009	8.2	21
	5/19/2009	10	22
	7/16/2010	25	27
	2/8/2011	25	28
	9/14/2011	15	24
	2/17/2012	18	25
	8/1/2012	25	29
	3/27/2013	32	31

12/23/2013	35	32
6/26/2014	29	30
11/21/2014	65	33
5/28/2015	92.8	35
11/11/2015	458	42
12/4/2015	360	41
2/19/2016	96.1	36
5/9/2016	80.7	34
8/18/2016	218	40
11/10/2016	120	37
3/8/2017	164	39
6/8/2017	163	38

The Wilcoxon Statistic is 440
The Expected value is is 220
The Standard Deviation is 39.7073
The Z Score is 5.52796
The Standard Deviation adjusted for ties is 39.7073
The Z Score adjusted for ties is 5.52796
5.52796 > 2.326 indicating statistical significance at 1% level
5.52796 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride

Location: MW-4

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 0

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	5
	1/21/2009	2.9	14
	4/9/2009	1.9	4
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	7
	7/31/2012	2.2	9
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	6
	11/11/2015	3.97	18
	5/9/2016	2.12	8
	8/18/2016	2.4	10
	11/10/2016	4.59	19
	3/8/2017	1.89	3
	6/8/2017	5.68	20
MW-4	3/27/2013	270	30
	4/11/2013	150	29
	12/23/2013	6.4	21
	6/26/2014	31	28
	11/21/2014	6.7	24
	5/28/2015	17.5	27
	11/11/2015	7.34	25
	5/9/2016	7.91	26
	11/10/2016	6.61	22
	6/8/2017	6.67	23

The Wilcoxon Statistic is 200
The Expected value is is 100
The Standard Deviation is 22.7303
The Z Score is 4.37742
The Standard Deviation adjusted for ties is 22.7303
The Z Score adjusted for ties is 4.37742
4.37742 > 2.326 indicating statistical significance at 1% level
4.37742 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

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

Total non detects is 0
Non detect rank is 0

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	5
	1/21/2009	2.9	14
	4/9/2009	1.9	4
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	7
	7/31/2012	2.2	9
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	6
	11/11/2015	3.97	18
	5/9/2016	2.12	8
	8/18/2016	2.4	10
	11/10/2016	4.59	19
	3/8/2017	1.89	3
	6/8/2017	5.68	20
MW-5	4/28/2016	26.6	21
	5/9/2016	29.4	23
	11/10/2016	28.6	22
	6/8/2017	38.4	24

The Wilcoxon Statistic is 80
The Expected value is is 40
The Standard Deviation is 12.9099
The Z Score is 3.05966

The Standard Deviation adjusted for ties is 12.9099
The Z Score adjusted for ties is 3.05966
3.05966 > 2.326 indicating statistical significance at 1% level
3.05966 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Sulfate

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 8
Non detect rank is 4.5

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/19/2009	8.9	17
	7/16/2010	9.4	20
	2/8/2011	5.8	12
	9/14/2011	6.6	14
	2/17/2012	ND<5	4.5
	7/31/2012	ND<5	4.5
	3/27/2013	5.1	10
	12/23/2013	6.1	13
	6/26/2014	ND<5	4.5
	11/21/2014	9.1	19
	5/28/2015	ND<5	4.5
	11/11/2015	18.8	26
	5/9/2016	ND<5	4.5
	8/18/2016	3.51	9
	11/10/2016	16.5	25
	3/8/2017	8.17	16
	6/8/2017	ND<5	4.5
MW-3	5/19/2009	ND<5	4.5
	7/16/2010	5.1	11
	2/8/2011	ND<5	4.5
	9/14/2011	7.3	15
	2/17/2012	22	27
	7/31/2012	23	30
	3/27/2013	16	24
	12/23/2013	12	23
	6/26/2014	9.7	21
	11/21/2014	11	22
	5/28/2015	9.09	18
	11/11/2015	29.3	32
	12/4/2015	29.1	31

2/19/2016	22.2	28
5/9/2016	22.3	29
8/18/2016	95.7	35
11/10/2016	34	33
3/8/2017	105	36
6/8/2017	93.7	34

The Wilcoxon Statistic is 268
The Expected value is is 161.5
The Standard Deviation is 31.5581
The Z Score is 3.35888
The Standard Deviation adjusted for ties is 31.3871
The Z Score adjusted for ties is 3.37718
3.35888 > 2.326 indicating statistical significance at 1% level
3.37718 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

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

Total non detects is 17
Non detect rank is 9

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.011	18
	1/21/2009	0.015	25
	4/9/2009	0.011	19
	5/19/2009	0.021	31
	7/16/2010	0.011	20
	2/8/2011	0.016	28
	9/14/2011	0.022	32
	2/17/2012	ND<0.01	9
	7/31/2012	0.023	33
	3/27/2013	0.012	22
	12/23/2013	ND<0.01	9
	6/26/2014	ND<0.01	9
	11/21/2014	ND<0.025	9
	5/28/2015	ND<0.025	9
	11/11/2015	ND<0.025	9
	5/9/2016	0.0281	36
	11/10/2016	ND<0.025	9
	6/8/2017	ND<0.025	9
MW-3	4/19/2008	0.017	30
	1/21/2009	0.015	26
	4/9/2009	0.011	21
	5/19/2009	0.031	37
	7/16/2010	0.015	27
	2/8/2011	0.013	23
	9/14/2011	0.024	35
	2/17/2012	0.014	24
	7/31/2012	0.016	29
	3/27/2013	ND<0.01	9
	12/23/2013	ND<0.01	9
	6/26/2014	0.023	34

11/21/2014	ND<0.025	9
5/28/2015	ND<0.025	9
11/11/2015	ND<0.025	9
12/4/2015	ND<0.025	9
2/19/2016	ND<0.025	9
5/9/2016	ND<0.025	9
11/10/2016	ND<0.025	9
6/8/2017	0.0769	38

The Wilcoxon Statistic is 195
The Expected value is is 180
The Standard Deviation is 34.2053
The Z Score is 0.423911
The Standard Deviation adjusted for ties is 32.6425
The Z Score adjusted for ties is 0.444206
0.423911 < 2.326 indicating no statistical significance at 1% level
0.444206 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 56 - 133 = -77

Tied Group	Value	Members
1	0.2	2

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

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 17100

b = 61560
c = 760
Group Variance = 949
Z-Score = -2.46706
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.46706 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 5 - 1 = 4
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |4| is 0.334
0.334 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 154 - 35 = 119

Tied Group	Value	Members
1	0.15	2

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

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 17100

b = 61560
c = 760
Group Variance = 949
Z-Score = 3.83044
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.83044 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: MW-4
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 6 - 30 = -24
Comparing at 95% confidence level (downward trend)
Probability of obtaining S >= 24 is 0.00693
S < 0 and 0.00693 < 0.05 indicating a downward trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 3 - 3 = 0
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |0| is 1.25
1.25 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 110 - 1 = 109

Tied Group	Value	Members
1	0.0005	10
2	0.001	6

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

There are 0 time periods with multiple data

A = 2760
B = 0
C = 840
D = 0
E = 120
F = 0
a = 14706

b = 52326
c = 684
Group Variance = 663.667
Z-Score = 4.19227
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.19227 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 196 - 32 = 164

Tied Group	Value	Members
1	25	3

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

There are 0 time periods with multiple data

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

F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1254
Z-Score = 4.60298
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.60298 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-4
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 12 - 33 = -21
Comparing at 95% confidence level (downward trend)
Probability of obtaining S >= 21 is 0.036
S < 0 and 0.036 < 0.05 indicating a downward 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 = 5 - 1 = 4
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |4| is 0.334
0.334 >= 0.025 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 = 140 - 30 = 110

Tied Group	Value	Members
1	5	2

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

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 14706
b = 52326

c = 684
Group Variance = 816
Z-Score = 3.81576
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.81576 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 6 - 104 = -98

Tied Group	Value	Members
1	0.02	13
2	0.01	2
3	0.002	2

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

There are 0 time periods with multiple data

A = 4872
B = 0
C = 1716
D = 0
E = 160

F = 0
a = 17100
b = 61560
c = 760
Group Variance = 679.333
Z-Score = -3.7216
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.7216 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 1 - 5 = -4
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |-4| is 0.334
0.334 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 122 - 45 = 77

Tied Group	Value	Members
1	0.015	2
2	0.01	2
3	0.025	7

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

There are 0 time periods with multiple data

A = 834
B = 0
C = 210
D = 0
E = 46

F = 0
a = 17100
b = 61560
c = 760
Group Variance = 903.667
Z-Score = 2.52819
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.52819 > 1.65463 indicating an upward trend

APPENDIX C
LABORATORY ANALYTICAL REPORT &
FIELD INFORMATION LOGS

ANALYTICAL REPORT

June 27, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L914993
Samples Received:	06/09/2017
Project Number:	142-059
Description:	EWS Landfill

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

Jimmy Hunt
Technical Service Representative

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

TABLE OF CONTENTS

MW-1 L914993-01 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 09:55
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988268	1	06/14/17 09:28	06/14/17 09:28	MCG
Wet Chemistry by Method 350.1	WG989111	1	06/19/17 12:54	06/19/17 12:54	JER
Wet Chemistry by Method 410.4	WG987826	1	06/10/17 12:40	06/10/17 15:19	MAJ
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 08:40	06/10/17 08:40	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:28	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:13	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:24	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988465	1	06/13/17 14:03	06/13/17 14:03	ACG
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:04	HMH

MW-3 L914993-02 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 15:15
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988268	1	06/14/17 09:34	06/14/17 09:34	MCG
Wet Chemistry by Method 350.1	WG989111	5	06/19/17 13:41	06/19/17 13:41	JER
Wet Chemistry by Method 410.4	WG987826	1	06/10/17 12:40	06/10/17 15:19	MAJ
Wet Chemistry by Method 9056A	WG987730	10	06/12/17 23:15	06/12/17 23:15	KCF
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 11:02	06/10/17 11:02	KCF
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:37	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:03	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:28	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988465	1	06/13/17 14:19	06/13/17 14:19	ACG
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:15	HMH

MW-4 L914993-03 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 14:45
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988268	1	06/14/17 09:40	06/14/17 09:40	MCG
Wet Chemistry by Method 350.1	WG989111	1	06/19/17 13:02	06/19/17 13:02	JER
Wet Chemistry by Method 410.4	WG987826	1	06/10/17 12:40	06/10/17 15:19	MAJ
Wet Chemistry by Method 9056A	WG991594	1	06/21/17 18:11	06/21/17 18:11	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:39	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:16	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:32	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988465	1	06/13/17 14:35	06/13/17 14:35	ACG
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:26	HMH

MW-5 L914993-04 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 11:15
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 10:34	06/16/17 10:34	MCG
Wet Chemistry by Method 350.1	WG989111	1	06/19/17 14:35	06/19/17 14:35	JER
Wet Chemistry by Method 410.4	WG987826	1	06/10/17 12:40	06/10/17 15:20	MAJ
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 09:05	06/10/17 09:05	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:42	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:18	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:43	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	1	06/13/17 00:53	06/13/17 00:53	JHH
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:37	HMH

LEACHATE-SMELTER L914993-05 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 16:00
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 13:23	06/16/17 13:23	MCG
Wet Chemistry by Method 350.1	WG989111	2500	06/19/17 13:05	06/19/17 13:05	JER
Wet Chemistry by Method 410.4	WG987826	50	06/10/17 12:40	06/10/17 15:20	MAJ
Wet Chemistry by Method 9056A	WG987730	1	06/12/17 14:37	06/12/17 14:37	KCF
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 11:15	06/10/17 11:15	DR
Wet Chemistry by Method 9056A	WG987892	1000	06/10/17 13:24	06/10/17 13:24	DR
Wet Chemistry by Method 9056A	WG988817	20	06/14/17 17:32	06/14/17 17:32	DR
Mercury by Method 7470A	WG988230	10	06/13/17 05:15	06/13/17 10:28	TRB
Metals (ICP) by Method 6010B	WG990279	9	06/17/17 09:18	06/18/17 22:27	CCE
Metals (ICPMS) by Method 6020	WG988953	9	06/15/17 07:39	06/17/17 10:47	JPD
Metals (ICPMS) by Method 6020	WG988953	90	06/15/17 07:39	06/17/17 11:08	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	5	06/19/17 15:19	06/19/17 15:19	JHH
EDB / DBCP by Method 8011	WG988443	1	06/13/17 10:16	06/13/17 22:55	HMH

TMW-1 L914993-06 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 13:30
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 13:09	06/16/17 13:09	MCG
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 09:18	06/10/17 09:18	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:44	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:29	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:51	JPD

TMW-2 L914993-07 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 13:50
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 10:41	06/16/17 10:41	MCG
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 10:23	06/10/17 10:23	KCF
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:46	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:32	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:10	JPD

TMW-3 L914993-08 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 14:15
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 10:46	06/16/17 10:46	MCG
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 09:31	06/10/17 09:31	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:48	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:35	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:54	JPD

IWC-L L914993-09 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 16:30
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 10:53	06/16/17 10:53	MCG
Wet Chemistry by Method 350.1	WG989111	200	06/19/17 13:06	06/19/17 13:06	JER
Wet Chemistry by Method 410.4	WG987826	50	06/10/17 12:40	06/10/17 15:20	MAJ

IWC-L L914993-09 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 16:30
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG987730	1	06/12/17 15:06	06/12/17 15:06	KCF
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 13:37	06/10/17 13:37	DR
Wet Chemistry by Method 9056A	WG987892	500	06/10/17 14:03	06/10/17 14:03	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:55	EL
Metals (ICP) by Method 6010B	WG990279	5	06/17/17 09:18	06/19/17 01:02	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 10:58	JPD
Metals (ICPMS) by Method 6020	WG988953	1000	06/15/17 07:39	06/17/17 11:55	JPD
Metals (ICPMS) by Method 6020	WG988953	20	06/15/17 07:39	06/17/17 11:41	JPD
Metals (ICPMS) by Method 6020	WG988953	500	06/15/17 07:39	06/17/17 11:44	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	1	06/13/17 01:10	06/13/17 01:10	JHH
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:48	HMH

FIELD BLANK L914993-10 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 10:45
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 11:00	06/16/17 11:00	MCG
Wet Chemistry by Method 350.1	WG989111	1	06/19/17 14:37	06/19/17 14:37	JER
Wet Chemistry by Method 410.4	WG988370	1	06/12/17 17:59	06/12/17 21:09	MZ
Wet Chemistry by Method 9056A	WG987892	1	06/10/17 08:52	06/10/17 08:52	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 13:58	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/26/17 11:36	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/23/17 16:35	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	1	06/13/17 01:28	06/13/17 01:28	JHH
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 04:59	HMH

TRIP BLANK L914993-11 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 00:00
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	1	06/12/17 20:25	06/12/17 20:25	JHH

DUPLICATE L914993-12 GW

Collected by: Philip Campbell
Collected date/time: 06/08/17 00:00
Received date/time: 06/09/17 15:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG988616	1	06/16/17 11:14	06/16/17 11:14	MCG
Wet Chemistry by Method 350.1	WG989111	1	06/19/17 13:10	06/19/17 13:10	JER
Wet Chemistry by Method 410.4	WG988370	1	06/12/17 17:59	06/12/17 21:09	MZ
Wet Chemistry by Method 9056A	WG991594	1	06/21/17 18:22	06/21/17 18:22	DR
Mercury by Method 7470A	WG987833	1	06/10/17 06:44	06/12/17 14:00	EL
Metals (ICP) by Method 6010B	WG990279	1	06/17/17 09:18	06/18/17 22:53	CCE
Metals (ICPMS) by Method 6020	WG988953	1	06/15/17 07:39	06/17/17 11:05	JPD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG988366	1	06/13/17 01:46	06/13/17 01:46	JHH
EDB / DBCP by Method 8011	WG988165	1	06/12/17 07:45	06/14/17 05:10	HMH

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.

Jimmy Hunt
Technical Service Representative

Sample Handling and Receiving

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

ESC Sample ID	Project Sample ID	Method
L914993-05	LEACHATE-SMELTER	6010B, 6020, 7470A

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	35.2		20.0	1	06/14/2017 09:28	WG988268

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/19/2017 12:54	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/10/2017 15:19	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/10/2017 08:40	WG987892
Chloride	5.68		1.00	1	06/10/2017 08:40	WG987892
Fluoride	0.178		0.100	1	06/10/2017 08:40	WG987892
Nitrate	ND		0.100	1	06/10/2017 08:40	WG987892
Sulfate	ND		5.00	1	06/10/2017 08:40	WG987892

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	0.000222		0.000200	1	06/12/2017 13:28	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/18/2017 22:13	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/17/2017 10:24	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:24	WG988953
Arsenic	0.0571		0.00200	1	06/17/2017 10:24	WG988953
Barium	0.0146		0.00500	1	06/17/2017 10:24	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:24	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:24	WG988953
Calcium	2.73		1.00	1	06/17/2017 10:24	WG988953
Chromium	ND		0.00200	1	06/17/2017 10:24	WG988953
Cobalt	0.0342		0.00200	1	06/17/2017 10:24	WG988953
Copper	ND		0.00500	1	06/17/2017 10:24	WG988953
Iron	13.2		0.100	1	06/17/2017 10:24	WG988953
Lead	ND		0.00200	1	06/17/2017 10:24	WG988953
Magnesium	2.27		1.00	1	06/17/2017 10:24	WG988953
Manganese	0.776		0.00500	1	06/17/2017 10:24	WG988953
Nickel	0.00418		0.00200	1	06/17/2017 10:24	WG988953
Potassium	ND		1.00	1	06/17/2017 10:24	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:24	WG988953
Silver	ND		0.00200	1	06/17/2017 10:24	WG988953
Sodium	2.93		1.00	1	06/17/2017 10:24	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/17/2017 10:24	WG988953
Vanadium	ND		0.00500	1	06/17/2017 10:24	WG988953
Zinc	ND		0.0250	1	06/17/2017 10:24	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 14:03	WG988465
Acrylonitrile	ND		0.0100	1	06/13/2017 14:03	WG988465
Benzene	ND		0.00100	1	06/13/2017 14:03	WG988465
Bromochloromethane	ND		0.00100	1	06/13/2017 14:03	WG988465
Bromodichloromethane	ND		0.00100	1	06/13/2017 14:03	WG988465
Bromoform	ND		0.00100	1	06/13/2017 14:03	WG988465
Bromomethane	ND		0.00500	1	06/13/2017 14:03	WG988465
Carbon disulfide	ND		0.00100	1	06/13/2017 14:03	WG988465
Carbon tetrachloride	ND		0.00100	1	06/13/2017 14:03	WG988465
Chlorobenzene	ND		0.00100	1	06/13/2017 14:03	WG988465
Chlorodibromomethane	ND		0.00100	1	06/13/2017 14:03	WG988465
Chloroethane	ND		0.00500	1	06/13/2017 14:03	WG988465
Chloroform	ND		0.00500	1	06/13/2017 14:03	WG988465
Chloromethane	ND		0.00250	1	06/13/2017 14:03	WG988465
Dibromomethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 14:03	WG988465
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:03	WG988465
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:03	WG988465
trans-1,4-Dichloro-2-butene	ND	J3 J4	0.00250	1	06/13/2017 14:03	WG988465
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 14:03	WG988465
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:03	WG988465
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:03	WG988465
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 14:03	WG988465
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:03	WG988465
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:03	WG988465
Ethylbenzene	ND		0.00100	1	06/13/2017 14:03	WG988465
2-Hexanone	ND		0.0100	1	06/13/2017 14:03	WG988465
Iodomethane	ND		0.0100	1	06/13/2017 14:03	WG988465
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 14:03	WG988465
Methylene Chloride	ND		0.00500	1	06/13/2017 14:03	WG988465
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 14:03	WG988465
Styrene	ND		0.00100	1	06/13/2017 14:03	WG988465
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
Tetrachloroethene	ND		0.00100	1	06/13/2017 14:03	WG988465
Toluene	ND		0.00100	1	06/13/2017 14:03	WG988465
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 14:03	WG988465
Trichloroethene	ND		0.00100	1	06/13/2017 14:03	WG988465
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 14:03	WG988465
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 14:03	WG988465
Vinyl acetate	ND		0.0100	1	06/13/2017 14:03	WG988465
Vinyl chloride	ND		0.00100	1	06/13/2017 14:03	WG988465
Xylenes, Total	ND		0.00300	1	06/13/2017 14:03	WG988465
(S) Toluene-d8	*99.9*		*80.0-120*		*06/13/2017 14:03*	WG988465
(S) Dibromofluoromethane	*98.5*		*76.0-123*		*06/13/2017 14:03*	WG988465

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*102*		*80.0-120*		*06/13/2017 14:03*	WG988465
(S) 4-Bromofluorobenzene	*107*		*80.0-120*		*06/13/2017 14:03*	WG988465

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:04	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:04	WG988165

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	26.2		20.0	1	06/14/2017 09:34	WG988268

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	11.9		0.500	5	06/19/2017 13:41	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	19.4		10.0	1	06/10/2017 15:19	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/10/2017 11:02	WG987892
Chloride	163		10.0	10	06/12/2017 23:15	WG987730
Fluoride	0.208		0.100	1	06/10/2017 11:02	WG987892
Nitrate	3.23		0.100	1	06/10/2017 11:02	WG987892
Sulfate	93.7		5.00	1	06/10/2017 11:02	WG987892

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 13:37	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/18/2017 22:03	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.226		0.100	1	06/17/2017 10:28	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:28	WG988953
Arsenic	ND		0.00200	1	06/17/2017 10:28	WG988953
Barium	0.134		0.00500	1	06/17/2017 10:28	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:28	WG988953
Cadmium	0.0286		0.00100	1	06/17/2017 10:28	WG988953
Calcium	38.9		1.00	1	06/17/2017 10:28	WG988953
Chromium	ND		0.00200	1	06/17/2017 10:28	WG988953
Cobalt	ND		0.00200	1	06/17/2017 10:28	WG988953
Copper	ND		0.00500	1	06/17/2017 10:28	WG988953
Iron	0.226		0.100	1	06/17/2017 10:28	WG988953
Lead	ND		0.00200	1	06/17/2017 10:28	WG988953
Magnesium	17.8		1.00	1	06/17/2017 10:28	WG988953
Manganese	0.555		0.00500	1	06/17/2017 10:28	WG988953
Nickel	0.00231		0.00200	1	06/17/2017 10:28	WG988953
Potassium	25.8		1.00	1	06/17/2017 10:28	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:28	WG988953
Silver	ND		0.00200	1	06/17/2017 10:28	WG988953
Sodium	60.1		1.00	1	06/17/2017 10:28	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/17/2017 10:28	WG988953
Vanadium	ND		0.00500	1	06/17/2017 10:28	WG988953
Zinc	0.0769		0.0250	1	06/17/2017 10:28	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 14:19	WG988465
Acrylonitrile	ND		0.0100	1	06/13/2017 14:19	WG988465
Benzene	ND		0.00100	1	06/13/2017 14:19	WG988465
Bromochloromethane	ND		0.00100	1	06/13/2017 14:19	WG988465
Bromodichloromethane	ND		0.00100	1	06/13/2017 14:19	WG988465
Bromoform	ND		0.00100	1	06/13/2017 14:19	WG988465
Bromomethane	ND		0.00500	1	06/13/2017 14:19	WG988465
Carbon disulfide	ND		0.00100	1	06/13/2017 14:19	WG988465
Carbon tetrachloride	ND		0.00100	1	06/13/2017 14:19	WG988465
Chlorobenzene	ND		0.00100	1	06/13/2017 14:19	WG988465
Chlorodibromomethane	ND		0.00100	1	06/13/2017 14:19	WG988465
Chloroethane	ND		0.00500	1	06/13/2017 14:19	WG988465
Chloroform	ND		0.00500	1	06/13/2017 14:19	WG988465
Chloromethane	ND		0.00250	1	06/13/2017 14:19	WG988465
Dibromomethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 14:19	WG988465
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:19	WG988465
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:19	WG988465
trans-1,4-Dichloro-2-butene	ND	J3 J4	0.00250	1	06/13/2017 14:19	WG988465
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 14:19	WG988465
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:19	WG988465
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:19	WG988465
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 14:19	WG988465
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:19	WG988465
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:19	WG988465
Ethylbenzene	ND		0.00100	1	06/13/2017 14:19	WG988465
2-Hexanone	ND		0.0100	1	06/13/2017 14:19	WG988465
Iodomethane	ND		0.0100	1	06/13/2017 14:19	WG988465
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 14:19	WG988465
Methylene Chloride	ND		0.00500	1	06/13/2017 14:19	WG988465
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 14:19	WG988465
Styrene	ND		0.00100	1	06/13/2017 14:19	WG988465
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
Tetrachloroethene	ND		0.00100	1	06/13/2017 14:19	WG988465
Toluene	ND		0.00100	1	06/13/2017 14:19	WG988465
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 14:19	WG988465
Trichloroethene	ND		0.00100	1	06/13/2017 14:19	WG988465
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 14:19	WG988465
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 14:19	WG988465
Vinyl acetate	ND		0.0100	1	06/13/2017 14:19	WG988465
Vinyl chloride	ND		0.00100	1	06/13/2017 14:19	WG988465
Xylenes, Total	ND		0.00300	1	06/13/2017 14:19	WG988465
(S) Toluene-d8	*100*		*80.0-120*		*06/13/2017 14:19*	WG988465
(S) Dibromofluoromethane	*100*		*76.0-123*		*06/13/2017 14:19*	WG988465

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*102*		*80.0-120*		*06/13/2017 14:19*	WG988465
(S) 4-Bromofluorobenzene	*108*		*80.0-120*		*06/13/2017 14:19*	WG988465

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:15	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:15	WG988165

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

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	06/14/2017 09:40	WG988268

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/19/2017 13:02	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/10/2017 15:19	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/21/2017 18:11	WG991594
Chloride	6.67		1.00	1	06/21/2017 18:11	WG991594
Fluoride	ND		0.100	1	06/21/2017 18:11	WG991594
Nitrate	0.160	Q	0.100	1	06/21/2017 18:11	WG991594
Sulfate	ND		5.00	1	06/21/2017 18:11	WG991594

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 13:39	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/18/2017 22:16	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/17/2017 10:32	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:32	WG988953
Arsenic	ND		0.00200	1	06/17/2017 10:32	WG988953
Barium	0.00749		0.00500	1	06/17/2017 10:32	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:32	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:32	WG988953
Calcium	3.96		1.00	1	06/17/2017 10:32	WG988953
Chromium	ND		0.00200	1	06/17/2017 10:32	WG988953
Cobalt	ND		0.00200	1	06/17/2017 10:32	WG988953
Copper	ND		0.00500	1	06/17/2017 10:32	WG988953
Iron	0.109		0.100	1	06/17/2017 10:32	WG988953
Lead	ND		0.00200	1	06/17/2017 10:32	WG988953
Magnesium	2.58		1.00	1	06/17/2017 10:32	WG988953
Manganese	0.0130		0.00500	1	06/17/2017 10:32	WG988953
Nickel	ND		0.00200	1	06/17/2017 10:32	WG988953
Potassium	ND		1.00	1	06/17/2017 10:32	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:32	WG988953
Silver	ND		0.00200	1	06/17/2017 10:32	WG988953
Sodium	3.67		1.00	1	06/17/2017 10:32	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/17/2017 10:32	WG988953
Vanadium	ND		0.00500	1	06/17/2017 10:32	WG988953
Zinc	ND		0.0250	1	06/17/2017 10:32	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 14:35	WG988465
Acrylonitrile	ND		0.0100	1	06/13/2017 14:35	WG988465
Benzene	ND		0.00100	1	06/13/2017 14:35	WG988465
Bromochloromethane	ND		0.00100	1	06/13/2017 14:35	WG988465
Bromodichloromethane	ND		0.00100	1	06/13/2017 14:35	WG988465
Bromoform	ND		0.00100	1	06/13/2017 14:35	WG988465
Bromomethane	ND		0.00500	1	06/13/2017 14:35	WG988465
Carbon disulfide	ND		0.00100	1	06/13/2017 14:35	WG988465
Carbon tetrachloride	ND		0.00100	1	06/13/2017 14:35	WG988465
Chlorobenzene	ND		0.00100	1	06/13/2017 14:35	WG988465
Chlorodibromomethane	ND		0.00100	1	06/13/2017 14:35	WG988465
Chloroethane	ND		0.00500	1	06/13/2017 14:35	WG988465
Chloroform	ND		0.00500	1	06/13/2017 14:35	WG988465
Chloromethane	ND		0.00250	1	06/13/2017 14:35	WG988465
Dibromomethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 14:35	WG988465
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:35	WG988465
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 14:35	WG988465
trans-1,4-Dichloro-2-butene	ND	J3 J4	0.00250	1	06/13/2017 14:35	WG988465
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 14:35	WG988465
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:35	WG988465
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 14:35	WG988465
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 14:35	WG988465
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:35	WG988465
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 14:35	WG988465
Ethylbenzene	ND		0.00100	1	06/13/2017 14:35	WG988465
2-Hexanone	ND		0.0100	1	06/13/2017 14:35	WG988465
Iodomethane	ND		0.0100	1	06/13/2017 14:35	WG988465
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 14:35	WG988465
Methylene Chloride	ND		0.00500	1	06/13/2017 14:35	WG988465
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 14:35	WG988465
Styrene	ND		0.00100	1	06/13/2017 14:35	WG988465
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
Tetrachloroethene	ND		0.00100	1	06/13/2017 14:35	WG988465
Toluene	ND		0.00100	1	06/13/2017 14:35	WG988465
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 14:35	WG988465
Trichloroethene	ND		0.00100	1	06/13/2017 14:35	WG988465
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 14:35	WG988465
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 14:35	WG988465
Vinyl acetate	ND		0.0100	1	06/13/2017 14:35	WG988465
Vinyl chloride	ND		0.00100	1	06/13/2017 14:35	WG988465
Xylenes, Total	ND		0.00300	1	06/13/2017 14:35	WG988465
(S) Toluene-d8	*100*		*80.0-120*		*06/13/2017 14:35*	WG988465
(S) Dibromofluoromethane	*96.9*		*76.0-123*		*06/13/2017 14:35*	WG988465

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*101*		*80.0-120*		*06/13/2017 14:35*	WG988465
(S) 4-Bromofluorobenzene	*105*		*80.0-120*		*06/13/2017 14:35*	WG988465

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:26	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:26	WG988165

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	47.0		20.0	1	06/16/2017 10:34	WG988616

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/19/2017 14:35	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/10/2017 15:20	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/10/2017 09:05	WG987892
Chloride	38.4		1.00	1	06/10/2017 09:05	WG987892
Fluoride	ND		0.100	1	06/10/2017 09:05	WG987892
Nitrate	0.994		0.100	1	06/10/2017 09:05	WG987892
Sulfate	ND		5.00	1	06/10/2017 09:05	WG987892

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 13:42	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/18/2017 22:18	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.237		0.100	1	06/17/2017 10:43	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:43	WG988953
Arsenic	ND		0.00200	1	06/17/2017 10:43	WG988953
Barium	0.0224		0.00500	1	06/17/2017 10:43	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:43	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:43	WG988953
Calcium	10.2		1.00	1	06/17/2017 10:43	WG988953
Chromium	ND		0.00200	1	06/17/2017 10:43	WG988953
Cobalt	ND		0.00200	1	06/17/2017 10:43	WG988953
Copper	ND		0.00500	1	06/17/2017 10:43	WG988953
Iron	0.920		0.100	1	06/17/2017 10:43	WG988953
Lead	ND		0.00200	1	06/17/2017 10:43	WG988953
Magnesium	5.58		1.00	1	06/17/2017 10:43	WG988953
Manganese	0.0450		0.00500	1	06/17/2017 10:43	WG988953
Nickel	0.00338		0.00200	1	06/17/2017 10:43	WG988953
Potassium	ND		1.00	1	06/17/2017 10:43	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:43	WG988953
Silver	ND		0.00200	1	06/17/2017 10:43	WG988953
Sodium	10.1		1.00	1	06/17/2017 10:43	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/17/2017 10:43	WG988953
Vanadium	ND		0.00500	1	06/17/2017 10:43	WG988953
Zinc	ND		0.0250	1	06/17/2017 10:43	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 00:53	WG988366
Acrylonitrile	ND		0.0100	1	06/13/2017 00:53	WG988366
Benzene	ND		0.00100	1	06/13/2017 00:53	WG988366
Bromochloromethane	ND		0.00100	1	06/13/2017 00:53	WG988366
Bromodichloromethane	ND		0.00100	1	06/13/2017 00:53	WG988366
Bromoform	ND		0.00100	1	06/13/2017 00:53	WG988366
Bromomethane	ND		0.00500	1	06/13/2017 00:53	WG988366
Carbon disulfide	ND		0.00100	1	06/13/2017 00:53	WG988366
Carbon tetrachloride	ND		0.00100	1	06/13/2017 00:53	WG988366
Chlorobenzene	ND		0.00100	1	06/13/2017 00:53	WG988366
Chlorodibromomethane	ND		0.00100	1	06/13/2017 00:53	WG988366
Chloroethane	ND		0.00500	1	06/13/2017 00:53	WG988366
Chloroform	ND		0.00500	1	06/13/2017 00:53	WG988366
Chloromethane	ND		0.00250	1	06/13/2017 00:53	WG988366
Dibromomethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 00:53	WG988366
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 00:53	WG988366
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 00:53	WG988366
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/13/2017 00:53	WG988366
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 00:53	WG988366
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 00:53	WG988366
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 00:53	WG988366
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 00:53	WG988366
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 00:53	WG988366
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 00:53	WG988366
Ethylbenzene	ND		0.00100	1	06/13/2017 00:53	WG988366
2-Hexanone	ND		0.0100	1	06/13/2017 00:53	WG988366
Iodomethane	ND		0.0100	1	06/13/2017 00:53	WG988366
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 00:53	WG988366
Methylene Chloride	ND		0.00500	1	06/13/2017 00:53	WG988366
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 00:53	WG988366
Styrene	ND		0.00100	1	06/13/2017 00:53	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
Tetrachloroethene	ND		0.00100	1	06/13/2017 00:53	WG988366
Toluene	ND		0.00100	1	06/13/2017 00:53	WG988366
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 00:53	WG988366
Trichloroethene	ND		0.00100	1	06/13/2017 00:53	WG988366
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 00:53	WG988366
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 00:53	WG988366
Vinyl acetate	ND		0.0100	1	06/13/2017 00:53	WG988366
Vinyl chloride	ND		0.00100	1	06/13/2017 00:53	WG988366
Xylenes, Total	ND		0.00300	1	06/13/2017 00:53	WG988366
(S) Toluene-d8	*103*		*80.0-120*		*06/13/2017 00:53*	WG988366
(S) Dibromofluoromethane	*99.5*		*76.0-123*		*06/13/2017 00:53*	WG988366

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
(S) α,α,α-Trifluorotoluene	*99.8*		*80.0-120*		*06/13/2017 00:53*	WG988366
(S) 4-Bromofluorobenzene	*95.2*		*80.0-120*		*06/13/2017 00:53*	WG988366

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:37	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:37	WG988165

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

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	6580		20.0	1	06/16/2017 13:23	WG988616

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	7300		250	2500	06/19/2017 13:05	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	9840		500	50	06/10/2017 15:20	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	77.0		1.00	1	06/10/2017 11:15	WG987892
Chloride	63600		1000	1000	06/10/2017 13:24	WG987892
Fluoride	ND		0.100	1	06/10/2017 11:15	WG987892
Nitrate	ND	Q	0.100	1	06/12/2017 14:37	WG987730
Sulfate	1090		100	20	06/14/2017 17:32	WG988817

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.00200	10	06/13/2017 10:28	WG988230

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	9.22		1.80	9	06/18/2017 22:27	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.900	9	06/17/2017 10:47	WG988953
Antimony	0.0585		0.0180	9	06/17/2017 10:47	WG988953
Arsenic	ND		0.0180	9	06/17/2017 10:47	WG988953
Barium	1.34		0.0450	9	06/17/2017 10:47	WG988953
Beryllium	ND		0.0180	9	06/17/2017 10:47	WG988953
Cadmium	0.150		0.00900	9	06/17/2017 10:47	WG988953
Calcium	277		9.00	9	06/17/2017 10:47	WG988953
Chromium	ND		0.0180	9	06/17/2017 10:47	WG988953
Cobalt	0.0410		0.0180	9	06/17/2017 10:47	WG988953
Copper	4.40		0.450	90	06/17/2017 11:08	WG988953
Iron	ND		0.900	9	06/17/2017 10:47	WG988953
Lead	ND		0.180	90	06/17/2017 11:08	WG988953
Magnesium	ND		9.00	9	06/17/2017 10:47	WG988953
Manganese	0.181		0.0450	9	06/17/2017 10:47	WG988953
Nickel	0.503		0.0180	9	06/17/2017 10:47	WG988953
Potassium	48600		90.0	90	06/17/2017 11:08	WG988953
Selenium	ND		0.180	90	06/17/2017 11:08	WG988953
Silver	ND		0.0180	9	06/17/2017 10:47	WG988953
Sodium	74700		90.0	90	06/17/2017 11:08	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.180	90	06/17/2017 11:08	WG988953
Vanadium	ND		0.0450	9	06/17/2017 10:47	WG988953
Zinc	38.4		2.25	90	06/17/2017 11:08	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.350		0.250	5	06/19/2017 15:19	WG988366
Acrylonitrile	ND		0.0500	5	06/19/2017 15:19	WG988366
Benzene	ND		0.00500	5	06/19/2017 15:19	WG988366
Bromochloromethane	ND		0.00500	5	06/19/2017 15:19	WG988366
Bromodichloromethane	ND		0.00500	5	06/19/2017 15:19	WG988366
Bromoform	ND		0.00500	5	06/19/2017 15:19	WG988366
Bromomethane	ND		0.0250	5	06/19/2017 15:19	WG988366
Carbon disulfide	ND		0.00500	5	06/19/2017 15:19	WG988366
Carbon tetrachloride	ND		0.00500	5	06/19/2017 15:19	WG988366
Chlorobenzene	ND		0.00500	5	06/19/2017 15:19	WG988366
Chlorodibromomethane	ND		0.00500	5	06/19/2017 15:19	WG988366
Chloroethane	ND		0.0250	5	06/19/2017 15:19	WG988366
Chloroform	ND		0.0250	5	06/19/2017 15:19	WG988366
Chloromethane	ND		0.0125	5	06/19/2017 15:19	WG988366
Dibromomethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.0250	5	06/19/2017 15:19	WG988366
1,2-Dibromoethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,2-Dichlorobenzene	ND		0.00500	5	06/19/2017 15:19	WG988366
1,4-Dichlorobenzene	ND		0.00500	5	06/19/2017 15:19	WG988366
trans-1,4-Dichloro-2-butene	ND		0.0125	5	06/19/2017 15:19	WG988366
1,1-Dichloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,2-Dichloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,1-Dichloroethene	ND		0.00500	5	06/19/2017 15:19	WG988366
cis-1,2-Dichloroethene	ND		0.00500	5	06/19/2017 15:19	WG988366
trans-1,2-Dichloroethene	ND		0.00500	5	06/19/2017 15:19	WG988366
1,2-Dichloropropane	ND		0.00500	5	06/19/2017 15:19	WG988366
cis-1,3-Dichloropropene	ND		0.00500	5	06/19/2017 15:19	WG988366
trans-1,3-Dichloropropene	ND		0.00500	5	06/19/2017 15:19	WG988366
Ethylbenzene	ND		0.00500	5	06/19/2017 15:19	WG988366
2-Hexanone	ND		0.0500	5	06/19/2017 15:19	WG988366
Iodomethane	ND		0.0500	5	06/19/2017 15:19	WG988366
2-Butanone (MEK)	ND		0.0500	5	06/19/2017 15:19	WG988366
Methylene Chloride	ND		0.0250	5	06/19/2017 15:19	WG988366
4-Methyl-2-pentanone (MIBK)	ND		0.0500	5	06/19/2017 15:19	WG988366
Styrene	ND		0.00500	5	06/19/2017 15:19	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
Tetrachloroethene	ND		0.00500	5	06/19/2017 15:19	WG988366
Toluene	ND		0.00500	5	06/19/2017 15:19	WG988366
1,1,1-Trichloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
1,1,2-Trichloroethane	ND		0.00500	5	06/19/2017 15:19	WG988366
Trichloroethene	ND		0.00500	5	06/19/2017 15:19	WG988366
Trichlorofluoromethane	ND		0.0250	5	06/19/2017 15:19	WG988366
1,2,3-Trichloropropane	ND		0.0125	5	06/19/2017 15:19	WG988366
Vinyl acetate	ND		0.0500	5	06/19/2017 15:19	WG988366
Vinyl chloride	ND		0.00500	5	06/19/2017 15:19	WG988366
Xylenes, Total	ND		0.0150	5	06/19/2017 15:19	WG988366
(S) Toluene-d8	*99.0*		*80.0-120*		*06/19/2017 15:19*	WG988366
(S) Dibromofluoromethane	*107*		*76.0-123*		*06/19/2017 15:19*	WG988366

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*100*		*80.0-120*		*06/19/2017 15:19*	WG988366
(S) 4-Bromofluorobenzene	*98.3*		*80.0-120*		*06/19/2017 15:19*	WG988366

Sample Narrative:

8260B L914993-05 WG988366: Dilution due to foaming and sediment in the sample vial.

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/13/2017 22:55	WG988443
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/13/2017 22:55	WG988443

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	76.2		20.0	1	06/16/2017 13:09	WG988616

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/10/2017 09:18	WG987892
Chloride	8.82		1.00	1	06/10/2017 09:18	WG987892
Fluoride	ND		0.100	1	06/10/2017 09:18	WG987892
Nitrate	1.31		0.100	1	06/10/2017 09:18	WG987892
Sulfate	ND		5.00	1	06/10/2017 09:18	WG987892

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/12/2017 13:44	WG987833

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/18/2017 22:29	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	1.04		0.100	1	06/17/2017 10:51	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:51	WG988953
Arsenic	0.00220		0.00200	1	06/17/2017 10:51	WG988953
Barium	0.0272		0.00500	1	06/17/2017 10:51	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:51	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:51	WG988953
Calcium	7.49		1.00	1	06/17/2017 10:51	WG988953
Chromium	0.0102		0.00200	1	06/17/2017 10:51	WG988953
Cobalt	ND		0.00200	1	06/17/2017 10:51	WG988953
Copper	0.0153		0.00500	1	06/17/2017 10:51	WG988953
Iron	3.29		0.100	1	06/17/2017 10:51	WG988953
Lead	0.00398		0.00200	1	06/17/2017 10:51	WG988953
Magnesium	2.11		1.00	1	06/17/2017 10:51	WG988953
Manganese	0.0986		0.00500	1	06/17/2017 10:51	WG988953
Nickel	0.00251		0.00200	1	06/17/2017 10:51	WG988953
Potassium	1.50		1.00	1	06/17/2017 10:51	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:51	WG988953
Silver	ND		0.00200	1	06/17/2017 10:51	WG988953
Sodium	4.52		1.00	1	06/17/2017 10:51	WG988953
Thallium	ND		0.00200	1	06/17/2017 10:51	WG988953
Vanadium	0.00858		0.00500	1	06/17/2017 10:51	WG988953
Zinc	ND		0.0250	1	06/17/2017 10:51	WG988953

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/16/2017 10:41	WG988616

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/10/2017 10:23	WG987892
Chloride	44.5		1.00	1	06/10/2017 10:23	WG987892
Fluoride	ND		0.100	1	06/10/2017 10:23	WG987892
Nitrate	3.58		0.100	1	06/10/2017 10:23	WG987892
Sulfate	ND		5.00	1	06/10/2017 10:23	WG987892

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/12/2017 13:46	WG987833

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/18/2017 22:32	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/17/2017 10:10	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:10	WG988953
Arsenic	ND		0.00200	1	06/17/2017 10:10	WG988953
Barium	0.0329		0.00500	1	06/17/2017 10:10	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:10	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:10	WG988953
Calcium	15.5		1.00	1	06/17/2017 10:10	WG988953
Chromium	ND		0.00200	1	06/17/2017 10:10	WG988953
Cobalt	ND		0.00200	1	06/17/2017 10:10	WG988953
Copper	ND		0.00500	1	06/17/2017 10:10	WG988953
Iron	ND		0.100	1	06/17/2017 10:10	WG988953
Lead	ND		0.00200	1	06/17/2017 10:10	WG988953
Magnesium	5.32		1.00	1	06/17/2017 10:10	WG988953
Manganese	0.0385		0.00500	1	06/17/2017 10:10	WG988953
Nickel	ND		0.00200	1	06/17/2017 10:10	WG988953
Potassium	1.42		1.00	1	06/17/2017 10:10	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:10	WG988953
Silver	ND		0.00200	1	06/17/2017 10:10	WG988953
Sodium	9.09		1.00	1	06/17/2017 10:10	WG988953
Thallium	ND		0.00200	1	06/17/2017 10:10	WG988953
Vanadium	ND		0.00500	1	06/17/2017 10:10	WG988953
Zinc	ND		0.0250	1	06/17/2017 10:10	WG988953

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	06/16/2017 10:46	WG988616

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	06/10/2017 09:31	WG987892
Chloride	10.3		1.00	1	06/10/2017 09:31	WG987892
Fluoride	ND		0.100	1	06/10/2017 09:31	WG987892
Nitrate	0.618		0.100	1	06/10/2017 09:31	WG987892
Sulfate	ND		5.00	1	06/10/2017 09:31	WG987892

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/12/2017 13:48	WG987833

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	06/18/2017 22:35	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	10.5		0.100	1	06/17/2017 10:54	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:54	WG988953
Arsenic	0.00740		0.00200	1	06/17/2017 10:54	WG988953
Barium	0.127		0.00500	1	06/17/2017 10:54	WG988953
Beryllium	ND		0.00200	1	06/17/2017 10:54	WG988953
Cadmium	ND		0.00100	1	06/17/2017 10:54	WG988953
Calcium	7.15		1.00	1	06/17/2017 10:54	WG988953
Chromium	0.0311		0.00200	1	06/17/2017 10:54	WG988953
Cobalt	0.0108		0.00200	1	06/17/2017 10:54	WG988953
Copper	0.0199		0.00500	1	06/17/2017 10:54	WG988953
Iron	21.5		0.100	1	06/17/2017 10:54	WG988953
Lead	0.0131		0.00200	1	06/17/2017 10:54	WG988953
Magnesium	3.04		1.00	1	06/17/2017 10:54	WG988953
Manganese	0.326		0.00500	1	06/17/2017 10:54	WG988953
Nickel	0.00777		0.00200	1	06/17/2017 10:54	WG988953
Potassium	1.32		1.00	1	06/17/2017 10:54	WG988953
Selenium	ND		0.00200	1	06/17/2017 10:54	WG988953
Silver	ND		0.00200	1	06/17/2017 10:54	WG988953
Sodium	3.31		1.00	1	06/17/2017 10:54	WG988953
Thallium	ND		0.00200	1	06/17/2017 10:54	WG988953
Vanadium	0.0348		0.00500	1	06/17/2017 10:54	WG988953
Zinc	0.0399		0.0250	1	06/17/2017 10:54	WG988953

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	06/16/2017 10:53	WG988616

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	369		20.0	200	06/19/2017 13:06	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	1390		500	50	06/10/2017 15:20	WG987826

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/10/2017 13:37	WG987892
Chloride	24200		500	500	06/10/2017 14:03	WG987892
Fluoride	ND		50.0	500	06/10/2017 14:03	WG987892
Nitrate	0.193	Q	0.100	1	06/12/2017 15:06	WG987730
Sulfate	ND		5.00	1	06/10/2017 13:37	WG987892

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 13:55	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		1.00	5	06/19/2017 01:02	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	29.0		0.100	1	06/17/2017 10:58	WG988953
Antimony	ND		0.00200	1	06/17/2017 10:58	WG988953
Arsenic	0.113		0.0400	20	06/17/2017 11:41	WG988953
Barium	0.692		0.00500	1	06/17/2017 10:58	WG988953
Beryllium	ND		0.0400	20	06/17/2017 11:41	WG988953
Cadmium	155		0.0200	20	06/17/2017 11:41	WG988953
Calcium	2560		20.0	20	06/17/2017 11:41	WG988953
Chromium	ND		0.0400	20	06/17/2017 11:41	WG988953
Cobalt	0.728		0.0400	20	06/17/2017 11:41	WG988953
Copper	2.99		0.100	20	06/17/2017 11:41	WG988953
Iron	142		2.00	20	06/17/2017 11:41	WG988953
Lead	0.0450		0.0400	20	06/17/2017 11:41	WG988953
Magnesium	1340		20.0	20	06/17/2017 11:41	WG988953
Manganese	286		2.50	500	06/17/2017 11:44	WG988953
Nickel	0.639		0.0400	20	06/17/2017 11:41	WG988953
Potassium	3400		20.0	20	06/17/2017 11:41	WG988953
Selenium	0.262		0.00200	1	06/17/2017 10:58	WG988953
Silver	ND		0.00200	1	06/17/2017 10:58	WG988953
Sodium	5850		20.0	20	06/17/2017 11:41	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.0400	20	06/17/2017 11:41	WG988953
Vanadium	ND		0.100	20	06/17/2017 11:41	WG988953
Zinc	1980		25.0	1000	06/17/2017 11:55	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.414		0.0500	1	06/13/2017 01:10	WG988366
Acrylonitrile	ND		0.0100	1	06/13/2017 01:10	WG988366
Benzene	ND		0.00100	1	06/13/2017 01:10	WG988366
Bromochloromethane	ND		0.00100	1	06/13/2017 01:10	WG988366
Bromodichloromethane	ND		0.00100	1	06/13/2017 01:10	WG988366
Bromoform	ND		0.00100	1	06/13/2017 01:10	WG988366
Bromomethane	ND		0.00500	1	06/13/2017 01:10	WG988366
Carbon disulfide	0.0130		0.00100	1	06/13/2017 01:10	WG988366
Carbon tetrachloride	ND		0.00100	1	06/13/2017 01:10	WG988366
Chlorobenzene	ND		0.00100	1	06/13/2017 01:10	WG988366
Chlorodibromomethane	ND		0.00100	1	06/13/2017 01:10	WG988366
Chloroethane	ND		0.00500	1	06/13/2017 01:10	WG988366
Chloroform	ND		0.00500	1	06/13/2017 01:10	WG988366
Chloromethane	0.00487		0.00250	1	06/13/2017 01:10	WG988366
Dibromomethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 01:10	WG988366
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:10	WG988366
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:10	WG988366
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/13/2017 01:10	WG988366
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 01:10	WG988366
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:10	WG988366
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:10	WG988366
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 01:10	WG988366
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:10	WG988366
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:10	WG988366
Ethylbenzene	ND		0.00100	1	06/13/2017 01:10	WG988366
2-Hexanone	ND		0.0100	1	06/13/2017 01:10	WG988366
Iodomethane	ND		0.0100	1	06/13/2017 01:10	WG988366
2-Butanone (MEK)	0.0423		0.0100	1	06/13/2017 01:10	WG988366
Methylene Chloride	ND		0.00500	1	06/13/2017 01:10	WG988366
4-Methyl-2-pentanone (MIBK)	0.0250		0.0100	1	06/13/2017 01:10	WG988366
Styrene	0.0126		0.00100	1	06/13/2017 01:10	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
Tetrachloroethene	ND		0.00100	1	06/13/2017 01:10	WG988366
Toluene	ND		0.00100	1	06/13/2017 01:10	WG988366
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 01:10	WG988366
Trichloroethene	ND		0.00100	1	06/13/2017 01:10	WG988366
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 01:10	WG988366
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 01:10	WG988366
Vinyl acetate	ND		0.0100	1	06/13/2017 01:10	WG988366
Vinyl chloride	ND		0.00100	1	06/13/2017 01:10	WG988366
Xylenes, Total	ND		0.00300	1	06/13/2017 01:10	WG988366
(S) Toluene-d8	*100*		*80.0-120*		*06/13/2017 01:10*	WG988366
(S) Dibromofluoromethane	*102*		*76.0-123*		*06/13/2017 01:10*	WG988366

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*99.7*		*80.0-120*		*06/13/2017 01:10*	WG988366
(S) 4-Bromofluorobenzene	*97.3*		*80.0-120*		*06/13/2017 01:10*	WG988366

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:48	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:48	WG988165

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	06/16/2017 11:00	WG988616

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/19/2017 14:37	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/12/2017 21:09	WG988370

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/10/2017 08:52	WG987892
Chloride	ND		1.00	1	06/10/2017 08:52	WG987892
Fluoride	ND		0.100	1	06/10/2017 08:52	WG987892
Nitrate	ND		0.100	1	06/10/2017 08:52	WG987892
Sulfate	ND		5.00	1	06/10/2017 08:52	WG987892

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 13:58	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/26/2017 11:36	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	06/23/2017 16:35	WG988953
Antimony	ND		0.00200	1	06/23/2017 16:35	WG988953
Arsenic	ND		0.00200	1	06/23/2017 16:35	WG988953
Barium	ND		0.00500	1	06/23/2017 16:35	WG988953
Beryllium	ND		0.00200	1	06/23/2017 16:35	WG988953
Cadmium	ND		0.00100	1	06/23/2017 16:35	WG988953
Calcium	ND		1.00	1	06/23/2017 16:35	WG988953
Chromium	ND		0.00200	1	06/23/2017 16:35	WG988953
Cobalt	ND		0.00200	1	06/23/2017 16:35	WG988953
Copper	ND		0.00500	1	06/23/2017 16:35	WG988953
Iron	ND		0.100	1	06/23/2017 16:35	WG988953
Lead	ND		0.00200	1	06/23/2017 16:35	WG988953
Magnesium	ND		1.00	1	06/23/2017 16:35	WG988953
Manganese	ND		0.00500	1	06/23/2017 16:35	WG988953
Nickel	ND		0.00200	1	06/23/2017 16:35	WG988953
Potassium	ND		1.00	1	06/23/2017 16:35	WG988953
Selenium	ND		0.00200	1	06/23/2017 16:35	WG988953
Silver	ND		0.00200	1	06/23/2017 16:35	WG988953
Sodium	ND		1.00	1	06/23/2017 16:35	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/23/2017 16:35	WG988953
Vanadium	ND		0.00500	1	06/23/2017 16:35	WG988953
Zinc	ND		0.0250	1	06/23/2017 16:35	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 01:28	WG988366
Acrylonitrile	ND		0.0100	1	06/13/2017 01:28	WG988366
Benzene	ND		0.00100	1	06/13/2017 01:28	WG988366
Bromochloromethane	ND		0.00100	1	06/13/2017 01:28	WG988366
Bromodichloromethane	ND		0.00100	1	06/13/2017 01:28	WG988366
Bromoform	ND		0.00100	1	06/13/2017 01:28	WG988366
Bromomethane	ND		0.00500	1	06/13/2017 01:28	WG988366
Carbon disulfide	ND		0.00100	1	06/13/2017 01:28	WG988366
Carbon tetrachloride	ND		0.00100	1	06/13/2017 01:28	WG988366
Chlorobenzene	ND		0.00100	1	06/13/2017 01:28	WG988366
Chlorodibromomethane	ND		0.00100	1	06/13/2017 01:28	WG988366
Chloroethane	ND		0.00500	1	06/13/2017 01:28	WG988366
Chloroform	ND		0.00500	1	06/13/2017 01:28	WG988366
Chloromethane	ND		0.00250	1	06/13/2017 01:28	WG988366
Dibromomethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 01:28	WG988366
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:28	WG988366
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:28	WG988366
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/13/2017 01:28	WG988366
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 01:28	WG988366
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:28	WG988366
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:28	WG988366
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 01:28	WG988366
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:28	WG988366
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:28	WG988366
Ethylbenzene	ND		0.00100	1	06/13/2017 01:28	WG988366
2-Hexanone	ND		0.0100	1	06/13/2017 01:28	WG988366
Iodomethane	ND		0.0100	1	06/13/2017 01:28	WG988366
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 01:28	WG988366
Methylene Chloride	ND		0.00500	1	06/13/2017 01:28	WG988366
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 01:28	WG988366
Styrene	ND		0.00100	1	06/13/2017 01:28	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
Tetrachloroethene	ND		0.00100	1	06/13/2017 01:28	WG988366
Toluene	ND		0.00100	1	06/13/2017 01:28	WG988366
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 01:28	WG988366
Trichloroethene	ND		0.00100	1	06/13/2017 01:28	WG988366
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 01:28	WG988366
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 01:28	WG988366
Vinyl acetate	ND		0.0100	1	06/13/2017 01:28	WG988366
Vinyl chloride	ND		0.00100	1	06/13/2017 01:28	WG988366
Xylenes, Total	ND		0.00300	1	06/13/2017 01:28	WG988366
(S) Toluene-d8	*102*		*80.0-120*		*06/13/2017 01:28*	WG988366
(S) Dibromofluoromethane	*99.3*		*76.0-123*		*06/13/2017 01:28*	WG988366

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*100*		*80.0-120*		*06/13/2017 01:28*	WG988366
(S) 4-Bromofluorobenzene	*95.2*		*80.0-120*		*06/13/2017 01:28*	WG988366

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 04:59	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 04:59	WG988165

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/12/2017 20:25	WG988366
Acrylonitrile	ND		0.0100	1	06/12/2017 20:25	WG988366
Benzene	ND		0.00100	1	06/12/2017 20:25	WG988366
Bromochloromethane	ND		0.00100	1	06/12/2017 20:25	WG988366
Bromodichloromethane	ND		0.00100	1	06/12/2017 20:25	WG988366
Bromoform	ND		0.00100	1	06/12/2017 20:25	WG988366
Bromomethane	ND		0.00500	1	06/12/2017 20:25	WG988366
Carbon disulfide	ND		0.00100	1	06/12/2017 20:25	WG988366
Carbon tetrachloride	ND		0.00100	1	06/12/2017 20:25	WG988366
Chlorobenzene	ND		0.00100	1	06/12/2017 20:25	WG988366
Chlorodibromomethane	ND		0.00100	1	06/12/2017 20:25	WG988366
Chloroethane	ND		0.00500	1	06/12/2017 20:25	WG988366
Chloroform	ND		0.00500	1	06/12/2017 20:25	WG988366
Chloromethane	ND		0.00250	1	06/12/2017 20:25	WG988366
Dibromomethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/12/2017 20:25	WG988366
1,2-Dibromoethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,2-Dichlorobenzene	ND		0.00100	1	06/12/2017 20:25	WG988366
1,4-Dichlorobenzene	ND		0.00100	1	06/12/2017 20:25	WG988366
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/12/2017 20:25	WG988366
1,1-Dichloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,2-Dichloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,1-Dichloroethene	ND		0.00100	1	06/12/2017 20:25	WG988366
cis-1,2-Dichloroethene	ND		0.00100	1	06/12/2017 20:25	WG988366
trans-1,2-Dichloroethene	ND		0.00100	1	06/12/2017 20:25	WG988366
1,2-Dichloropropane	ND		0.00100	1	06/12/2017 20:25	WG988366
cis-1,3-Dichloropropene	ND		0.00100	1	06/12/2017 20:25	WG988366
trans-1,3-Dichloropropene	ND		0.00100	1	06/12/2017 20:25	WG988366
Ethylbenzene	ND		0.00100	1	06/12/2017 20:25	WG988366
2-Hexanone	ND		0.0100	1	06/12/2017 20:25	WG988366
Iodomethane	ND		0.0100	1	06/12/2017 20:25	WG988366
2-Butanone (MEK)	ND		0.0100	1	06/12/2017 20:25	WG988366
Methylene Chloride	ND		0.00500	1	06/12/2017 20:25	WG988366
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/12/2017 20:25	WG988366
Styrene	ND		0.00100	1	06/12/2017 20:25	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
Tetrachloroethene	ND		0.00100	1	06/12/2017 20:25	WG988366
Toluene	ND		0.00100	1	06/12/2017 20:25	WG988366
1,1,1-Trichloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
1,1,2-Trichloroethane	ND		0.00100	1	06/12/2017 20:25	WG988366
Trichloroethene	ND		0.00100	1	06/12/2017 20:25	WG988366
Trichlorofluoromethane	ND		0.00500	1	06/12/2017 20:25	WG988366
1,2,3-Trichloropropane	ND		0.00250	1	06/12/2017 20:25	WG988366
Vinyl acetate	ND		0.0100	1	06/12/2017 20:25	WG988366
Vinyl chloride	ND		0.00100	1	06/12/2017 20:25	WG988366
Xylenes, Total	ND		0.00300	1	06/12/2017 20:25	WG988366
(S) Toluene-d8	*103*		*80.0-120*		*06/12/2017 20:25*	WG988366
(S) Dibromofluoromethane	*101*		*76.0-123*		*06/12/2017 20:25*	WG988366
(S) a,a,a-Trifluorotoluene	*98.9*		*80.0-120*		*06/12/2017 20:25*	WG988366
(S) 4-Bromofluorobenzene	*100*		*80.0-120*		*06/12/2017 20:25*	WG988366

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	22.8		20.0	1	06/16/2017 11:14	WG988616

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	06/19/2017 13:10	WG989111

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	06/12/2017 21:09	WG988370

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	06/21/2017 18:22	WG991594
Chloride	6.22		1.00	1	06/21/2017 18:22	WG991594
Fluoride	ND		0.100	1	06/21/2017 18:22	WG991594
Nitrate	0.207	Q	0.100	1	06/21/2017 18:22	WG991594
Sulfate	ND		5.00	1	06/21/2017 18:22	WG991594

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/12/2017 14:00	WG987833

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	06/18/2017 22:53	WG990279

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.103		0.100	1	06/17/2017 11:05	WG988953
Antimony	ND		0.00200	1	06/17/2017 11:05	WG988953
Arsenic	ND		0.00200	1	06/17/2017 11:05	WG988953
Barium	0.00782		0.00500	1	06/17/2017 11:05	WG988953
Beryllium	ND		0.00200	1	06/17/2017 11:05	WG988953
Cadmium	0.00236		0.00100	1	06/17/2017 11:05	WG988953
Calcium	4.15		1.00	1	06/17/2017 11:05	WG988953
Chromium	ND		0.00200	1	06/17/2017 11:05	WG988953
Cobalt	ND		0.00200	1	06/17/2017 11:05	WG988953
Copper	ND		0.00500	1	06/17/2017 11:05	WG988953
Iron	0.226		0.100	1	06/17/2017 11:05	WG988953
Lead	ND		0.00200	1	06/17/2017 11:05	WG988953
Magnesium	2.61		1.00	1	06/17/2017 11:05	WG988953
Manganese	0.0275		0.00500	1	06/17/2017 11:05	WG988953
Nickel	ND		0.00200	1	06/17/2017 11:05	WG988953
Potassium	ND		1.00	1	06/17/2017 11:05	WG988953
Selenium	ND		0.00200	1	06/17/2017 11:05	WG988953
Silver	ND		0.00200	1	06/17/2017 11:05	WG988953
Sodium	3.93		1.00	1	06/17/2017 11:05	WG988953

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Thallium	ND		0.00200	1	06/17/2017 11:05	WG988953
Vanadium	ND		0.00500	1	06/17/2017 11:05	WG988953
Zinc	0.0395		0.0250	1	06/17/2017 11:05	WG988953

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	06/13/2017 01:46	WG988366
Acrylonitrile	ND		0.0100	1	06/13/2017 01:46	WG988366
Benzene	ND		0.00100	1	06/13/2017 01:46	WG988366
Bromochloromethane	ND		0.00100	1	06/13/2017 01:46	WG988366
Bromodichloromethane	ND		0.00100	1	06/13/2017 01:46	WG988366
Bromoform	ND		0.00100	1	06/13/2017 01:46	WG988366
Bromomethane	ND		0.00500	1	06/13/2017 01:46	WG988366
Carbon disulfide	ND		0.00100	1	06/13/2017 01:46	WG988366
Carbon tetrachloride	ND		0.00100	1	06/13/2017 01:46	WG988366
Chlorobenzene	ND		0.00100	1	06/13/2017 01:46	WG988366
Chlorodibromomethane	ND		0.00100	1	06/13/2017 01:46	WG988366
Chloroethane	ND		0.00500	1	06/13/2017 01:46	WG988366
Chloroform	ND		0.00500	1	06/13/2017 01:46	WG988366
Chloromethane	ND		0.00250	1	06/13/2017 01:46	WG988366
Dibromomethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/13/2017 01:46	WG988366
1,2-Dibromoethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,2-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:46	WG988366
1,4-Dichlorobenzene	ND		0.00100	1	06/13/2017 01:46	WG988366
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/13/2017 01:46	WG988366
1,1-Dichloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,2-Dichloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,1-Dichloroethene	ND		0.00100	1	06/13/2017 01:46	WG988366
cis-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:46	WG988366
trans-1,2-Dichloroethene	ND		0.00100	1	06/13/2017 01:46	WG988366
1,2-Dichloropropane	ND		0.00100	1	06/13/2017 01:46	WG988366
cis-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:46	WG988366
trans-1,3-Dichloropropene	ND		0.00100	1	06/13/2017 01:46	WG988366
Ethylbenzene	ND		0.00100	1	06/13/2017 01:46	WG988366
2-Hexanone	ND		0.0100	1	06/13/2017 01:46	WG988366
Iodomethane	ND		0.0100	1	06/13/2017 01:46	WG988366
2-Butanone (MEK)	ND		0.0100	1	06/13/2017 01:46	WG988366
Methylene Chloride	ND		0.00500	1	06/13/2017 01:46	WG988366
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/13/2017 01:46	WG988366
Styrene	ND		0.00100	1	06/13/2017 01:46	WG988366
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
Tetrachloroethene	ND		0.00100	1	06/13/2017 01:46	WG988366
Toluene	ND		0.00100	1	06/13/2017 01:46	WG988366
1,1,1-Trichloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
1,1,2-Trichloroethane	ND		0.00100	1	06/13/2017 01:46	WG988366
Trichloroethene	ND		0.00100	1	06/13/2017 01:46	WG988366
Trichlorofluoromethane	ND		0.00500	1	06/13/2017 01:46	WG988366
1,2,3-Trichloropropane	ND		0.00250	1	06/13/2017 01:46	WG988366
Vinyl acetate	ND		0.0100	1	06/13/2017 01:46	WG988366
Vinyl chloride	ND		0.00100	1	06/13/2017 01:46	WG988366
Xylenes, Total	ND		0.00300	1	06/13/2017 01:46	WG988366
(S) Toluene-d8	*105*		*80.0-120*		*06/13/2017 01:46*	WG988366
(S) Dibromofluoromethane	*102*		*76.0-123*		*06/13/2017 01:46*	WG988366

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
(S) α,α,α-Trifluorotoluene	*99.6*		*80.0-120*		*06/13/2017 01:46*	WG988366
(S) 4-Bromofluorobenzene	*95.2*		*80.0-120*		*06/13/2017 01:46*	WG988366

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	06/14/2017 05:10	WG988165
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	06/14/2017 05:10	WG988165

Method Blank (MB)

(MB) R3225494-1 06/14/17 07:42

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

L915368-01 Original Sample (OS) • Duplicate (DUP)

(OS) L915368-01 06/14/17 10:45 • (DUP) R3225494-7 06/14/17 10:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	427	434	1	2.00		20

L914919-09 Original Sample (OS) • Duplicate (DUP)

(OS) L914919-09 06/14/17 08:03 • (DUP) R3225494-3 06/14/17 08:08

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	18.4	19.8	1	7.00	J	20

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

(LCS) R3225494-5 06/14/17 08:51 • (LCSD) R3225494-6 06/14/17 10:20

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	102	106	102	106	85.0-115			4.00	20

Method Blank (MB)

(MB) R3226335-1 06/16/17 09:57

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

L914396-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914396-01 06/16/17 10:04 • (DUP) R3226335-2 06/16/17 10:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	60.5	62.4	1	3.00		20

L915401-06 Original Sample (OS) • Duplicate (DUP)

(OS) L915401-06 06/16/17 12:54 • (DUP) R3226335-7 06/16/17 13:02

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	184	183	1	0.000		20

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

(LCS) R3226335-3 06/16/17 11:05 • (LCSD) R3226335-6 06/16/17 12:26

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	105	107	105	107	85.0-115			2.00	20

Method Blank (MB)

(MB) R3226781-1 06/19/17 12:43

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

L914441-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914441-01 06/19/17 12:47 • (DUP) R3226781-4 06/19/17 12:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Ammonia Nitrogen	1.03	0.988	1	4		20

L915058-01 Original Sample (OS) • Duplicate (DUP)

(OS) L915058-01 06/19/17 13:36 • (DUP) R3226781-8 06/19/17 13:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Ammonia Nitrogen	ND	0.000	1	0		20

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

(LCS) R3226781-2 06/19/17 12:44 • (LCSD) R3226781-3 06/19/17 12:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Ammonia Nitrogen	7.50	7.39	7.42	98	99	90-110			0	20

L914577-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L914577-01 06/19/17 12:50 • (MS) R3226781-5 06/19/17 12:52

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Ammonia Nitrogen	5.00	1.92	6.79	97	1	90-110	

L915057-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L915057-01 06/19/17 13:22 • (MS) R3226781-6 06/19/17 13:24 • (MSD) R3226781-7 06/19/17 13:25

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Ammonia Nitrogen	5.00	7.41	11.8	11.7	87	86	1	90-110	E J6	E J6	0	20

Method Blank (MB)

(MB) R3224642-1 06/10/17 15:14

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L914896-04 Original Sample (OS) • Duplicate (DUP)

(OS) L914896-04 06/10/17 15:16 • (DUP) R3224642-6 06/10/17 15:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	12.5	12.8	1	2		20

L914993-04 Original Sample (OS) • Duplicate (DUP)

(OS) L914993-04 06/10/17 15:20 • (DUP) R3224642-7 06/10/17 15:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	4.30	1	6	J	20

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

(LCS) R3224642-2 06/10/17 15:14 • (LCSD) R3224642-3 06/10/17 15:14

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
COD	242	226	225	93	93	90-110			0	20

L914896-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914896-03 06/10/17 15:16 • (MS) R3224642-4 06/10/17 15:16 • (MSD) R3224642-5 06/10/17 15:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	9.74	399	398	97	97	1	80-120			0	20

Method Blank (MB)

(MB) R3225009-1 06/12/17 21:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L913493-01 Original Sample (OS) • Duplicate (DUP)

(OS) L913493-01 06/12/17 21:08 • (DUP) R3225009-4 06/12/17 21:08

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	993	997	1	0		20

L915252-03 Original Sample (OS) • Duplicate (DUP)

(OS) L915252-03 06/12/17 21:12 • (DUP) R3225009-7 06/12/17 21:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	30.8	30.5	1	1		20

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

(LCS) R3225009-2 06/12/17 21:07 • (LCSD) R3225009-3 06/12/17 21:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
COD	242	235	233	97	96	90-110			1	20

L915099-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L915099-01 06/12/17 21:10 • (MS) R3225009-5 06/12/17 21:10 • (MSD) R3225009-6 06/12/17 21:10

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	416	420	102	103	1	80-120			1	20

Method Blank (MB)

(MB) R3225085-1 06/12/17 11:20

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	0.0802	J	0.0519	1.00
Nitrate	U		0.0227	0.100

L914562-14 Original Sample (OS) • Duplicate (DUP)

(OS) L914562-14 06/12/17 17:43 • (DUP) R3225085-4 06/12/17 17:58

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	9.40	9.35	1	1		15
Nitrate	U	0.000	1	0		15

L914562-19 Original Sample (OS) • Duplicate (DUP)

(OS) L914562-19 06/12/17 19:53 • (DUP) R3225085-6 06/12/17 20:07

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	6.73	6.57	1	2		15
Nitrate	U	0.000	1	0		15

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

(LCS) R3225085-2 06/12/17 11:35 • (LCSD) R3225085-3 06/12/17 11:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40.0	39.6	39.8	99	100	80-120			1	15
Nitrate	8.00	8.35	8.39	104	105	80-120			1	15

L914562-15 Original Sample (OS) • Matrix Spike (MS)

(OS) L914562-15 06/12/17 18:12 • (MS) R3225085-5 06/12/17 18:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	5.74	56.6	102	1	80-120	
Nitrate	5.00	U	4.86	97	1	80-120	

L914570-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914570-06 06/12/17 22:31 • (MS) R3225085-7 06/12/17 22:46 • (MSD) R3225085-8 06/12/17 23:00

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50.0	26.6	77.9	78.5	103	104	1	80-120			1	15
Nitrate	5.00	0.144	5.41	5.38	105	105	1	80-120			1	15

Method Blank (MB)

(MB) R3224819-1 06/10/17 06:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L914993-08 Original Sample (OS) • Duplicate (DUP)

(OS) L914993-08 06/10/17 09:31 • (DUP) R3224819-4 06/10/17 09:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	10.3	10.5	1	2		15
Fluoride	ND	0.000	1	0		15
Nitrate	0.618	0.634	1	3		15
Sulfate	ND	0.000	1	0		15

L915057-01 Original Sample (OS) • Duplicate (DUP)

(OS) L915057-01 06/10/17 11:28 • (DUP) R3224819-6 06/10/17 11:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0		15
Chloride	60.0	57.4	1	4		15
Fluoride	0.506	0.479	1	6		15
Nitrate	U	0.000	1	0		15

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

(LCS) R3224819-2 06/10/17 06:34 • (LCSD) R3224819-3 06/10/17 06:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	39.2	39.2	98	98	80-120			0	15
Chloride	40.0	39.8	39.8	99	99	80-120			0	15
Fluoride	8.00	8.18	8.14	102	102	80-120			0	15
Nitrate	8.00	8.28	8.28	104	104	80-120			0	15
Sulfate	40.0	38.9	39.0	97	98	80-120			0	15

L915057-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L915057-04 06/10/17 12:45 • (MS) R3224819-7 06/10/17 12:58 • (MSD) R3224819-8 06/10/17 13:11

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	4.83	49.6	49.9	89	90	1	80-120			1	15
Fluoride	5.00	0.456	5.05	5.23	92	96	1	80-120			4	15
Nitrate	5.00	U	5.33	5.30	107	106	1	80-120			1	15
Sulfate	50.0	80.9	50.3	51.7	0	0	1	80-120	J6	J6	3	15

Method Blank (MB)

(MB) R3225859-2 06/14/17 06:06

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Sulfate	0.955	J	0.0774	5.00

L915557-02 Original Sample (OS) • Duplicate (DUP)

(OS) L915557-02 06/14/17 21:31 • (DUP) R3225859-6 06/14/17 21:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Sulfate	47.2	48.0	1	2		15

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

(LCS) R3225859-3 06/14/17 06:22 • (LCSD) R3225859-4 06/14/17 06:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Sulfate	40.0	40.2	40.2	101	101	80-120			0	15

L915162-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L915162-01 06/14/17 18:51 • (MS) R3225859-5 06/14/17 19:39

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Sulfate	50.0	10.8	59.2	97	1	80-120	

L915557-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L915557-09 06/15/17 00:10 • (MS) R3225859-7 06/15/17 00:26 • (MSD) R3225859-8 06/15/17 00:42

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Sulfate	50.0	4.23	53.5	53.4	98	98	1	80-120			0	15

Method Blank (MB)

(MB) R3227775-1 06/21/17 16:44

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L917451-03 Original Sample (OS) • Duplicate (DUP)

(OS) L917451-03 06/21/17 18:52 • (DUP) R3227775-4 06/21/17 19:02

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.699	1	0		15
Chloride	49.3	49.8	1	1		15
Fluoride	0.324	0.323	1	0		15
Nitrate	ND	0.000	1	0		15
Sulfate	28.8	28.9	1	0		15

L917451-07 Original Sample (OS) • Duplicate (DUP)

(OS) L917451-07 06/21/17 20:23 • (DUP) R3227775-6 06/21/17 20:34

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	17.2	16.6	1	4		15
Fluoride	1.28	1.30	1	1		15
Nitrate	ND	0.000	1	0		15

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

(LCS) R3227775-2 06/21/17 16:55 • (LCSD) R3227775-3 06/21/17 17:05

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	39.2	39.2	98	98	80-120			0	15
Chloride	40.0	38.8	38.9	97	97	80-120			0	15
Fluoride	8.00	7.96	7.96	99	99	80-120			0	15
Nitrate	8.00	8.00	8.00	100	100	80-120			0	15
Sulfate	40.0	39.2	39.2	98	98	80-120			0	15

L917451-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L917451-05 06/21/17 19:53 • (MS) R3227775-5 06/21/17 20:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	42.4	85	1	80-120	
Chloride	50.0	10.1	58.5	97	1	80-120	
Fluoride	5.00	0.214	5.12	98	1	80-120	
Nitrate	5.00	0.116	4.88	95	1	80-120	

L917456-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L917456-01 06/21/17 21:45 • (MS) R3227775-7 06/21/17 21:55 • (MSD) R3227775-8 06/21/17 22:05

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	47.0	47.3	94	95	1	80-120			1	15
Chloride	50.0	3.21	51.3	51.6	96	97	1	80-120			1	15
Fluoride	5.00	0.307	5.22	5.26	98	99	1	80-120			1	15
Nitrate	5.00	ND	4.83	4.87	95	96	1	80-120			1	15
Sulfate	50.0	44.1	91.2	91.5	94	95	1	80-120			0	15

Method Blank (MB)

(MB) R3224891-1 06/12/17 13:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Mercury	U		0.000049	0.000200

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

(LCS) R3224891-2 06/12/17 13:19 • (LCSD) R3224891-3 06/12/17 13:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Mercury	0.00300	0.00275	0.00280	92	93	80-120			2	20

L914993-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914993-01 06/12/17 13:28 • (MS) R3224891-4 06/12/17 13:30 • (MSD) R3224891-5 06/12/17 13:32

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Mercury	0.00300	0.000222	0.00296	0.00285	91	88	1	75-125			4	20

Method Blank (MB)

(MB) R3225138-1 06/13/17 10:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Mercury	U		0.000049	0.000200

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

(LCS) R3225138-2 06/13/17 10:07 • (LCSD) R3225138-3 06/13/17 10:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Mercury	0.00300	0.00304	0.00293	101	98	80-120			4	20

L915161-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L915161-01 06/13/17 10:19 • (MS) R3225138-4 06/13/17 10:21 • (MSD) R3225138-5 06/13/17 10:23

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Mercury	0.00300	ND	0.00304	0.00274	101	91	1	75-125			10	20

Method Blank (MB)

(MB) R3226613-1 06/18/17 21:55

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

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

(LCS) R3226613-2 06/18/17 21:58 • (LCSD) R3226613-3 06/18/17 22:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron	1.00	0.954	0.959	95	96	80-120			1	20

L914993-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914993-02 06/18/17 22:03 • (MS) R3226613-5 06/18/17 22:08 • (MSD) R3226613-6 06/18/17 22:10

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron	1.00	ND	1.01	1.02	94	95	1	75-125			1	20

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

Method Blank (MB)

(MB) R3226504-1 06/17/17 09:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	U		0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	U		0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	U		0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	0.000361	J	0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	U		0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	U		0.00018	0.00500
Zinc	U		0.00256	0.0250

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

(LCS) R3226504-2 06/17/17 10:03 • (LCSD) R3226504-3 06/17/17 10:06

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.72	4.72	94	94	80-120			0	20
Antimony	0.0500	0.0481	0.0484	96	97	80-120			1	20
Arsenic	0.0500	0.0468	0.0475	94	95	80-120			1	20
Barium	0.0500	0.0454	0.0456	91	91	80-120			0	20
Beryllium	0.0500	0.0437	0.0439	87	88	80-120			0	20
Cadmium	0.0500	0.0504	0.0515	101	103	80-120			2	20
Calcium	5.00	4.77	4.72	95	94	80-120			1	20
Chromium	0.0500	0.0486	0.0495	97	99	80-120			2	20
Copper	0.0500	0.0467	0.0475	93	95	80-120			6	20
Cobalt	0.0500	0.0496	0.0505	99	101	80-120			2	20
Iron	5.00	4.77	4.91	95	98	80-120			3	20

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

(LCS) R3226504-2 06/17/17 10:03 • (LCSD) R3226504-3 06/17/17 10:06

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0474	0.0486	95	97	80-120			2	20
Magnesium	5.00	4.90	4.93	98	99	80-120			1	20
Manganese	0.0500	0.0474	0.0491	95	98	80-120			4	20
Nickel	0.0500	0.0494	0.0501	99	100	80-120			1	20
Potassium	5.00	4.71	4.69	94	94	80-120			0	20
Selenium	0.0500	0.0476	0.0492	95	98	80-120			3	20
Silver	0.0500	0.0475	0.0482	95	96	80-120			2	20
Sodium	5.00	4.89	4.91	98	98	80-120			0	20
Thallium	0.0500	0.0466	0.0476	93	95	80-120			2	20
Vanadium	0.0500	0.0478	0.0483	96	97	80-120			1	20
Zinc	0.0500	0.0488	0.0505	98	101	80-120			3	20

L914993-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914993-07 06/17/17 10:10 • (MS) R3226504-5 06/17/17 10:17 • (MSD) R3226504-6 06/17/17 10:21

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 %
Aluminum	5.00	ND	4.67	4.70	93	94	1	75-125			1	20
Antimony	0.0500	ND	0.0474	0.0478	95	96	1	75-125			1	20
Arsenic	0.0500	ND	0.0459	0.0455	92	91	1	75-125			1	20
Barium	0.0500	0.0329	0.0773	0.0780	89	90	1	75-125			1	20
Beryllium	0.0500	ND	0.0439	0.0428	88	86	1	75-125			3	20
Cadmium	0.0500	ND	0.0511	0.0514	101	101	1	75-125			1	20
Calcium	5.00	15.5	20.1	20.3	92	95	1	75-125			1	20
Chromium	0.0500	ND	0.0489	0.0480	98	96	1	75-125			2	20
Copper	0.0500	ND	0.0450	0.0450	88	88	1	75-125			10	20
Cobalt	0.0500	ND	0.0514	0.0505	99	97	1	75-125			2	20
Potassium	5.00	1.42	6.05	6.09	93	94	1	75-125			1	20
Iron	5.00	ND	4.75	4.72	95	94	1	75-125			1	20
Lead	0.0500	ND	0.0470	0.0476	93	94	1	75-125			1	20
Magnesium	5.00	5.32	10.1	10.2	96	98	1	75-125			1	20
Manganese	0.0500	0.0385	0.0853	0.0835	94	90	1	75-125			2	20
Nickel	0.0500	ND	0.0502	0.0499	98	97	1	75-125			1	20
Selenium	0.0500	ND	0.0475	0.0492	95	98	1	75-125			3	20
Silver	0.0500	ND	0.0472	0.0471	94	94	1	75-125			0	20
Sodium	5.00	9.09	13.9	13.9	96	96	1	75-125			0	20
Thallium	0.0500	ND	0.0461	0.0464	92	93	1	75-125			1	20
Vanadium	0.0500	ND	0.0474	0.0467	95	93	1	75-125			1	20
Zinc	0.0500	ND	0.0572	0.0573	92	93	1	75-125			0	20

Method Blank (MB)

(MB) R3226581-3 06/12/17 19:49

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

Method Blank (MB)

(MB) R3226581-3 06/12/17 19:49

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*104*			*80.0-120*
(S) Dibromofluoromethane	*100*			*76.0-123*
(S) α,α,α-Trifluorotoluene	*96.9*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.1*			*80.0-120*

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

(LCS) R3226581-1 06/12/17 18:37 • (LCSD) R3226581-2 06/12/17 19:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.181	0.186	145	149	10.0-160			2.95	23
Acrylonitrile	0.125	0.127	0.132	102	105	60.0-142			3.36	20
Benzene	0.0250	0.0260	0.0258	104	103	69.0-123			0.770	20
Bromodichloromethane	0.0250	0.0223	0.0223	89.3	89.0	76.0-120			0.280	20
Bromochloromethane	0.0250	0.0250	0.0245	99.9	97.9	76.0-122			2.04	20
Bromoform	0.0250	0.0233	0.0235	93.4	94.2	67.0-132			0.860	20
Bromomethane	0.0250	0.0152	0.0144	60.6	57.6	18.0-160			5.11	20
Carbon disulfide	0.0250	0.0296	0.0287	118	115	55.0-127			2.98	20
Carbon tetrachloride	0.0250	0.0239	0.0240	95.4	96.2	63.0-122			0.760	20
Chlorobenzene	0.0250	0.0244	0.0244	97.8	97.4	79.0-121			0.390	20
Chlorodibromomethane	0.0250	0.0231	0.0233	92.5	93.1	75.0-125			0.550	20
Chloroethane	0.0250	0.0231	0.0223	92.5	89.3	47.0-152			3.46	20
Chloroform	0.0250	0.0236	0.0235	94.4	93.8	72.0-121			0.670	20
Chloromethane	0.0250	0.0254	0.0273	102	109	48.0-139			7.16	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0200	0.0200	80.1	80.2	64.0-127			0.130	20
1,2-Dibromoethane	0.0250	0.0241	0.0238	96.2	95.4	77.0-123			0.900	20
Dibromomethane	0.0250	0.0246	0.0242	98.5	97.0	78.0-120			1.55	20
1,2-Dichlorobenzene	0.0250	0.0237	0.0244	95.0	97.4	80.0-120			2.58	20
1,4-Dichlorobenzene	0.0250	0.0238	0.0241	95.2	96.5	77.0-120			1.38	20
trans-1,4-Dichloro-2-butene	0.0250	0.0183	0.0189	73.4	75.7	55.0-134			3.15	20
1,1-Dichloroethane	0.0250	0.0264	0.0260	106	104	70.0-126			1.53	20
1,2-Dichloroethane	0.0250	0.0256	0.0253	103	101	67.0-126			1.27	20

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

(LCS) R3226581-1 06/12/17 18:37 • (LCSD) R3226581-2 06/12/17 19:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,1-Dichloroethene	0.0250	0.0281	0.0268	112	107	64.0-129			4.82	20
cis-1,2-Dichloroethene	0.0250	0.0257	0.0254	103	102	73.0-120			0.870	20
trans-1,2-Dichloroethene	0.0250	0.0256	0.0259	103	104	71.0-121			1.04	20
1,2-Dichloropropane	0.0250	0.0254	0.0255	102	102	75.0-125			0.340	20
cis-1,3-Dichloropropene	0.0250	0.0233	0.0230	93.2	91.8	79.0-123			1.49	20
trans-1,3-Dichloropropene	0.0250	0.0232	0.0230	93.0	92.0	74.0-127			1.11	20
Ethylbenzene	0.0250	0.0244	0.0247	97.6	98.7	77.0-120			1.05	20
2-Hexanone	0.125	0.140	0.139	112	111	58.0-147			0.650	20
Iodomethane	0.125	0.0894	0.100	71.5	80.3	57.0-140			11.6	20
2-Butanone (MEK)	0.125	0.110	0.111	88.4	88.6	37.0-158			0.280	20
Methylene Chloride	0.0250	0.0248	0.0249	99.3	99.6	66.0-121			0.350	20
4-Methyl-2-pentanone (MIBK)	0.125	0.124	0.122	99.5	98.0	59.0-143			1.53	20
Styrene	0.0250	0.0237	0.0243	94.7	97.3	78.0-124			2.70	20
1,1,1,2-Tetrachloroethane	0.0250	0.0220	0.0221	88.2	88.3	75.0-122			0.170	20
1,1,2,2-Tetrachloroethane	0.0250	0.0239	0.0234	95.5	93.6	71.0-122			2.07	20
Tetrachloroethene	0.0250	0.0246	0.0251	98.3	100	70.0-127			1.99	20
Toluene	0.0250	0.0242	0.0242	96.8	97.0	77.0-120			0.190	20
1,1,1-Trichloroethane	0.0250	0.0246	0.0242	98.3	96.8	68.0-122			1.54	20
1,1,2-Trichloroethane	0.0250	0.0237	0.0232	94.7	92.8	78.0-120			2.07	20
Trichloroethene	0.0250	0.0251	0.0249	100	99.5	78.0-120			0.990	20
Trichlorofluoromethane	0.0250	0.0237	0.0232	94.8	92.9	56.0-137			2.07	20
1,2,3-Trichloropropane	0.0250	0.0227	0.0229	90.9	91.5	72.0-124			0.650	20
Vinyl acetate	0.125	0.125	0.115	99.7	91.8	46.0-160			8.22	20
Vinyl chloride	0.0250	0.0228	0.0226	91.3	90.5	64.0-133			0.940	20
Xylenes, Total	0.0750	0.0710	0.0716	94.7	95.5	77.0-120			0.840	20
(S) Toluene-d8				*101*	*103*	*80.0-120*				
(S) Dibromofluoromethane				*102*	*102*	*76.0-123*				
(S) a,a,a-Trifluorotoluene				*99.5*	*101*	*80.0-120*				
(S) 4-Bromofluorobenzene				*100*	*102*	*80.0-120*				

Method Blank (MB)

(MB) R3225477-4 06/13/17 10:03

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

Method Blank (MB)

(MB) R3225477-4 06/13/17 10:03

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*101*			*80.0-120*
(S) Dibromofluoromethane	*97.0*			*76.0-123*
(S) α,α,α-Trifluorotoluene	*102*			*80.0-120*
(S) 4-Bromofluorobenzene	*106*			*80.0-120*

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

(LCS) R3225477-1 06/13/17 09:01 • (LCSD) R3225477-2 06/13/17 09:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Acetone	0.125	0.162	0.163	130	131	10.0-160			0.500	23
Acrylonitrile	0.125	0.113	0.116	90.6	92.5	60.0-142			2.00	20
Benzene	0.0250	0.0231	0.0234	92.5	93.8	69.0-123			1.41	20
Bromodichloromethane	0.0250	0.0219	0.0219	87.5	87.5	76.0-120			0.0600	20
Bromochloromethane	0.0250	0.0221	0.0225	88.5	89.9	76.0-122			1.56	20
Bromoform	0.0250	0.0207	0.0206	82.6	82.4	67.0-132			0.310	20
Bromomethane	0.0250	0.0190	0.0190	75.8	76.1	18.0-160			0.460	20
Carbon disulfide	0.0250	0.0235	0.0240	94.1	96.0	55.0-127			1.92	20
Carbon tetrachloride	0.0250	0.0235	0.0239	94.2	95.5	63.0-122			1.41	20
Chlorobenzene	0.0250	0.0220	0.0221	88.0	88.5	79.0-121			0.620	20
Chlorodibromomethane	0.0250	0.0214	0.0215	85.5	85.8	75.0-125			0.390	20
Chloroethane	0.0250	0.0229	0.0232	91.5	92.7	47.0-152			1.27	20
Chloroform	0.0250	0.0224	0.0227	89.4	90.8	72.0-121			1.58	20
Chloromethane	0.0250	0.0238	0.0245	95.0	98.1	48.0-139			3.17	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0204	0.0205	81.7	82.0	64.0-127			0.440	20
1,2-Dibromoethane	0.0250	0.0234	0.0235	93.5	93.8	77.0-123			0.370	20
Dibromomethane	0.0250	0.0226	0.0226	90.5	90.3	78.0-120			0.230	20
1,2-Dichlorobenzene	0.0250	0.0223	0.0220	89.4	88.0	80.0-120			1.58	20
1,4-Dichlorobenzene	0.0250	0.0236	0.0236	94.3	94.3	77.0-120			0.0500	20
trans-1,4-Dichloro-2-butene	0.0250	0.0112	0.00909	44.6	36.3	55.0-134	J4	J3 J4	20.4	20
1,1-Dichloroethane	0.0250	0.0227	0.0231	90.7	92.4	70.0-126			1.86	20
1,2-Dichloroethane	0.0250	0.0235	0.0236	94.0	94.3	67.0-126			0.370	20

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

(LCS) R3225477-1 06/13/17 09:01 • (LCSD) R3225477-2 06/13/17 09:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,1-Dichloroethene	0.0250	0.0242	0.0246	96.9	98.5	64.0-129			1.66	20
cis-1,2-Dichloroethene	0.0250	0.0232	0.0238	92.9	95.1	73.0-120			2.32	20
trans-1,2-Dichloroethene	0.0250	0.0233	0.0238	93.2	95.2	71.0-121			2.19	20
1,2-Dichloropropane	0.0250	0.0230	0.0229	91.9	91.7	75.0-125			0.180	20
cis-1,3-Dichloropropene	0.0250	0.0220	0.0218	88.1	87.4	79.0-123			0.870	20
trans-1,3-Dichloropropene	0.0250	0.0222	0.0221	89.0	88.5	74.0-127			0.520	20
Ethylbenzene	0.0250	0.0236	0.0236	94.2	94.6	77.0-120			0.360	20
2-Hexanone	0.125	0.140	0.144	112	115	58.0-147			2.17	20
Iodomethane	0.125	0.116	0.118	92.8	94.8	57.0-140			2.13	20
2-Butanone (MEK)	0.125	0.141	0.143	113	114	37.0-158			1.01	20
Methylene Chloride	0.0250	0.0227	0.0232	90.8	92.7	66.0-121			2.09	20
4-Methyl-2-pentanone (MIBK)	0.125	0.120	0.123	96.0	98.5	59.0-143			2.54	20
Styrene	0.0250	0.0245	0.0248	98.0	99.1	78.0-124			1.14	20
1,1,1,2-Tetrachloroethane	0.0250	0.0217	0.0219	86.6	87.5	75.0-122			1.01	20
1,1,2,2-Tetrachloroethane	0.0250	0.0226	0.0233	90.3	93.0	71.0-122			2.94	20
Tetrachloroethene	0.0250	0.0227	0.0227	90.7	90.8	70.0-127			0.0800	20
Toluene	0.0250	0.0235	0.0235	93.9	94.0	77.0-120			0.140	20
1,1,1-Trichloroethane	0.0250	0.0228	0.0232	91.1	92.7	68.0-122			1.72	20
1,1,2-Trichloroethane	0.0250	0.0225	0.0226	90.1	90.6	78.0-120			0.540	20
Trichloroethene	0.0250	0.0223	0.0225	89.1	90.0	78.0-120			0.950	20
Trichlorofluoromethane	0.0250	0.0246	0.0253	98.4	101	56.0-137			2.83	20
1,2,3-Trichloropropane	0.0250	0.0231	0.0235	92.5	93.9	72.0-124			1.55	20
Vinyl acetate	0.125	0.130	0.130	104	104	46.0-160			0.320	20
Vinyl chloride	0.0250	0.0239	0.0241	95.8	96.5	64.0-133			0.730	20
Xylenes, Total	0.0750	0.0678	0.0684	90.4	91.2	77.0-120			0.880	20
(S) Toluene-d8				*101*	*101*	*80.0-120*				
(S) Dibromofluoromethane				*100*	*101*	*76.0-123*				
(S) a,a,a-Trifluorotoluene				*102*	*102*	*80.0-120*				
(S) 4-Bromofluorobenzene				*104*	*105*	*80.0-120*				

Method Blank (MB)

(MB) R3225737-1 06/14/17 01:08

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

L914530-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914530-01 06/14/17 01:52 • (DUP) R3225737-3 06/14/17 01:41

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

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

(LCS) R3225737-4 06/14/17 03:31 • (LCSD) R3225737-6 06/14/17 05:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000249	0.000250	99.5	99.9	60.0-140			0.390	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000240	0.000234	96.0	93.4	60.0-140			2.69	20

L914530-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L914530-02 06/14/17 01:30 • (MS) R3225737-2 06/14/17 01:19

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	0.000112	112	1	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.000103	103	1	63.0-149	

Method Blank (MB)

(MB) R3225738-1 06/13/17 20:20

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

L914690-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914690-01 06/13/17 21:04 • (DUP) R3225738-3 06/13/17 20:53

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

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

(LCS) R3225738-4 06/13/17 22:44 • (LCSD) R3225738-5 06/14/17 00:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Ethylene Dibromide	0.000250	0.000252	0.000254	101	102	60.0-140			0.870	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000239	0.000248	95.6	99.0	60.0-140			3.46	20

L914690-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L914690-02 06/13/17 20:42 • (MS) R3225738-2 06/13/17 20:31

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Ethylene Dibromide	0.000100	0.0000295	0.000131	101	1	72.0-146	
Ethylene Dibromide	0.000100	0.0000546	0.000131	101	1	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.0000960	96.0	1	63.0-149	

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
(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.
Rec.	Recovery.

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.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
Q	Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

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

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

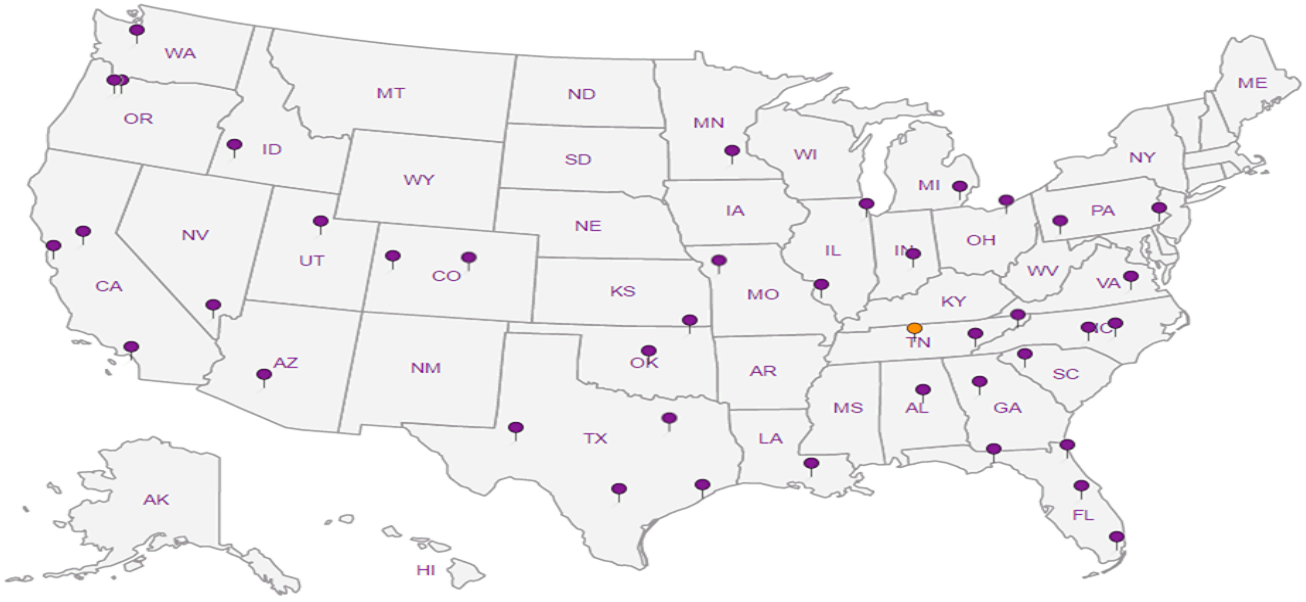
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

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

Our Locations

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



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: mjohnson@cecinc.com, pcampbell@cecinc.com

Project Description: EWS Landfill

City/State Collected:

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

Client Project # 142-059

Lab Project # CEC-142-059

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Chain of Custody Page 1 of 2

ESC LABS
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L914993

H052

Acctnum: CEC
Template: T124509
Prelogin: P605466
TSR: 350 - Jimmy Hunt
PB: 6-7-17 MW
Shipped Via: Client

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	ALK 60mlAmb-NoPres	Br, Cl, F, NO3, SO4 250mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Chloride, Fluoride 125mlHDPE-NoPres	Metals 250mlHDPE-HNO3	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	Metals-Dissolved (Field Filtered THEN Preserved)	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	6-8-17	9:55	10		X	X	X		X	X	X	X			-01
MW-3	↓	GW	↓	↓	1515	10		X	X	X		X	X	X	X	X	Hold Dissolved	02
MW-4		GW			1445	10		X	X	X		X	X	X	X			03
MW-5		GW			1115	10		X	X	X		X	X	X	X			04
~~LEACHATE-SMELTER~~ Pre-Leachate - Smelter	Grab	GW			1600	10		X	X	X		X	X	X	X			05
TMW-1	Grab	GW			1330	4	X		X		~~X~~	X				X	Hold Dissolved	06
TMW-2	Grab	GW			1350	4	X		X		~~X~~	X				X	↓	07
TMW-3	Grab	GW	↓	↓	1415	4	X		X		~~X~~	X				X		08

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

Remarks: Metals = AP1 + Al, B, Ca, Fe, K, Mg, Mn, Na, ~~Boron~~

*Hold - Dissolved Metals (Field Filtered + Preserved)

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier X

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP ___Y ___N
COC Signed/Accurate: ✓Y ___N
Bottles arrive intact: ✓Y ___N
Correct bottles used: ✓Y ___N
Sufficient volume sent: ✓Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ✓Y ___N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR
Philip Campbell	6-9-17	9:00	Johnny Fisher	2 X
Relinquished by: (Signature) Johnny Fisher	6/9/17	15:30	Received by: (Signature)	Temp: 3.0 °C Bottles Received: 93
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Matthew Sadler	Date: 06-07-2017 Time: 1530

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: mjohnson@cecinc.com, pcampbell@cecinc.com

Project Description: EWS Landfill

City/State Collected:

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

Client Project # 142-059

Lab Project # CEC-142-059

Collected by (print): Philip Campbell

Site/Facility ID #

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 2 of 2

ESC LABS
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L914593

Table #

Acctnum: CEC
Template: T111756
Prelogin: P603277
TSR: 350 - Jimmy Hunt
PB: 5/31/17 MG
Shipped Via: Courier

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 60mlAmb-NoPres	Br, Cl, F, NO3, SO4 250mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Metals 250mlHDPE-HNO3	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
~~LEACHATE~~ Iwc-LPT	Grab	GW	—	6-8-17	16:30	10	X	X	X	X	X	X	X			09
FIELD BLANK	Grab	GW	—	6-9-17	10:45	10	X	X	X	X	X	X	X			10
TRIP BLANK	—	GW	—	—	—	12 VOC								X		11
DUPLICATE	Grab	GW	—	6-8-17	—	10	X	X	X	X	X	X	X			12

* 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 X

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR
Philip Campbell	6-9-17	9:00	Johnny Fisher	2 X
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.0 °C Bottles Received: 93
Johnny Fisher	6/9/17	15:30		If preservation required by Login: Date/Time
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 06-09-2017 Time: 1530
			Kathleen Sole	Hold: Condition: NCF / OK

L914993

Jimmy Hunt

From: Chris Unterstein
Sent: Monday, June 12, 2017 4:15 PM
To: Jimmy Hunt
Cc: John Davis
Subject: L914993

Jimmy,

These samples are giving us some issues for anions. Most of them have really high chloride and sulfate concentrations that are wiping out the rest of the chromatogram. They also caused a bracketing standard to fail, so the Nitrates with hits are going to have to be reported OOH.

EQUIPMENT CALIBRATION LOG

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	Ph. I.p Campbell
LOCATION	EWS site, Camden
DATE AND TIME	6-8-17/8:45
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus w/ quatro cable
Equipment Serial #	YSI #1

pH Calibration							
pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	10/2018	4.07	163.2	160 to 180	Yes	4.01	yes
7	5/2018	7.01	2.3	+/-50	Yes	7.00	↓
10	5/2018	10.05	-167	-160 to -180	Yes	10.01	↓

checked + notified

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				ORP Calibration			
Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)	ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
1,000	5/2018	1072	1001	—	—	—	—

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				

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, Low 70's
DATE & TIME	6-8-17/ 9:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	Measured ~~30.5~~ 33.05	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	22.74	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	10.31	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	6.0	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	
0.5	910	02	15.9	4.94	37.8	2.71	234.6	404	
2.0	916	08	15.7	5.48	60.4	1.20	103.6	169	stop & let recharge 5 min
4.0	928	14	15.7	5.67	75.6	0.45	44.9	22.2	
6.0	938	24	15.9	5.71	81.0	0.83	19.2	22.4	stop & let recharge before sample

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
6.0	955	24	16.5	5.72	83.4	0.61	35.2	8.80

Sample Charateristics (Odor, Color)	Start - Lt. orange / No odor Finish - Clear	**Preservatives Used**	5cc HCl
Number of Containers	10	**Sampler Signature**	PMC for sample

WELL DATA

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

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 80's
DATE & TIME	6-8-17/1550	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	10	**SAMPLING EQUIPMENT**	YSI 600 pro plus
DEPTH TO WATER (feet)	6.11	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	3.89	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	2.0	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.0	1550 CNo	3	20.2	6.26	224.9	8.30	159.2	>1000

Sample Charateristics (Odor, Color)	Sample collected. Dark color, No odor	**Preservatives Used**	NA
Number of Containers	NA	**Sampler Signature**	PC

WELL DATA

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

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 70's
DATE & TIME	6-8-17 / 1200	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	19.48	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	7.52	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	4.0	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0.5	1216	4	16.7	5.49	660	1.22	108.5	>1000
1.0	1218	6	16.5	5.43	656	0.81	117.8	>1000
2.0	1224	12	17.5	5.52	688	1.53	152.3	346
2.5	12:30 - Going dry, turn off pump & let re-charge 5 min.							
3.0	1242	25	16.6	5.49	672	3.29	145.8	352
4.0	1250	33	17.4	5.56	679	4.22	141.2	460
well dry again at 4.0 - come back to sample								

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.0	1515	33	16.3	5.53	670	2.96	201.2	34.8 *

* - Metals sample

Sample Charateristics (Odor, Color)	slightly cloudy, then clear / No odor	**Preservatives Used**	
Number of Containers	1 / *Dissolved metals (field filtered)	**Sampler Signature**	Philip A Campbell

WELL DATA

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

* took dissolved metals out of casing sample (field filtered) to put on hold.

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-4
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 70's
DATE & TIME	6-8-17 14:25	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	23.1 0	**SAMPLING EQUIPMENT**	~~Bailer~~ Peristaltic, (only use soda straw method)
DEPTH TO WATER (feet)	11.74	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	Yes
WATER COLUMN (feet)	11.76	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1vol ≈ 2 gal, 3vol ≈ 6 gal	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	14.27	0	15.4	5.79	55.2	2.91	188.9	29.7
2.0	1431	4	15.3	5.79	54.5	2.97	175.9	64.4
4.0	1435	8	15.4	5.78	53.2	2.92	174.4	5.25
6.0	1439	12	15.5	5.79	54.3	2.88	165.4	3.05

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
6.0	1445	12	15.5	5.79	54.3	2.88	165.4	3.05

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

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes / yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/good	**Lock Condition**	good

orange at first. ~~[illegible]~~ oxidized iron in appearance. clears up nicely.

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-5
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 70's
DATE & TIME	6-8-17/10:25	**EVENT FREQUENCY**	~~Quarterly~~ Semi-Ann.
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	33.85	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	9.30	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	24.55	**FIELD BLANK COLLECTED?**	Yes - 10:45
PURGE VOLUME (gallons)	12.0	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.5	1036	3	15.9	5.24	198.6	0.90	178.8	226
4.0	1042	9	16.0	5.31	181.3	1.02	194.2	>1000
8.0	10:50	17	16.0	5.39	155.9	2.00	203.5	469
12.0	1102	29	16.1	5.49	145.1	2.67	202.4	57.1

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
12.0	1115	29	16.0	5.46	150.9	2.39	203.1	35.9

Sample Charateristics (Odor, Color)	Slight - Lt. Orange Finish - Clear / No odor	**Preservatives Used**	- HCl, H_2SO_4, HNO_3 - Nathio, None
Number of Containers	10	**Sampler Signature**	PM Campbell

WELL DATA

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

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC - 70's
DATE & TIME	6-8-17/13:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5 0	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	6.49	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1"	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	26.01	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	3vol — ≈2.75	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.0	13:07	2	15.8	5.74	66.3	7.15	159.3	>1000
2.0	13 11	6	15.8	5.73	65.4	6.95	170.9	~~>1000~~ 594 PC
3.0	13 15	10	16.7	5.71	65.6	6.78	176.8	372
4.0	1320	15	16.2	5.73	66.7	6.93	179.2	343

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.0	1330	15	16.2	5.73	66.7	6.93	179.2	343

Sample Charateristics (Odor, Color)	No odor, Light orange	**Preservatives Used**	Seq-COC
Number of Containers	3	**Sampler Signature**	Philip Campbell

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	No Casing, cap on
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	ok
Pad/Casing Quality	NA	**Lock Condition**	OK, lock on rubber seal

* Took Dissolved Metals sample - Field Filtered

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 80's
DATE & TIME	6-8-17 / 1330	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.50	**SAMPLING EQUIPMENT**	~~Baller~~ Peristaltic
DEPTH TO WATER (feet)	11.10	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	16.40	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	2.30	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	1336	0	16.0	5.82	63.1	8.34	186.9	>1000
1.00	1340	4	17.0	6.07	50.9	9.24	184.1	>1000
1.5	1342	6	15.8	5.85	56.9	8.31	190.6	>1000
3vol- 2.25	1345	9	16.0	5.85	60.7	8.60	198.5	>1000
2.30	-well dry, let recharge 5 min before sample							

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.30	1350	9	16.0	5.85	60.7	8.60	198.5	>1000

Sample Charateristics (Odor, Color)	No odor, orange	**Preservatives Used**	see COC
Number of Containers	3	**Sampler Signature**	Phil Campbell

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	well seal, No casing
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	well seal OK
Pad/Casing Quality	No pad	**Lock Condition**	OK, on well seal

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 80's
DATE & TIME	6/15/17 ~ 14:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	28.00	**SAMPLING EQUIPMENT**	~~Bailer~~ Peristaltic
DEPTH TO WATER (feet)	9.82	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	18.18	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1vol ≈ 0.75 3vol ≈ 2.25	**EQUIPMENT BLANK COLLECTED?**	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0.5	1402	1	15.9	5.36	194.7	2.68	217.4	871
1.25	1405	4	15.7	5.38	172.8	2.39	217.3	>1000
2.0	1407	6	15.7	5.37	174.3	2.42	217.2	>1000
2.75	1409	8	16.0	5.37	176.6	2.30	217.9	>1000

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.75	1415	8	16.0	5.37	176.6	2.30	217.9	>1000

Sample Charateristics (Odor, Color)	Lt. orange / No odor	**Preservatives Used**	HNO_3, None,
Number of Containers	3	**Sampler Signature**	Phil Campbell

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	well cap only
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	OK
Pad/Casing Quality	NA - Temp	**Lock Condition**	OK

* collected dissolved metals sample - field filtered

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	~~French Drain~~ Leachate - Smelter
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 90's
DATE & TIME	6-8-17 / 1600	**EVENT FREQUENCY**	Grab
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab from ~~pump~~ inlet hose pre-tank.
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
–	1600	–	38.2	9.39	380,037	0.13	6.1	NS

Sample Charateristics (Odor, Color)	Cloudy / Ammonia odor	**Preservatives Used**	See COC
Number of Containers	10	**Sampler Signature**	Phil Campbell

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	~~IWC-LTP~~ IWC-LPT
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC/~~GC~~ 70's
DATE & TIME	~~5/3/17/ 14:30~~ 6-8-17/16:30	**EVENT FREQUENCY**	Grab
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab from port - pre-treatment
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	1630 ~~11.30~~	~~0.00~~	~~20.00~~ 26.6	~~7.18~~ 4.89	~~50,703~~ 71,330	0.57 ~~5.39~~	62.7 ~~205~~	NA
Sample Charateristics (Odor, Color)	Clear, No odor		**Preservatives Used**			HCL, HNO3, H2SO4, ~~NaOH~~, None, Na thio		
Number of Containers	10 ~~23~~		**Sampler Signature**			Philip Campbell		

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com, pcampbell@cecinc.com**

Project Description: **EWS Landfill**

City/State Collected:

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

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip F. Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	ALK 60mlAmb-NoPres	Br, Cl, F, NO3, SO4 250mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Chloride, Fluoride 125mlHDPE-NoPres	Metals 250mlHDPE-HNO3	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	Metals-Dissolved (Field Filtered) HNO3	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	6-8-17	9:55	10		X	X	X		X	X	X	X			
MW-3	↓	GW	↓	↓	1515	10		X	X	X		X	X	X	X	X	Hold Dissolved	
MW-4		GW			1445	10		X	X	X		X	X	X	X			
MW-5		GW			1115	10		X	X	X		X	X	X	X			
~~LEACHATE SMELTER~~	~~Grab~~	GW			1600	10		X	X	X		X	X	X	X			
TMW-1	Grab	GW			1330	3	X		X		X	X				X	Hold Dissolved	
TMW-2	Grab	GW			1350	3	X		X		X	X				X	↓	
TMW-3	Grab	GW	↓	↓	1415	3	X		X		X	X				X	↓	

Chain of Custody Page ___ of ___

ESC LAB SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T124509**
Prelogin: **P605466**
TSR: **350 - Jimmy Hunt**
PB: 6-7-17 DW

Shipped Via: **Client**

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

Remarks:Metals = AP1 + Al, B, Ca, Fe, K, Mg, Mn, Na Boron
*Hold - Dissolved Metals (Field Filtered +Preserved)

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier X

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip F. Campbell	6-9-17	9:00		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received: / If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time: / Hold: / Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com, pcampbell@cecinc.com**

Project Description: **EWS Landfill**

City/State Collected:

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

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Phil J. Campbell

Immediately Packed on Ice N ____ Y ____

Rush? (Lab MUST Be Notified)
____ Same Day ____ Five Day
____ Next Day ____ 5 Day (Rad Only)
____ Two Day ____ 10 Day (Rad Only)
____ Three Day

Quote #

Date Results Needed

Chain of Custody Page ___ of ___

ESC LABORATORIES

YOUR LAB OF CHOICE

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

L #

Table #

Acctnum: **CEC**

Template: **T111756**

Prelogin: **P603277**

TSR: **350 - Jimmy Hunt**

PB: 5/31/17 WG

Shipped Via: **Courier**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Pres Chk	ALK 60mlAmb-NoPres	Br, Cl, F, NO3, SO4 250mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Metals 250mlHDPE-HNO3	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
~~LEACHATE~~ Iwc-LFT	Grab	GW	—	6-8-17	16:30	10		X	X	X	X	X	X	X					
FIELD BLANK	Grab	GW	—	6-8-17	10:45	10		X	X	X	X	X	X	X					
TRIP BLANK	—	GW	—	—	—	1									X				
DUPLICATE	Grab	GW	—	6-8-17	—	10		X	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:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__UPS __FedEx __Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip J. Campbell	6-9-17	9:00	Johnny Hunter	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
				Hold: Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-3
LOCATION	Camden, TN 171-823	TEMPERATURE & WEATHER	80 humid
DATE & TIME		EVENT FREQUENCY	Semi-Annual
PURGE METHOD	Peristaltic Pump	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	27	SAMPLING EQUIPMENT	Bailer
DEPTH TO WATER (feet)	19.45	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	NO
WATER COLUMN (feet)	7.55	FIELD BLANK COLLECTED?	YES 4:30
PURGE VOLUME (gallons)	1.22	EQUIPMENT BLANK COLLECTED?	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	15:30	0	20.1	5.18	707	2.29	135.6	5.09
1.2	1540	10	17.2	5.49	677	1.08	132.4	46.5
2.4	1545	15	16.7	5.37	710	3.23	126.4	36.2
* Well Dry at 2 Volumes. Return at 4:30 to check NTU. Value is 99. Discuss with M. David (TDEC) Decide to let recharge overnight and Sample 8/8/17.								
8/8 8:02 Sample NTU=16.6								

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
			16.7	5.37	710	3.23	126.4	16.6

Sample Charateristics (Odor, Color)		Preservatives Used	
Number of Containers	1	Sampler Signature	

WELL DATA

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

GROUNDWATER MONITORING FIELD INFORMATION LOG

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

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-4
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	80 humid
DATE & TIME		**EVENT FREQUENCY**	Semi-Annual
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	23.1	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	11.80	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	YES 4:20
WATER COLUMN (feet)	11.3	**FIELD BLANK COLLECTED?**	NO
PURGE VOLUME (gallons)	1.8	**EQUIPMENT BLANK COLLECTED?**	NO

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	4:00	0	20.0	5.85	89.1	2.96	97.6	10.1
2	4:05	5	16.9	5.71	96.2	2.87	98.7	11.7
4	4:10	10	16.6	5.69	101.3	3.24	111.5	68.5
5.5	4:15	15	16.8	5.90	80.0	3.31	103.1	30.2
5.7	4:20	20	16.7	5.90	81.6	3.27	104	16.7

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
5.7	4:20	20	16.7	5.90	81.6	3.27	104	16.7

Sample Charateristics (Odor, Color)		**Preservatives Used**	
Number of Containers	2	**Sampler Signature**	

WELL DATA

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

ANALYTICAL REPORT

August 15, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L927601
Samples Received:	08/08/2017
Project Number:	171873
Description:	EWS
Site:	CAMDEN, TN
Report To:	Matt Turner 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

Jimmy Hunt
Technical Service Representative

TABLE OF CONTENTS

MW-3 L927601-01 GW

Collected by: M. Johnson
Collected date/time: 08/08/17 08:02
Received date/time: 08/08/17 12:06

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICPMS) by Method 6020	WG1008536	1	08/11/17 17:47	08/13/17 16:50	LAT

MW-4 L927601-02 GW

Collected by: M. Johnson
Collected date/time: 08/07/17 16:20
Received date/time: 08/08/17 12:06

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICPMS) by Method 6020	WG1008536	1	08/11/17 17:47	08/13/17 16:54	LAT

DUPLICATE L927601-03 GW

Collected by: M. Johnson
Collected date/time: 08/07/17 00:00
Received date/time: 08/08/17 12:06

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICPMS) by Method 6020	WG1008536	1	08/11/17 17:47	08/13/17 16:57	LAT

FIELD BLANK L927601-04 WW

Collected by: M. Johnson
Collected date/time: 08/07/17 16:30
Received date/time: 08/08/17 12:06

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICPMS) by Method 200.8	WG1009385	1	08/14/17 17:59	08/15/17 09:32	JPD

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. 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.

Jimmy Hunt
Technical Service Representative

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Cadmium	0.0113		0.000160	0.00100	1	08/13/2017 16:50	WG1008536

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Cadmium	U		0.000160	0.00100	1	08/13/2017 16:54	WG1008536

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Cadmium	U		0.000160	0.00100	1	08/13/2017 16:57	WG1008536

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Cadmium	U		0.000220	0.00100	1	08/15/2017 09:32	WG1009385

Method Blank (MB)

(MB) R3241299-1 08/15/17 09:22

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Cadmium	U		0.00022	0.00100

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

(LCS) R3241299-2 08/15/17 09:25 • (LCSD) R3241299-3 08/15/17 09:29

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Cadmium	0.0500	0.0533	0.0572	107	114	85-115			7	20

L927601-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L927601-04 08/15/17 09:32 • (MS) R3241299-5 08/15/17 09:39 • (MSD) R3241299-6 08/15/17 09:43

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Cadmium	0.0500	U	0.0531	0.0541	106	108	1	70-130			2	20

L928987-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L928987-01 08/15/17 11:26 • (MS) R3241299-7 08/15/17 11:30 • (MSD) R3241299-8 08/15/17 11:33

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Cadmium	0.0500	ND	0.0563	0.0580	113	116	1	70-130			3	20

Method Blank (MB)

(MB) R3240854-1 08/13/17 15:26

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Cadmium	U		0.00016	0.00100

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

(LCS) R3240854-2 08/13/17 15:30 • (LCSD) R3240854-3 08/13/17 15:33

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Cadmium	0.0500	0.0535	0.0525	107	105	80-120			2	20

L927650-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L927650-01 08/13/17 15:37 • (MS) R3240854-5 08/13/17 15:44 • (MSD) R3240854-6 08/13/17 15:47

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Cadmium	0.0500	ND	0.0552	0.0552	110	110	1	75-125			0	20

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
Rec.	Recovery.

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

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

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

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

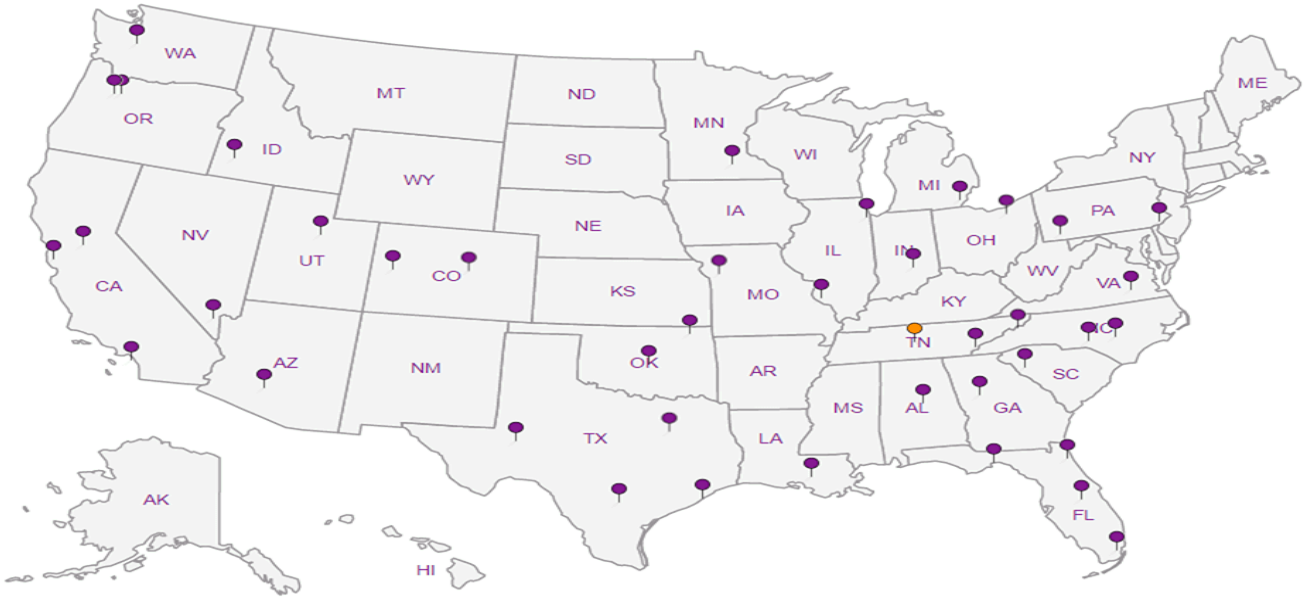
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

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

Our Locations

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



Company Name/Address: Civil & Env. Consultants Inc, 325 Seaboard Lane Suite 170, Franklin TN

Billing Information: Dr Kevin Wolfe, 325 Seaboard LN, St 170, Franklin TN 37067

Report to: Phillip Campbell

Email To: pCampbell@cecinc.com

Project Description: EWS

City/State Collected: Camden, TN

Phone: 615 333-7797 Fax:

Client Project # 171-873

Lab Project #

Collected by (print): M Johnson

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%
X ~~Five Day~~

Date Results Needed ~~5-8-17~~ 8-14-17

Email? ___No X Yes
FAX? ___No ___Yes

Analysis / Container / Preservative: Cadmium, Total (12)

Chain of Custody Page 1 of 1

ESC LABS — YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Lab # L927601

G065

Acctnum:
Template:
Prelogin:
TSR:
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cadmium, Total	Rem./Contaminant	Sample # (lab only)
MW-3	G	GW	-	8/8/17	8:02	1	X		-01
MW-4	G	GW	-	8/7/17	16:20	1	X		02
Duplicate	G	GW	-	8/7/17	-	1	X		03
Field Blank	G	W	-	8/7/17	16:30	1	X		04

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Hold #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	8/8/17	1205	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: 2.1°C Bottles Received: 4

Date: 8-8-17 Time: 1206

Condition: (lab use only) OK

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF:

ESC LAB SCIENCES
Cooler Receipt Form

Client: CEL	SDG#	L927601	
Cooler Received/Opened On: 8/8/17	Temperature:	2.1°C	
Received by : Ian White			
Signature:			

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	✓		
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?		✓	

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 FIELD BLANKS

I. SCOPE AND APPLICABILITY

The purpose of a blank in general is to evaluate artificially introduced sources of contamination. Field blanks are part of a continuum of blank types that may be used to monitor for contamination introduced throughout the life span of a sample from collection through to analysis (see Exhibit 1). Examples of field blanks include equipment blanks, lot checks of dedicated sampling equipment, bottle blanks, transfer blanks, decontamination/rinsate source blanks and trip blanks (see 04-01-02).

A. Equipment Blanks are collected to assess the adequacy of decontamination procedures for non-dedicated sampling equipment and may help evaluate whether field conditions, and/or sampling equipment, sample transport, preparation and/or analysis are contributing contaminants to samples. Equipment blanks are typically performed on non-dedicated sampling equipment that requires decontamination between uses. Equipment blanks should not be collected near running machinery which may emit fumes that can contaminate the blanks
.

B. Lot Checks are rinsates of disposable sampling equipment analyzed for the target analytes of interest that are sampled using that equipment. This may include peristolic tubing, sampling scoops or bailers as well as the empty bottles provided by the laboratory if there are concerns with their purity.

C. Transfer Blanks are empty sample containers filled with water in the field to monitor for ambient contamination - they most typically are used for aqueous samples for organics such as volatiles, GRO, and DRO but may also be useful if airborne particulates are of concern for inorganic parameters. The water source should be the same as what will be used for the final rinse of decontaminated field equipment (see 04-04-01).

D. Decontamination/Rinsate Source Blanks are samples created from the source of final rinsate water used in the field. They differ from Transfer Blanks in that they would typically be filled in a "clean" location as opposed to the field to avoid picking up unexpected ambient contamination. This type of blank, while rare, typically is utilized when an unexplained and persistent contaminant has been detected in the equipment blanks and all other potential sources of contamination have been eliminated as the source.

II. PROJECT-SPECIFIC REQUIREMENTS

WATER TYPES TO BE USED FOR BLANKS: Blank water refers to water that is free of any analytes of interest. Common water types include distilled, deionized, HPLC-grade, pesticide grade etc. Depending on the data quality objectives for the project and expected levels of target analytes, the choice of water used for field blanks water may vary. Investigations where trace levels (parts per billion or lower) of contaminant are of interest may require water that meets higher purity standards than soil investigations where target analytes may be in the parts per million range.

Sources of water suitable for use for field blanks include:

A. **Laboratory supplied water** is laboratory reagent water that is used in the analytical or cleaning processes, as well as for their method blanks. For the best comparability between field blanks and laboratory method or instrument blanks it is recommended that laboratory supplied water be used. This water should be in glass containers if organics analytes are of interest. In addition, this water should be from the laboratory performing the analyses and not left over from a prior investigation or from a different laboratory. This eliminates any variability introduced as a result of different blank water sources. Left over water from a previous project is not recommended for use as a field blank as the possibility exists that the water could have become contaminated during storage.

B. **Store purchased distilled/deionized**: If trace level analyses are not required, the use of commercially prepared distilled/deionized water purchased from a supermarket or home improvement store may be sufficient. As this water typically is available in plastic jugs, it is not an appropriate blank water source when trace level organics are the constituents of interest.

C. **Ultra Pure**: Certified metal-grade, pesticide-grade or HPLC-grade water may be purchased from most chemical supply companies.

III. METHODOLOGY

A. Review the SOP for the medium sampled, the project specific field sampling plan or quality assurance project plan to determine the blank collection frequency required for the project. Due to cost or other considerations, every project may not warrant the use of an equipment blank. Considerations impacting the frequency of equipment blank collection may include expected concentration ranges of the analytes of interest, field conditions (i.e. will sampling activities occur in an area where there are potential background ambient concentrations of target analytes), use of new sampling equipment, newly trained staff, or use of an unknown laboratory. Field blanks may also be collected if unexpected results in field samples are observed.

B. Record the source, date opened and lot number of the water used for the rinsate blanks.

C. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

D. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket or bowl. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket and/or bowl used for homogenizing.

E. Fill a complete set of sample bottles.

F. Assign the blank a sample id – if it is desirable to obscure the fact that the sample is a blank, use the same format as the other samples in the series, otherwise a simplified sample id such as FB-mmddyy is recommended (where FB could be EB, TRB, LC etc. as appropriate for the blank type).

G. Assign the blank a sample date and time. Laboratory protocols for assigning sampling date/time to improperly labeled samples vary widely and may impact sampling holding times for certain short hold parameters.

H. Include the blanks on the Chain of Custody form along with the other samples.

I. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock blank water depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- Source of blank water (include a lot number if available and the type of sample container)
- Time and sequence within the sampling event when the blanks were prepared

- Description of the procedure for preparing the blanks
- Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 06-02-05).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume I, Chapter I. Washington, DC.
EPA, 2009. Region III Fact Sheet: Quality Control Tool – Blanks
(http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf)

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY

A trip blank is a container of laboratory reagent water that is prepared by the laboratory and shipped, unopened, to the field with empty sample containers and then from the field along with the full sample containers. Trip blanks are used to document contamination attributable to shipping and field handling procedures (i.e., diffusion of volatile organics through the septum during daily collection activities, shipment and storage) as well as provide an independent assessment of laboratory introduced contamination. If the trip blank and associated laboratory preparation blanks are free of analytes of interest, it may safely be assumed that reported analytes are actually present in the environmental samples.

II. PROJECT-SPECIFIC REQUIREMENTS

A. Frequency: *Specify the project specific frequency based on the Work Plan.*

B. Other Criteria: A trip blank is used for all classes of volatile organic analyte analyses (VOA), such as TCL volatile organic compounds (VOCs), BTEX, methanol or other purgeable organic compounds. If you are unsure whether a specific analysis is considered a purgeable method, confirm with the laboratory.

1. Trip blanks are also required for soil samples submitted for TPH-gasoline range organics and other purgeable organics analyses (VOAs). These trip blanks should be prepared in the same manner as an aqueous trip blank.
2. If some of the daily samples being collected/shipped together are submitted for typical VOCs (SW846-8260 or EPA 624) while others are submitted for TPH gasoline/diesel range organics (or another purgeable organic method), you will need to include 2 sets of trip blanks and analyze one for each unique (non-overlapping analyte list) method.

C. Other Considerations: Even if the project Work Plan doesn't specifically call for the use of Trip Blanks there are certain situations where the use of a Trip Blank should be evaluated:

1. If an unexpected high field PID reading is encountered during sampling, a trip blank may be warranted to monitor for cross contamination if other samples are included in the shipment.
2. When there is suspicion of the potential of airborne contamination from external sources such as idling vehicles or machinery or operations upwind using VOCs (such as a refinery, spray painting etc.) although such contamination is best monitored for using a transfer blank where the VOA vial is filled in the field with the water used for equipment rinsate blanks.
3. In general, if there is a suspicion of external cross contamination, a trip blank could be submitted to the laboratory to be placed on HOLD. If unexpected results are encountered in the other samples in the shipment, the laboratory can then be requested to analyze the trip blank to determine whether cross contamination has occurred however holding times must be closely monitored in such cases.

III. METHODOLOGY

For those projects where trip blanks are required, appropriate procedures are discussed below:

A. One trip blank should be included with each cooler containing volatile samples. To save on trip blank analysis costs, you may collect all volatile samples during the day in a single cooler and ship them separately from other sample bottles (if necessary to minimize the number of trip blanks required).

B. When ordering bottles from the laboratory for the sampling event, request sufficient trip blanks such that there is at least one trip blank associated with each day of sample collection activities (with a few spares as a contingency if unexpected conditions expand the field activities or a trip blank container breaks).

C. A trip blank is associated with a group of samples that are collected together throughout the day and shipped together. (It is not necessary to maintain the trip blanks with the same set(s) of vials that are shipped from the laboratory, unless there is a concern that these sample containers have potentially been exposed to contamination during shipment, when it is recommended that fresh containers be obtained.)

D. The trip blank should go out to the field in a cooler (with ice) that volatile field samples containers are added to as they are collected during each day's sampling activities. Handle the blank in the same manner as the filled sample vials.

E. Assign the trip blank a sample number identifying its source, consistent with the format used for the sampling event. One suggestion is to include the sample date in the sample number to aid in matching it with the associated field samples in presentation of results in the project report (i.e. TB0401 or TRIP0401 for the trip blank associated with samples collected on 04/01).

F. Assign a date and time to the trip blank on the COC and sample container as if it were a field sample. The time stamp for the trip blank is when the first sample is added to the cooler containing the trip blank. Do not leave this field blank as the laboratory will require a date and time stamp to monitor analysis holding times. Laboratory protocols for assigning this date if left blank can vary considerably.

G. Return the trip blanks to the laboratory with the samples. Include the trip blank information along with the samples on the Chain-of-Custody form (SOP 06-02-02). Analysis is performed for the same suite of volatile organic compounds as the associated samples. (i.e., it is only necessary to request BTEX if associated samples are only analyzed for BTEX). However, if samples with different subsets of volatile constituents are collected and shipped together, select the method that covers all of the constituents. It is not necessary to analyze for both BTEX and TCL VOCs, for example.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Trip blanks should never be opened in the field.

B. If there are multiple sample teams on the project that are collecting samples separately from each other during the day, a separate trip blank should be assigned to each group which is then shipped separately to the lab.

C. Do not combine groupings of samples with different associated trip blanks into the same cooler for shipping.

D. Do not combine multiple days' worth of VOC samples into a cooler for shipment unless they have been in the same cooler with the trip blank and each other throughout the sampling process.

V. DOCUMENTATION

Describe handling of the trip blanks in the Trip Report (SOP 06-02-05). Include the sample numbers assigned and associated samples (if more than one trip blank is used).

VI. REFERENCES:

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC

EPA Region III Quality Control Fact Sheet, Field Blanks, http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-02-02 CHAIN-OF-CUSTODY FORM

I. SCOPE AND APPLICABILITY

A Chain-of-Custody (COC) Form must be completed for each shipment of samples for laboratory analysis. The COC form is the communication record between the project field team and the laboratory login personnel. Accurate and legible completion of the COC form is necessary to insure that samples are analyzed for the correct parameters.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

Complete a Chain-of-Custody Form as provided by the laboratory for each shipping container of samples containing the following information (each laboratory will have their own preferred COC form so the location of the information on the form may vary):

- CEC project number and name
- Project Manager or designated CEC contact with their phone number and email
- Date and time of sample collection
- Sample number
- Sample Matrix
- Total number of bottles or jars
- Preservation (this is especially important if the laboratory is expected to preserve the bottles upon receipt)
- Suites of analyses requested, in specific terms. Examples:
  TCL VOCs
  RCRA Metals
  BTEX
  PNAs-SW846 8270/SIM
  Avoid vague descriptors like "VOCs" or "metals." If a project specific analyte list (subset of metals or organic compounds for example) has been set up with the project and is referenced on the COC, include a copy of it with each shipment to the laboratory to ensure that it becomes part of the data report and the sample custody records. It should be possible to determine exactly what sample analyses were requested/required from the COC.
- Requested turnaround time (be specific (i.e. 48 hours, 3 days, etc.,) if not standard)
- Any special notes/requests, for example indicate high PID readings if applicable, request for lower reporting limits – don't assume you will get drinking water limits just because you submit a drinking water sample, this must be requested either in advance or on the COC
- Signature of CEC person relinquishing custody to the laboratory or shipping courier
- Date and time samples were handed over to someone else or placed under custody seals

Signatures of every person who has control of the samples should appear on the Chain-of-Custody Form. If another person, even another CEC employee, takes responsibility for packing or shipping the samples after you have completed the form and before the samples have been sealed, that person should sign as receiving and subsequently relinquishing the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

- Use of vague terms such as VOCs or Metals may lead to missing parameters. Verify with the laboratory which compounds/metals are part of their standard analyses to ensure that all necessary parameters will be reported.
- Illegible sample names/IDs will lead to the sample login personnel guessing/interpreting what was written which may result in the laboratory report not reflecting the intended sample names/ID. It is often not possible for the laboratory to retroactively edit the report and more importantly the

underlying analysis records to correct sample names/IDs.

- If lower reporting limits are required, this must be communicated to the laboratory on the COC in addition to any prior communication as this may impact how samples are logged in for analysis.

V. DOCUMENTATION

Use the laboratory supplied COC forms (paper or electronic) or equivalent. If three part forms are not used, either make a photocopy, take a photo of or fax the COC before placing it in the cooler. Use of the Chain-of-Custody Form is discussed in SOP 06-01-01 and SOP 06-01-03.

VI. REFERENCES: None.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.