FIRST 2015 SEMI-ANNUAL
GROUNDWATER MONITORING REPORT

ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
TDSWM PERMIT NUMBER IDL 03-0212
CAMDEN, TENNESSEE

Prepared For:

ENVIRONMENTAL WASTE SOLUTIONS CLASS II LANDFILL
200 OMAR CIRCLE
CAMDEN, TN 38320

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
NASHVILLE, TN

CEC Project 142-059

JULY 2015

FIRST SEMI-ANNUAL 2015 GROUNDWATER MONITORING REPORT
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Environmental Waste Solutions Camden Class II Landfill
TDSWM Permit Number IDL 03-0212
Camden, Tennessee

Prepared for:
Environmental Waste Solutions Camden Class II Landfill
200 Omar Circle
Camden, TN 38320

Prepared by:
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CEC Project No. 142-059
July 24, 2015

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Vice-President

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APPENDICES

EXECUTIVE SUMMARY

This report documents the first semi-annual monitoring event of 2015 for the Environmental Waste Solutions, LLC (EWS) Class II Landfill. The Class II landfill is registered with the Tennessee Division of Solid Waste Management (TDSWM) with permit number IDL 03-0212. The EWS Camden Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/ longitude 88°05'16" W).

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

Upgradient Monitoring Points	Downgradient Monitoring Points
MW-1	MW-3, MW-4

Groundwater samples were collected by Civil & Environmental Consultants, Inc. (CEC) on May 28, 2015. Leachate analysis was performed on samples collected on June 2, 2015 and analyzed at TEC Environmental Laboratories, Inc. (TEC) and reported the results on June 23, 2015. ESC Lab Sciences (ESC) performed the groundwater analysis and reported the results on June 9, 2015. All groundwater monitoring wells were sampled during the event, with the exception of MW-2, which was recently replaced by MW-4 in April 2013. MW-2 has subsequently been removed from the detection monitoring network because the well routinely yielded insufficient volumes of water for sampling purposes. MW-2 remains in place, and will continue to be monitored for field parameters and water level data. The collected groundwater samples were analyzed for Appendix I organics, Appendix I inorganics, Bromide, Chloride, Nitrate, Sulfate, Ammonia (NH_3), and a short list of ions.

Since additional waste streams have been approved for disposal in the EWS Class II Landfill, 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. In a special waste approval letter dated June 22, 2015, TDSWM requested that EWS add Polychlorobiphenyls (PCBs) to the existing list of

groundwater monitoring constituents. Therefore, PCBs will be added to the existing list of groundwater constituents during the second semi-annual 2015 monitoring event.

Inter-well prediction interval analysis was used to identify statistically significant increases (SSIs) over background concentrations for the analyzed water quality parameters. Only parameters reported above the detection limits (practical quantitation limits) of the laboratory were evaluated. The results of the analysis are summarized as follows:

Review of the statistical analysis performed on the available data indicated that there were two statistically significant increases (SSI's) over background data. The SSI's over background data were limited to Barium (MW-3), and Chloride (MW-3 and MW-4). The Barium and Chloride detections observed at MW-3 and the chloride detection observed at MW-4 are well below their associated MCL's.

The next semi-annual monitoring event is tentatively scheduled for November, 2015.

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 accepts household waste
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
SNL	Sanitary Landfill
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

Environmental Waste Solutions, LLC (EWS) manages the Camden Class II landfill 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° 3' 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 indicated 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 EWS Camden Class II Landfill currently receives secondary aluminum smelter waste for disposal including aluminum dross and salt cakes and other industrial wastes approved by the TDSWM.

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 mottlings 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, 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 indicate that the uppermost aquifer is sloped to the southwest. 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, and MW-4. Monitoring well MW-1 serves as an up-gradient monitoring point while monitoring wells MW-3 and MW-4 serve as down-gradient monitoring points.

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 probe is slowly lowered into the well to establish the distance between the established top of casing and the elevation of free groundwater. 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 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. Groundwater elevations are listed in Appendix A- Table 1 – Field Parameters & Potentiometric Data.

2.3 GROUNDWATER FLOW DIRECTION

Groundwater flow at the landfill appears to flow in a southwesterly direction towards Charlie 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 and MW-4 located to the southeast. Monitoring wells MW-3 and MW-4 are positioned to intercept any possible groundwater contaminants leaching from the landfill.

2.4 POTENTIOMETRIC GRADIENT

The potentiometric surface of the first aquifer occurring beneath the Class II Landfill occurs at approximately twenty-one (21) feet below ground surface at the up-gradient monitor well MW-1

to approximately nine (9) feet below ground surface at monitor well MW-4. 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 southwest 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 May 28, 2015 is approximately 1.44 %.

The potentiometric gradient is calculated according to the following formula:

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

$$\frac{(393') - (373')}{1{,}390'} * 100 = 1.44\%$$

The above calculation assumes a perpendicular gradient between the potentiometric contours drawn between 393' and 373'. 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 first 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 probe was used to record pH, specific conductance, temperature, dissolved oxygen and ORP during groundwater sampling events at the landfill. A Hach model 2100P turbidity meter or equivalent 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 either a decontaminated down-well pump using new tubing, using new tubing connected to a peristaltic pump, or in the case of a pump malfunction, a new disposable bailer. Bailers and tubing used for purging activities were constructed of either polyethylene or Teflon. 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. When purging using a disposable polyethylene bailer, the bailer with sufficient nylon twine was slowly lowered into the water column. The bailer was allowed to completely submerse into the water column prior to extracting the bailer from the monitor well.

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; (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) reservoir or flow-through cell where it was measured for temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP) and turbidity. These values were noted in the site specific field book under V_0 and then the collected groundwater was poured onto the ground, down-gradient from the monitor well.

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 book as V_1. 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 specific conductance 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. If the field parameters were not stable, the purging procedures continued until either one of the following conditions were met:

1. Field stabilization occurred,
2. Well was purged dry, or
3. A maximum of three well volumes were purged.

If the monitor well was purged dry, then the recharging groundwater was collected for analysis within twenty-four hours.

Field parameter values for each well are presented in Table 1 – Groundwater Field Data, 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 monitor wells when field parameter data indicated that stagnant water has been purged from the well and replaced by groundwater from the adjacent formation that is representative of actual aquifer conditions. Groundwater is 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); Chloride, Nitrate, Sulfate – one (1), two-hundred fifty (250) ml unpreserved HDPE container; Ammonia –

one (1), two-hundred fifty (250) ml HDPE jar preserved with sulfuric (H_2SO_4) acid; Dissolved Inorganics- one (1), five-hundred (500) ml unpreserved HDPE container.

3.4 QUALITY ASSURANCE & QUALITY CONTROL

Field blanks, trip blanks, and a duplicate sample were collected during each monitoring event performed at the EWS Class II Landfill. CEC collected a field blank next to monitoring well MW-4 and a duplicate sample was collected from MW-1. The field blank was collected by pouring deionized water into a set of sample bottles, thereby allowing any airborne contaminants a chance to enter the field blank sample. A laboratory-supplied VOC trip blank was transported into the field and handled in the same manner as the water samples collected for volatile organic compounds analysis. Laboratory analytical testing of the field blanks and trip blank revealed that none of the tested constituents were above the PQL. Additionally, the results for the duplicate sample collected from MW-1 were similar to the original MW-1 sample results.

3.5 SAMPLE CHAIN-OF-CUSTODY

A sample Chain-of-Custody (COC) traveled along with each sample kit from ESC to EWS and back to ESC for the sampling events. 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 May 2015 monitoring event were completed by Environmental Science Corporation in Mt. Juliet, Tennessee. The analytical methods chosen for this monitoring event are in full compliance with the procedures required by the Tennessee Division of Solid Waste Management (TN-DSWM) 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
Method 6020	ICP – Mass Spectrometry
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 9056	Determination of Inorganic Anions by Ion Chromatography (Fluoride)
Method 350.1	Ammonia Nitrogen

4.2 LABORATORY ANALYTICAL RESULTS

Laboratory reports from the analysis of groundwater samples collected from the EWS Camden Class II Landfill during the May 2015 semi-annual monitoring event were prepared by ESC and reported to CEC on June 9, 2015. Copies of the laboratory reports are located in Appendix C – Laboratory Analytical Reports. Constituent values from all laboratory analyses along with applicable maximum contaminant levels (MCLs) are presented in Table 2 – Analytical Results, Appendix A. Leachate analytical results for May 2015 are given in Appendix C. Additional

constituents will be added for leachate analysis for the next groundwater monitoring event.

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. One QC qualifier code was indicated during the laboratory analysis of groundwater samples during this monitoring event and can be viewed along with the Laboratory Analytical Reports, in Appendix C.

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. Several methods may be employed for this endeavor. EWS Camden Class II Landfill has chosen to use inter-well and intra-well non-parametric prediction limit analysis (NPPL) at this time.

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 was 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 to the concentrations observed at the up-gradient monitoring location during this monitoring event. For the Class II Landfill, monitor well MW-1 was considered as background. Intra-well analysis was utilized only at MW-1 to compare the concentrations observed during the current groundwater sampling event to the established background data set.

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 analysis is conducted on the data.

The computer program ChemStat was used for all statistical computations. Worksheets indicating inter-well and intra-well statistical analysis sheets and time versus concentration charts may be viewed in Appendix B, Statistical and Trend Analysis.

5.2 STATISTICAL RESULTS

SSIs over background identified for the current monitoring event include barium and chloride at MW-3, and chloride at MW-4. The barium concentration at MW-3 was 0.152 mg/L, well below the maximum contaminant level (MCL) primary drinking water standard for barium concentrations (2 mg/L). The chloride concentration reported at MW-3 was 92.8 mg/L and is currently exhibiting an increasing trend per the Mann-Kendall Non-parametric trend procedure. The chloride concentrations observed at MW-4 was 17.5 mg/L and is consistent with previous data. The chloride concentrations observed at both MW-3 and MW-4 remain well below the secondary drinking water standard for chloride concentrations (250 mg/L).

Trend analysis utilizing the limited data available from the monitoring events showed no distinct trends for the site monitoring wells, with the exception of MW-3. MW-3 showed an upward trend in chloride concentrations reported at MW-3 per Mann-Kendall trend procedure at a type I error of 10%. Refer to Appendix E for a copy of the report prepared by House Engineering, LLC regarding potential contributors to the rising chloride concentrations in the groundwater wells.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Representative groundwater samples were collected from monitor wells MW-1, MW-3 and MW-4. The groundwater samples were analyzed for Appendix I list of parameters, plus chloride, nitrate, sulfate, ammonia (NH_3), and a short list of ions.

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

Laboratory analytical results for the groundwater samples collected from the facility monitoring wells for the EWS Class II Landfill indicate that one compound was detected at concentrations that exceeded the EPA MCL; specifically, the concentration of Arsenic in MW-1, the background monitoring well.

Arsenic was detected in MW-1 at a concentration of 0.0604 mg/l. The MCL for arsenic is 0.01 mg/l. Arsenic has been detected at concentrations exceeding the primary drinking water MCL prior to the disposal of waste in the landfill. More specifically, 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 attributable to naturally occurring deposits in the soil overburden since there is no immediate development up-gradient of the well.

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

Laboratory analytical results for the groundwater samples collected in May of 2015 from the EWS Class II Landfill groundwater monitoring well network indicate that two of the site specific groundwater monitoring list of compounds were detected at concentrations which exceeded the Tennessee Public Water Supply Secondary Drinking Water Standards (2DW). Those parameters included Iron and Manganese in upgradient well MW-1, and Manganese in MW-4. Although

aluminum was detected at MW-3, the concentration was well below the 2DW for aluminum concentrations during this event.

Aluminum was detected at a concentration of 1.2 mg/L in MW-1 and 1.8 mg/L in MW-3 prior to the placement of waste. The concentration of aluminum (0.135 mg/L) observed in MW-3 during the May 2015 sample event is less than the highest concentrations observed prior to placement of waste and is also below the 2DW (0.2 mg/L) for aluminum.

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. The concentration in the groundwater samples taken during the May 2015 sample event was 16.3 mg/L in MW-1 is not considered the result of landfill operations.

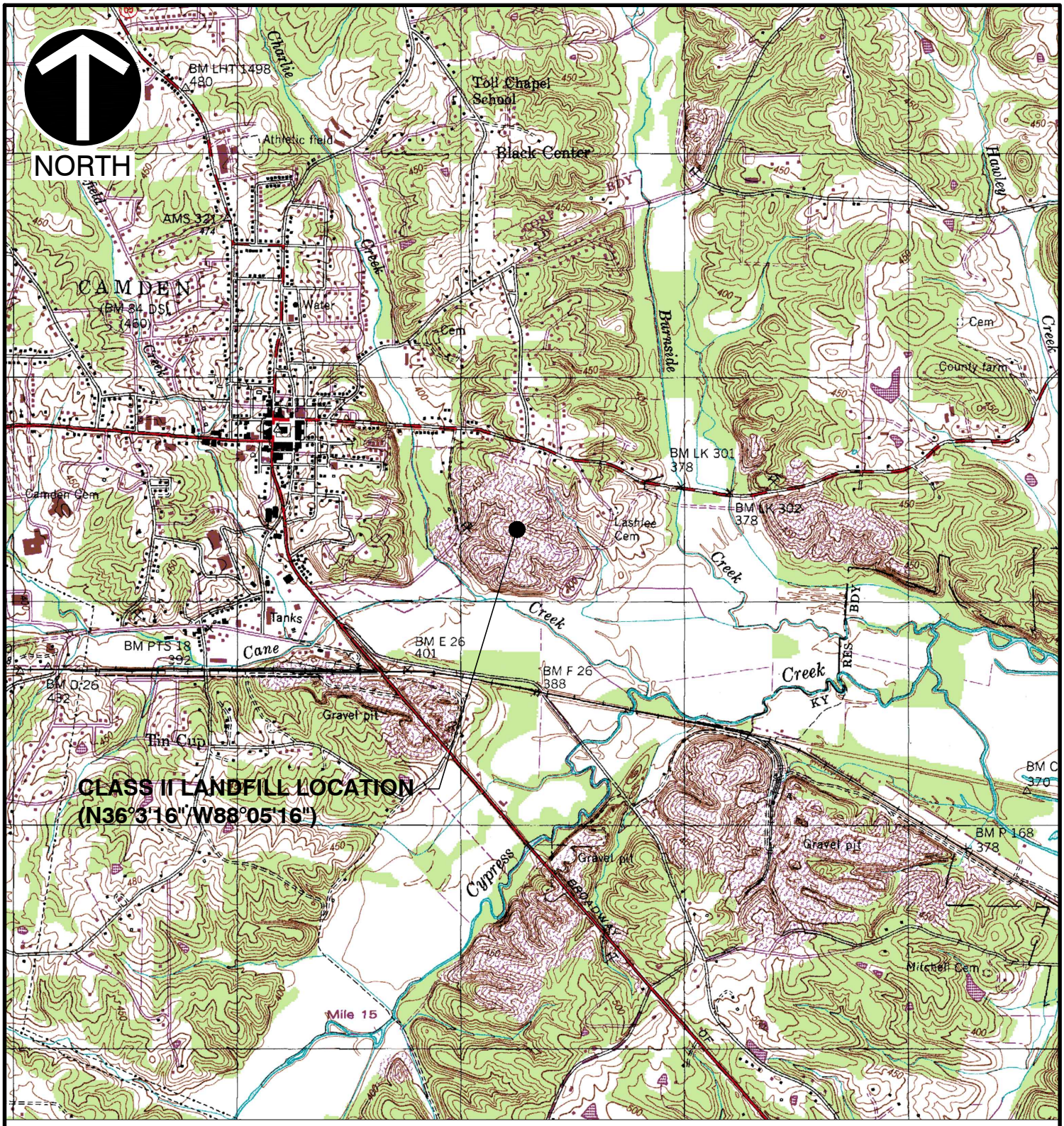
Manganese has been consistently detected in upgradient well MW-1 and has the highest reported concentration observed during the current monitoring event of 1.07 mg/L. The manganese detections observed in site monitoring wells MW-3 (0.0136 mg/L) and MW-4 (.077 mg/L) are considered a natural variation in local groundwater.

Chloride concentrations indicated an upward trend reported at MW-3. The chloride concentrations observed at MW-3 remains well below the secondary drinking water standard for chloride concentrations (250 mg/L).

The next semi-annual monitoring event is tentatively scheduled for November 2015.

APPENDIX A

MAPS AND TABLES



REFERENCE

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

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

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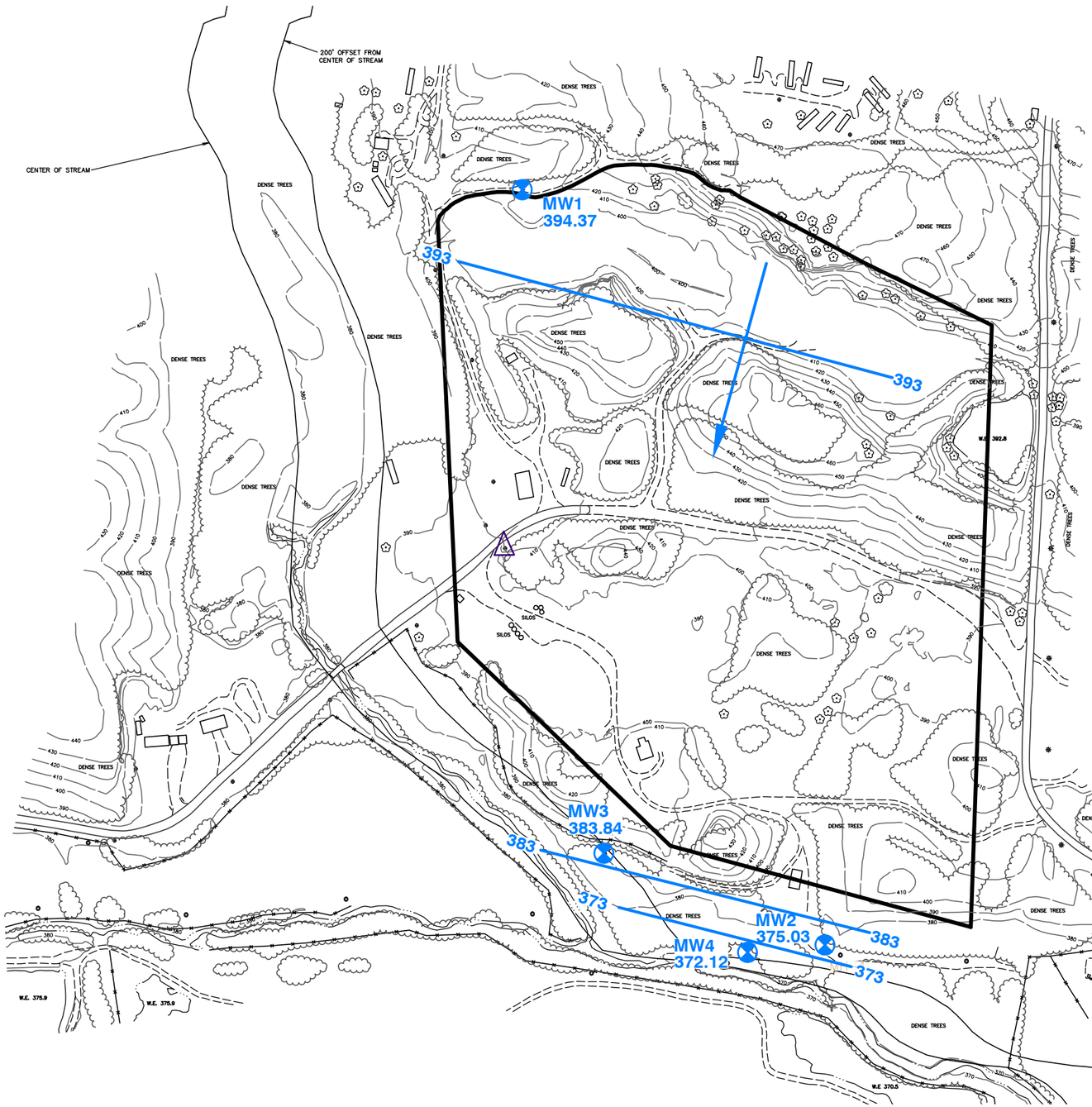
ENVIRONMENTAL WASTE SOLUTIONS
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	KLU	CHECKED BY:	PC	APPROVED BY:	MJJ	FIGURE NO.:	1
DATE:	MAY 2015	DWG SCALE:	1"=2000'	PROJECT NO:	142-059		

\\svr-nash\projects\2014\142-059\-CADD\Dwg\142-059 SITE LOCATION MAP.dwg{LAYOUT1} LS:(7/23/2015 - awiseman) - LP: 7/23/2015 4:01 PM



LEGEND

- MW1 392.62 — GROUND WATER MONITORING WELL / GROUND WATER ELEVATION (FMSL)
- 390 — POTENTIOMETRIC SURFACE CONTOUR (FMSL)
- GROUND WATER FLOW DIRECTION
- MH1 — MANHOLE
- APPROXIMATE FILL LIMITS

NOTE:

Hydraulic gradient calculation between contour lines 370' and 390'

$$i = \frac{393' - 373'}{1{,}390'} = 0.0144 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

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

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

SCALE IN FEET

0 300' 600'

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ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

MAY 2015
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	PC	CHECKED BY:	MJ	APPROVED BY:	MJ	FIGURE NO.:	2
DATE:	JUNE 2015	DWG SCALE:	1"=300'	PROJECT NO:	142-059		

Table 1

Environmental Waste Solutions Camden Class II Landfill IDL 03-0212

Field Parameters and Potentiometric Data - May 28, 2015

Monitoring Well/ Piezometric Well	Date	Sample Time	Top of Casing Elevation (Feet MSL)	Sample Method	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	5/28/2015	13:00	415.36	Bailer	382.26	0.17	2.1	20.99	394.37	15.0	87.1	4.99	1.22	11.2	1.98
MW-2*	5/28/2015	NS	380.15	NS	367.70	0.17	1.2	5.12	375.03	18.7	175.4	5.73	4.14	124.2	NS
MW-3	5/28/2015	14:00	392.49	Bailer	369.66	0.17	2.4	8.65	383.84	15.1	318.1	5.22	2.19	111.7	3.92
MW-4	5/28/2015	13:25	381.50	Bailer	369.39	0.17	0.5	9.38	372.12	13.7	76.3	5.13	1.96	137	1.05

* - MW-2 has been removed from monitoring network. Only water level and field parameters collected at MW-2.
NS= Not Sampled

Table 2
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212
Analytical Data - May 28, 2015

		MW-1		MW-3		MW-4	
		5/28/2015		5/28/2015		5/28/2015	
Parameter	MCL (mg/l)	Value (mg/l)	Qual	Value (mg/l)	Qual	Value (mg/l)	Qual
Bromide	-	<1.0		<1.0		<1.0	
Chloride	250 [2]	**2**		**93.0**		**18**	
Nitrate	10	<0.10		**2.5**		**0.74**	
Sulfate	250 [2]	<5.0		**9.1**		<5.0	
Ammonia Nitrogen	-	<0.25		<0.25		<0.25	
Antimony	0.006	<0.0020		<0.0020		<0.0020	
Arsenic	0.01	**0.06**		<0.0020		<0.0020	
Beryllium	0.004	<0.0020		<0.0020		<0.0020	
Cadmium	0.005	<0.0010		<0.0010		<0.0010	
Copper	1.3	<0.0050		<0.0050		<0.0050	
Lead	0.015	<0.0020		<0.0020		<0.0020	
Selenium	0.05	<0.0020		<0.0020		<0.0020	
Thallium	0.002	<0.0020		<0.0020		<0.0020	
Zinc	5 [2]	<0.025		<0.025		<0.025	
Mercury	0.002	<0.00020		<0.00020		<0.00020	
Aluminum	0.2 [2]	<0.10		**0.14**		<0.10	
Barium	2	**0.019**		**0.15**		**0.017**	
Boron	-	<0.20		<0.20		<0.20	
Calcium	-	**3.4**		**21.0**		**6.0**	
Chromium	0.1	<0.010		<0.010		<0.010	
Cobalt	-	**0.041**		<0.010		<0.010	
Iron	0.3 [2]	**16.0**		<0.10		<0.10	
Magnesium	-	**2.8**		**6.7**		**3.8**	
Manganese	0.05 [2]	**1.1**		**0.014**		**0.077**	
Nickel	-	<0.020		<0.020		<0.020	
Potassium	-	**1.1**		**13.0**		**1.4**	
Silver	0.10 [2]	<0.010		<0.010		<0.010	
Sodium	-	**3.0**		**30.0**		**8.2**	
Vanadium	-	<0.020		<0.020		<0.020	

Notes:

MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards

2: Non-Enforceable National Secondary Drinking Water Standard

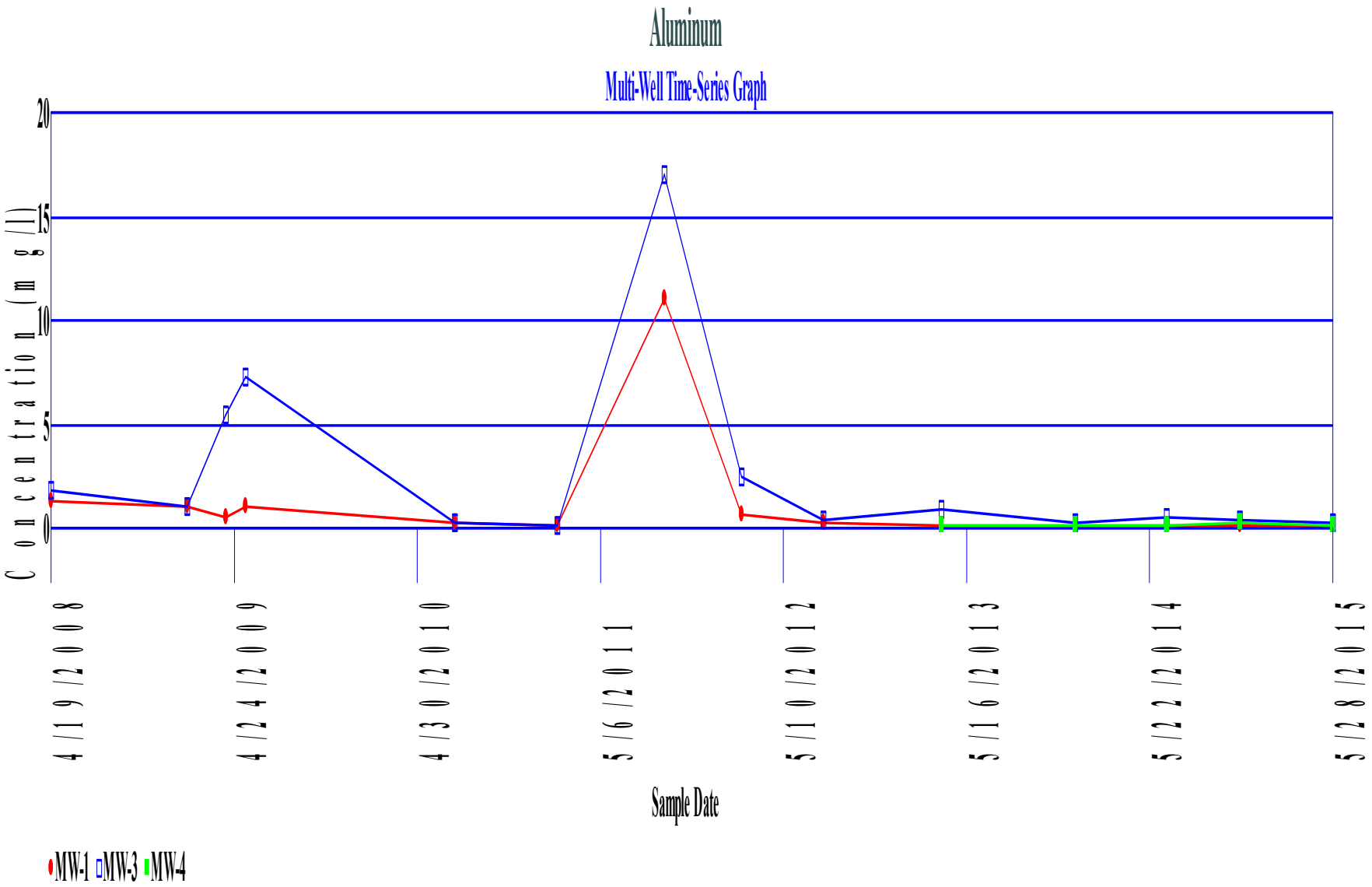
Bold text indicates laboratory analytical detections above the practical quantitation level

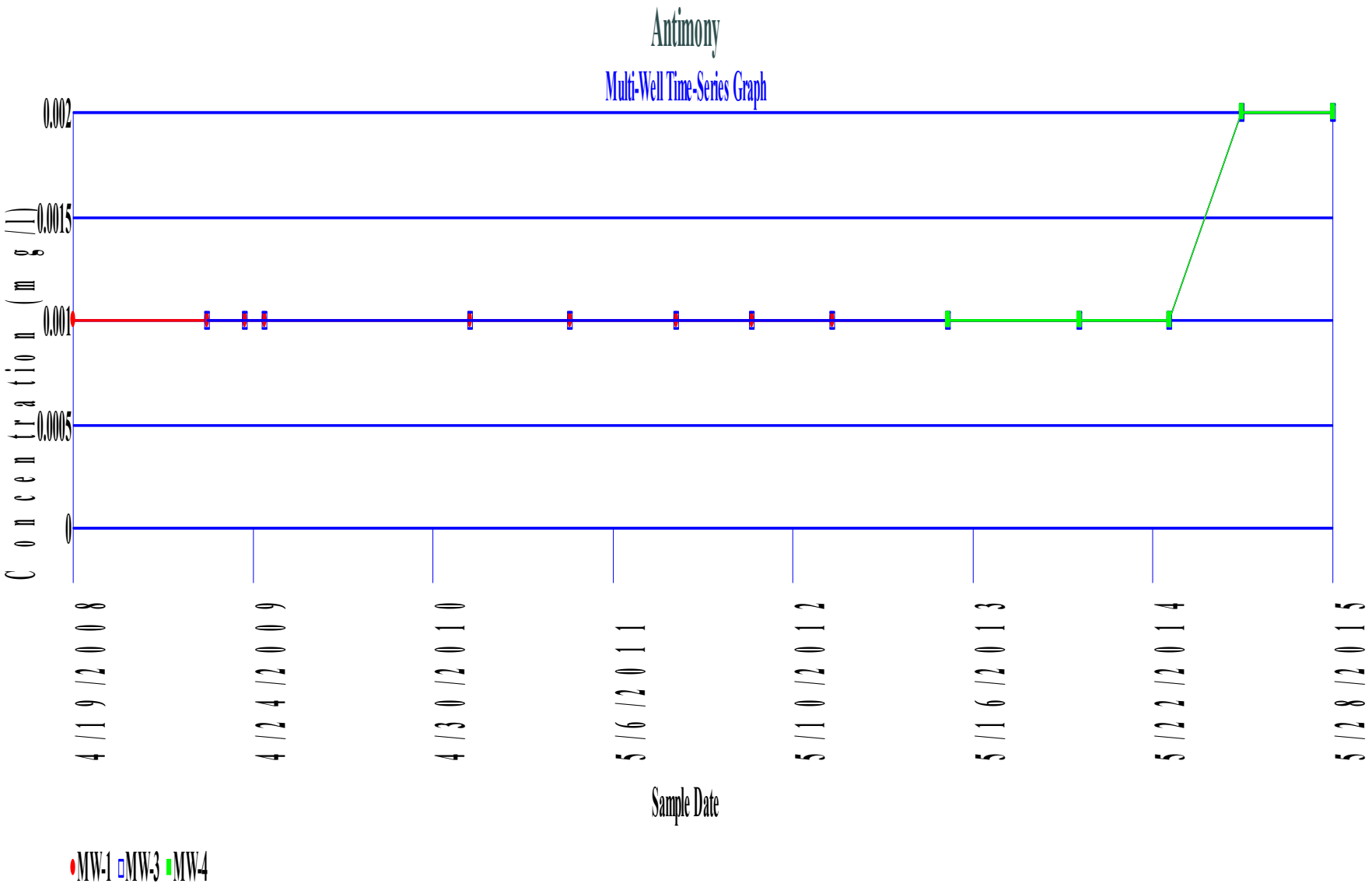
Greyed text indicates detection above respective MCL

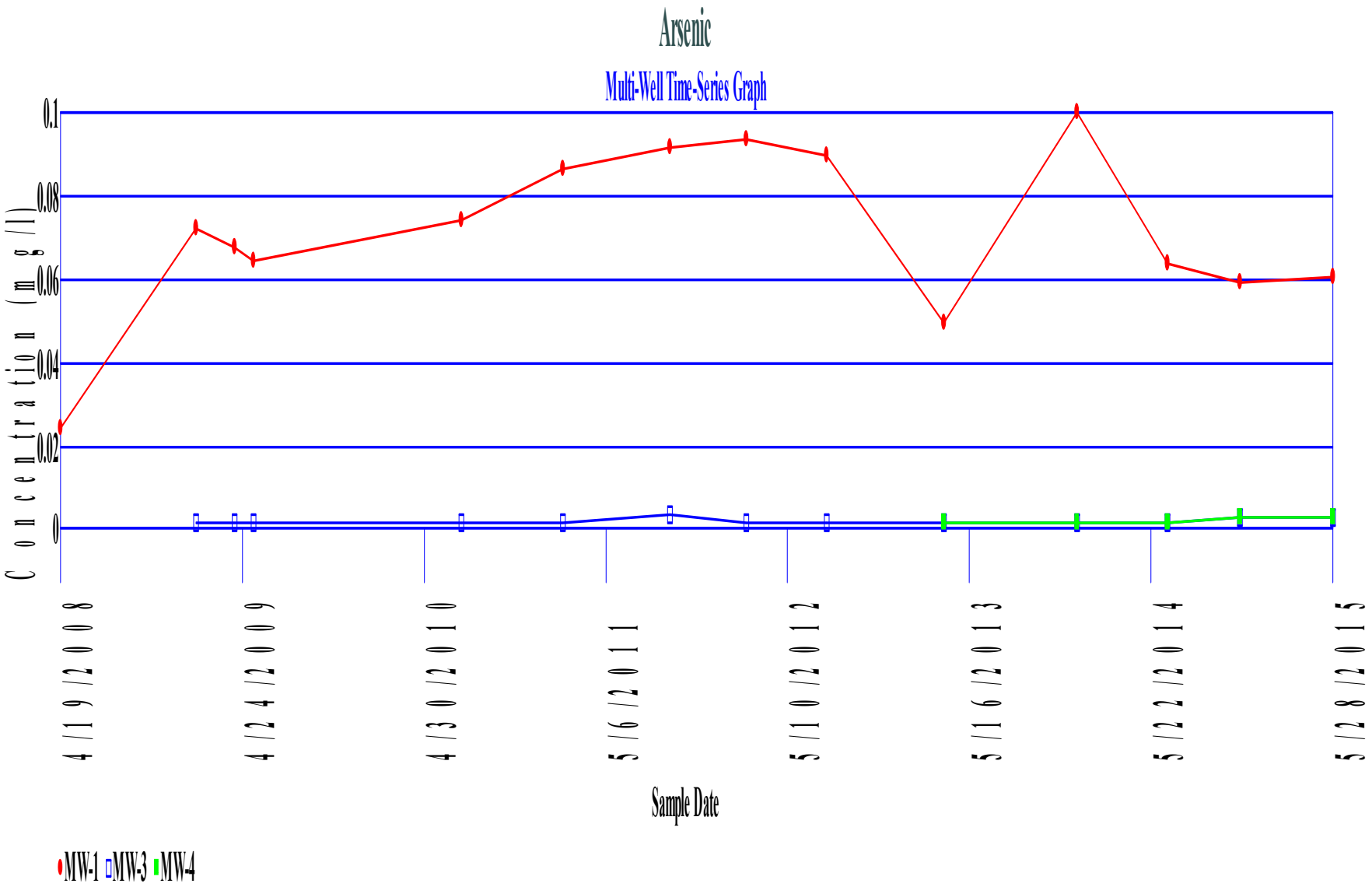
V: (ESC)- Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

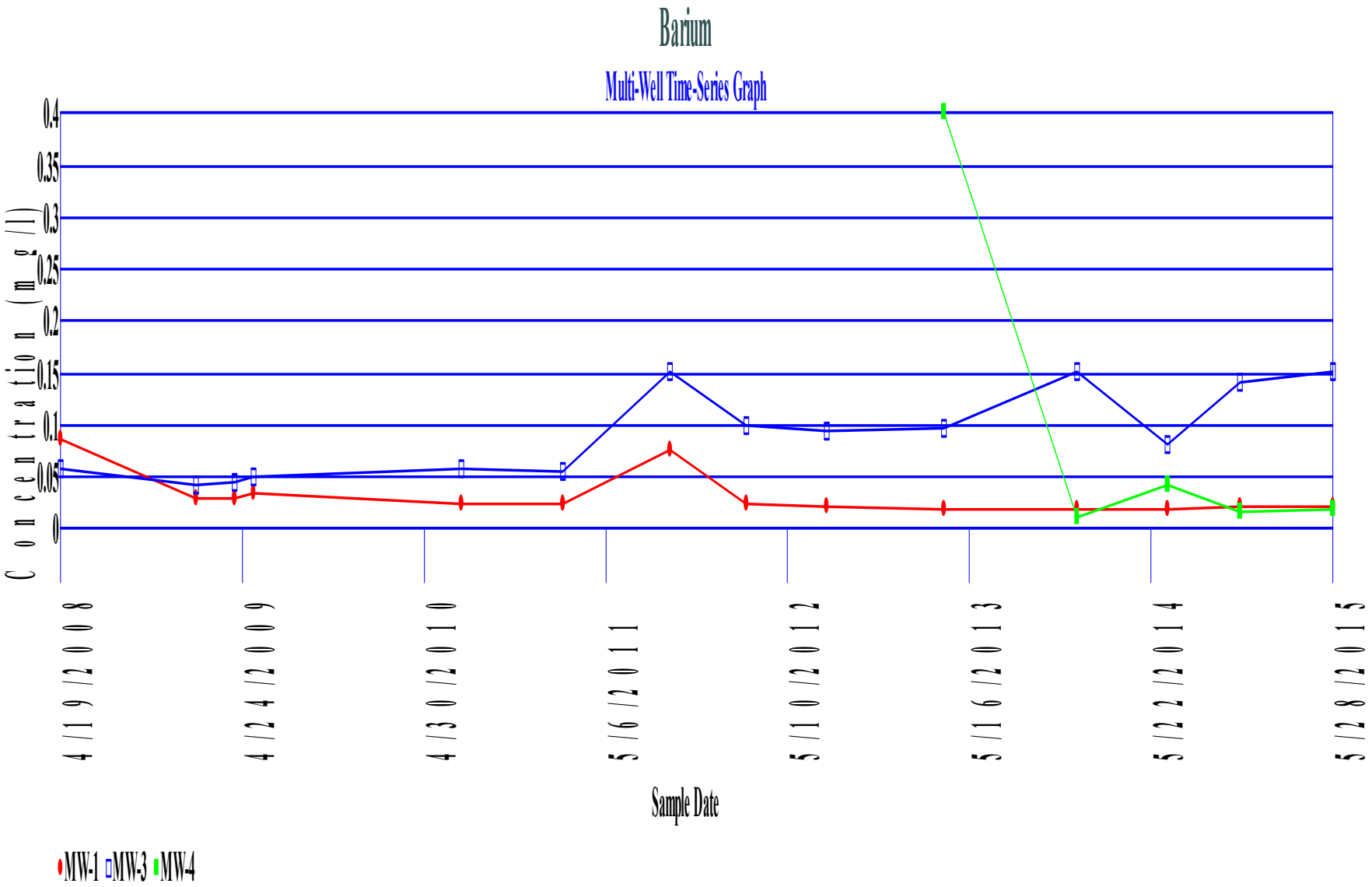
APPENDIX B

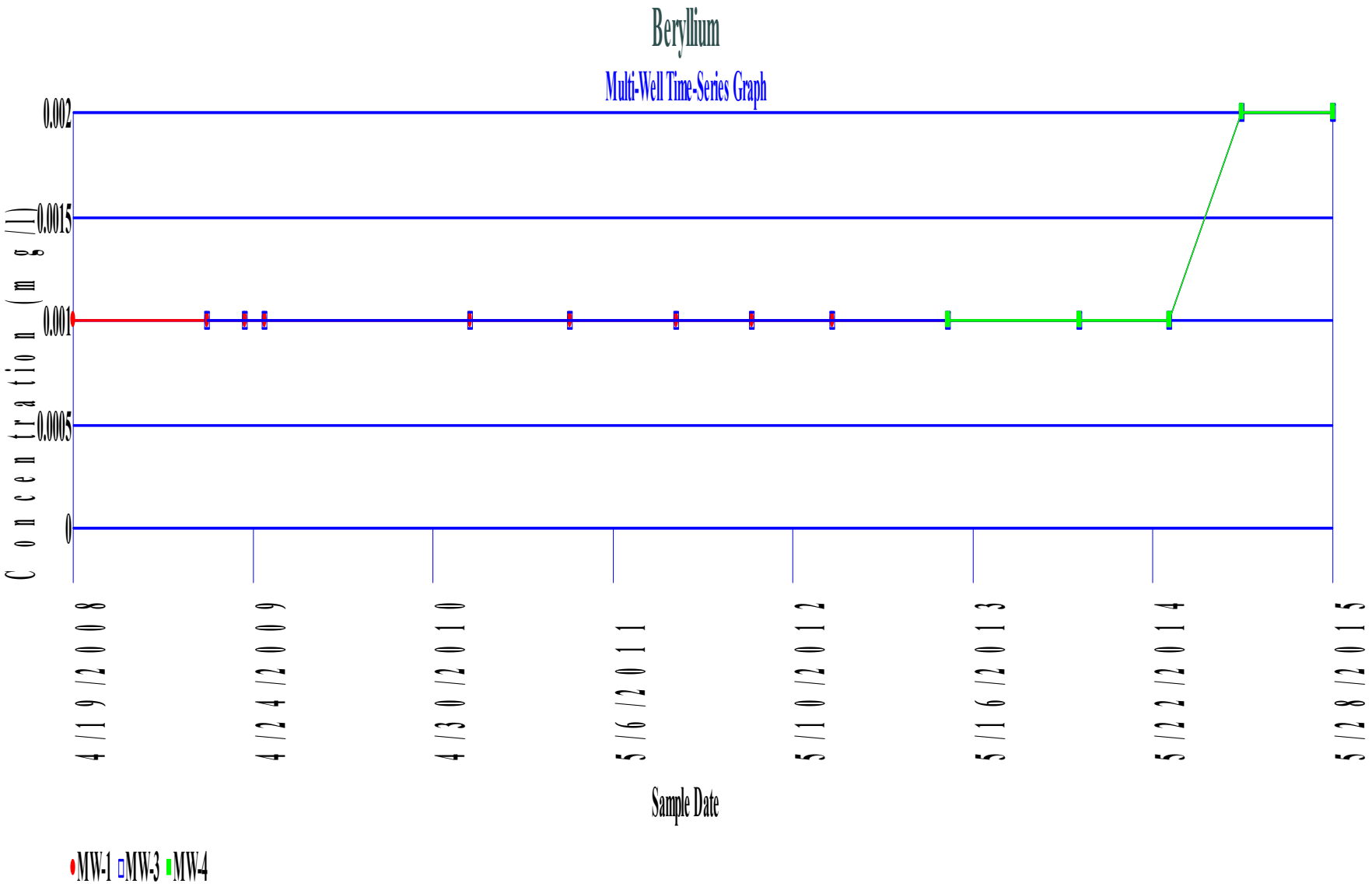
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

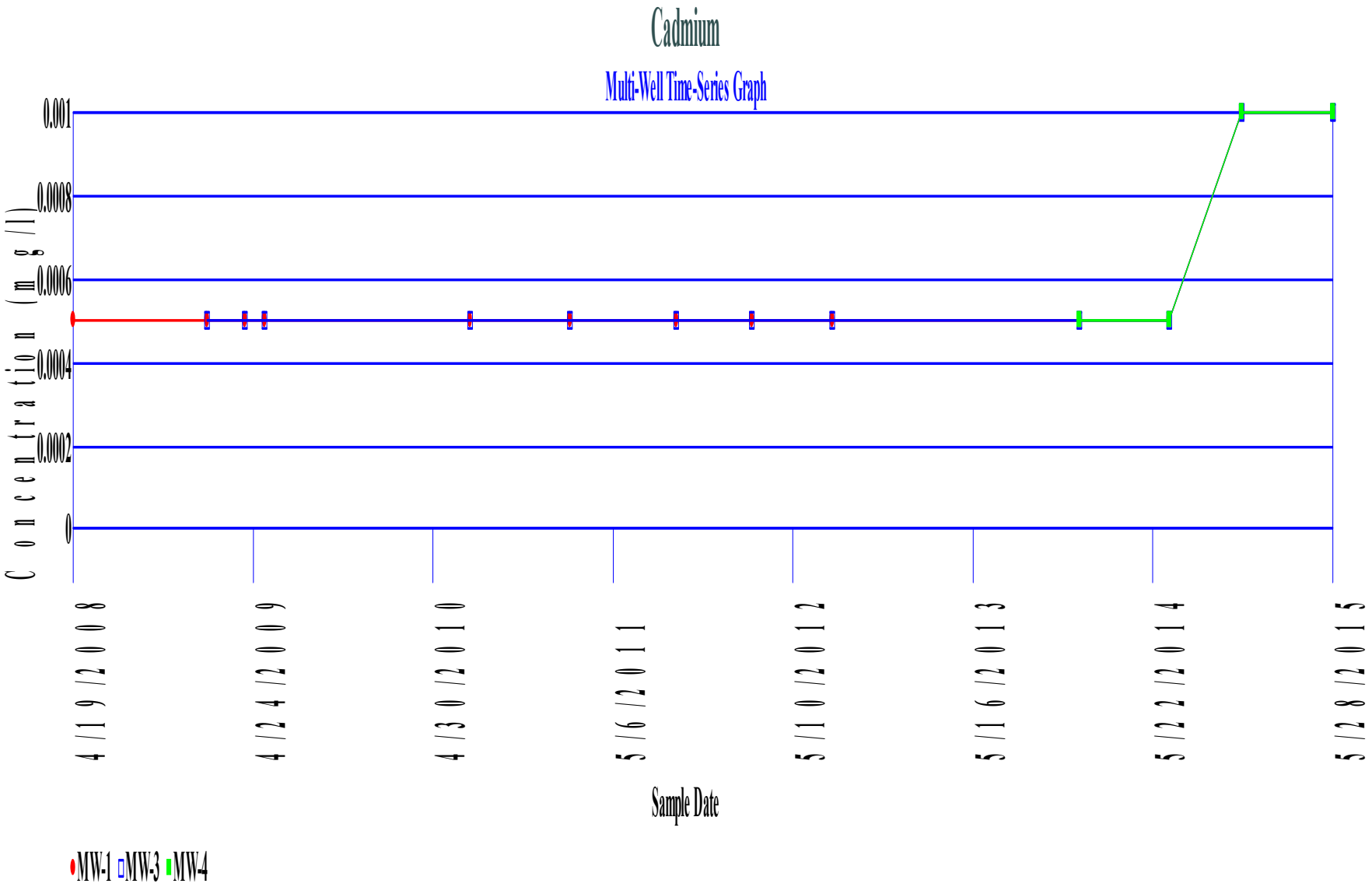

Aluminum
Multi-Well Time-Series Graph
Concentration (mg/L)
20
15
10
5
0
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

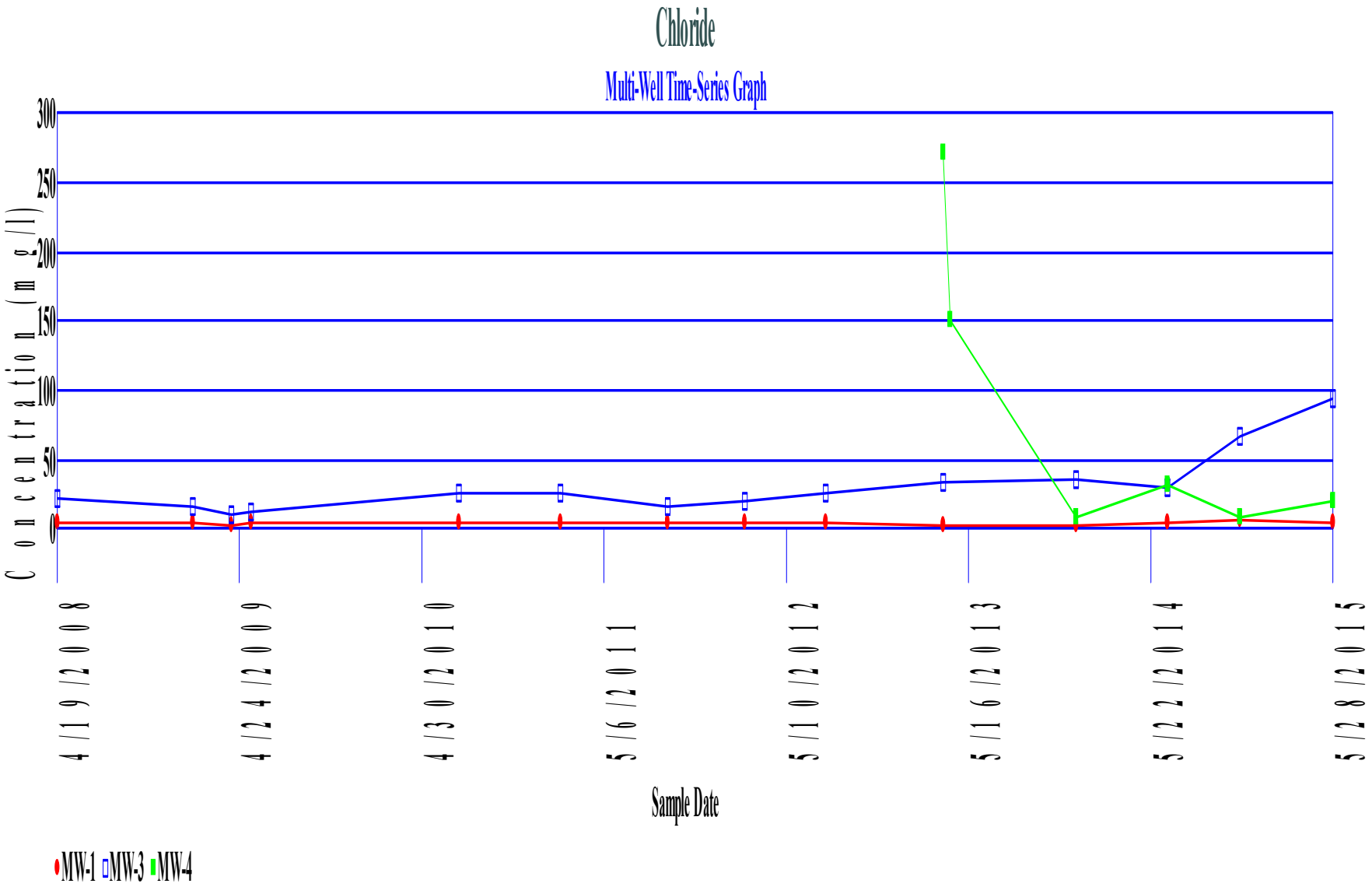

Antimony
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/L)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

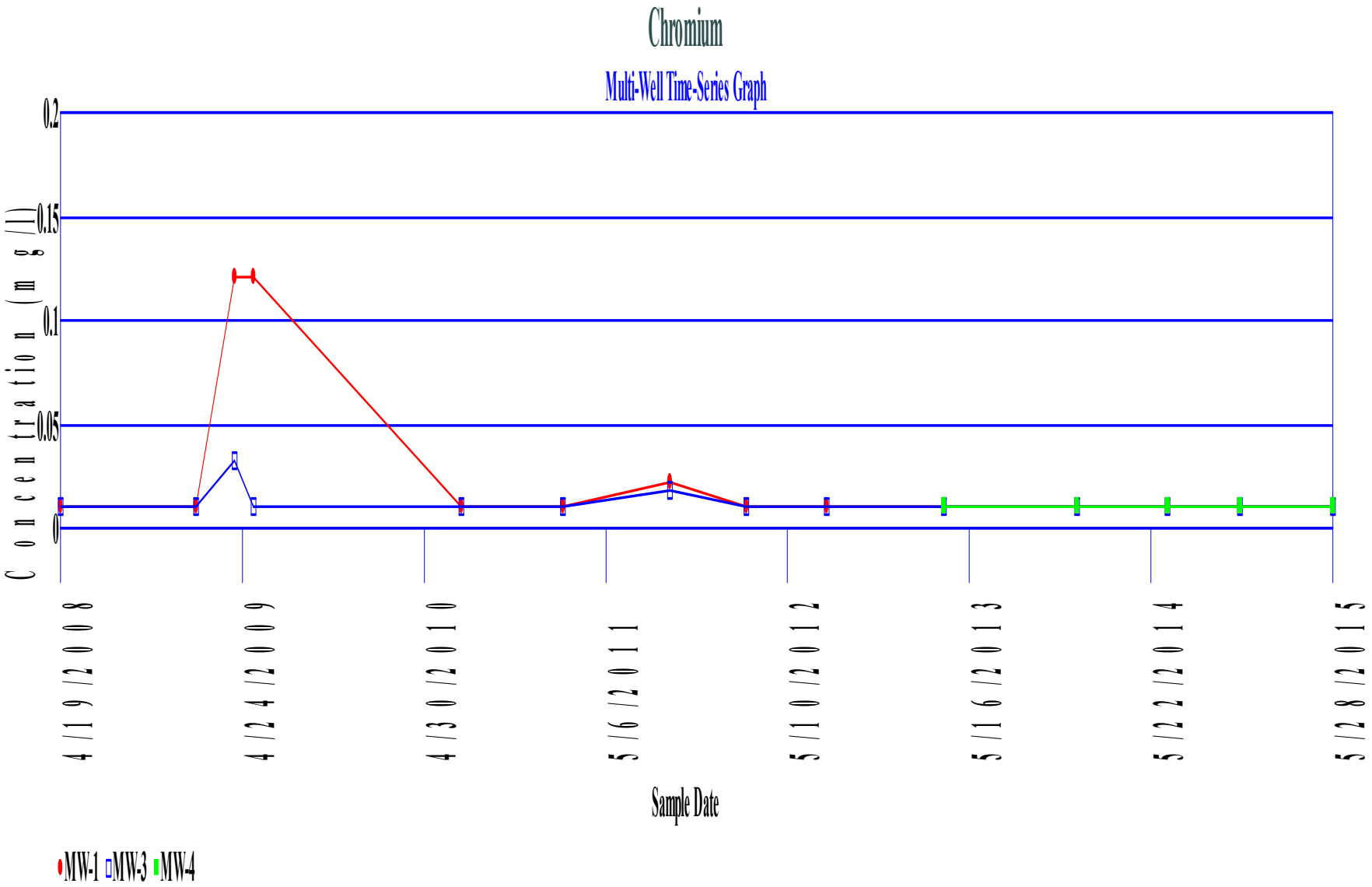

Arsenic
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

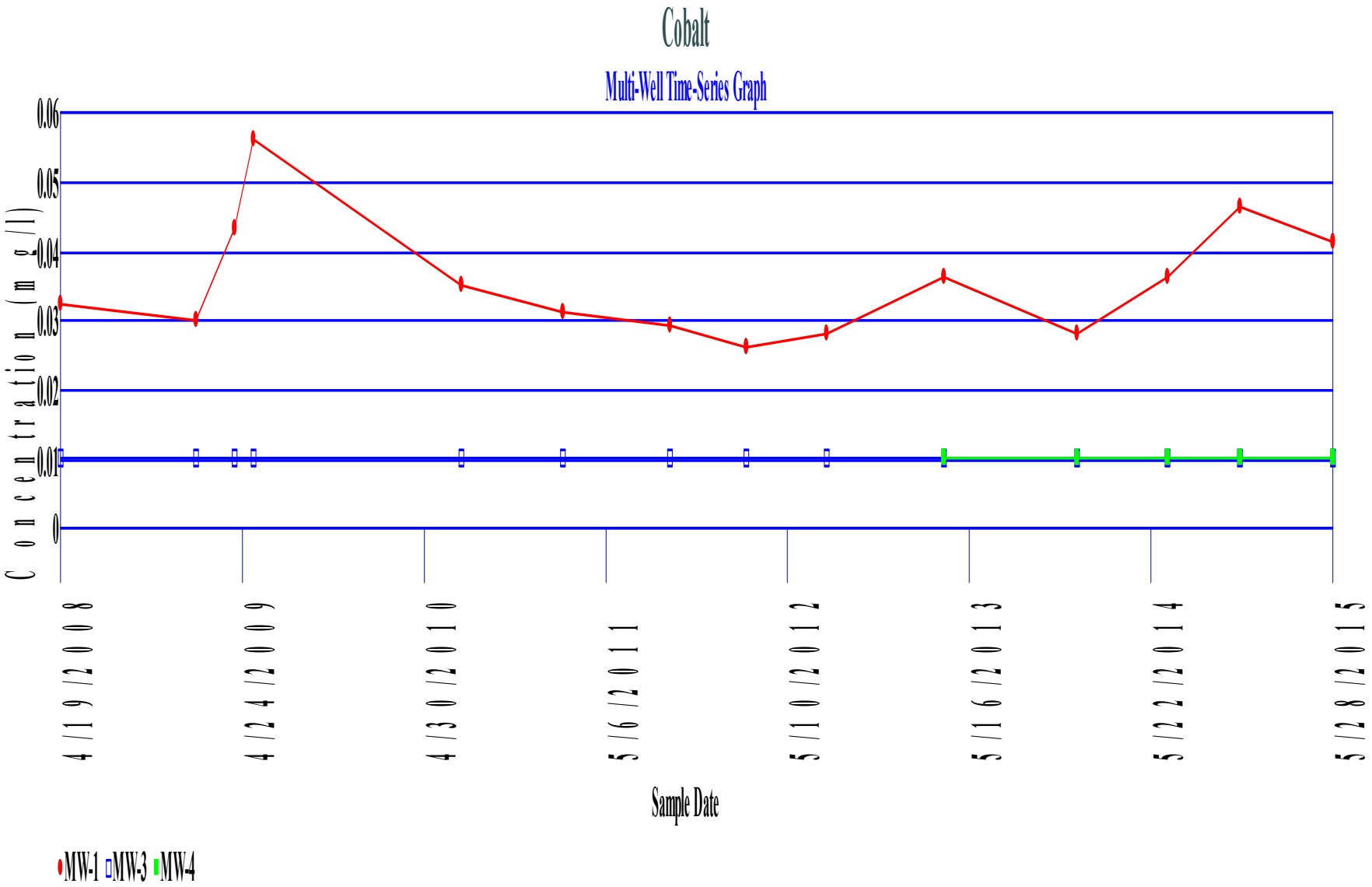

Barium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

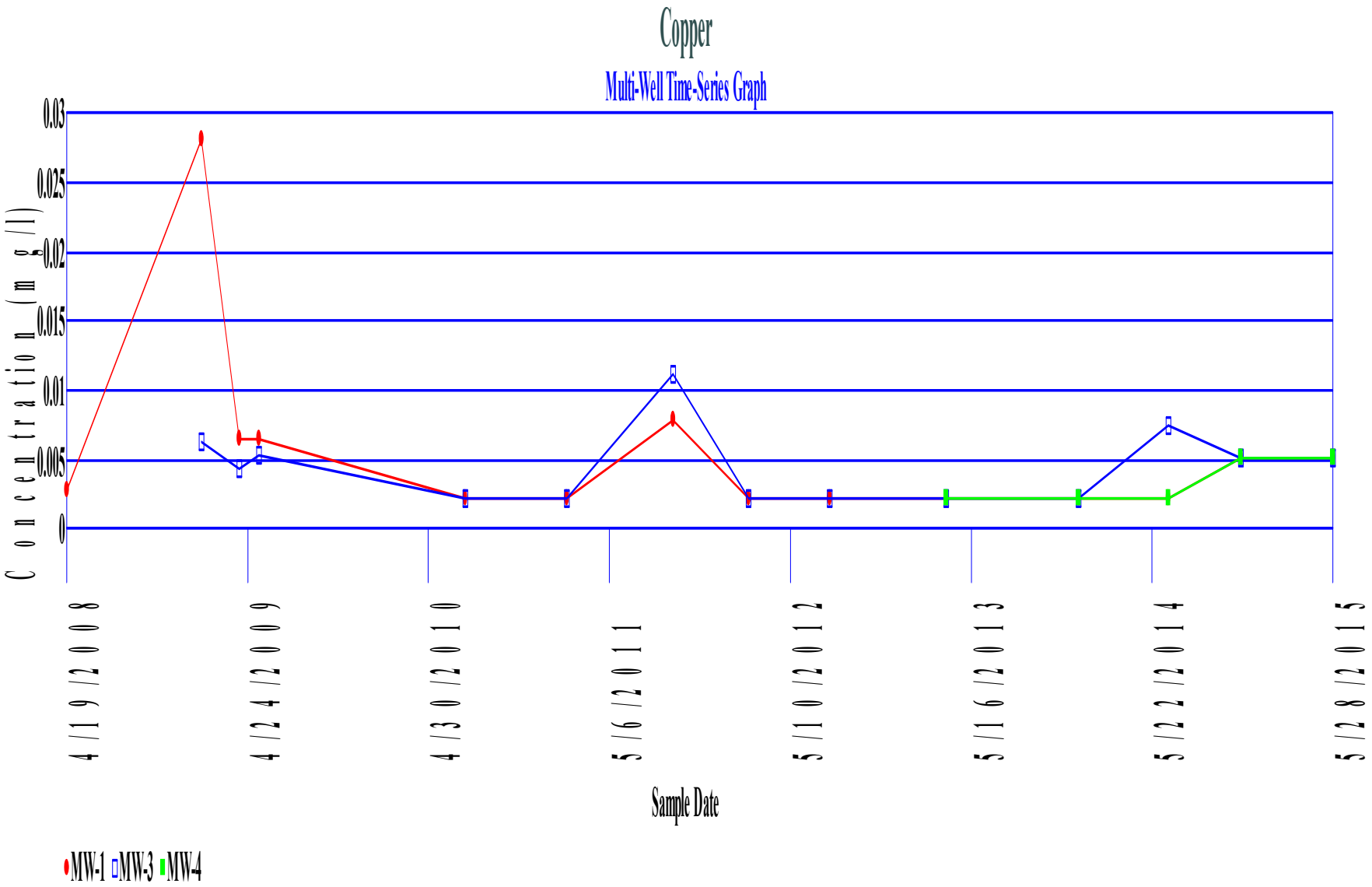

Beryllium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/L)
4/19/2008
4/24/2009
4/30/2010
5/16/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

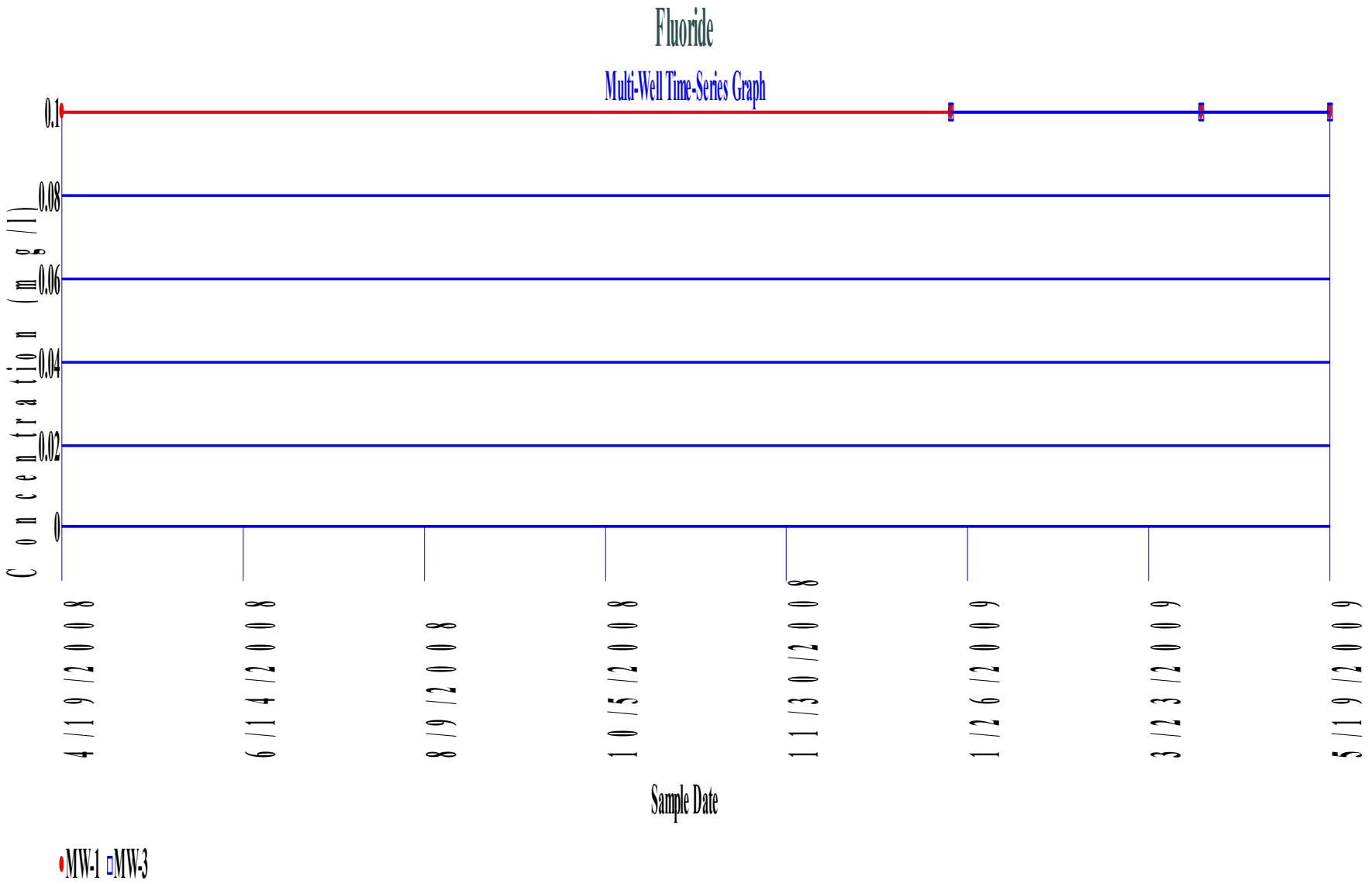

Cadmium
Multi-Well Time-Series Graph
0.001
0.0008
0.0006
0.0004
0.0002
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


Chloride
Multi-Well Time-Series Graph
300
250
200
150
100
50
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

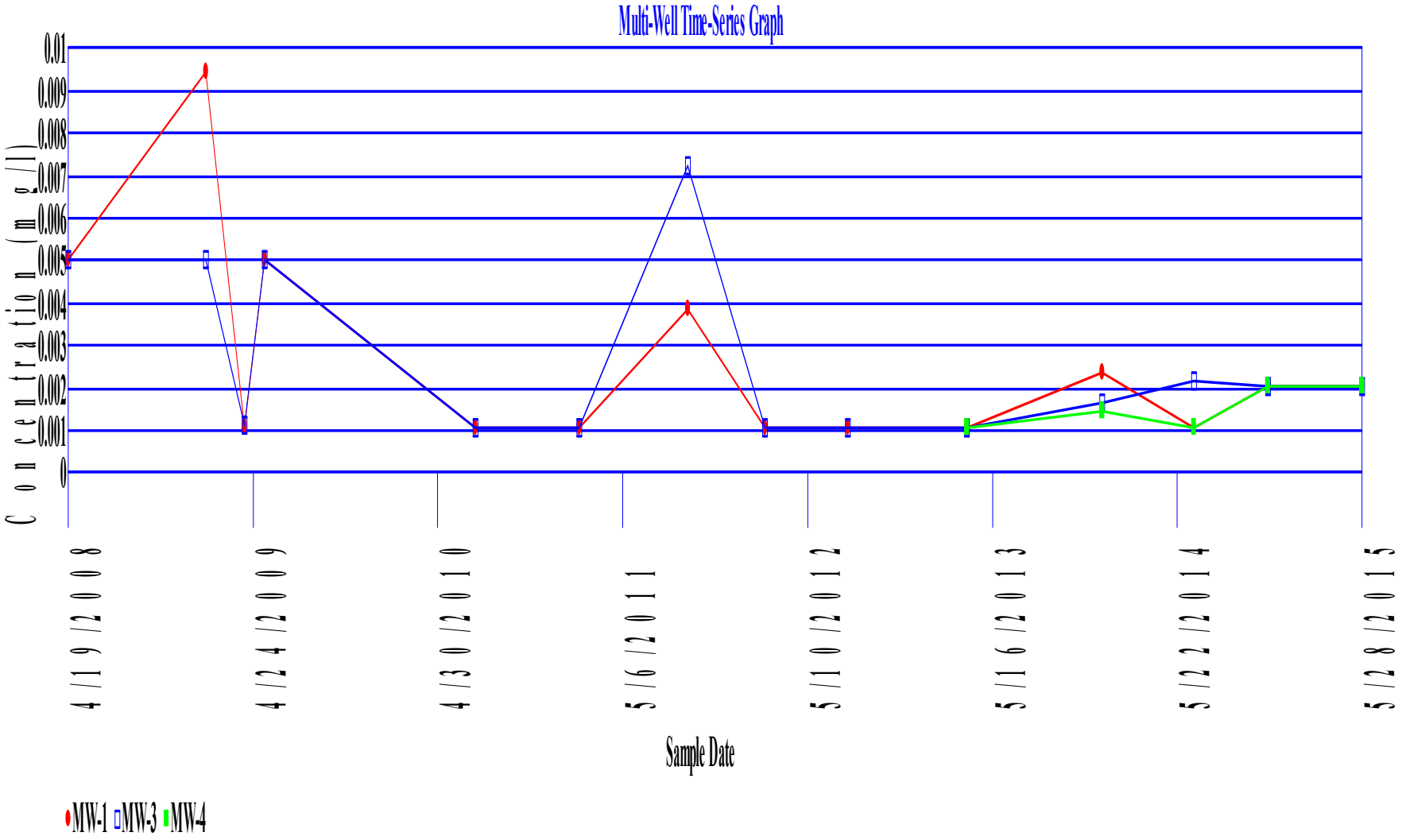

Chromium
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

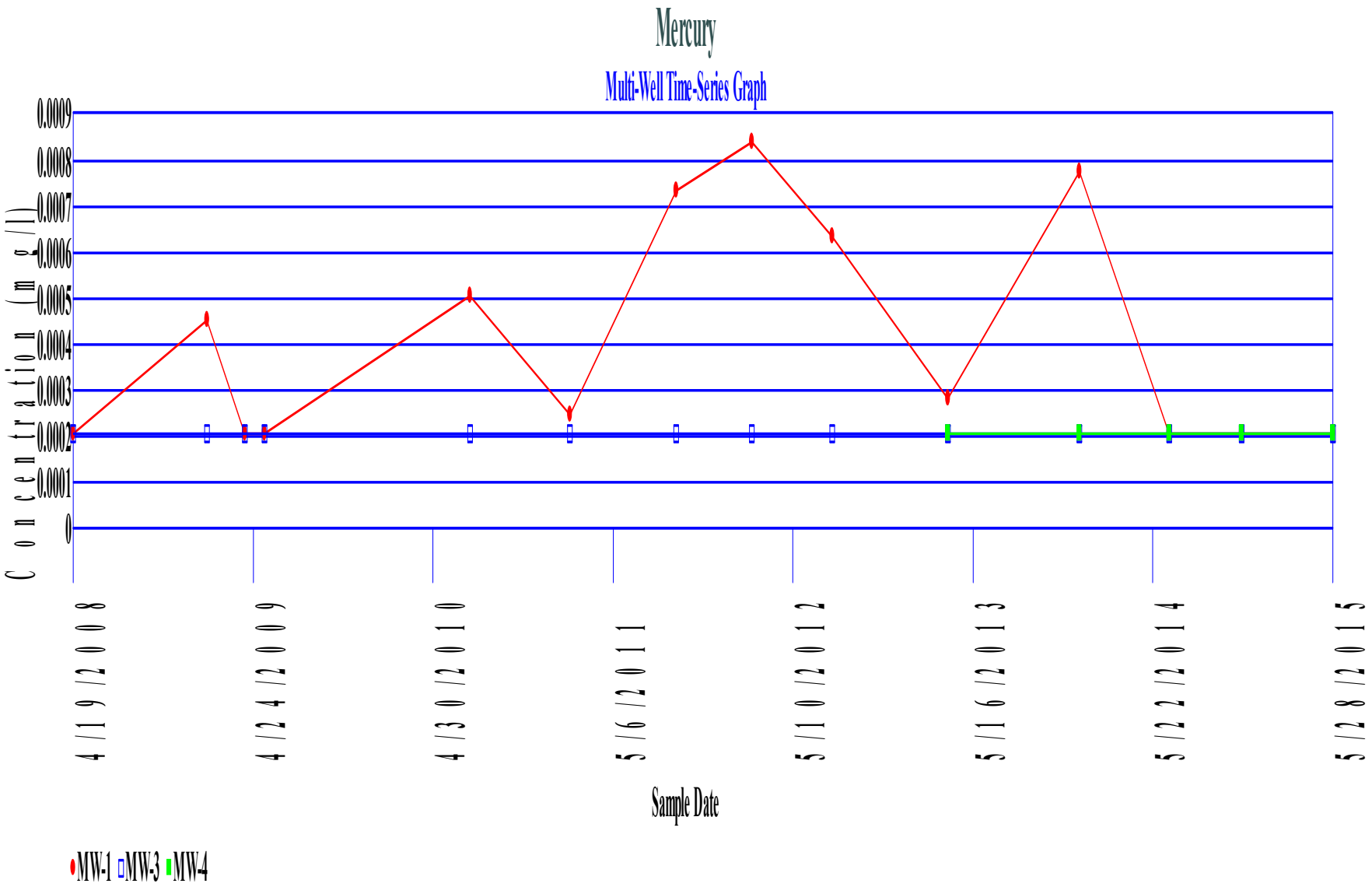

Cobalt
Multi-Well Time-Series Graph
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

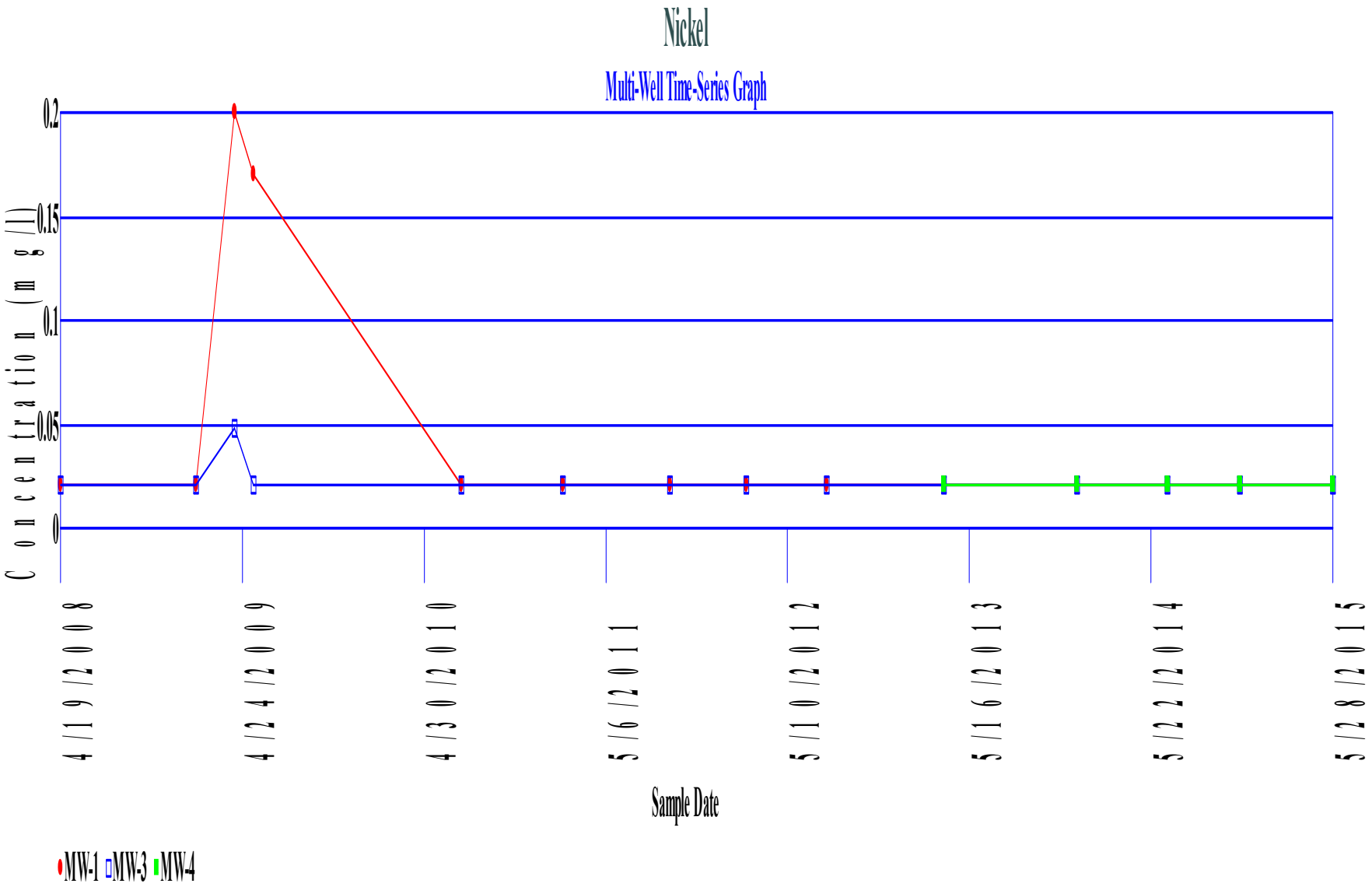

Copper
Multi-Well Time-Series Graph
0.03
0.025
0.02
0.015
0.01
0.005
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

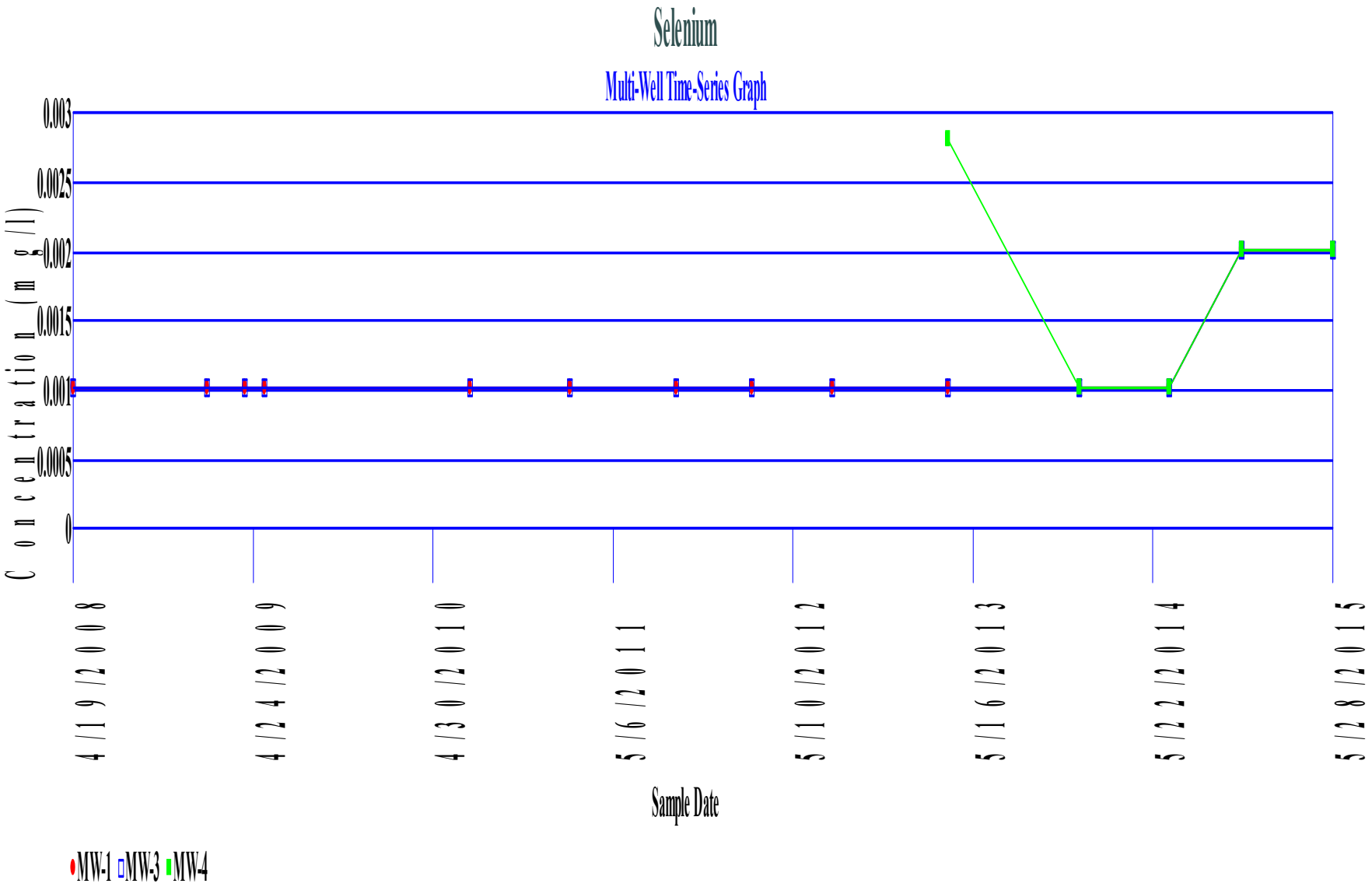

Fluoride
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
6/14/2008
8/9/2008
10/5/2008
11/30/2008
1/26/2009
3/23/2009
5/19/2009
Sample Date
MW-1
MW-3

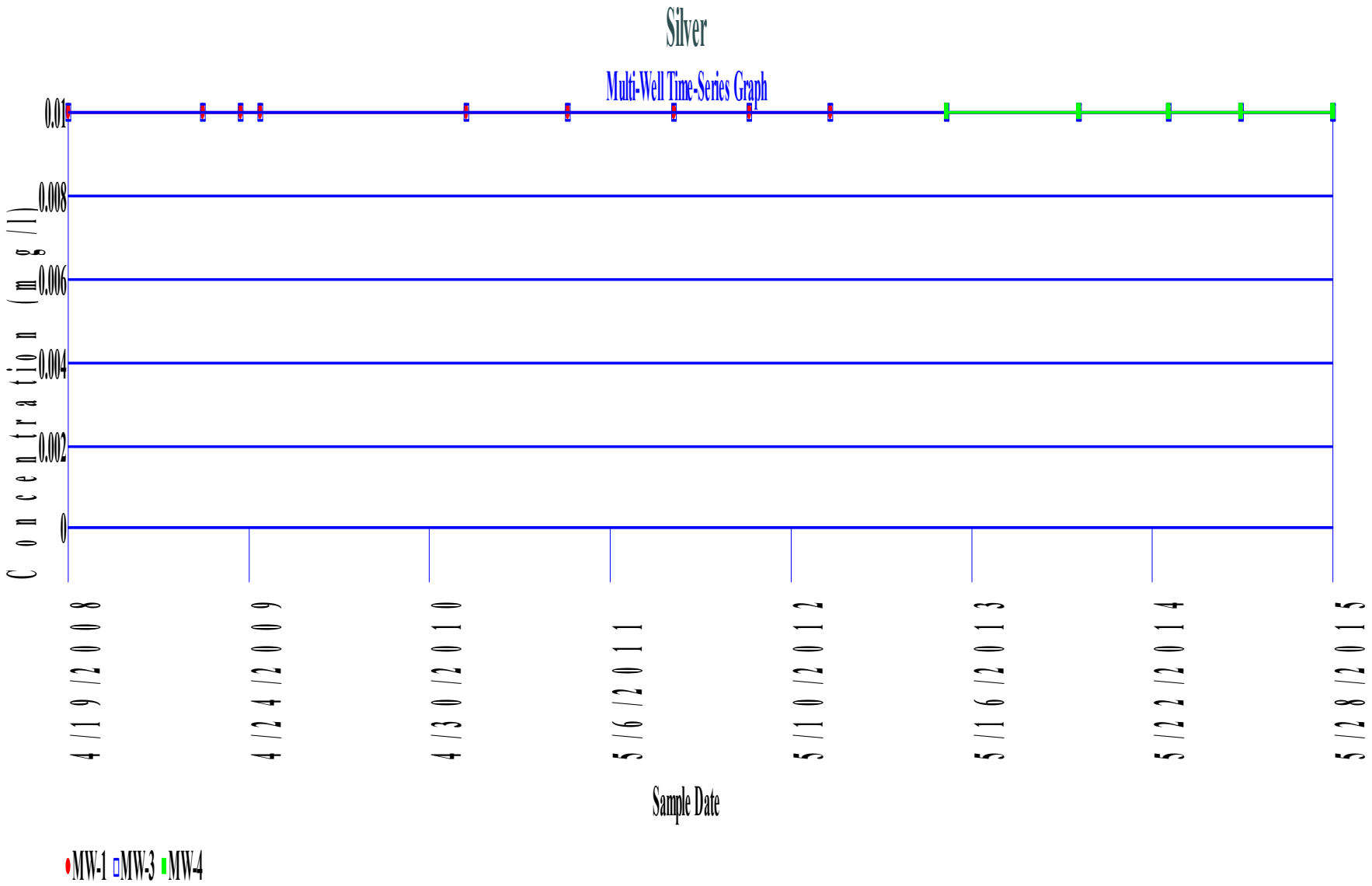
Lead

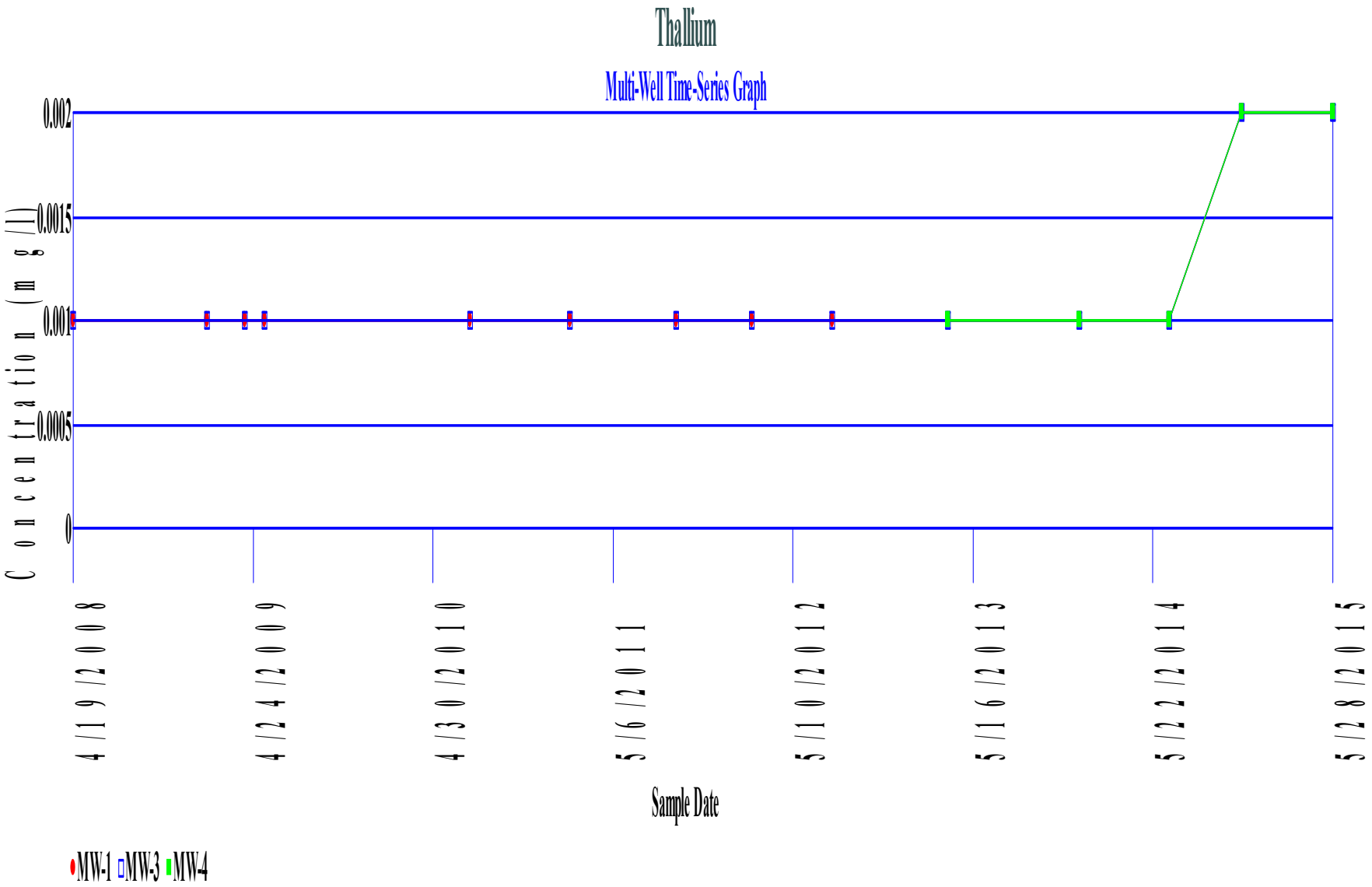

Multi-Well Time-Series Graph
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

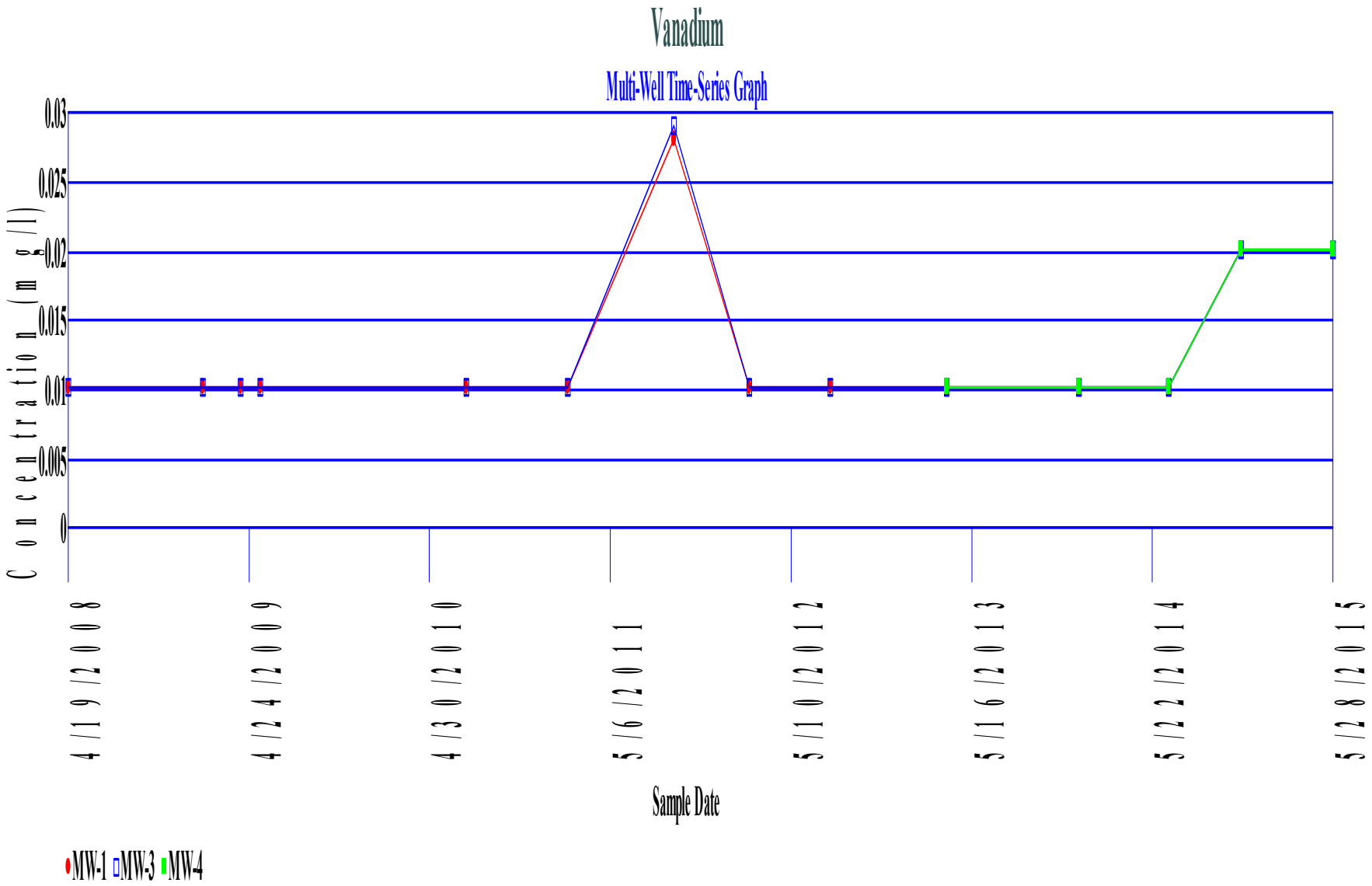

Mercury
Multi-Well Time-Series Graph
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Concentration (mg/L)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

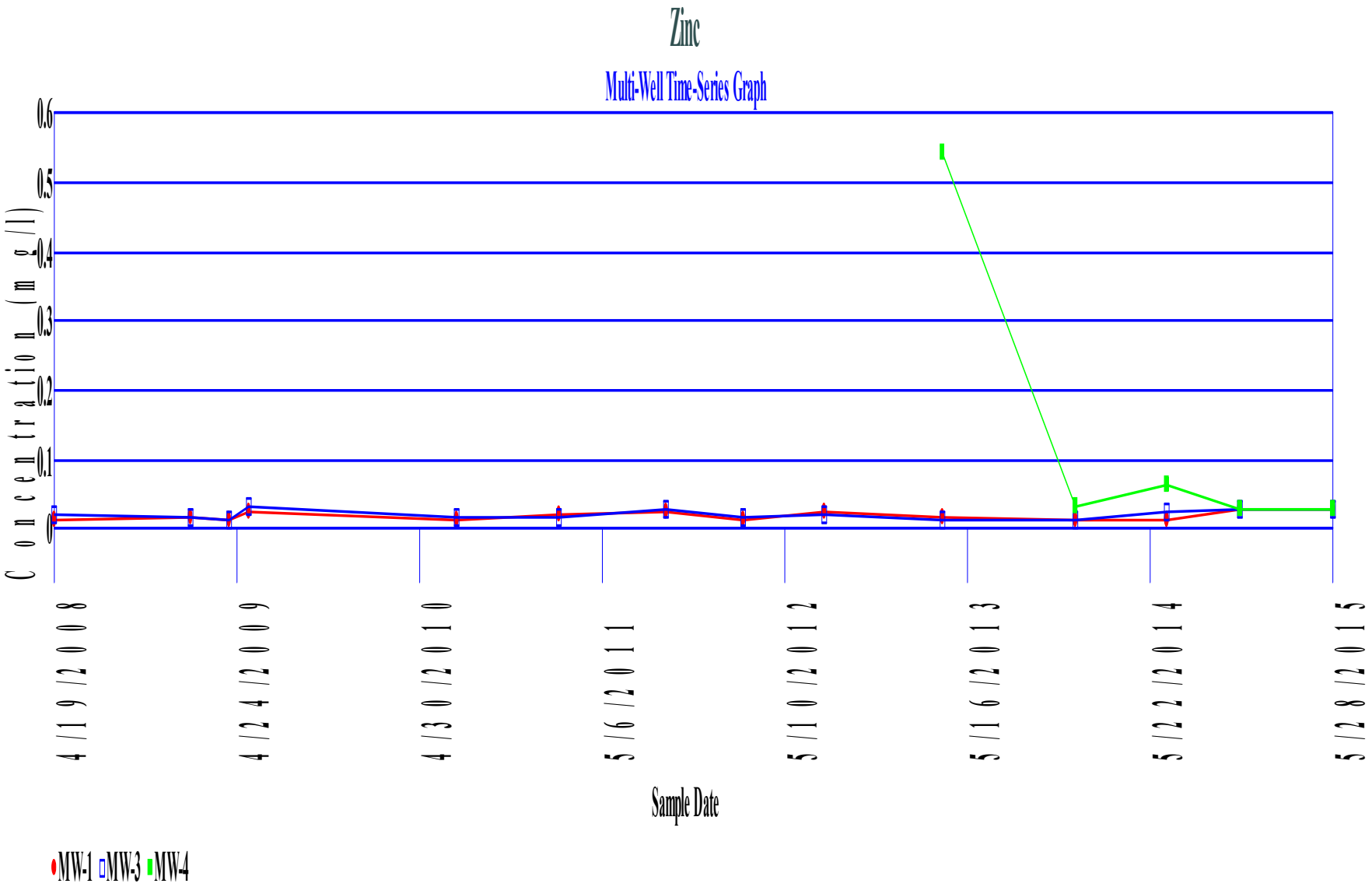

Nickel
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


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
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


Thallium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/L)
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


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
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4


Zinc
Multi-Well Time-Series Graph
Concentration (mg/l)
0.6
0.5
0.4
0.3
0.2
0.1
0
4/19/2008
4/24/2009
4/30/2010
5/6/2011
5/10/2012
5/16/2013
5/22/2014
5/28/2015
Sample Date
MW-1
MW-3
MW-4

Shapiro-Wilks Test of Normality

Parameter: Aluminum
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 16 for 33 measurements

Sum of b values = 14.3207
Sample Standard Deviation = 3.61243
W Statistic = 0.491107

5% Critical value of 0.931 exceeds 0.491107
Evidence of non-normality at 95% level of significance

1% Critical value of 0.906 exceeds 0.491107
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Arsenic
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 16 for 32 measurements

Sum of b values = 0.179765
Sample Standard Deviation = 0.0374001
W Statistic = 0.745252

5% Critical value of 0.93 exceeds 0.745252
Evidence of non-normality at 95% level of significance

1% Critical value of 0.904 exceeds 0.745252
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 16 for 33 measurements

Sum of b values = 0.341045
Sample Standard Deviation = 0.0740992
W Statistic = 0.66198

5% Critical value of 0.931 exceeds 0.66198
Evidence of non-normality at 95% level of significance

1% Critical value of 0.906 exceeds 0.66198
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cobalt
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 16 for 33 measurements

Sum of b values = 0.0684733
Sample Standard Deviation = 0.0138822
W Statistic = 0.760282

5% Critical value of 0.931 exceeds 0.760282
Evidence of non-normality at 95% level of significance

1% Critical value of 0.906 exceeds 0.760282
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 17 for 34 measurements

Sum of b values = 217.323
Sample Standard Deviation = 52.377
W Statistic = 0.521695

5% Critical value of 0.933 exceeds 0.521695
Evidence of non-normality at 95% level of significance

1% Critical value of 0.908 exceeds 0.521695
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Aluminum
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 16 for 33 measurements

Sum of b values = 9.36062
Sample Standard Deviation = 1.74901
W Statistic = 0.895105

5% Critical value of 0.931 exceeds 0.895105
Evidence of non-normality at 95% level of significance

1% Critical value of 0.906 exceeds 0.895105
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Arsenic
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 16 for 32 measurements

Sum of b values = 11.1855
Sample Standard Deviation = 2.34108
W Statistic = 0.736411

5% Critical value of 0.93 exceeds 0.736411
Evidence of non-normality at 95% level of significance

1% Critical value of 0.904 exceeds 0.736411
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 16 for 33 measurements

Sum of b values = 4.87605
Sample Standard Deviation = 0.882847
W Statistic = 0.953269

5% Critical value of 0.931 is less than 0.953269
Data is normally distributed at 95% level of significance

1% Critical value of 0.906 is less than 0.953269
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cobalt
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 16 for 33 measurements

Sum of b values = 4.6318
Sample Standard Deviation = 0.981992
W Statistic = 0.695238

5% Critical value of 0.931 exceeds 0.695238
Evidence of non-normality at 95% level of significance

1% Critical value of 0.906 exceeds 0.695238
Evidence of non-normality at 99% level of significance

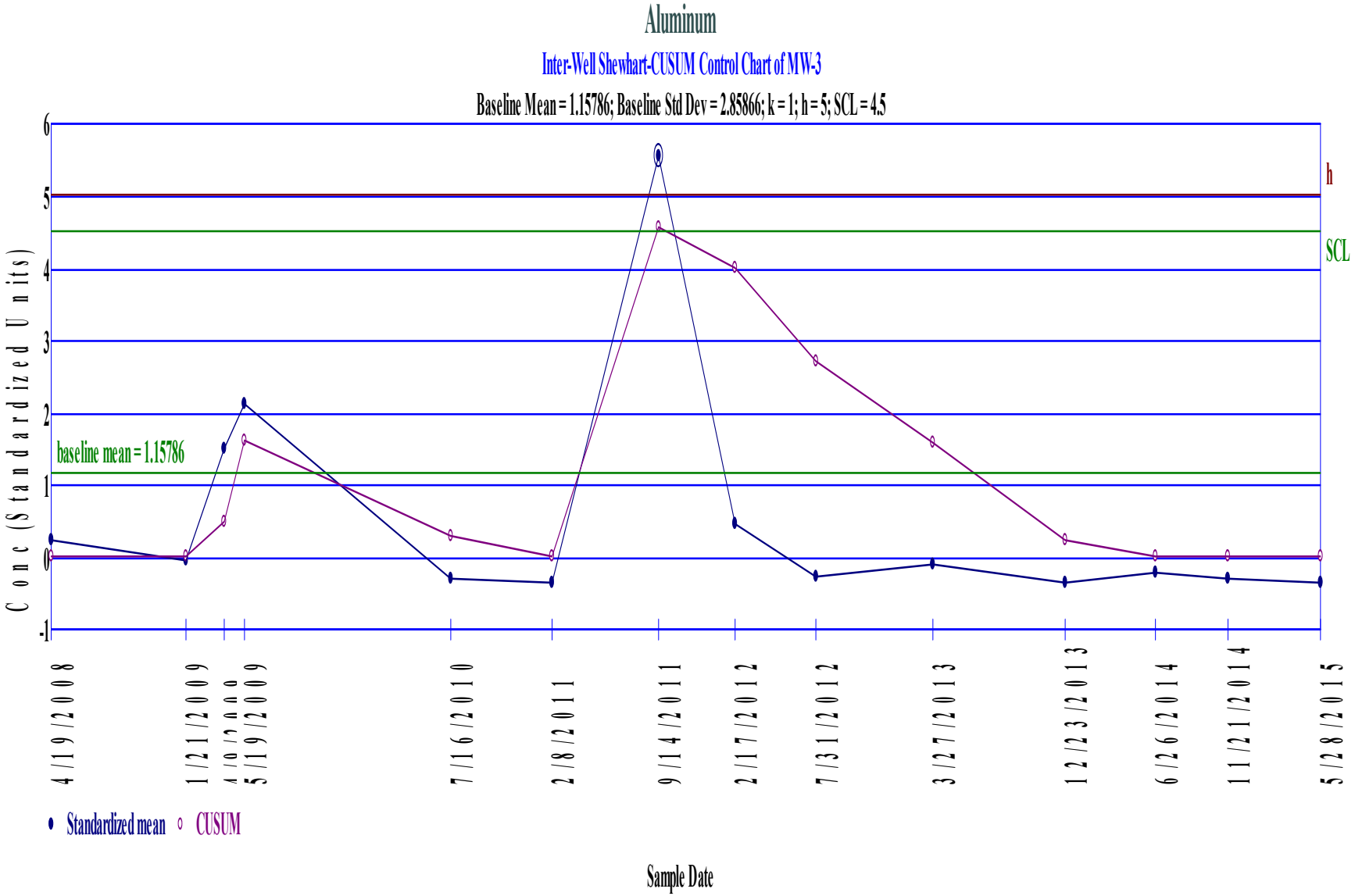
Shapiro-Wilks Test of Normality

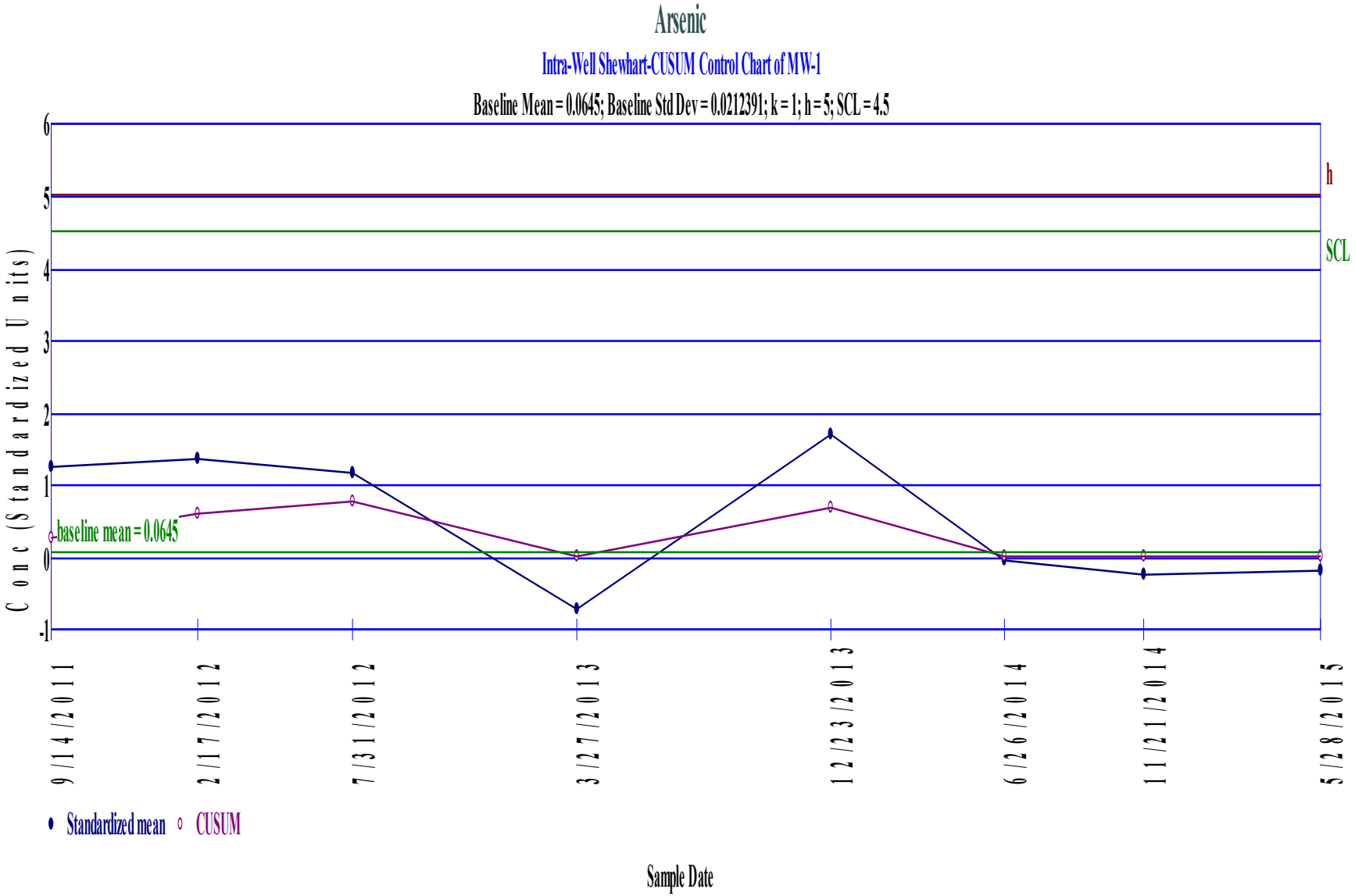
Parameter: Chloride
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 17 for 34 measurements

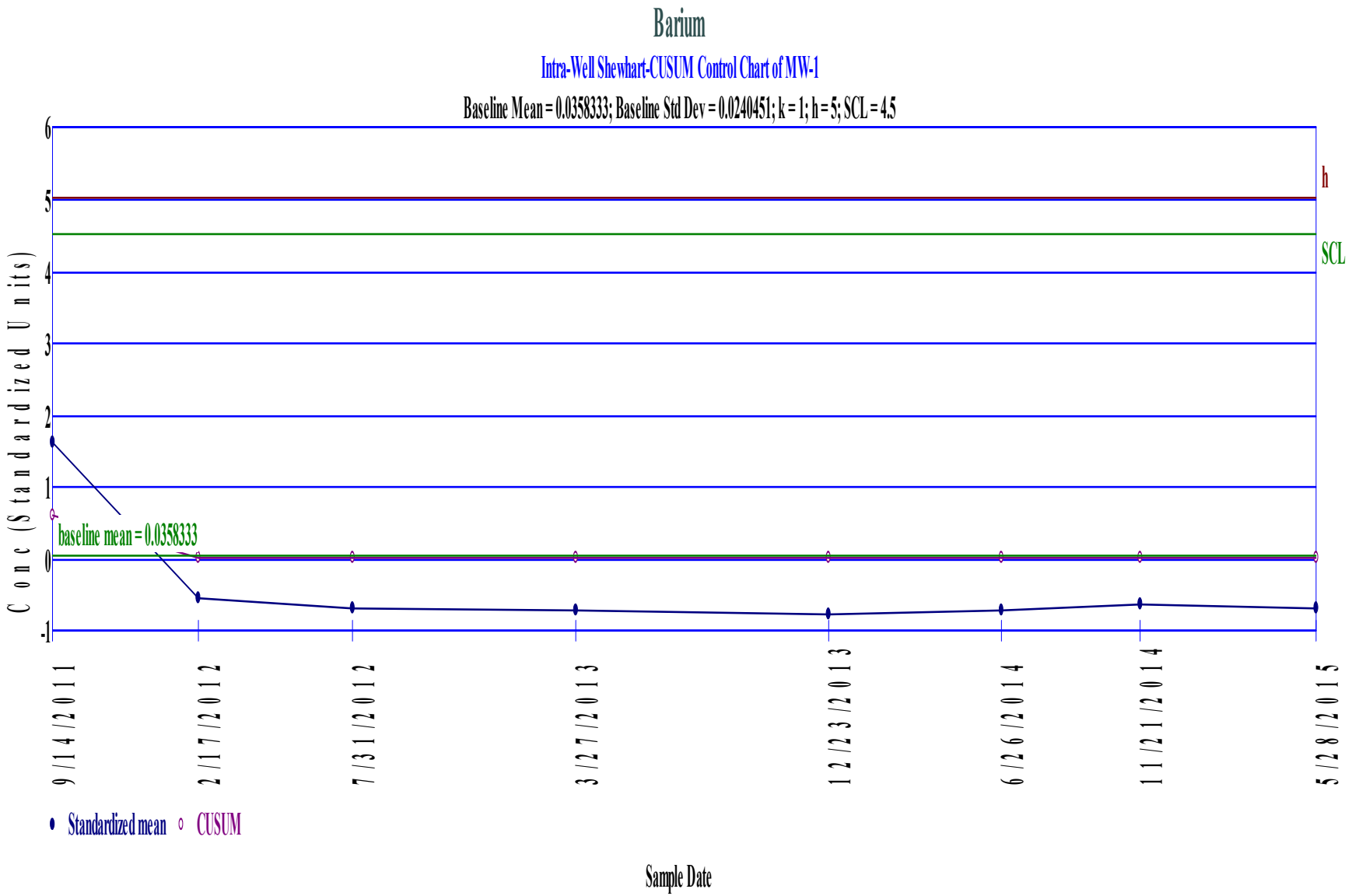
Sum of b values = 7.78711
Sample Standard Deviation = 1.41346
W Statistic = 0.91975

5% Critical value of 0.933 exceeds 0.91975
Evidence of non-normality at 95% level of significance

1% Critical value of 0.908 is less than 0.91975
Data is normally distributed at 99% level of significance


Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 1.15786; Baseline Std Dev = 2.85866; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 1.15786
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
Standardized mean
CUSUM
Sample Date


Arsenic
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.0645; Baseline Std Dev = 0.0212391; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.0645
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
Standardized mean
CUSUM
Sample Date


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
Standardized mean
CUSUM
Sample Date

Parametric Prediction Interval Analysis

Inter-Well Comparison
Parameter: Barium
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

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

Background Samples = 14
Background Mean = -3.65244
Background Std Dev = 0.509354

Number of comparisons = 2
Future Samples (k) = 2
Actual confidence level is 1.0 - (0.05/2) = 97.5 %
t is Percentile of Student's T-Test (0.95/2) = 0.975
Degrees of Freedom = 14 (background observations) - 1
t(0.975, 14) = 2.16037

Well MW-3

Date	Samples	Mean	Interval	Significant
5/28/2015	**1**	**-1.89712**	**[0, -2.51342]**	**TRUE**

Well MW-4

Date	Samples	Mean	Interval	Significant
5/28/2015	1	-4.07454	[0, -2.51342]	FALSE

Wilcoxon Non-Parametric Analysis (Inter-Well)

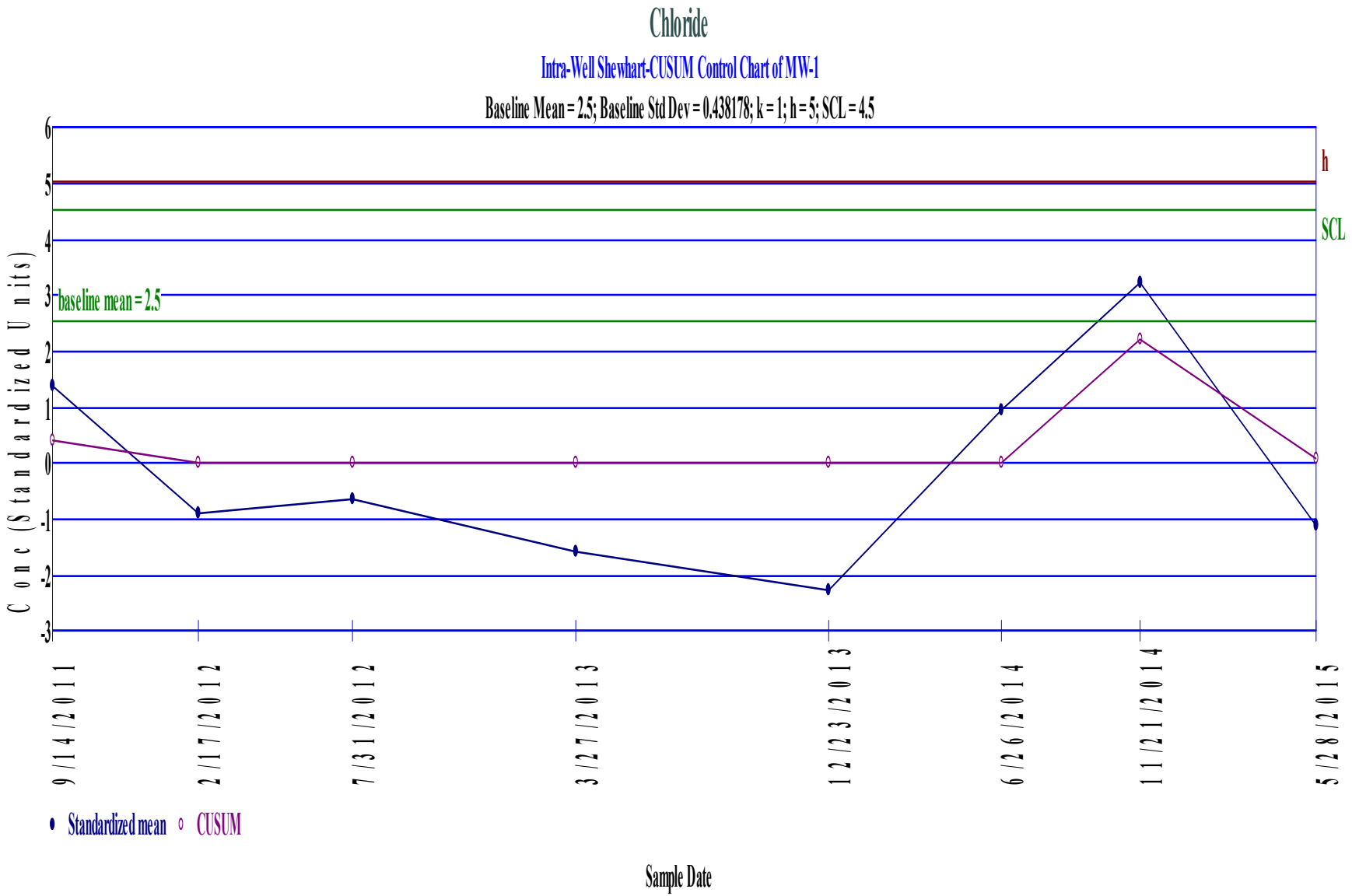
Parameter: Barium
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

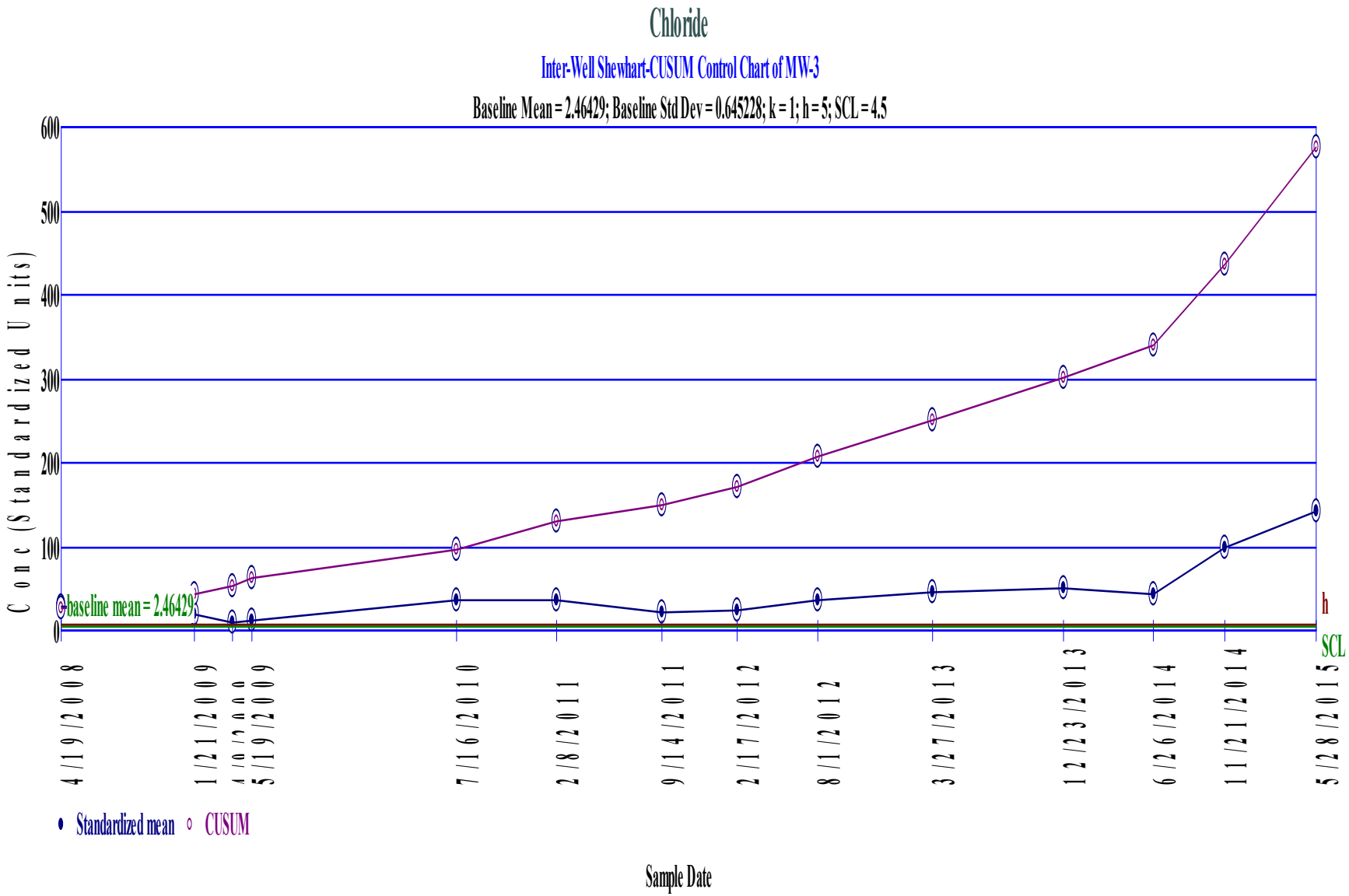
Total non detects is 0
Non detect rank is 0

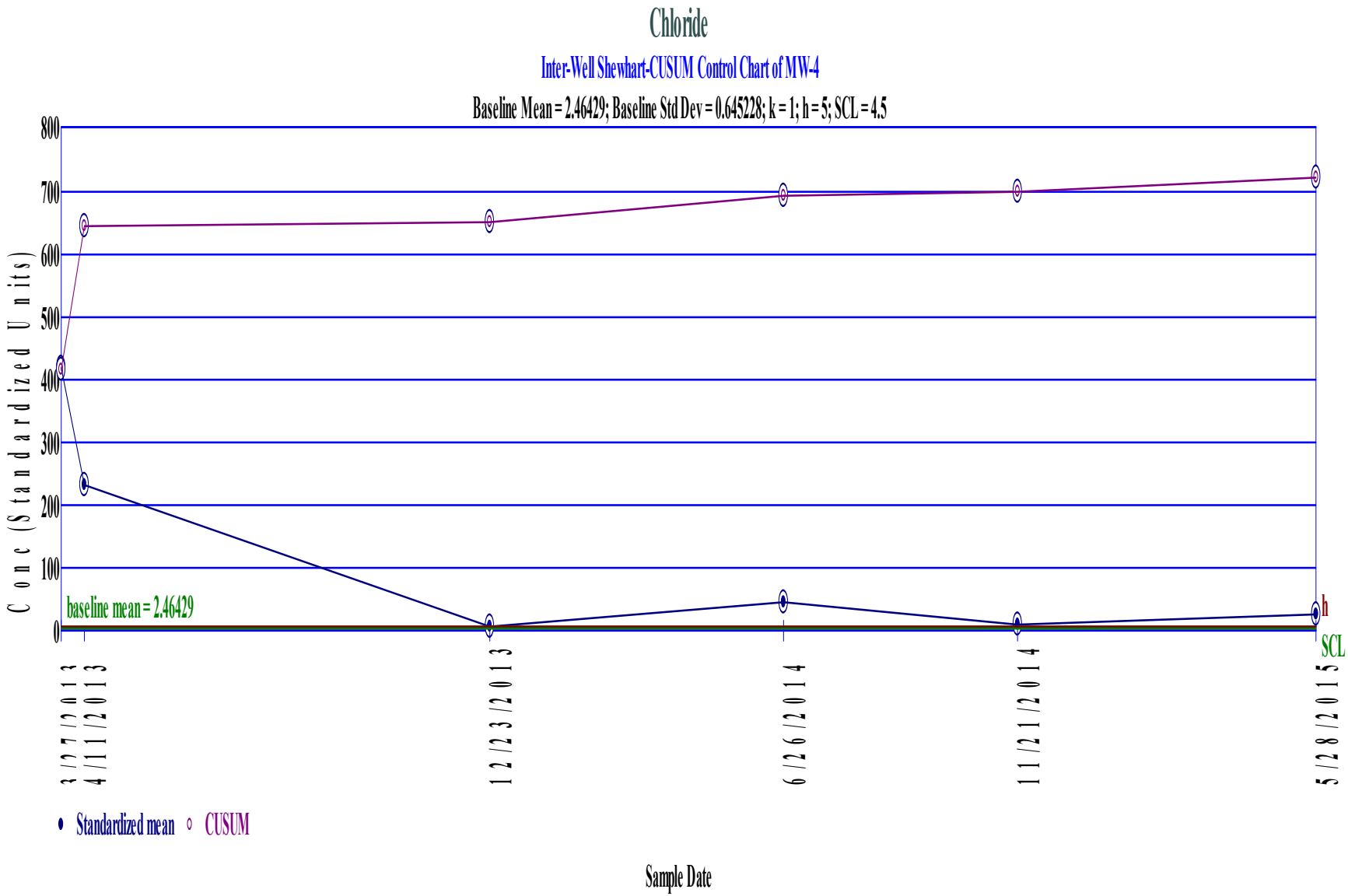
Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.084	21
	1/21/2009	0.028	10
	4/9/2009	0.028	11
	5/19/2009	0.033	12
	7/16/2010	0.021	7
	2/8/2011	0.021	8
	9/14/2011	0.074	19
	2/17/2012	0.022	9
	7/31/2012	0.019	4
	3/27/2013	0.018	2
	12/23/2013	0.017	1
	6/26/2014	0.018	3
	11/21/2014	0.02	6
	5/28/2015	0.019	5
MW-3	4/19/2008	0.056	18
	1/21/2009	0.039	13
	4/9/2009	0.043	14
	5/19/2009	0.047	15
	7/16/2010	0.055	17
	2/8/2011	0.052	16
	9/14/2011	0.15	26
	2/17/2012	0.097	24
	7/31/2012	0.091	22
	3/27/2013	0.094	23
	12/23/2013	0.15	27
	6/26/2014	0.079	20
	11/21/2014	0.14	25
	5/28/2015	0.15	28

The Wilcoxon Statistic is 183
The Expected value is is 98
The Standard Deviation is 21.7639
The Z Score is 3.88258
The Standard Deviation adjusted for ties is 21.7639
The Z Score adjusted for ties is 3.88258
3.88258 > 2.326 indicating statistical significance at 1% level
3.88258 > 2.326 indicating statistical significance at 1% level when adjusted for ties


Chloride
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 2.5; Baseline Std Dev = 0.438178; k = 1; h = 5; SCL = 4.5
h
SCL
baseline mean = 2.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
-2
-3
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 2.46429; Baseline Std Dev = 0.645228; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
600
500
400
300
200
100
0
baseline mean = 2.46429
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
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 2.46429; Baseline Std Dev = 0.645228; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
800
700
600
500
400
300
200
100
0
baseline mean = 2.46429
h
SCL
3/27/2013
4/11/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
Standardized mean
CUSUM
Sample Date

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	4
	1/21/2009	2.9	11
	4/9/2009	1.9	3
	5/19/2009	2.8	9
	7/16/2010	2.8	10
	2/8/2011	2.6	8
	9/14/2011	3.1	13
	2/17/2012	2.1	6
	7/31/2012	2.2	7
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	12
	11/21/2014	3.9	14
	5/28/2015	2	5
MW-3	4/19/2008	20	20
	1/21/2009	14	17
	4/9/2009	8.2	15
	5/19/2009	10	16
	7/16/2010	25	21
	2/8/2011	25	22
	9/14/2011	15	18
	2/17/2012	18	19
	8/1/2012	25	23
	3/27/2013	32	25
	12/23/2013	35	26
	6/26/2014	29	24
	11/21/2014	65	27
	5/28/2015	93	28

The Wilcoxon Statistic is 196
The Expected value is is 98
The Standard Deviation is 21.7639
The Z Score is 4.4799
The Standard Deviation adjusted for ties is 21.7639
The Z Score adjusted for ties is 4.4799
4.4799 > 2.326 indicating statistical significance at 1% level
4.4799 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 75 - 13 = 62

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

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 330
Z-Score = 3.35794
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.35794 > 1.65463 indicating an upward trend

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	4
	1/21/2009	2.9	11
	4/9/2009	1.9	3
	5/19/2009	2.8	9
	7/16/2010	2.8	10
	2/8/2011	2.6	8
	9/14/2011	3.1	13
	2/17/2012	2.1	6
	7/31/2012	2.2	7
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	12
	11/21/2014	3.9	14
	5/28/2015	2	5
MW-4	3/27/2013	270	20
	4/11/2013	150	19
	12/23/2013	6.4	15
	6/26/2014	31	18
	11/21/2014	6.7	16
	5/28/2015	18	17

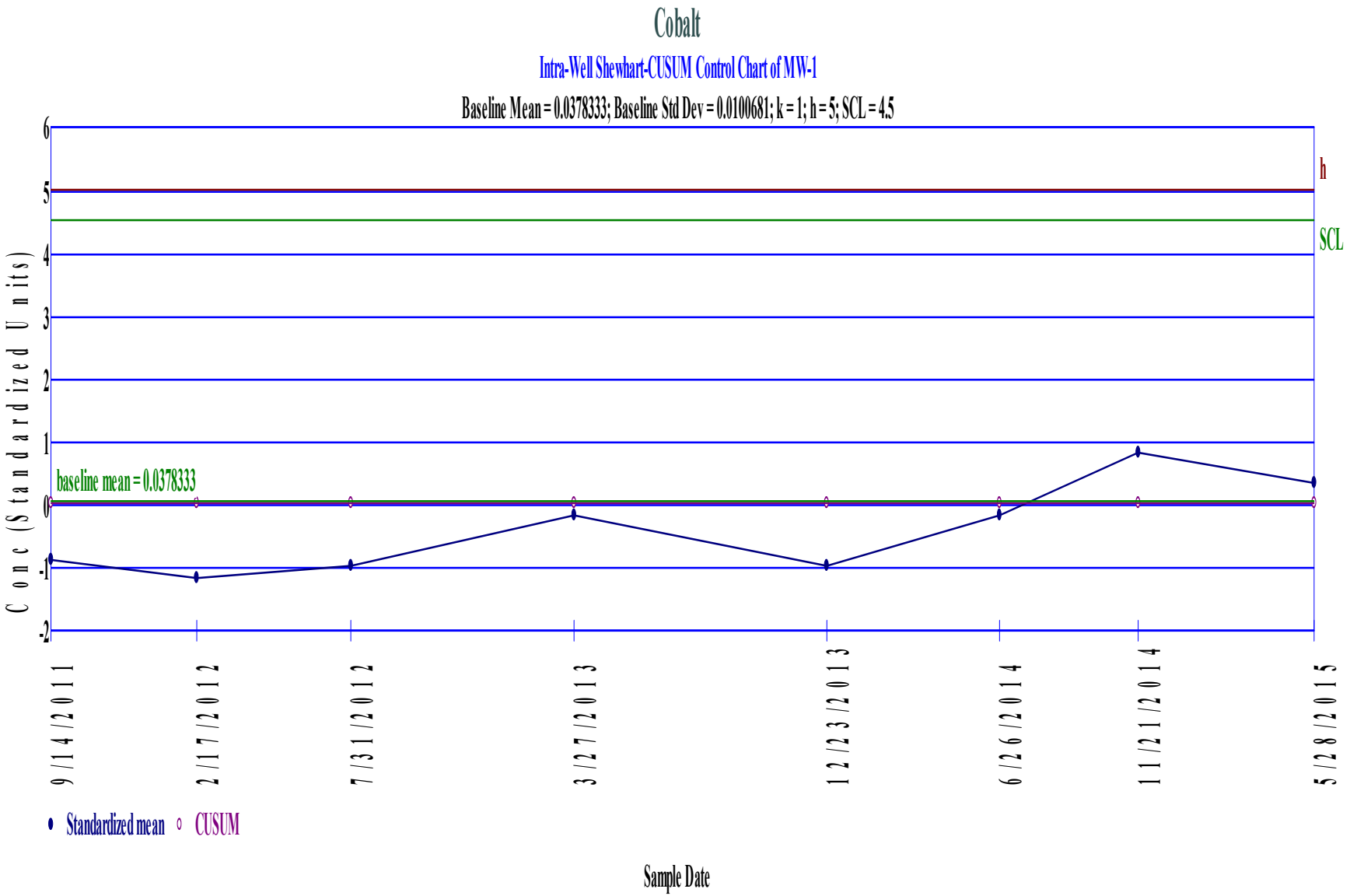
The Wilcoxon Statistic is 84
The Expected value is is 42
The Standard Deviation is 12.1244
The Z Score is 3.42286
The Standard Deviation adjusted for ties is 12.1244
The Z Score adjusted for ties is 3.42286
3.42286 > 2.326 indicating statistical significance at 1% level
3.42286 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

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

95% Confidence Level

S Statistic = 4 - 11 = -7
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= -7 is 0.136
S < 0 or 0.136 >= 0.05 indicating no evidence of an upward trend


Cobalt
Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.0378333; Baseline Std Dev = 0.0100681; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
-2
h
SCL
baseline mean = 0.0378333
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
Standardized mean
CUSUM
Sample Date

APPENDIX C

LABORATORY ANALYTICAL REPORT, FIELD INFORMATION LOGS

ANALYTICAL REPORT

June 09, 2015

Civil & Environmental Consultants - TN

Sample Delivery Group:	L767898
Samples Received:	05/29/2015
Project Number:	142-059
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

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 L767898-01 GW

Collected by: Philip Campbell | Collected date/time: 05/28/15 10:15 | Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG792321	1	06/01/15 11:03	06/01/15 18:09	MPT
Metals (ICP) by Method 6010B	WG792434	1	06/01/15 09:17	06/01/15 21:52	ST
Metals (ICPMS) by Method 6020	WG792660	1	06/02/15 09:43	06/04/15 01:20	AB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG792517	1	06/06/15 15:09	06/06/15 15:09	MCB
Wet Chemistry by Method 350.1	WG793493	1	06/04/15 15:00	06/04/15 15:00	JAL
Wet Chemistry by Method 9056MOD	WG792253	1	05/29/15 18:13	05/29/15 18:13	DJD

MW-4 L767898-02 GW

Collected by: Philip Campbell | Collected date/time: 05/28/15 11:50 | Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG792321	1	06/01/15 11:03	06/01/15 18:12	MPT
Metals (ICP) by Method 6010B	WG792434	1	06/01/15 09:17	06/01/15 21:57	ST
Metals (ICPMS) by Method 6020	WG792660	1	06/02/15 09:43	06/04/15 01:07	AB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG792517	1	06/06/15 15:30	06/06/15 15:30	MCB
Wet Chemistry by Method 350.1	WG793493	1	06/04/15 15:02	06/04/15 15:02	JAL
Wet Chemistry by Method 9056MOD	WG792253	1	05/29/15 18:27	05/29/15 18:27	DJD

MW-3 L767898-03 GW

Collected by: Philip Campbell | Collected date/time: 05/28/15 11:15 | Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG792321	1	06/01/15 11:03	06/01/15 18:14	MPT
Metals (ICP) by Method 6010B	WG792434	1	06/01/15 09:17	06/01/15 22:01	ST
Metals (ICPMS) by Method 6020	WG792660	1	06/02/15 09:43	06/04/15 01:23	AB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG792517	1	06/06/15 15:50	06/06/15 15:50	MCB
Wet Chemistry by Method 350.1	WG793493	1	06/04/15 15:05	06/04/15 15:05	JAL
Wet Chemistry by Method 9056MOD	WG792253	1	05/29/15 18:42	05/29/15 18:42	DJD

DUPLICATE L767898-04 GW

Collected by: Philip Campbell | Collected date/time: 05/28/15 00:00 | Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG792321	1	06/01/15 11:03	06/01/15 18:16	MPT
Metals (ICP) by Method 6010B	WG792434	1	06/01/15 09:17	06/01/15 22:06	ST
Metals (ICPMS) by Method 6020	WG792660	1	06/02/15 09:43	06/04/15 01:25	AB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG792517	1	06/06/15 10:45	06/06/15 10:45	MCB
Wet Chemistry by Method 350.1	WG793493	1	06/04/15 15:07	06/04/15 15:07	JAL
Wet Chemistry by Method 9056MOD	WG792253	1	05/29/15 19:11	05/29/15 19:11	DJD

FIELD BLANK L767898-05 GW

Collected by: Philip Campbell | Collected date/time: 05/28/15 12:00 | Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG792321	1	06/01/15 11:03	06/01/15 18:18	MPT
Metals (ICP) by Method 6010B	WG792434	1	06/01/15 09:17	06/01/15 22:11	ST
Metals (ICPMS) by Method 6020	WG792660	1	06/02/15 09:43	06/04/15 01:27	AB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG792517	1	06/06/15 09:03	06/06/15 09:03	MCB
Wet Chemistry by Method 350.1	WG793493	1	06/04/15 15:10	06/04/15 15:10	JAL
Wet Chemistry by Method 9056MOD	WG792253	1	05/29/15 19:25	05/29/15 19:25	DJD

TRIP BLANK L767898-06 GW

Collected by: Philip Campbell
Collected date/time: 05/28/15 00:00
Received date/time: 05/29/15 11:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG794361	1	06/09/15 00:23	06/09/15 00:23	MCB

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

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	06/04/2015 15:00	WG793493

Wet Chemistry by Method 9056MOD

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	05/29/2015 18:13	WG792253
Chloride	2.01		1.00	1	05/29/2015 18:13	WG792253
Nitrate	ND		0.100	1	05/29/2015 18:13	WG792253
Sulfate	ND		5.00	1	05/29/2015 18:13	WG792253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/01/2015 18:09	WG792321

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/01/2015 21:52	WG792434
Barium	0.0188		0.00500	1	06/01/2015 21:52	WG792434
Boron	ND		0.200	1	06/01/2015 21:52	WG792434
Calcium	3.44		1.00	1	06/01/2015 21:52	WG792434
Chromium	ND		0.0100	1	06/01/2015 21:52	WG792434
Cobalt	0.0408		0.0100	1	06/01/2015 21:52	WG792434
Iron	16.3		0.100	1	06/01/2015 21:52	WG792434
Magnesium	2.76		1.00	1	06/01/2015 21:52	WG792434
Manganese	1.07		0.0100	1	06/01/2015 21:52	WG792434
Nickel	ND		0.0200	1	06/01/2015 21:52	WG792434
Potassium	1.10		1.00	1	06/01/2015 21:52	WG792434
Silver	ND		0.0100	1	06/01/2015 21:52	WG792434
Sodium	2.95		1.00	1	06/01/2015 21:52	WG792434
Vanadium	ND		0.0200	1	06/01/2015 21:52	WG792434

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Antimony	ND		0.00200	1	06/04/2015 01:20	WG792660
Arsenic	0.0604		0.00200	1	06/04/2015 01:20	WG792660
Beryllium	ND		0.00200	1	06/04/2015 01:20	WG792660
Cadmium	ND		0.00100	1	06/04/2015 01:20	WG792660
Copper	ND		0.00500	1	06/04/2015 01:20	WG792660
Lead	ND		0.00200	1	06/04/2015 01:20	WG792660
Selenium	ND		0.00200	1	06/04/2015 01:20	WG792660
Thallium	ND		0.00200	1	06/04/2015 01:20	WG792660
Zinc	ND		0.0250	1	06/04/2015 01:20	WG792660

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	06/06/2015 15:09	WG792517
Acrylonitrile	ND		0.0100	1	06/06/2015 15:09	WG792517
Benzene	ND		0.00100	1	06/06/2015 15:09	WG792517
Bromochloromethane	ND		0.00100	1	06/06/2015 15:09	WG792517
Bromodichloromethane	ND		0.00100	1	06/06/2015 15:09	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromoform	ND		0.00100	1	06/06/2015 15:09	WG792517
Bromomethane	ND		0.00500	1	06/06/2015 15:09	WG792517
Carbon disulfide	ND		0.00100	1	06/06/2015 15:09	WG792517
Carbon tetrachloride	ND		0.00100	1	06/06/2015 15:09	WG792517
Chlorobenzene	ND		0.00100	1	06/06/2015 15:09	WG792517
Chlorodibromomethane	ND		0.00100	1	06/06/2015 15:09	WG792517
Chloroethane	ND		0.00500	1	06/06/2015 15:09	WG792517
Chloroform	ND		0.00500	1	06/06/2015 15:09	WG792517
Chloromethane	ND		0.00250	1	06/06/2015 15:09	WG792517
Dibromomethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/06/2015 15:09	WG792517
1,2-Dibromoethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,2-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:09	WG792517
1,4-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:09	WG792517
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/06/2015 15:09	WG792517
1,1-Dichloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,2-Dichloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,1-Dichloroethene	ND		0.00100	1	06/06/2015 15:09	WG792517
cis-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:09	WG792517
trans-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:09	WG792517
1,2-Dichloropropane	ND		0.00100	1	06/06/2015 15:09	WG792517
cis-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:09	WG792517
trans-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:09	WG792517
Ethylbenzene	ND		0.00100	1	06/06/2015 15:09	WG792517
2-Hexanone	ND		0.0100	1	06/06/2015 15:09	WG792517
Iodomethane	ND		0.0100	1	06/06/2015 15:09	WG792517
2-Butanone (MEK)	ND		0.0100	1	06/06/2015 15:09	WG792517
Methylene Chloride	ND		0.00500	1	06/06/2015 15:09	WG792517
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/06/2015 15:09	WG792517
Styrene	ND		0.00100	1	06/06/2015 15:09	WG792517
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
Tetrachloroethene	ND		0.00100	1	06/06/2015 15:09	WG792517
Toluene	ND		0.00500	1	06/06/2015 15:09	WG792517
1,1,1-Trichloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
1,1,2-Trichloroethane	ND		0.00100	1	06/06/2015 15:09	WG792517
Trichloroethene	ND		0.00100	1	06/06/2015 15:09	WG792517
Trichlorofluoromethane	ND		0.00500	1	06/06/2015 15:09	WG792517
1,2,3-Trichloropropane	ND		0.00250	1	06/06/2015 15:09	WG792517
Vinyl acetate	ND		0.0100	1	06/06/2015 15:09	WG792517
Vinyl chloride	ND		0.00100	1	06/06/2015 15:09	WG792517
Xylenes, Total	ND		0.00300	1	06/06/2015 15:09	WG792517
(S) Toluene-d8	*99.4*		*90.0-115*		*06/06/2015 15:09*	WG792517
(S) Dibromofluoromethane	*87.0*		*79.0-121*		*06/06/2015 15:09*	WG792517
(S) a,a,a-Trifluorotoluene	*103*		*90.4-116*		*06/06/2015 15:09*	WG792517
(S) 4-Bromofluorobenzene	*104*		*80.1-120*		*06/06/2015 15:09*	WG792517

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	06/04/2015 15:02	WG793493

Wet Chemistry by Method 9056MOD

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	05/29/2015 18:27	WG792253
Chloride	17.5		1.00	1	05/29/2015 18:27	WG792253
Nitrate	0.746		0.100	1	05/29/2015 18:27	WG792253
Sulfate	ND		5.00	1	05/29/2015 18:27	WG792253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/01/2015 18:12	WG792321

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/01/2015 21:57	WG792434
Barium	0.0169		0.00500	1	06/01/2015 21:57	WG792434
Boron	ND		0.200	1	06/01/2015 21:57	WG792434
Calcium	6.05		1.00	1	06/01/2015 21:57	WG792434
Chromium	ND		0.0100	1	06/01/2015 21:57	WG792434
Cobalt	ND		0.0100	1	06/01/2015 21:57	WG792434
Iron	ND		0.100	1	06/01/2015 21:57	WG792434
Magnesium	3.81		1.00	1	06/01/2015 21:57	WG792434
Manganese	0.0770		0.0100	1	06/01/2015 21:57	WG792434
Nickel	ND		0.0200	1	06/01/2015 21:57	WG792434
Potassium	1.43		1.00	1	06/01/2015 21:57	WG792434
Silver	ND		0.0100	1	06/01/2015 21:57	WG792434
Sodium	8.21		1.00	1	06/01/2015 21:57	WG792434
Vanadium	ND		0.0200	1	06/01/2015 21:57	WG792434

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Antimony	ND		0.00200	1	06/04/2015 01:07	WG792660
Arsenic	ND		0.00200	1	06/04/2015 01:07	WG792660
Beryllium	ND		0.00200	1	06/04/2015 01:07	WG792660
Cadmium	ND		0.00100	1	06/04/2015 01:07	WG792660
Copper	ND		0.00500	1	06/04/2015 01:07	WG792660
Lead	ND		0.00200	1	06/04/2015 01:07	WG792660
Selenium	ND		0.00200	1	06/04/2015 01:07	WG792660
Thallium	ND		0.00200	1	06/04/2015 01:07	WG792660
Zinc	ND		0.0250	1	06/04/2015 01:07	WG792660

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	06/06/2015 15:30	WG792517
Acrylonitrile	ND		0.0100	1	06/06/2015 15:30	WG792517
Benzene	ND		0.00100	1	06/06/2015 15:30	WG792517
Bromochloromethane	ND		0.00100	1	06/06/2015 15:30	WG792517
Bromodichloromethane	ND		0.00100	1	06/06/2015 15:30	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromoform	ND		0.00100	1	06/06/2015 15:30	WG792517
Bromomethane	ND		0.00500	1	06/06/2015 15:30	WG792517
Carbon disulfide	ND		0.00100	1	06/06/2015 15:30	WG792517
Carbon tetrachloride	ND		0.00100	1	06/06/2015 15:30	WG792517
Chlorobenzene	ND		0.00100	1	06/06/2015 15:30	WG792517
Chlorodibromomethane	ND		0.00100	1	06/06/2015 15:30	WG792517
Chloroethane	ND		0.00500	1	06/06/2015 15:30	WG792517
Chloroform	ND		0.00500	1	06/06/2015 15:30	WG792517
Chloromethane	ND		0.00250	1	06/06/2015 15:30	WG792517
Dibromomethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/06/2015 15:30	WG792517
1,2-Dibromoethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,2-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:30	WG792517
1,4-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:30	WG792517
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/06/2015 15:30	WG792517
1,1-Dichloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,2-Dichloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,1-Dichloroethene	ND		0.00100	1	06/06/2015 15:30	WG792517
cis-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:30	WG792517
trans-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:30	WG792517
1,2-Dichloropropane	ND		0.00100	1	06/06/2015 15:30	WG792517
cis-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:30	WG792517
trans-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:30	WG792517
Ethylbenzene	ND		0.00100	1	06/06/2015 15:30	WG792517
2-Hexanone	ND		0.0100	1	06/06/2015 15:30	WG792517
Iodomethane	ND		0.0100	1	06/06/2015 15:30	WG792517
2-Butanone (MEK)	ND		0.0100	1	06/06/2015 15:30	WG792517
Methylene Chloride	ND		0.00500	1	06/06/2015 15:30	WG792517
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/06/2015 15:30	WG792517
Styrene	ND		0.00100	1	06/06/2015 15:30	WG792517
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
Tetrachloroethene	ND		0.00100	1	06/06/2015 15:30	WG792517
Toluene	ND		0.00500	1	06/06/2015 15:30	WG792517
1,1,1-Trichloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
1,1,2-Trichloroethane	ND		0.00100	1	06/06/2015 15:30	WG792517
Trichloroethene	ND		0.00100	1	06/06/2015 15:30	WG792517
Trichlorofluoromethane	ND		0.00500	1	06/06/2015 15:30	WG792517
1,2,3-Trichloropropane	ND		0.00250	1	06/06/2015 15:30	WG792517
Vinyl acetate	ND		0.0100	1	06/06/2015 15:30	WG792517
Vinyl chloride	ND		0.00100	1	06/06/2015 15:30	WG792517
Xylenes, Total	ND		0.00300	1	06/06/2015 15:30	WG792517
(S) Toluene-d8	*100*		*90.0-115*		*06/06/2015 15:30*	WG792517
(S) Dibromofluoromethane	*86.8*		*79.0-121*		*06/06/2015 15:30*	WG792517
(S) a,a,a-Trifluorotoluene	*103*		*90.4-116*		*06/06/2015 15:30*	WG792517
(S) 4-Bromofluorobenzene	*105*		*80.1-120*		*06/06/2015 15:30*	WG792517

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.250	1	06/04/2015 15:05	WG793493

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	05/29/2015 18:42	WG792253
Chloride	92.8		1.00	1	05/29/2015 18:42	WG792253
Nitrate	2.55		0.100	1	05/29/2015 18:42	WG792253
Sulfate	9.09		5.00	1	05/29/2015 18:42	WG792253

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	06/01/2015 18:14	WG792321

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.135		0.100	1	06/01/2015 22:01	WG792434
Barium	0.152		0.00500	1	06/01/2015 22:01	WG792434
Boron	ND		0.200	1	06/01/2015 22:01	WG792434
Calcium	21.4		1.00	1	06/01/2015 22:01	WG792434
Chromium	ND		0.0100	1	06/01/2015 22:01	WG792434
Cobalt	ND		0.0100	1	06/01/2015 22:01	WG792434
Iron	ND		0.100	1	06/01/2015 22:01	WG792434
Magnesium	6.71		1.00	1	06/01/2015 22:01	WG792434
Manganese	0.0136		0.0100	1	06/01/2015 22:01	WG792434
Nickel	ND		0.0200	1	06/01/2015 22:01	WG792434
Potassium	13.0		1.00	1	06/01/2015 22:01	WG792434
Silver	ND		0.0100	1	06/01/2015 22:01	WG792434
Sodium	30.4		1.00	1	06/01/2015 22:01	WG792434
Vanadium	ND		0.0200	1	06/01/2015 22:01	WG792434

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony	ND		0.00200	1	06/04/2015 01:23	WG792660
Arsenic	ND		0.00200	1	06/04/2015 01:23	WG792660
Beryllium	ND		0.00200	1	06/04/2015 01:23	WG792660
Cadmium	ND		0.00100	1	06/04/2015 01:23	WG792660
Copper	ND		0.00500	1	06/04/2015 01:23	WG792660
Lead	ND		0.00200	1	06/04/2015 01:23	WG792660
Selenium	ND		0.00200	1	06/04/2015 01:23	WG792660
Thallium	ND		0.00200	1	06/04/2015 01:23	WG792660
Zinc	ND		0.0250	1	06/04/2015 01:23	WG792660

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	06/06/2015 15:50	WG792517
Acrylonitrile	ND		0.0100	1	06/06/2015 15:50	WG792517
Benzene	ND		0.00100	1	06/06/2015 15:50	WG792517
Bromochloromethane	ND		0.00100	1	06/06/2015 15:50	WG792517
Bromodichloromethane	ND		0.00100	1	06/06/2015 15:50	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromoform	ND		0.00100	1	06/06/2015 15:50	WG792517
Bromomethane	ND		0.00500	1	06/06/2015 15:50	WG792517
Carbon disulfide	ND		0.00100	1	06/06/2015 15:50	WG792517
Carbon tetrachloride	ND		0.00100	1	06/06/2015 15:50	WG792517
Chlorobenzene	ND		0.00100	1	06/06/2015 15:50	WG792517
Chlorodibromomethane	ND		0.00100	1	06/06/2015 15:50	WG792517
Chloroethane	ND		0.00500	1	06/06/2015 15:50	WG792517
Chloroform	ND		0.00500	1	06/06/2015 15:50	WG792517
Chloromethane	ND		0.00250	1	06/06/2015 15:50	WG792517
Dibromomethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/06/2015 15:50	WG792517
1,2-Dibromoethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,2-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:50	WG792517
1,4-Dichlorobenzene	ND		0.00100	1	06/06/2015 15:50	WG792517
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/06/2015 15:50	WG792517
1,1-Dichloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,2-Dichloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,1-Dichloroethene	ND		0.00100	1	06/06/2015 15:50	WG792517
cis-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:50	WG792517
trans-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 15:50	WG792517
1,2-Dichloropropane	ND		0.00100	1	06/06/2015 15:50	WG792517
cis-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:50	WG792517
trans-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 15:50	WG792517
Ethylbenzene	ND		0.00100	1	06/06/2015 15:50	WG792517
2-Hexanone	ND		0.0100	1	06/06/2015 15:50	WG792517
Iodomethane	ND		0.0100	1	06/06/2015 15:50	WG792517
2-Butanone (MEK)	ND		0.0100	1	06/06/2015 15:50	WG792517
Methylene Chloride	ND		0.00500	1	06/06/2015 15:50	WG792517
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/06/2015 15:50	WG792517
Styrene	ND		0.00100	1	06/06/2015 15:50	WG792517
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
Tetrachloroethene	ND		0.00100	1	06/06/2015 15:50	WG792517
Toluene	ND		0.00500	1	06/06/2015 15:50	WG792517
1,1,1-Trichloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
1,1,2-Trichloroethane	ND		0.00100	1	06/06/2015 15:50	WG792517
Trichloroethene	ND		0.00100	1	06/06/2015 15:50	WG792517
Trichlorofluoromethane	ND		0.00500	1	06/06/2015 15:50	WG792517
1,2,3-Trichloropropane	ND		0.00250	1	06/06/2015 15:50	WG792517
Vinyl acetate	ND		0.0100	1	06/06/2015 15:50	WG792517
Vinyl chloride	ND		0.00100	1	06/06/2015 15:50	WG792517
Xylenes, Total	ND		0.00300	1	06/06/2015 15:50	WG792517
(S) Toluene-d8	*99.8*		*90.0-115*		*06/06/2015 15:50*	WG792517
(S) Dibromofluoromethane	*87.8*		*79.0-121*		*06/06/2015 15:50*	WG792517
(S) a,a,a-Trifluorotoluene	*103*		*90.4-116*		*06/06/2015 15:50*	WG792517
(S) 4-Bromofluorobenzene	*104*		*80.1-120*		*06/06/2015 15:50*	WG792517

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	06/04/2015 15:07	WG793493

Wet Chemistry by Method 9056MOD

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	05/29/2015 19:11	WG792253
Chloride	1.93		1.00	1	05/29/2015 19:11	WG792253
Nitrate	ND		0.100	1	05/29/2015 19:11	WG792253
Sulfate	ND		5.00	1	05/29/2015 19:11	WG792253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/01/2015 18:16	WG792321

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/01/2015 22:06	WG792434
Barium	0.0188		0.00500	1	06/01/2015 22:06	WG792434
Boron	ND		0.200	1	06/01/2015 22:06	WG792434
Calcium	3.29		1.00	1	06/01/2015 22:06	WG792434
Chromium	ND		0.0100	1	06/01/2015 22:06	WG792434
Cobalt	0.0414		0.0100	1	06/01/2015 22:06	WG792434
Iron	16.6		0.100	1	06/01/2015 22:06	WG792434
Magnesium	2.69		1.00	1	06/01/2015 22:06	WG792434
Manganese	1.07		0.0100	1	06/01/2015 22:06	WG792434
Nickel	ND		0.0200	1	06/01/2015 22:06	WG792434
Potassium	1.06		1.00	1	06/01/2015 22:06	WG792434
Silver	ND		0.0100	1	06/01/2015 22:06	WG792434
Sodium	2.87		1.00	1	06/01/2015 22:06	WG792434
Vanadium	ND		0.0200	1	06/01/2015 22:06	WG792434

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Antimony	ND		0.00200	1	06/04/2015 01:25	WG792660
Arsenic	0.0646		0.00200	1	06/04/2015 01:25	WG792660
Beryllium	ND		0.00200	1	06/04/2015 01:25	WG792660
Cadmium	ND		0.00100	1	06/04/2015 01:25	WG792660
Copper	ND		0.00500	1	06/04/2015 01:25	WG792660
Lead	ND		0.00200	1	06/04/2015 01:25	WG792660
Selenium	ND		0.00200	1	06/04/2015 01:25	WG792660
Thallium	ND		0.00200	1	06/04/2015 01:25	WG792660
Zinc	ND		0.0250	1	06/04/2015 01:25	WG792660

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	06/06/2015 10:45	WG792517
Acrylonitrile	ND		0.0100	1	06/06/2015 10:45	WG792517
Benzene	ND		0.00100	1	06/06/2015 10:45	WG792517
Bromochloromethane	ND		0.00100	1	06/06/2015 10:45	WG792517
Bromodichloromethane	ND		0.00100	1	06/06/2015 10:45	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromoform	ND		0.00100	1	06/06/2015 10:45	WG792517
Bromomethane	ND		0.00500	1	06/06/2015 10:45	WG792517
Carbon disulfide	ND		0.00100	1	06/06/2015 10:45	WG792517
Carbon tetrachloride	ND		0.00100	1	06/06/2015 10:45	WG792517
Chlorobenzene	ND		0.00100	1	06/06/2015 10:45	WG792517
Chlorodibromomethane	ND		0.00100	1	06/06/2015 10:45	WG792517
Chloroethane	ND		0.00500	1	06/06/2015 10:45	WG792517
Chloroform	ND		0.00500	1	06/06/2015 10:45	WG792517
Chloromethane	ND		0.00250	1	06/06/2015 10:45	WG792517
Dibromomethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/06/2015 10:45	WG792517
1,2-Dibromoethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,2-Dichlorobenzene	ND		0.00100	1	06/06/2015 10:45	WG792517
1,4-Dichlorobenzene	ND		0.00100	1	06/06/2015 10:45	WG792517
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/06/2015 10:45	WG792517
1,1-Dichloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,2-Dichloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,1-Dichloroethene	ND		0.00100	1	06/06/2015 10:45	WG792517
cis-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 10:45	WG792517
trans-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 10:45	WG792517
1,2-Dichloropropane	ND		0.00100	1	06/06/2015 10:45	WG792517
cis-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 10:45	WG792517
trans-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 10:45	WG792517
Ethylbenzene	ND		0.00100	1	06/06/2015 10:45	WG792517
2-Hexanone	ND		0.0100	1	06/06/2015 10:45	WG792517
Iodomethane	ND		0.0100	1	06/06/2015 10:45	WG792517
2-Butanone (MEK)	ND		0.0100	1	06/06/2015 10:45	WG792517
Methylene Chloride	ND		0.00500	1	06/06/2015 10:45	WG792517
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/06/2015 10:45	WG792517
Styrene	ND		0.00100	1	06/06/2015 10:45	WG792517
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
Tetrachloroethene	ND		0.00100	1	06/06/2015 10:45	WG792517
Toluene	ND		0.00500	1	06/06/2015 10:45	WG792517
1,1,1-Trichloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
1,1,2-Trichloroethane	ND		0.00100	1	06/06/2015 10:45	WG792517
Trichloroethene	ND		0.00100	1	06/06/2015 10:45	WG792517
Trichlorofluoromethane	ND		0.00500	1	06/06/2015 10:45	WG792517
1,2,3-Trichloropropane	ND		0.00250	1	06/06/2015 10:45	WG792517
Vinyl acetate	ND		0.0100	1	06/06/2015 10:45	WG792517
Vinyl chloride	ND		0.00100	1	06/06/2015 10:45	WG792517
Xylenes, Total	ND		0.00300	1	06/06/2015 10:45	WG792517
(S) Toluene-d8	*99.7*		*90.0-115*		*06/06/2015 10:45*	WG792517
(S) Dibromofluoromethane	*86.2*		*79.0-121*		*06/06/2015 10:45*	WG792517
(S) a,a,a-Trifluorotoluene	*104*		*90.4-116*		*06/06/2015 10:45*	WG792517
(S) 4-Bromofluorobenzene	*104*		*80.1-120*		*06/06/2015 10:45*	WG792517

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	06/04/2015 15:10	WG793493

Wet Chemistry by Method 9056MOD

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	05/29/2015 19:25	WG792253
Chloride	ND	P1	1.00	1	05/29/2015 19:25	WG792253
Nitrate	ND		0.100	1	05/29/2015 19:25	WG792253
Sulfate	ND		5.00	1	05/29/2015 19:25	WG792253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	06/01/2015 18:18	WG792321

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	06/01/2015 22:11	WG792434
Barium	ND		0.00500	1	06/01/2015 22:11	WG792434
Boron	ND		0.200	1	06/01/2015 22:11	WG792434
Calcium	ND		1.00	1	06/01/2015 22:11	WG792434
Chromium	ND		0.0100	1	06/01/2015 22:11	WG792434
Cobalt	ND		0.0100	1	06/01/2015 22:11	WG792434
Iron	ND		0.100	1	06/01/2015 22:11	WG792434
Magnesium	ND		1.00	1	06/01/2015 22:11	WG792434
Manganese	ND		0.0100	1	06/01/2015 22:11	WG792434
Nickel	ND		0.0200	1	06/01/2015 22:11	WG792434
Potassium	ND		1.00	1	06/01/2015 22:11	WG792434
Silver	ND		0.0100	1	06/01/2015 22:11	WG792434
Sodium	ND		1.00	1	06/01/2015 22:11	WG792434
Vanadium	ND		0.0200	1	06/01/2015 22:11	WG792434

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Antimony	ND		0.00200	1	06/04/2015 01:27	WG792660
Arsenic	ND		0.00200	1	06/04/2015 01:27	WG792660
Beryllium	ND		0.00200	1	06/04/2015 01:27	WG792660
Cadmium	ND		0.00100	1	06/04/2015 01:27	WG792660
Copper	ND		0.00500	1	06/04/2015 01:27	WG792660
Lead	ND		0.00200	1	06/04/2015 01:27	WG792660
Selenium	ND		0.00200	1	06/04/2015 01:27	WG792660
Thallium	ND		0.00200	1	06/04/2015 01:27	WG792660
Zinc	ND		0.0250	1	06/04/2015 01:27	WG792660

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	06/06/2015 09:03	WG792517
Acrylonitrile	ND		0.0100	1	06/06/2015 09:03	WG792517
Benzene	ND		0.00100	1	06/06/2015 09:03	WG792517
Bromochloromethane	ND		0.00100	1	06/06/2015 09:03	WG792517
Bromodichloromethane	ND		0.00100	1	06/06/2015 09:03	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromoform	ND		0.00100	1	06/06/2015 09:03	WG792517
Bromomethane	ND		0.00500	1	06/06/2015 09:03	WG792517
Carbon disulfide	ND		0.00100	1	06/06/2015 09:03	WG792517
Carbon tetrachloride	ND		0.00100	1	06/06/2015 09:03	WG792517
Chlorobenzene	ND		0.00100	1	06/06/2015 09:03	WG792517
Chlorodibromomethane	ND		0.00100	1	06/06/2015 09:03	WG792517
Chloroethane	ND		0.00500	1	06/06/2015 09:03	WG792517
Chloroform	ND		0.00500	1	06/06/2015 09:03	WG792517
Chloromethane	ND		0.00250	1	06/06/2015 09:03	WG792517
Dibromomethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/06/2015 09:03	WG792517
1,2-Dibromoethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,2-Dichlorobenzene	ND		0.00100	1	06/06/2015 09:03	WG792517
1,4-Dichlorobenzene	ND		0.00100	1	06/06/2015 09:03	WG792517
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/06/2015 09:03	WG792517
1,1-Dichloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,2-Dichloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,1-Dichloroethene	ND		0.00100	1	06/06/2015 09:03	WG792517
cis-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 09:03	WG792517
trans-1,2-Dichloroethene	ND		0.00100	1	06/06/2015 09:03	WG792517
1,2-Dichloropropane	ND		0.00100	1	06/06/2015 09:03	WG792517
cis-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 09:03	WG792517
trans-1,3-Dichloropropene	ND		0.00100	1	06/06/2015 09:03	WG792517
Ethylbenzene	ND		0.00100	1	06/06/2015 09:03	WG792517
2-Hexanone	ND		0.0100	1	06/06/2015 09:03	WG792517
Iodomethane	ND		0.0100	1	06/06/2015 09:03	WG792517
2-Butanone (MEK)	ND		0.0100	1	06/06/2015 09:03	WG792517
Methylene Chloride	ND		0.00500	1	06/06/2015 09:03	WG792517
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/06/2015 09:03	WG792517
Styrene	ND		0.00100	1	06/06/2015 09:03	WG792517
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
Tetrachloroethene	ND		0.00100	1	06/06/2015 09:03	WG792517
Toluene	ND		0.00500	1	06/06/2015 09:03	WG792517
1,1,1-Trichloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
1,1,2-Trichloroethane	ND		0.00100	1	06/06/2015 09:03	WG792517
Trichloroethene	ND		0.00100	1	06/06/2015 09:03	WG792517
Trichlorofluoromethane	ND		0.00500	1	06/06/2015 09:03	WG792517
1,2,3-Trichloropropane	ND		0.00250	1	06/06/2015 09:03	WG792517
Vinyl acetate	ND		0.0100	1	06/06/2015 09:03	WG792517
Vinyl chloride	ND		0.00100	1	06/06/2015 09:03	WG792517
Xylenes, Total	ND		0.00300	1	06/06/2015 09:03	WG792517
(S) Toluene-d8	*99.8*		*90.0-115*		*06/06/2015 09:03*	WG792517
(S) Dibromofluoromethane	*86.8*		*79.0-121*		*06/06/2015 09:03*	WG792517
(S) a,a,a-Trifluorotoluene	*102*		*90.4-116*		*06/06/2015 09:03*	WG792517
(S) 4-Bromofluorobenzene	*104*		*80.1-120*		*06/06/2015 09:03*	WG792517

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	06/09/2015 00:23	WG794361
Acrylonitrile	ND		0.0100	1	06/09/2015 00:23	WG794361
Benzene	ND		0.00100	1	06/09/2015 00:23	WG794361
Bromochloromethane	ND		0.00100	1	06/09/2015 00:23	WG794361
Bromodichloromethane	ND		0.00100	1	06/09/2015 00:23	WG794361
Bromoform	ND		0.00100	1	06/09/2015 00:23	WG794361
Bromomethane	ND		0.00500	1	06/09/2015 00:23	WG794361
Carbon disulfide	ND		0.00100	1	06/09/2015 00:23	WG794361
Carbon tetrachloride	ND		0.00100	1	06/09/2015 00:23	WG794361
Chlorobenzene	ND		0.00100	1	06/09/2015 00:23	WG794361
Chlorodibromomethane	ND		0.00100	1	06/09/2015 00:23	WG794361
Chloroethane	ND		0.00500	1	06/09/2015 00:23	WG794361
Chloroform	ND		0.00500	1	06/09/2015 00:23	WG794361
Chloromethane	ND		0.00250	1	06/09/2015 00:23	WG794361
Dibromomethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	06/09/2015 00:23	WG794361
1,2-Dibromoethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,2-Dichlorobenzene	ND		0.00100	1	06/09/2015 00:23	WG794361
1,4-Dichlorobenzene	ND		0.00100	1	06/09/2015 00:23	WG794361
trans-1,4-Dichloro-2-butene	ND		0.00250	1	06/09/2015 00:23	WG794361
1,1-Dichloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,2-Dichloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,1-Dichloroethene	ND		0.00100	1	06/09/2015 00:23	WG794361
cis-1,2-Dichloroethene	ND		0.00100	1	06/09/2015 00:23	WG794361
trans-1,2-Dichloroethene	ND		0.00100	1	06/09/2015 00:23	WG794361
1,2-Dichloropropane	ND		0.00100	1	06/09/2015 00:23	WG794361
cis-1,3-Dichloropropene	ND		0.00100	1	06/09/2015 00:23	WG794361
trans-1,3-Dichloropropene	ND		0.00100	1	06/09/2015 00:23	WG794361
Ethylbenzene	ND		0.00100	1	06/09/2015 00:23	WG794361
2-Hexanone	ND		0.0100	1	06/09/2015 00:23	WG794361
Iodomethane	ND		0.0100	1	06/09/2015 00:23	WG794361
2-Butanone (MEK)	ND		0.0100	1	06/09/2015 00:23	WG794361
Methylene Chloride	ND		0.00500	1	06/09/2015 00:23	WG794361
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	06/09/2015 00:23	WG794361
Styrene	ND		0.00100	1	06/09/2015 00:23	WG794361
1,1,1,2-Tetrachloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,1,2,2-Tetrachloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
Tetrachloroethene	ND		0.00100	1	06/09/2015 00:23	WG794361
Toluene	ND		0.00500	1	06/09/2015 00:23	WG794361
1,1,1-Trichloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
1,1,2-Trichloroethane	ND		0.00100	1	06/09/2015 00:23	WG794361
Trichloroethene	ND		0.00100	1	06/09/2015 00:23	WG794361
Trichlorofluoromethane	ND		0.00500	1	06/09/2015 00:23	WG794361
1,2,3-Trichloropropane	ND		0.00250	1	06/09/2015 00:23	WG794361
Vinyl acetate	ND		0.0100	1	06/09/2015 00:23	WG794361
Vinyl chloride	ND		0.00100	1	06/09/2015 00:23	WG794361
Xylenes, Total	ND		0.00300	1	06/09/2015 00:23	WG794361
(S) Toluene-d8	*106*		*90.0-115*		*06/09/2015 00:23*	WG794361
(S) Dibromofluoromethane	*99.2*		*79.0-121*		*06/09/2015 00:23*	WG794361
(S) α,α,α-Trifluorotoluene	*111*		*90.4-116*		*06/09/2015 00:23*	WG794361
(S) 4-Bromofluorobenzene	*101*		*80.1-120*		*06/09/2015 00:23*	WG794361

Method Blank (MB)

(MB) 06/04/15 14:32

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Ammonia Nitrogen	ND		0.250

L768063-01 Original Sample (OS) • Duplicate (DUP)

(OS) 06/04/15 16:34 • (DUP) 06/04/15 16:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	ND	1	0.00		20

L767827-03 Original Sample (OS) • Duplicate (DUP)

(OS) 06/04/15 14:45 • (DUP) 06/04/15 14:47

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	ND	1	0.00		20

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

(LCS) 06/04/15 14:37 • (LCSD) 06/04/15 14:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.44	7.65	99.2	102	90.0-110			2.78	20

L767827-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/04/15 14:50 • (MS) 06/04/15 14:52 • (MSD) 06/04/15 14:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	10.0	0.106	9.81	9.96	98.1	99.6	1	90.0-110			1.52	20

Method Blank (MB)

(MB) 05/29/15 06:28

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Bromide	ND		1.00
Chloride	ND		1.00
Nitrate	ND		0.100
Sulfate	ND		5.00

L767781-01 Original Sample (OS) • Duplicate (DUP)

(OS) 05/29/15 12:23 • (DUP) 05/29/15 12:38

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		20
Chloride	59.7	59.9	1	0		20
Nitrate	0.779	0.779	1	0		20

L767781-01 Original Sample (OS) • Duplicate (DUP)

(OS) 05/29/15 15:45 • (DUP) 05/29/15 15:59

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	386	393	5	2		20

L767898-05 Original Sample (OS) • Duplicate (DUP)

(OS) 05/29/15 19:25 • (DUP) 05/29/15 19:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		20
Chloride	0.208	-0.0500	1	327	P1	20
Nitrate	ND	0.000	1	0		20
Sulfate	ND	0.000	1	0		20

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

(LCS) 05/29/15 06:43 • (LCSD) 05/29/15 06:57

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	40.6	40.6	102	102	90-110			0	20

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

(LCS) 05/29/15 06:43 • (LCSD) 05/29/15 06:57

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40.0	39.5	39.6	99	99	90-110			0	20
Nitrate	8.00	8.17	8.17	102	102	90-110			0	20
Sulfate	40.0	40.6	40.6	102	102	90-110			0	20

Method Blank (MB)

(MB) 06/01/15 17:45

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Mercury	ND		0.000200

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

(LCS) 06/01/15 17:47 • (LCSD) 06/01/15 17:49

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 %
Mercury	0.00300	0.00287	0.00294	96	98	80-120			2	20

L768104-30 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/01/15 17:52 • (MS) 06/01/15 17:54 • (MSD) 06/01/15 18:00

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 %
Mercury	0.00300	ND	0.00233	0.00284	78	95	1	75-125			20	20

Method Blank (MB)

(MB) 06/01/15 20:35

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Aluminum	ND		0.100
Barium	ND		0.00500
Boron	ND		0.200
Calcium	ND		1.00
Chromium	ND		0.0100
Cobalt	ND		0.0100
Iron	ND		0.100
Magnesium	ND		1.00
Manganese	ND		0.0100
Nickel	ND		0.0200
Potassium	ND		1.00
Silver	ND		0.0100
Sodium	ND		1.00
Vanadium	ND		0.0200

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

(LCS) 06/01/15 20:49 • (LCSD) 06/01/15 20:53

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	1.00	1.17	1.15	117	115	80-120			2	20
Barium	1.00	1.06	1.06	106	106	80-120			0	20
Boron	1.00	1.04	1.04	104	104	80-120			0	20
Calcium	10.0	10.2	10.3	102	103	80-120			1	20
Chromium	1.00	1.06	1.07	106	107	80-120			1	20
Cobalt	1.00	1.05	1.05	105	105	80-120			0	20
Iron	1.00	1.03	1.03	103	103	80-120			0	20
Magnesium	10.0	10.4	10.5	104	105	80-120			2	20
Manganese	1.00	1.04	1.04	104	104	80-120			0	20
Nickel	1.00	1.04	1.03	104	103	80-120			0	20
Potassium	10.0	10.4	10.6	104	106	80-120			1	20
Silver	1.00	1.06	1.05	106	105	80-120			1	20
Sodium	10.0	10.2	10.3	102	103	80-120			2	20
Vanadium	1.00	1.06	1.07	106	107	80-120			1	20

L767889-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/01/15 20:58 • (MS) 06/01/15 21:07 • (MSD) 06/01/15 21:11

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 %
Aluminum	1.00	0.237	1.39	1.40	115	116	1	75-125			1	20
Barium	1.00	0.0646	1.09	1.11	103	105	1	75-125			2	20
Boron	1.00	0.109	1.13	1.16	103	105	1	75-125			2	20
Calcium	10.0	46.8	56.2	55.8	94	90	1	75-125			1	20
Chromium	1.00	ND	1.04	1.06	104	106	1	75-125			2	20
Cobalt	1.00	0.000464	1.04	1.06	104	106	1	75-125			2	20
Iron	1.00	0.505	1.52	1.54	102	104	1	75-125			1	20
Magnesium	10.0	8.52	18.5	18.8	100	103	1	75-125			2	20
Manganese	1.00	1.08	2.06	2.07	98	99	1	75-125			0	20
Nickel	1.00	0.000177	1.03	1.05	103	105	1	75-125			2	20
Potassium	10.0	3.72	14.1	14.3	104	105	1	75-125			1	20
Silver	1.00	0.000378	1.04	1.06	104	106	1	75-125			2	20
Sodium	10.0	29.8	39.5	39.3	98	95	1	75-125			1	20
Vanadium	1.00	0.00510	1.05	1.07	104	106	1	75-125			2	20

Method Blank (MB)

(MB) 06/04/15 01:00

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Antimony	ND		0.00200
Arsenic	ND		0.00200
Beryllium	ND		0.00200
Cadmium	ND		0.00100
Copper	ND		0.00500
Lead	ND		0.00200
Selenium	ND		0.00200
Thallium	ND		0.00200
Zinc	ND		0.0250

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

(LCS) 06/04/15 01:02 • (LCSD) 06/04/15 01:05

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 %
Antimony	0.0500	0.0553	0.0556	111	111	80-120			1	20
Arsenic	0.0500	0.0524	0.0490	105	98	80-120			7	20
Beryllium	0.0500	0.0531	0.0538	106	108	80-120			1	20
Cadmium	0.0500	0.0581	0.0539	116	108	80-120			8	20
Copper	0.0500	0.0549	0.0557	110	111	80-120			1	20
Lead	0.0500	0.0536	0.0534	107	107	80-120			0	20
Selenium	0.0500	0.0515	0.0514	103	103	80-120			0	20
Thallium	0.0500	0.0521	0.0521	104	104	80-120			0	20
Zinc	0.0500	0.0518	0.0501	104	100	80-120			3	20

L767898-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/04/15 01:07 • (MS) 06/04/15 01:11 • (MSD) 06/04/15 01:14

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Antimony	0.0500	0.000628	0.0557	0.0545	110	108	1	75-125			2	20
Arsenic	0.0500	0.000284	0.0539	0.0497	107	99	1	75-125			8	20
Beryllium	0.0500	0.0000214	0.0525	0.0524	105	105	1	75-125			0	20
Cadmium	0.0500	0.0000480	0.0601	0.0554	120	111	1	75-125			8	20
Copper	0.0500	0.000366	0.0563	0.0547	112	109	1	75-125			3	20
Lead	0.0500	0.000270	0.0530	0.0529	105	105	1	75-125			0	20
Selenium	0.0500	0.000203	0.0500	0.0518	100	103	1	75-125			4	20
Thallium	0.0500	0.0000739	0.0523	0.0519	104	104	1	75-125			1	20

L767898-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/04/15 01:07 • (MS) 06/04/15 01:11 • (MSD) 06/04/15 01:14

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 %
Zinc	0.0500	0.0204	0.0718	0.0702	103	100	1	75-125			2	20

Method Blank (MB)

(MB) 06/06/15 07:30

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

Method Blank (MB)

(MB) 06/06/15 07:30

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
1,1,1-Trichloroethane	ND		0.00100
1,1,2-Trichloroethane	ND		0.00100
Trichloroethene	ND		0.00100
Trichlorofluoromethane	ND		0.00500
1,2,3-Trichloropropane	ND		0.00100
Vinyl acetate	ND		0.0100
Vinyl chloride	ND		0.00100
Xylenes, Total	ND		0.00300
(S) Toluene-d8	*99.0*		*90.0-115*
(S) Dibromofluoromethane	*85.9*		*79.0-121*
(S) a,a,a-Trifluorotoluene	*103*		*90.4-116*
(S) 4-Bromofluorobenzene	*106*		*80.1-120*

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

(LCS) 06/06/15 06:28 • (LCSD) 06/06/15 06:49

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 %
Acetone	0.125	0.101	0.106	80.4	84.8	28.7-175			5.37	20.9
Acrylonitrile	0.125	0.125	0.127	99.9	102	58.2-145			2.02	20
Benzene	0.0250	0.0248	0.0252	99.0	101	73.0-122			1.85	20
Bromodichloromethane	0.0250	0.0208	0.0212	83.4	84.8	75.5-121			1.70	20
Bromochloromethane	0.0250	0.0228	0.0240	91.1	95.9	78.9-123			5.17	20
Bromoform	0.0250	0.0195	0.0202	78.2	80.9	71.5-131			3.41	20
Bromomethane	0.0250	0.0280	0.0283	112	113	22.4-187			1.18	20
Carbon disulfide	0.0250	0.0195	0.0198	78.0	79.4	53.0-134			1.71	20
Carbon tetrachloride	0.0250	0.0213	0.0218	85.0	87.2	70.9-129			2.52	20
Chlorobenzene	0.0250	0.0257	0.0269	103	107	79.7-122			4.40	20
Chlorodibromomethane	0.0250	0.0212	0.0222	84.9	88.9	78.2-124			4.61	20
Chloroethane	0.0250	0.0249	0.0247	99.5	98.8	41.2-153			0.670	20
Chloroform	0.0250	0.0225	0.0228	89.9	91.3	73.2-125			1.52	20
Chloromethane	0.0250	0.0205	0.0209	82.1	83.7	55.8-134			1.85	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0196	0.0199	78.4	79.6	64.8-131			1.56	20
1,2-Dibromoethane	0.0250	0.0231	0.0245	92.4	97.9	79.8-122			5.76	20
Dibromomethane	0.0250	0.0217	0.0224	86.9	89.5	79.5-118			2.99	20
1,2-Dichlorobenzene	0.0250	0.0239	0.0248	95.8	99.0	84.7-118			3.35	20
1,4-Dichlorobenzene	0.0250	0.0240	0.0249	96.2	99.5	82.2-114			3.40	20
trans-1,4-Dichloro-2-butene	0.0250	0.0220	0.0233	88.0	93.1	58.3-129			5.59	20

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

(LCS) 06/06/15 06:28 • (LCSD) 06/06/15 06:49

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 %
1,1-Dichloroethane	0.0250	0.0232	0.0236	92.7	94.5	71.7-127			1.95	20
1,2-Dichloroethane	0.0250	0.0222	0.0227	88.9	91.0	65.3-126			2.27	20
1,1-Dichloroethene	0.0250	0.0229	0.0233	91.4	93.1	59.9-137			1.78	20
cis-1,2-Dichloroethene	0.0250	0.0236	0.0244	94.5	97.6	77.3-122			3.18	20
trans-1,2-Dichloroethene	0.0250	0.0230	0.0238	92.0	95.2	72.6-125			3.52	20
1,2-Dichloropropane	0.0250	0.0234	0.0238	93.8	95.2	77.4-125			1.52	20
cis-1,3-Dichloropropene	0.0250	0.0226	0.0230	90.4	92.2	77.7-124			1.92	20
trans-1,3-Dichloropropene	0.0250	0.0221	0.0229	88.5	91.7	73.5-127			3.59	20
Ethylbenzene	0.0250	0.0256	0.0268	103	107	80.9-121			4.39	20
2-Hexanone	0.125	0.122	0.127	97.3	102	59.4-151			4.50	20
Iodomethane	0.125	0.111	0.113	88.7	90.6	64.6-137			2.15	20
2-Butanone (MEK)	0.125	0.115	0.118	91.7	94.0	46.4-155			2.54	20
Methylene Chloride	0.0250	0.0229	0.0234	91.6	93.8	69.5-120			2.36	20
4-Methyl-2-pentanone (MIBK)	0.125	0.121	0.125	97.1	99.7	63.3-138			2.58	20
Styrene	0.0250	0.0256	0.0270	102	108	79.9-124			5.11	20
1,1,1,2-Tetrachloroethane	0.0250	0.0232	0.0243	93.0	97.2	78.5-125			4.42	20
1,1,2,2-Tetrachloroethane	0.0250	0.0236	0.0247	94.3	98.9	79.3-123			4.79	20
Tetrachloroethene	0.0250	0.0243	0.0249	97.0	99.7	73.5-130			2.71	20
Toluene	0.0250	0.0245	0.0248	97.8	99.3	77.9-116			1.51	20
1,1,1-Trichloroethane	0.0250	0.0219	0.0219	87.7	87.6	71.1-129			0.100	20
1,1,2-Trichloroethane	0.0250	0.0240	0.0250	96.2	100	81.6-120			4.03	20
Trichloroethene	0.0250	0.0242	0.0249	96.8	99.4	79.5-121			2.75	20
Trichlorofluoromethane	0.0250	0.0229	0.0231	91.6	92.3	49.1-157			0.840	20
1,2,3-Trichloropropane	0.0250	0.0236	0.0248	94.3	99.3	74.9-124			5.19	20
Vinyl acetate	0.125	0.122	0.122	97.3	97.7	41.7-159			0.420	20
Vinyl chloride	0.0250	0.0224	0.0227	89.5	90.8	61.5-134			1.44	20
Xylenes, Total	0.0750	0.0770	0.0804	103	107	79.2-122			4.30	20
(S) Toluene-d8				*101*	*100*	*90.0-115*				
(S) Dibromofluoromethane				*86.2*	*87.2*	*79.0-121*				
(S) α,α,α-Trifluorotoluene				*102*	*102*	*90.4-116*				
(S) 4-Bromofluorobenzene				*98.5*	*102*	*80.1-120*				

L767898-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/06/15 10:45 • (MS) 06/06/15 11:05 • (MSD) 06/06/15 11:26

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 %
Acetone	0.125	0.000499	0.0594	0.0591	47.1	46.8	1	25.0-156			0.540	21.5

L767898-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/06/15 10:45 • (MS) 06/06/15 11:05 • (MSD) 06/06/15 11:26

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 %
Acrylonitrile	0.125	ND	0.126	0.125	100	99.7	1	55.9-161			0.840	20
Benzene	0.0250	ND	0.0265	0.0261	106	104	1	58.6-133			1.59	20
Bromodichloromethane	0.0250	ND	0.0217	0.0214	86.8	85.7	1	69.2-127			1.26	20
Bromochloromethane	0.0250	ND	0.0243	0.0242	97.3	96.8	1	74.4-128			0.520	20
Bromoform	0.0250	ND	0.0201	0.0202	80.3	80.9	1	66.3-140			0.730	20
Bromomethane	0.0250	ND	0.0299	0.0297	120	119	1	16.6-183			0.750	20.5
Carbon disulfide	0.0250	ND	0.0231	0.0228	92.3	91.3	1	34.9-138			1.02	20
Carbon tetrachloride	0.0250	ND	0.0223	0.0219	89.0	87.7	1	60.6-139			1.51	20
Chlorobenzene	0.0250	ND	0.0272	0.0277	109	111	1	70.1-130			1.64	20
Chlorodibromomethane	0.0250	ND	0.0226	0.0223	90.3	89.1	1	71.6-132			1.33	20
Chloroethane	0.0250	ND	0.0267	0.0265	107	106	1	33.3-155			0.830	20
Chloroform	0.0250	ND	0.0234	0.0229	93.6	91.6	1	66.1-133			2.15	20
Chloromethane	0.0250	ND	0.0233	0.0227	93.2	90.9	1	40.7-139			2.50	20
1,2-Dibromo-3-Chloropropane	0.0250	ND	0.0187	0.0194	74.8	77.4	1	63.9-142			3.38	20.2
1,2-Dibromoethane	0.0250	ND	0.0246	0.0247	98.3	98.9	1	73.8-131			0.530	20
Dibromomethane	0.0250	ND	0.0227	0.0226	90.9	90.3	1	72.8-127			0.650	20
1,2-Dichlorobenzene	0.0250	ND	0.0242	0.0244	96.6	97.6	1	77.4-127			1.01	20
1,4-Dichlorobenzene	0.0250	ND	0.0242	0.0247	96.6	98.8	1	74.4-123			2.21	20
trans-1,4-Dichloro-2-butene	0.0250	ND	0.0225	0.0226	90.1	90.4	1	57.6-136			0.360	20
1,1-Dichloroethane	0.0250	ND	0.0245	0.0241	98.1	96.4	1	64.0-134			1.72	20
1,2-Dichloroethane	0.0250	ND	0.0233	0.0231	93.1	92.2	1	60.7-132			0.980	20
1,1-Dichloroethene	0.0250	ND	0.0246	0.0242	98.4	96.8	1	48.8-144			1.58	20
cis-1,2-Dichloroethene	0.0250	0.000664	0.0255	0.0247	99.5	96.3	1	60.6-136			3.25	20
trans-1,2-Dichloroethene	0.0250	ND	0.0250	0.0249	100	99.5	1	61.0-132			0.510	20
1,2-Dichloropropane	0.0250	ND	0.0246	0.0242	98.6	97.0	1	69.7-130			1.62	20
cis-1,3-Dichloropropene	0.0250	ND	0.0228	0.0227	91.0	90.8	1	71.1-129			0.270	20
trans-1,3-Dichloropropene	0.0250	ND	0.0226	0.0222	90.3	88.7	1	66.3-136			1.85	20
Ethylbenzene	0.0250	ND	0.0276	0.0280	110	112	1	62.7-136			1.46	20
2-Hexanone	0.125	ND	0.108	0.110	86.4	88.0	1	59.4-154			1.81	20.1
Iodomethane	0.125	ND	0.121	0.120	96.8	95.6	1	55.2-140			1.19	20
2-Butanone (MEK)	0.125	ND	0.0929	0.0918	74.3	73.4	1	45.0-156			1.13	20.8
Methylene Chloride	0.0250	ND	0.0243	0.0241	97.2	96.4	1	61.5-125			0.840	20
4-Methyl-2-pentanone (MIBK)	0.125	ND	0.118	0.117	94.8	93.8	1	60.7-150			1.01	20
Styrene	0.0250	ND	0.0273	0.0274	109	110	1	68.2-133			0.460	20
1,1,1,2-Tetrachloroethane	0.0250	ND	0.0243	0.0245	97.2	98.0	1	70.5-132			0.800	20
1,1,2,2-Tetrachloroethane	0.0250	ND	0.0245	0.0247	98.1	98.9	1	64.9-145			0.760	20
Tetrachloroethene	0.0250	0.000665	0.0255	0.0259	99.3	101	1	57.4-141			1.61	20
Toluene	0.0250	ND	0.0258	0.0257	103	103	1	67.8-124			0.480	20
1,1,1-Trichloroethane	0.0250	ND	0.0224	0.0223	89.6	89.1	1	58.7-134			0.630	20

L767898-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/06/15 10:45 • (MS) 06/06/15 11:05 • (MSD) 06/06/15 11:26

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 %
1,1,2-Trichloroethane	0.0250	ND	0.0255	0.0252	102	101	1	74.1-130			1.05	20
Trichloroethene	0.0250	ND	0.0252	0.0251	101	100	1	48.9-148			0.480	20
Trichlorofluoromethane	0.0250	ND	0.0247	0.0243	98.7	97.4	1	39.9-165			1.32	20
1,2,3-Trichloropropane	0.0250	ND	0.0243	0.0245	97.0	97.9	1	71.5-134			0.930	20
Vinyl acetate	0.125	ND	0.129	0.129	104	103	1	42.8-181			0.530	20
Vinyl chloride	0.0250	ND	0.0248	0.0243	99.2	97.2	1	44.3-143			2.02	20
Xylenes, Total	0.0750	0.000339	0.0827	0.0834	110	111	1	65.6-133			0.850	20
(S) Toluene-d8					*99.9*	*99.0*		*90.0-115*				
(S) Dibromofluoromethane					*88.0*	*86.8*		*79.0-121*				
(S) α,α,α-Trifluorotoluene					*103*	*103*		*90.4-116*				
(S) 4-Bromofluorobenzene					*103*	*103*		*80.1-120*				

Method Blank (MB)

(MB) 06/08/15 21:36

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

Method Blank (MB)

(MB) 06/08/15 21:36

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
1,1,1-Trichloroethane	ND		0.00100
1,1,2-Trichloroethane	ND		0.00100
Trichloroethene	ND		0.00100
Trichlorofluoromethane	ND		0.00500
1,2,3-Trichloropropane	ND		0.00100
Vinyl acetate	ND		0.0100
Vinyl chloride	ND		0.00100
Xylenes, Total	ND		0.00300
(S) Toluene-d8	*98.4*		*90.0-115*
(S) Dibromofluoromethane	*101*		*79.0-121*
(S) a,a,a-Trifluorotoluene	*104*		*90.4-116*
(S) 4-Bromofluorobenzene	*102*		*80.1-120*

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

(LCS) 06/08/15 20:23 • (LCSD) 06/08/15 20:41

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	0.103	0.0931	82.2	74.4	28.7-175			9.94	20.9
Acrylonitrile	0.125	0.127	0.127	102	102	58.2-145			0.0600	20
Benzene	0.0250	0.0242	0.0244	96.9	97.6	73.0-122			0.720	20
Bromodichloromethane	0.0250	0.0267	0.0259	107	104	75.5-121			3.04	20
Bromochloromethane	0.0250	0.0256	0.0255	103	102	78.9-123			0.470	20
Bromoform	0.0250	0.0262	0.0257	105	103	71.5-131			1.94	20
Bromomethane	0.0250	0.0220	0.0222	88.1	88.7	22.4-187			0.680	20
Carbon disulfide	0.0250	0.0235	0.0227	94.1	90.9	53.0-134			3.40	20
Carbon tetrachloride	0.0250	0.0249	0.0251	99.4	101	70.9-129			1.08	20
Chlorobenzene	0.0250	0.0250	0.0250	100	100	79.7-122			0.0100	20
Chlorodibromomethane	0.0250	0.0269	0.0250	108	99.9	78.2-124			7.48	20
Chloroethane	0.0250	0.0222	0.0229	88.9	91.7	41.2-153			3.15	20
Chloroform	0.0250	0.0246	0.0249	98.3	99.4	73.2-125			1.16	20
Chloromethane	0.0250	0.0239	0.0236	95.7	94.4	55.8-134			1.28	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0279	0.0249	112	99.6	64.8-131			11.4	20
1,2-Dibromoethane	0.0250	0.0265	0.0249	106	99.5	79.8-122			6.11	20
Dibromomethane	0.0250	0.0268	0.0276	107	110	79.5-118			2.58	20
1,2-Dichlorobenzene	0.0250	0.0254	0.0248	101	99.1	84.7-118			2.33	20
1,4-Dichlorobenzene	0.0250	0.0244	0.0248	97.6	99.2	82.2-114			1.62	20
trans-1,4-Dichloro-2-butene	0.0250	0.0276	0.0247	110	98.7	58.3-129			11.3	20

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

(LCS) 06/08/15 20:23 • (LCSD) 06/08/15 20:41

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-Dichloroethane	0.0250	0.0246	0.0250	98.6	99.9	71.7-127			1.32	20
1,2-Dichloroethane	0.0250	0.0249	0.0248	99.6	99.0	65.3-126			0.600	20
1,1-Dichloroethene	0.0250	0.0240	0.0238	95.8	95.2	59.9-137			0.710	20
cis-1,2-Dichloroethene	0.0250	0.0249	0.0251	99.5	101	77.3-122			1.03	20
trans-1,2-Dichloroethene	0.0250	0.0248	0.0255	99.2	102	72.6-125			2.73	20
1,2-Dichloropropane	0.0250	0.0262	0.0262	105	105	77.4-125			0.110	20
cis-1,3-Dichloropropene	0.0250	0.0267	0.0273	107	109	77.7-124			2.04	20
trans-1,3-Dichloropropene	0.0250	0.0256	0.0271	102	109	73.5-127			5.77	20
Ethylbenzene	0.0250	0.0251	0.0253	100	101	80.9-121			0.670	20
2-Hexanone	0.125	0.129	0.122	104	98.0	59.4-151			5.49	20
Iodomethane	0.125	0.123	0.124	98.6	98.9	64.6-137			0.270	20
2-Butanone (MEK)	0.125	0.122	0.122	97.8	97.6	46.4-155			0.230	20
Methylene Chloride	0.0250	0.0231	0.0232	92.3	92.8	69.5-120			0.500	20
4-Methyl-2-pentanone (MIBK)	0.125	0.134	0.130	107	104	63.3-138			2.80	20
Styrene	0.0250	0.0255	0.0251	102	100	79.9-124			1.96	20
1,1,1,2-Tetrachloroethane	0.0250	0.0264	0.0252	105	101	78.5-125			4.48	20
1,1,2,2-Tetrachloroethane	0.0250	0.0263	0.0243	105	97.3	79.3-123			7.62	20
Tetrachloroethene	0.0250	0.0266	0.0265	106	106	73.5-130			0.510	20
Toluene	0.0250	0.0254	0.0249	102	99.6	77.9-116			2.09	20
1,1,1-Trichloroethane	0.0250	0.0247	0.0254	98.7	101	71.1-129			2.78	20
1,1,2-Trichloroethane	0.0250	0.0269	0.0256	108	103	81.6-120			4.95	20
Trichloroethene	0.0250	0.0265	0.0268	106	107	79.5-121			0.880	20
Trichlorofluoromethane	0.0250	0.0238	0.0235	95.1	94.0	49.1-157			1.12	20
1,2,3-Trichloropropane	0.0250	0.0263	0.0232	105	92.7	74.9-124			12.7	20
Vinyl acetate	0.125	0.119	0.118	94.8	94.7	41.7-159			0.150	20
Vinyl chloride	0.0250	0.0234	0.0232	93.5	92.6	61.5-134			0.870	20
Xylenes, Total	0.0750	0.0767	0.0741	102	98.8	79.2-122			3.51	20
(S) Toluene-d8				*101*	*101*	*90.0-115*				
(S) Dibromofluoromethane				*98.0*	*97.8*	*79.0-121*				
(S) α,α,α-Trifluorotoluene				*107*	*107*	*90.4-116*				
(S) 4-Bromofluorobenzene				*98.2*	*93.7*	*80.1-120*				

L768160-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/09/15 03:08 • (MS) 06/08/15 22:52 • (MSD) 06/08/15 23:10

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 %
Acetone	0.125	0.000829	0.0627	0.0649	49.5	51.2	1	25.0-156			3.38	21.5

L768160-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/09/15 03:08 • (MS) 06/08/15 22:52 • (MSD) 06/08/15 23:10

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 %
Acrylonitrile	0.125	ND	0.138	0.148	110	119	1	55.9-161			7.24	20
Benzene	0.0250	ND	0.0233	0.0262	93.3	105	1	58.6-133			11.5	20
Bromodichloromethane	0.0250	ND	0.0254	0.0288	101	115	1	69.2-127			12.7	20
Bromochloromethane	0.0250	ND	0.0250	0.0277	100	111	1	74.4-128			10.2	20
Bromoform	0.0250	ND	0.0278	0.0293	111	117	1	66.3-140			5.42	20
Bromomethane	0.0250	ND	0.0197	0.0222	78.9	88.8	1	16.6-183			11.9	20.5
Carbon disulfide	0.0250	ND	0.0181	0.0199	72.5	79.6	1	34.9-138			9.36	20
Carbon tetrachloride	0.0250	ND	0.0245	0.0269	98.2	108	1	60.6-139			9.24	20
Chlorobenzene	0.0250	ND	0.0239	0.0272	95.5	109	1	70.1-130			13.0	20
Chlorodibromomethane	0.0250	ND	0.0258	0.0290	103	116	1	71.6-132			11.8	20
Chloroethane	0.0250	ND	0.0210	0.0236	83.8	94.5	1	33.3-155			12.0	20
Chloroform	0.0250	ND	0.0249	0.0273	99.5	109	1	66.1-133			9.17	20
Chloromethane	0.0250	ND	0.0206	0.0231	82.4	92.5	1	40.7-139			11.5	20
1,2-Dibromo-3-Chloropropane	0.0250	ND	0.0273	0.0306	109	122	1	63.9-142			11.4	20.2
1,2-Dibromoethane	0.0250	ND	0.0254	0.0286	102	115	1	73.8-131			12.0	20
Dibromomethane	0.0250	ND	0.0256	0.0294	102	118	1	72.8-127			14.1	20
1,2-Dichlorobenzene	0.0250	ND	0.0242	0.0283	96.9	113	1	77.4-127			15.6	20
1,4-Dichlorobenzene	0.0250	ND	0.0239	0.0275	95.4	110	1	74.4-123			14.1	20
trans-1,4-Dichloro-2-butene	0.0250	ND	0.0269	0.0300	108	120	1	57.6-136			10.9	20
1,1-Dichloroethane	0.0250	ND	0.0245	0.0266	98.0	106	1	64.0-134			8.19	20
1,2-Dichloroethane	0.0250	ND	0.0246	0.0270	98.2	108	1	60.7-132			9.51	20
1,1-Dichloroethene	0.0250	ND	0.0221	0.0248	88.6	99.2	1	48.8-144			11.3	20
cis-1,2-Dichloroethene	0.0250	0.00670	0.0299	0.0335	92.9	107	1	60.6-136			11.2	20
trans-1,2-Dichloroethene	0.0250	ND	0.0232	0.0260	92.8	104	1	61.0-132			11.3	20
1,2-Dichloropropane	0.0250	ND	0.0242	0.0285	96.8	114	1	69.7-130			16.2	20
cis-1,3-Dichloropropene	0.0250	ND	0.0250	0.0292	100	117	1	71.1-129			15.3	20
trans-1,3-Dichloropropene	0.0250	ND	0.0249	0.0291	99.5	116	1	66.3-136			15.7	20
Ethylbenzene	0.0250	ND	0.0237	0.0274	94.8	110	1	62.7-136			14.5	20
2-Hexanone	0.125	ND	0.121	0.133	97.0	107	1	59.4-154			9.47	20.1
Iodomethane	0.125	ND	0.114	0.125	90.8	100	1	55.2-140			9.81	20
2-Butanone (MEK)	0.125	ND	0.107	0.115	85.8	91.7	1	45.0-156			6.55	20.8
Methylene Chloride	0.0250	ND	0.0229	0.0245	91.5	97.8	1	61.5-125			6.73	20
4-Methyl-2-pentanone (MIBK)	0.125	ND	0.129	0.145	103	116	1	60.7-150			12.3	20
Styrene	0.0250	ND	0.0256	0.0274	102	109	1	68.2-133			6.64	20
1,1,1,2-Tetrachloroethane	0.0250	ND	0.0257	0.0293	103	117	1	70.5-132			13.3	20
1,1,2,2-Tetrachloroethane	0.0250	ND	0.0272	0.0303	109	121	1	64.9-145			10.9	20
Tetrachloroethene	0.0250	ND	0.0248	0.0282	99.4	113	1	57.4-141			12.6	20
Toluene	0.0250	ND	0.0229	0.0277	91.4	111	1	67.8-124			19.3	20
1,1,1-Trichloroethane	0.0250	ND	0.0247	0.0271	98.8	108	1	58.7-134			9.25	20

L768160-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 06/09/15 03:08 • (MS) 06/08/15 22:52 • (MSD) 06/08/15 23:10

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 %
1,1,2-Trichloroethane	0.0250	ND	0.0266	0.0301	106	120	1	74.1-130			12.5	20
Trichloroethene	0.0250	0.0240	0.0429	0.0480	75.7	95.8	1	48.9-148			11.1	20
Trichlorofluoromethane	0.0250	ND	0.0229	0.0260	91.6	104	1	39.9-165			12.8	20
1,2,3-Trichloropropane	0.0250	ND	0.0262	0.0286	105	115	1	71.5-134			8.86	20
Vinyl acetate	0.125	ND	0.141	0.149	113	119	1	42.8-181			5.70	20
Vinyl chloride	0.0250	ND	0.0210	0.0244	83.9	97.6	1	44.3-143			15.1	20
Xylenes, Total	0.0750	ND	0.0742	0.0839	99.0	112	1	65.6-133			12.2	20
(S) Toluene-d8					*97.9*	*100*		*90.0-115*				
(S) Dibromofluoromethane					*101*	*97.2*		*79.0-121*				
(S) α,α,α-Trifluorotoluene					*106*	*107*		*90.4-116*				
(S) 4-Bromofluorobenzene					*97.4*	*96.2*		*80.1-120*				

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
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.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

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

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**

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		

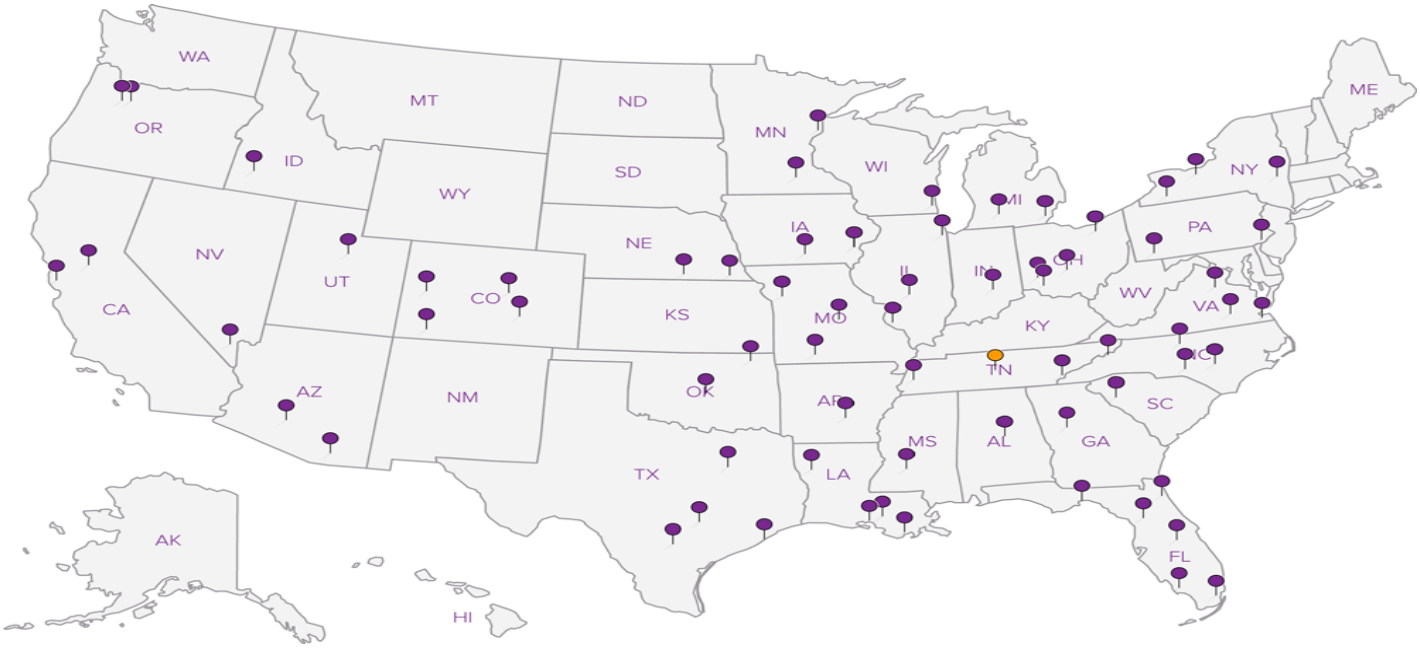
[1.] Drinking Water [2.] Underground Storage Tanks [3.] Aquatic Toxicity [4.] Chemical/Microbiological [5.] Mold [n/a] Accreditation not applicable

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
Canada	1461.01	DOD	1461.01
EPA–Crypto	TN00003	USDA	S-67674

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
Franklin, TN 37067

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

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

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

Client Project # 142-059

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed: Standard

Email? ___No X_Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl, Nitrate, SO4 125mlHDPE-NoPres Bromide	Dissolved Metals 500mlHDPE-NoPres *	NH3 250mlHDPE-H2SO4 <2	Total Metals 500mlHDPE-HNO3 <2	V8260AP1 40mlAmb-HCl	Rem./Contaminant	Sample # (lab only)
MW-1	Grab	GW	—	5-28-15	10:15	6	X	X	X	X	X		-01
MW-4	Grab	GW	—	5-28-15	11:50	6	X	X	X	X	X		02
MW-3	Grab	GW	—	5-28-15	11:15	6	X	X	X	X	X		03
DUPLICATE	Grab	GW	—	5-28-15	—	6	X	X	X	X	X		04
FIELD BLANK	Grab	GW	—	5-28-15	12:00	6	X	X	X	X	X		05
~~EQUIPMENT BLANK~~		~~GW~~				~~6~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
Trip Blank						1					X		06

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

Remarks: Total & Dissolved metals = AP1 + Al, B, Ca, Fe, K, Mg, Mn, Na
* Hold dissolved metals, may need to disregard. call Ph. T. Campbell

pH _____ Temp _____
Flow _____ Other _____

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	5-29-15	8:50	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	5/29/15	10:16	Johnny Justice
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
Johnny Justice	5/29/15	11:45	

Samples returned via: ☐ UPS ☐ FedEx ☒ Courier ☐ _____
Temp: 2.4 °C Bottles Received: 31
Date: 5/29/15 Time: 1145

Hold #
Condition: (lab use only) SCS
COC Seal Intact: ___Y ___N ___NA
pH Checked: <2 NCF:

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

L# L767898

C117

Acctnum: CEC
Template: T76821
Prelogin: P510851
TSR: 350 - Jimmy Hunt
PB: 5-20-15 6m
Shipped Via: Courier

TEC Environmental Laboratories, INC
2269 Dr. F.E. Wright Drive
Jackson, TN 38305
TEL: 731-423-5330 FAX: 731-423-5326
Website: www.tecenvirolabs.com

May 20, 2015

Chris White
Environmental Waste Solutions
4521 Tronsdale Drive
Nashville, TN 37204
TEL: (615) 717-5564
FAX

RE: EWS Camden-Bruceton Order No.: 1505050

Dear Chris White:

TEC Environmental Laboratories, INC received 1 sample(s) on 5/5/2015 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results designated with a "J" qualifier are estimated and represent a detection above the Method Detection Limit (MDL) and less than the Reporting Limit (PQL).

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

As always we appreciate your business and are pleased to be of service to you.

If you have any questions, please feel free to call or email.

Sincerely,

Billie J. Haynes

Billie Haynes
Laboratory Manager
2269 Dr. F.E. Wright Drive
Jackson, TN 38305

TEC Environmental Laboratories, INC
2269 Dr. F.E. Wright Drive
Jackson, TN 38305
TEL: 731-423-5330 FAX: 731-423-5326
Website: www.tecenvirolabs.com

Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
ICP METALS				**E200.7**			Analyst: **rh**
Cadmium	ND	0.000300			mg/L	1	5/6/2015 9:06:09 AM
Chromium	0.00501	0.000200			mg/L	1	5/6/2015 9:06:09 AM
Copper	0.261	0.000500			mg/L	1	5/6/2015 9:06:09 AM
Lead	ND	0.00100			mg/L	1	5/6/2015 9:06:09 AM
Nickel	0.0702	0.000700			mg/L	1	5/6/2015 9:06:09 AM
Silver	ND	0.000500			mg/L	1	5/6/2015 9:06:09 AM
Zinc	0.106	0.000700			mg/L	1	5/6/2015 9:06:09 AM
CR+6				**M3500-CR B 200**			Analyst: **rh**
Chromium, Hexavalent	0.0120	0.0100		J	mg/L	1	5/6/2015 10:00:00 AM
MERCURY				**E245.1-1994**			Analyst: **rh**
Mercury	ND	0.000200			mg/L	1	5/13/2015 1:30:00 PM
BOD, 5 DAY, 20°C				**SM5210 B-2001**			Analyst: **ps**
Biochemical Oxygen Demand	19.5	3.00			mg/L	1	5/11/2015 8:00:00 AM
AMMONIA AS N				**14500-NH3 D-199**			Analyst: **ps**
Ammonia	431	4.00			mg/L	20	5/12/2015 9:00:00 AM
TOTAL SUSPENDED SOLIDS				**SM2540-D-1997**			Analyst: **ps**
Suspended Solids (Residue, Non-Filterable)	24.0	2.00			mg/L	1	5/8/2015 1:00:00 PM
SEMIVOLATILE ORGANICS				**E625**			Analyst: **tlm**

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit		

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Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANICS				**E625**			Analyst: **tlm**
1,2,4-Trichlorobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
1,2-Dichlorobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
1,2-Diphenylhydrazine	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
1,3-Dichlorobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
1,4-Dichlorobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
2,4,6-Trichlorophenol	ND	0.00270			mg/L	1	5/12/2015 10:26:00 AM
2,4-Dichlorophenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
2,4-Dimethylphenol	ND	0.0100			mg/L	1	5/12/2015 10:26:00 AM
2,4-Dinitrophenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
2,4-Dinitrotoluene	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
2,6-Dinitrotoluene	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
2-Chloronaphthalene	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
2-Chlorophenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
2-Methyl-4,6-Dinitrophenol	ND	0.0100			mg/L	1	5/12/2015 10:26:00 AM
2-Nitrophenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
3,3-Dichlorobenzidine	ND	0.0100			mg/L	1	5/12/2015 10:26:00 AM
4-Bromophenylphenylether	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
4-Chloro-3-methylphenol	ND	0.0100			mg/L	1	5/12/2015 10:26:00 AM
4-Chlorophenylphenylether	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
4-Nitrophenol	ND	0.0100			mg/L	1	5/12/2015 10:26:00 AM
Acenaphthene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Acenaphthylene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Anthracene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Azobenzene	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Benzidine	ND	0.0200			mg/L	1	5/12/2015 10:26:00 AM
Benzo(a)anthracene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Benzo(a)pyrene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM

Qualifiers:

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ND	Not Detected at the Reporting Limit
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H	Holding times for preparation or analysis exceeded
M	Manual Integration used to determine area response
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits

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Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANICS				**E625**			Analyst: **tlm**
Benzo(b)fluoranthene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Benzo(g,h,i)perylene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Benzo(k)fluoranthene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Bis(2-chloroethoxy)methane	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Bis(2-chloroethyl)ether	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Bis(2-chloroisopropyl)ether	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Bis(2-ethylhexyl)phthalate	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Butyl benzyl phthalate	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Chrysene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Dibenz(a,h)anthracene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Diethyl phthalate	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Dimethyl phthalate	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Di-n-butyl phthalate	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Di-n-octyl phthalate	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Fluoranthene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Fluorene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Hexachlorobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Hexachlorobutadiene	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Hexachlorocyclopentadiene	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Hexachloroethane	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Indeno(1,2,3-cd)pyrene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Isophorone	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Naphthalene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Nitrobenzene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
N-Nitrosodimethylamine	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
N-Nitrosodi-n-propylamine	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
N-Nitrosodiphenylamine	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM

Qualifiers:

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Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANICS				**E625**			Analyst: **tlm**
Pentachlorophenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Phenanthrene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Phenol	ND	0.00500			mg/L	1	5/12/2015 10:26:00 AM
Pyrene	ND	0.00100			mg/L	1	5/12/2015 10:26:00 AM
Total Phthalates	ND	0.00200			mg/L	1	5/12/2015 10:26:00 AM
Surr: 2,4,6-Tribromophenol	88.1	0			%REC	1	5/12/2015 10:26:00 AM
Surr: 2-Fluorobiphenyl	72.1	0			%REC	1	5/12/2015 10:26:00 AM
Surr: 2-Fluorophenol	100	0			%REC	1	5/12/2015 10:26:00 AM
Surr: Nitrobenzene-d5	86.7	0			%REC	1	5/12/2015 10:26:00 AM
Surr: Phenol-d5	85.5	0			%REC	1	5/12/2015 10:26:00 AM
Surr: p-Terphenyl-d14	84.8	0			%REC	1	5/12/2015 10:26:00 AM
PURGEABLES				**E624**			Analyst: **tlm**
1,1,1-Trichloroethane	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
1,1,2,2-Tetrachloroethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,1,2-Trichloroethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,1-Dichloroethane	ND	0.00200			mg/L	1	5/11/2015 3:49:00 PM
1,1-Dichloroethene	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
1,2-Dichlorobenzene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,2-Dichloroethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,2-Dichloropropane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,3-Dichlorobenzene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
1,4-Dichlorobenzene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
2-Chloroethylvinylether	ND	0.0250			mg/L	1	5/11/2015 3:49:00 PM
Acrolein	ND	0.0200			mg/L	1	5/11/2015 3:49:00 PM
Acrylonitrile	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Benzene	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM

Qualifiers:

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Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
PURGEABLES				**E624**			Analyst: **tlm**
Bromodichloromethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Bromoform	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Bromomethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Carbon tetrachloride	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
Chlorobenzene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Chloroethane	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
Chloroform	0.0165	0.00300			mg/L	1	5/11/2015 3:49:00 PM
Chloromethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
cis-1,3-Dichloropropene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Dibromochloromethane	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Ethylbenzene	ND	0.00400			mg/L	1	5/11/2015 3:49:00 PM
Methylene chloride	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Tetrachloroethene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Toluene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
trans-1,2-Dichloroethene	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
trans-1,3-Dichloropropene	ND	0.00500			mg/L	1	5/11/2015 3:49:00 PM
Trichloroethene	ND	0.00200			mg/L	1	5/11/2015 3:49:00 PM
Trichlorofluoromethane	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
Vinyl chloride	ND	0.00100			mg/L	1	5/11/2015 3:49:00 PM
Surr: 4-Bromofluorobenzene	85.5	0.00500			%REC	1	5/11/2015 3:49:00 PM
Surr: Dibromofluoromethane	94.2	0.00500			%REC	1	5/11/2015 3:49:00 PM
Surr: Toluene-d8	83.8	0.00500			%REC	1	5/11/2015 3:49:00 PM
PH				**A4500-H+B**			Analyst: **bfc**
pH	8.86				SI	1	5/5/2015 10:30:00 AM

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H	Holding times for preparation or analysis exceeded
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O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits

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Website: www.tecenvirolabs.com

Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
FLOW				**FLOW**			Analyst: **bfc**
Water Usage	2886				GAL	1	5/5/2015 10:30:00 AM
TEMPERATURE				**SM2550_B-2000**			Analyst: **bfc**
Temperature	68				°F	1	5/5/2015 10:30:00 AM
ORGANOCHLORINE PESTICIDES/PCB				**E608**			Analyst: **SUB**
4,4'-DDD	ND	0.500			µg/L	1	5/9/2015 12:00:00 PM
4,4'-DDE	ND	0.500			µg/L	1	5/9/2015 12:00:00 PM
4,4'-DDT	ND	0.500			µg/L	1	5/9/2015 12:00:00 PM
Aldrin	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
alpha-BHC	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1016	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1221	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1232	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1242	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1248	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1254	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
Aroclor 1260	ND	5.00			µg/L	1	5/9/2015 12:00:00 PM
beta-BHC	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Chlordane	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
delta-BHC	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Dieldrin	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Endosulfan I	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Endosulfan II	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Endosulfan sulfate	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Endrin	ND	0.500			µg/L	1	5/9/2015 12:00:00 PM

Qualifiers:

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ND	Not Detected at the Reporting Limit
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Analytical Report

WO#: **1505050**
Date Reported: **5/20/2015**

CLIENT: Environmental Waste Solutions
Collection Date: 5/5/2015 10:30:00 AM
Project: EWS Camden-Bruceton
Lab ID: 1505050-001
Matrix: LEACHATE
Client Sample ID EWS Camden

Analyses	Result	MDL	MCL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCB				**E608**			Analyst: **SUB**
Endrin aldehyde	ND	0.500			µg/L	1	5/9/2015 12:00:00 PM
gamma-BHC	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Heptachlor	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Heptachlor epoxide	ND	0.250			µg/L	1	5/9/2015 12:00:00 PM
Methoxychlor	ND	2.50			µg/L	1	5/9/2015 12:00:00 PM
Toxaphene	ND	12.5			µg/L	1	5/9/2015 12:00:00 PM
Surr: Decachlorobiphenyl	82.7	0			%REC	1	5/9/2015 12:00:00 PM
Surr: Tetrachloro-m-xylene	86.2	0			%REC	1	5/9/2015 12:00:00 PM
OIL AND GREASE				**1664**			Analyst: **tlm**
Oil and Grease	ND	1.3			mg/L	1	5/7/2015 8:45:00 AM
TOTAL CYANIDE				**E335.4**			Analyst: **hh**
Cyanide	ND	0.00500			mg/L	1	5/6/2015 10:31:00 AM
TOTAL PHENOLICS				**E420.4**			Analyst: **hh**
Phenols	0.0266	0.00200			mg/L	1	5/20/2015 9:33:00 AM

Qualifiers:

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M	Manual Integration used to determine area response
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SUMMIT
ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

May 13, 2015

Billie Haynes
TEC Environmental Laboratories
2269 Dr. F.E. Wright Drive
Jackson, TN 38305
TEL: (731) 423-5330
FAX: (731) 423-5326

RE: 1505050

Dear Billie Haynes: Order No.: 15050473

Summit Environmental Technologies, Inc. received 1 sample(s) on 5/6/2015 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Dr. Mo Osman
Project Manager
3310 Win St.
Cuyahoga Falls, Ohio 44223

A2LA 0724.01, Alabama 41600, Arizona AZ0788, Arkansas 88-0735, California 07256CA, Colorado, Connecticut PH-0105, Delaware, Florida NELAC E87688, Georgia E87688 and 943, Idaho OH00923, Illinois 200061 and Reg.5, Indiana C-OH-13, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Louisiana 04061 and LA12004, Maine 2012015, Maryland 339, Massachusetts M-OPH923, Minnesota 409711, Montana CERT0099, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, Ohio Drinking Water 4170, Ohio VAP CL0052, Oklahoma 9940, Oregon OH200001, Pennsylvania 68-01335, Rhode Island LA000317, South Carolina 92016001, Tennessee TN04018, Texas T104704466-11-5, Region 8 8TMS-L, USDA/APHIS P330-11-00244, Utah OH009232011-1, Vermont VT-87688, Virginia 00440 and 1581, Washington C891, West Virginia 248 and 9957C and E87688, Wisconsin 399013010

SUMMIT
ENVIRONMENTAL TECHNOLOGIES, INC.
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Case Narrative

WO#: **15050473**
Date: **5/13/2015**

CLIENT: TEC Environmental Laboratories
Project: 1505050

This report in its entirety consists of the documents listed below. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Paginated Report including Cover Letter, Case Narrative, Analytical Results, Applicable Quality Control Summary Reports, and copies of the Chain of Custody Documents are supplied with this sample set.

Concentrations reported with a J-Flag in the Qualifier Field are values below the Limit of Quantitation (LOQ) but greater than the established Method Detection Limit (MDL).

Method numbers, unless specified as SM (Standard Methods) or ASTM, are EPA methods.

Estimated uncertainty values are available upon request.

Analysis performed by DBM, VRM, or SFG were performed at Summit Labs 2704 Eatonton Highway Haddock, GA 31033

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report.

 The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

This report is believed to meet all of the requirements of NELAC or the accrediting / certifying agency. Any comments or problems with the analytical events associated with this report are noted below.

SUMMIT
ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, In
3310 Win S
Cuyahoga Falls, Ohio 4422
TEL: (330) 253-8211 FAX: (330) 253-448
Website: http://www.settek.co

Qualifiers and Acronyms

WO#: **15050473**
Date: **5/13/2015**

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B/MB+	The analyte was detected in the associated blank.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.

Acronyms

ND	Not Detected	**RL**	Reporting Limit
QC	Quality Control	**MDL**	Method Detection Limit
MB	Method Blank	**LOD**	Level of Detection
LCS	Laboratory Control Sample	**LOQ**	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	**PQL**	Practical Quantitation Limit
QCS	Quality Control Sample	**CRQL**	Contract Required Quantitation Limit
DUP	Duplicate	**PL**	Permit Limit
MS	Matrix Spike	**RegLvl**	Regulatory Limit
MSD	Matrix Spike Duplicate	**MCL**	Maximum Contamination Limit
RPD	Relative Percent Different	**MinCL**	Minimum Compound Limit
ICV	Initial Calibration Verification	**RA**	Reanalysis
ICB	Initial Calibration Blank	**RE**	Reextraction
CCV	Continuing Calibration Verification	**TIC**	Tentatively Identified Compound
CCB	Continuing Calibration Blank	**RT**	Retention Time
RLC	Reporting Limit Check	**CF**	Calibration Factor
DF	Dilution Factor	**RF**	Response Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.

SUMMIT
ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Workorder Sample Summary

WO#: **15050473**

13-May-15

CLIENT: TEC Environmental Laboratories
Project: 1505050

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
15050473-001	1505050-001K		5/5/2015 10:30:00 AM	5/6/2015 10:40:00 AM	Non-Potable Water

SUMMIT ENVIRONMENTAL TECHNOLOGIES, INC.
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Analytical Report

(base report)

WO#: **15050473**

Date Reported: **5/13/2015**

CLIENT: TEC Environmental Laboratories
Matrix: NON-POTABLE WATER
Lab ID: 15050473-001A
Project: 1505050
Client Sample ID 1505050-001K

Tag Number:
Collection Date: 5/5/2015 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
TCDD-NPW-1613B				**E1613**	**E1613**	Analyst: **CM**
HRMS DIOXIN ANALYSIS - 2 COMPOUND (1613-B)						
2378-TCDD	ND	1.99		pg/L	1	5/13/2015 2:30:25 PM
Surr: 13C-2378-TCDD	68.1	25 - 164		%REC	1	5/13/2015 2:30:25 PM
Surr: 37Cl-2378-TCDD	77.0	35 - 197		%REC	1	5/13/2015 2:30:25 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
U	Samples with CalcVal < MDL		

CHAIN OF CUSTODY RECORD

Omega COCID 746 | PAGE: 1 | OF: 1

ADDRESS
TEC Environmental Laboratories, INC
2269 Dr. F.E. Wright Drive
Jackson, TN 38305
TEL: 731-423-5330
FAX: 731-423-5326
Website: www.tecenvirolabs.com

Please Include Email Address of Report Recipient Whenever Possible!!!

SUB CONTRATOR: **Summit Environmental** | COMPANY: **Summit Environmental Techno**
ADDRESS: **3310 Win Street**
CITY, STATE, ZIP: **Cuyahoga Falls, OH 44223**
PHONE: **(330) 253-8211** | FAX: **(330) 253-4489**
ACCOUNT #: | EMAIL:

SPECIAL INSTRUCTIONS / COMMENTS
Please analyze these samples as quickly as possible. After analysis, the samples do not need to be returned and can be disposed per your standard laboratory practices. Please e-mail Billie Haynes at bhaynes@tecenvirolabs.com the results when complete.

ITEM #	SAMPLE ID	Client Sample ID	Bottle Type	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	ANALYTICAL PARAMETERS: DIOXINS, W	COMMENTS: Methanol Preserved Weights, HOT Sample Notation, Additional Sample Description, etc
1	1505050-001K	EWS Camden	1LAMGU	Leachate	5/5/2015 10:30:00 AM	3	√	

TCDD 2,4,7,8 only

150504 73-001 sc

Relinquished By	Date	Time	Received By	Date	Time
R. Schmidt	5/5/2015	2:00 PM			
Relinquished By	Date	Time	Received By	Date	Time
Relinquished By	Date	Time	Received By: S Mcampbell	Date: 5-6-15	Time: 1040

TAT: Standard √ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐
Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED
☐ HARDCOPY (extra cost) ☐ FAX ☒ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples _____ °C Attempt to Cool ? _____
Comments: _____

Date: 07/27/13

Summit Environmental Technologies, Inc.
Cooler Receipt Form

Client: TEC

Initials of person inspecting cooler and samples: SC

Date Received: 5-6-15 Time Received: 1040

Order Number: 1058473

Number of Coolers/Boxes: 1

Date cooler(s) opened and samples inspected: 5-6

N/A

Shipper: (FED EX) UPS DHL Airborne US Postal Walk-in Pickup Other

Packaging: Peanuts (Bubble Wrap) Paper Foam None Other

Tape on cooler/box	(Y)	N	N/A
Custody Seals intact	Y	N	(N/A)
C-O-C in plastic	(Y)	N	N/A
Ice ✓ Blue ice	(present) / absent / melted		N/A
Sample Temperature IR Gun #16020459 CF 0.0 °C	3.1 °C		N/A
Radiological Testing Instrument serial #35127 (see page 2 for scan results)	Y	(N)	N/A

****Use 1 sheet per sample for Radiological Testing. If sample is HOT, the Radiological Safety Officer must be notified immediately**

C-O-C filled out properly	(Y)	N	N/A
Samples in separate bags	(Y)	N	N/A
Sample containers intact*	(Y)	N	N/A
*If no, list broken sample(s):			
Sample label(s) complete (ID, date, etc.)	(Y)	N	N/A
Label(s) agree with C-O-C	(Y)	N	N/A
Correct containers used	(Y)	N	N/A
Sufficient sample received	(Y)	N	N/A
Bubbles absent from 40 mL vials**	Y	N	N/A

** Samples with bubbles <6mm are acceptable. Indicate bubble size if >6mm:

Was client contacted about samples	Y	N
Will client send new samples	Y	N

Client contact:

Date/Time:

Logged in by:

Comments:

Summit Environmental Technologies, Inc.
Sample Receipt

pH test on samples

Client ID	Test	pH
1	✓	7
		7
		7

Radiological scan on sample

Client ID	scan	CPM

TEC Environmental Laboratories, INC
P.O. Box 2052
Jackson, TN 38302
TEL: 731-423-5330
Website: www.tecenvirolabs.com

INVOICE

Invoice#: **17596**
Date: **5/20/2015**

REMIT TO: TEC Environmental Laboratories, INC
Cindy Alexander
P.O. Box 2052
Jackson, TN 38302
TEL: 731-423-5330

INVOICE TO: ATTN: **ACCOUNTS PAYABLE**
Environmental Waste Solutions
Amy Bagwell
4521 Tronsdale Drive
Nashville, TN 37204

Acct. Code:

Work Order: **1505050**
Date Received: 5/5/2015
Priority: Routine
Phone:
Fax:
Project: EWS Camden-Bruceton
PO:
CaseNo:
Submitted By: Environmental Waste Solutions
Chris White

Item Description	Matrix	Remarks	Qty	Unit Price	Total
AMMONIA as N	Leachate		1	32.40	32.40
BOD, 5 Day, 20°C	Leachate		1	32.40	32.40
CR+6	Leachate		1	16.20	16.20
Dioxins	Leachate		1	550.00	550.00
ICP Metals	Leachate		1	127.01	127.01
MERCURY	Leachate		1	37.80	37.80
Oil and Grease	Leachate		1	43.20	43.20
Organochlorine pesticides/PCB	Leachate	TTO	1	200.00	200.00
PURGEABLES	Leachate	TTO	1	150.00	150.00
Semivolatile Organics	Leachate	TTO	1	200.00	200.00
Total Cyanide	Leachate		1	35.10	35.10
Total Phenolics	Leachate		1	32.40	32.40
TOTAL SUSPENDED SOLIDS	Leachate		1	12.96	12.96

Miscellaneous Charge Summary

Item	Unit	Qty	Total
Shipping & Handling	$204.00	1	$204.00

Sub Total:	$1,469.47
Misc. Charges:	$204.00
Surcharge:	0.00%
INVOICE Total:	**$1,673.47**
Pre-Paid Amount:	$0.00
Total Payable Amount:	**$1,673.47**

TERMS:

Unless prior arrangements have been made, all invoices are due and payable upon receipt. A late charge of 1.5% per month will be added to all amounts past due over 30 days. The Client, upon accepting the work order, agreed to pay this invoice in full pl

TEC Environmental Laboratories, INC

WORK ORDER Summary

05-May-15

Work Order: 1505050

WO Type: Quote

Client ID:	E0523	**Contact:**	Chris White
Project ID:		**PM:**	Billie Haynes
Project:	EWS Camden-Bruceton	**QC Level:**	
ChkList Completed On:		**Completed By**	
ChkList Reviewed On:		**Reviewed By:**	
WO Reviewed On:		**Reviewed By:**	

COMMENTS : chris@ewssite.com: Email results to Paula Summers.;

Sample ID	Client Sample ID	Date Collected	Date Received	Date Due	Matrix	Test Code	Hld	MS	SEL	Sub	Storage
1505050-001A	EWS Camden	5/5/2015 10:30:00 AM	5/5/2015 12:31:00 PM	5/18/2015	Leachate	BOD5	☐	☐	☐	☐	WALKIN MICRO
				5/18/2015		TSS	☐	☐	☐	☐	WALKIN MICRO
1505050-001B				5/18/2015		CR6_	☐	☐	☐	☐	ME PREP
1505050-001C				5/18/2015		1664	☐	☐	☐	☐	WALKIN WET
1505050-001D				5/18/2015		CN_FIA_W	☐	☐	☐	☐	WALKIN WET
1505050-001E				5/18/2015		NH3-N	☐	☐	☐	☐	WALKIN MICRO
1505050-001F				5/18/2015		PHENOLS_FIA_W	☐	☐	☐	☐	WALKIN WET
1505050-001G				5/18/2015		200.7	☐	☐	☑	☐	WALKIN ME
				5/18/2015		HG	☐	☐	☐	☐	WALKIN ME
1505050-001H				5/18/2015		624_W	☐	☐	☐	☐	WALKIN GCMS
1505050-001I				5/18/2015		625_W	☐	☐	☐	☐	WALKIN GCMS
1505050-001J				5/18/2015		608_W	☐	☐	☐	☐	SUB
1505050-001K				5/18/2015		DIOXINS_W	☐	☐	☑	☐	SUB
1505050-001L				5/18/2015		FLOW	☐	☐	☐	☐	
				5/18/2015		PH	☐	☐	☐	☐	
				5/18/2015		TEMP	☐	☐	☐	☐	

CHAIN OF CUSTODY RECORD

Omega COCID 747 | PAGE: 1 | OF: 1

ADDRESS
TEC Environmental Laboratories, INC
2269 Dr. F.E. Wright Drive
Jackson, TN 38305
TEL: 731-423-5330
FAX: 731-423-5326
Website: www.tecenvirolabs.com

Please Include Email Address of Report Recipient Whenever Possible!!!

SUB CONTRATOR:	ALLOWAY-Lima	COMPANY:	ALLOWAY-LIMA
ADDRESS:	1101 NORTH COLE STREET		
CITY, STATE, ZIP:	LIMA, OH 45805		
PHONE:	(419) 223-1362	FAX:	(419) 227-3792
ACCOUNT #:		EMAIL:	

SPECIAL INSTRUCTIONS / COMMENTS:
Please analyze these samples as quickly as possible. After analysis, the samples do not need to be returned and can be disposed per your standard laboratory practices. Please e-mail Billie Haynes at bhaynes@tecenvirolabs.com the results when complete.

ANALYTICAL PARAMETERS

608 W

Project: L15-13390

ITEM #	SAMPLE ID	Client Sample ID	Bottle Type	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	
1	1505050-001J	EWS Camden	1LAMGU	Leachate	5/5/2015 10:30:00 AM	1	√ -01

Relinquished By: R. Schmidt	Date: 5/5/2015	Time: 2:00 PM	Received By:	Date:	Time:	
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	
Relinquished By:	Date:	Time:	Received By:	Date: 5/6/15	Time: 1212	

TAT: Standard X RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL X ONLINE

FOR LAB USE ONLY
Temp of samples 5.0 °C Attempt to Cool? ICE
Comments: 7131

TEC ENVIRONMENTAL LABORATORIES

2269 Dr. F. E. Wright Drive
Jackson, TN 38305

(800) 832-1808
(731) 423-5330
FAX (731) 423-5326

CHAIN OF CUSTODY / FIELD DATA SHEET

CLIENT NAME: Environmental Waste Solutions
ADDRESS: 200 Omar Circle
Camden TN 38320
PHONE 731-213-2400 Paula Summers
FAX: 731-213-2401
COLLECTED BY: Corey Gibbons

PROJECT SITE: EWS Camden -Monthly-Bruceton
P.O. # QID # 1385
RUSH? (Lab MUST Be Notified) CLIENT# E0523
____ <24 hr. . . . . 200% DATE NEEDED:
____ 24-48 hr 100%
____ 48-72 hr. . . . . 50% FAX? __No __Yes

ANALYSES REQUESTED

# OF CONT.	SAMPLE DESCRIPTION/LOCATION	DATE	TIME	TYPE COMP	TYPE GRAB	MATRIX*	PRESERVATIVE	ANALYSES REQUESTED
1	EWS Camden	5/5/15	1030 am		X	LCH	NONE	BOD/TSS(DO not sample before 8 am)
1	EWS Camden				X	LCH	NONE	Cr6(has 24 hr. hold time)
1	EWS Camden				X	LCH	H2SO4	O&G
1	EWS Camden				X	LCH	NaOH	Cn+
1	EWS Camden				X	LCH	H2SO4	NH3-N
1	EWS Camden				X	LCH	H2SO4	T.Phenols(Use 2 mls of H2SO4)
1	EWS Camden				X	LCH	HNO3	Cd Cr Cu Pb Ni Ag Zn Hg
2	EWS Camden				X	LCH	HCL	VOA(624)(Includes Chloroform/Dichlobromomethane)
1	EWS Camden				X	LCH	NONE	BNA(625)
1	EWS Camden				X	LCH	NONE	PEST/PCB(608)
3	EWS Camden				X	LCH	NONE	Dioxins((2,4,7,8 TCDD)(Sub to Summitt)
0	EWS Camden	5/5/15	10:30 am		X	LCH	NONE	pH/Temp/Flow(on site by Client)

RS

*Matrix: SS - Soil GW - Groundwater TW - Treated Groundwater WW - Wastewater WS - Water Sample WO - Waste Oil DW - Drinking Water SL - Sludge SD - Sediment OT - Other

Remarks: Flow 2,886
pH 8,86 Temp 68°F @ 10:30 By CG
pH 7 7.0 pH10 12.9 @time 10:35 By CG
Email results to: Paula Summers Send a copy of the results from Summitt.
Sample not received on Fridays. Give them a copy of COC to take back with them.

PACK SAMPLES IN ICE

SHIPPED VIA:
UPS ____ CLIENT VEHICLE ____
FEDX ____ LAB VEHICLE X
OTHER ____ COOLER #: ____

SAMPLES RETURNED VIA:
UPS ____ CLIENT VEHICLE ____
FEDX ____ LAB VEHICLE X

Condition: (lab use only)

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
	5-5-15	12:31	
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED FOR LAB BY:
			K. Schmidt

TEMP: 4 oc on ice
Bottles Received: 14
DATE: 5/5/15
TIME: 12:35 pm
pH

EQUIPMENT CALIBRATION LOG

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	P. Campbell
LOCATION	CEC-Office
DATE AND TIME	5-27-15 / 3:45 PM
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus 556
Equipment Serial #	

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	11/18	3.89	~~245.8~~ 121.7	160 to 180	Yes	4.02	Y
7	11/18	6.89	-40.5	+/-50	Yes	7.01	Y
10	11/18	9.87	-170.3	-160 to -180	Yes	10.01	Y

Temperature Calibration Check	
Cert. Thermometer Value (deg C)	Meter Value (deg C)
20.08	20.1

DO Calibration				
Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
NA	NA	100	98.9	Yes

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)
calibrated 3-28-15 & checked 10,000 us/cm		5-27-15 9970	NA	✓	✓	✓	✓

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**	PC; humid, 80's
DATE & TIME	5-28-15/09:30	**EVENT FREQUENCY**	Semi-Annual
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	30.50	**SAMPLING EQUIPMENT**	~~Bailer~~ Peristaltic/soda straw for VOCs
DEPTH TO WATER (feet)	20.99	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	Yes
WATER COLUMN (feet)	9.51	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	6.50 (4.75=3vol)	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	9:43	0	15.5	4.39	41.3	5.16	176.4	395
1.55	9:49	6	15.1	4.14	54.3	2.84	103.5	26.1
3.10	9:56	13	15.1	4.66	73.3	2.08	47.4	35.9
4.75	10:04	21	15.0	4.91	81.4	1.39	27.1	25.7
6.50	10:12	29	15.0	4.99	87.1	1.22	11.2	1.98

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
6.50	1015	29	15.0	4.99	87.1	1.22	11.2	1.98

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4
Number of Containers	6	**Sampler Signature**	Philip Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	~~NA~~ NA
Well Clear of Weeds/Accessible?	Some weeds but OK/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good / good	**Lock Condition**	good - could use new lock

* could use new locks on all wells. Will order some for site-matching.

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, Humid, 80's
DATE & TIME	5-28-15/10:35	**EVENT FREQUENCY**	Semi-Annual
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	~~Bailer~~ Peristaltic pump, Soda Straw method for VOC's
DEPTH TO WATER (feet)	8.65	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	18.35	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	10.0 (9.17 x 3 vol)	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	1045	0	15.1	5.25	307.3	3.33	+119.5	24.8
2.5	1050	5	15.0	5.23	312.5	2.43	114.8	7.86
5.0	1055	10	15.1	5.21	314.9	2.29	113.7	8.00
7.5	11:00	15	15.1	5.22	315.9	2.23	111.0	5.09
10.0	11:05	20	15.1	5.22	318.1	2.19	111.7	3.92

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
10.0	1115	20	15.1	5.22	318.1	2.19	111.7	3.92

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, None
Number of Containers	6	**Sampler Signature**	Philip A. Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	NA / NA
Well Clear of Weeds/Accessible?	Some weeds but Accessible	**Fittings/Well Head Condition**	good / Ants on well head + inside steel casing.
Pad/Casing Quality	good / good but needs paint soon	**Lock Condition**	good, could use new one

* Ants on top of well seal & around casing. Inside of steel protective casing.

** baffles & steel cover may need paint soon

xx New locks couldn't hurt. They work but are old & different on each well.

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, humid, 80's
DATE & TIME	5-28-15 / 11:15	**EVENT FREQUENCY**	Semi-Annual
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	23.1 0	**SAMPLING EQUIPMENT**	~~Bailer~~ Peristaltic, soda straw for VOCs
DEPTH TO WATER (feet)	9.38	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	13.72	**FIELD BLANK COLLECTED?**	yes (~~Dup~~, near road)
PURGE VOLUME (gallons)	7.25 (x 1gal=3vol)	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	11:25	0	13.9	5.40	46.3	3.67	105.2	9.47
2.5	11:30	5	13.8	5.27	44.8	2.80	121.2	1.31
4.75	11:35	10	13.8	5.13	~~48.6~~ 686	2.50	132.9	1.19
7.25	11:40	15	13.7	5.13	76.3	1.96	137	1.05

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
7.25	1150	15	13.7	5.13	76.3	1.96	137	1.05

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl - HNO3, H2SO4
Number of Containers	6	**Sampler Signature**	Philip Campbell

WELL DATA

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

* could use new locks, work but are old & mismatch

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, Humid, 80's
DATE & TIME	5-28-15-1215	**EVENT FREQUENCY**	Semi-Annual
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	10.06	**SAMPLING EQUIPMENT**	YSI 600 pro plus - grab from inside well
DEPTH TO WATER (feet)	5.12	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	NA
WATER COLUMN (feet)	4.88	**FIELD BLANK COLLECTED?**	NA
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	NA

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	1215	—	18.7	5.73	175.4	4.14	042	NA

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

WELL DATA

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

* Could use new locks for wells

APPENDIX D

CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 EQUIPMENT BLANKS

I. SCOPE AND APPLICABILITY: Equipment blanks are collected to assess the adequacy of decontamination procedures and to determine whether sampling equipment and methods are contributing contaminants to samples.

II. PROJECT-SPECIFIC REQUIREMENTS:

WATER TYPES TO BE USED FOR BLANKS: *[distilled water, deionized water, HPLC-grade water, etc.]*

III. METHODOLOGY

A. Review the SOP for the medium sampled to establish the frequency for collection of blanks.

B. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

C. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket.

D. Fill a complete set of sample bottles.

E. Assign the blank a sample number of the same format as the other samples in the series.

F. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock solution depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- ≅ Source of blank water
- ≅ Time and sequence within the sampling event when the blanks were prepared
- ≅ Description of the procedure for preparing the blanks
- ≅ Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY: Trip blanks are prepared to evaluate whether volatile constituents have migrated into samples from the air on-site, during shipping, or at the laboratory.

II. PROJECT-SPECIFIC REQUIREMENTS:

A. Frequency:

B. Other Criteria:

III. METHODOLOGY

A. When ordering bottles from the laboratory for the sampling event, request that trip blanks be sent also.

B. Keep the supplied blanks with the samples being collected throughout the sampling event. Handle the blanks in the same manner as the filled sample vials.

C. Assign the trip blank a sample number of the format used for the sampling event.

D. Return the trip blanks to the laboratory with the samples. Include the samples on the Chain-of-Custody form (SOP 07-02-02). Analysis is typically performed for volatile organic compounds only.

IV. PRECAUTIONS AND COMMON PROBLEMS: None.

V. DOCUMENTATION: Describe handling on the trip blanks in the Trip Report (SOP 07-02-04). Include the sample numbers assigned.

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-02-01 LIQUID DUPLICATES

I. SCOPE AND APPLICABILITY: Duplicate samples are collected to evaluate the precision involved in the sampling effort. Duplicate samples must be collected to be as similar as possible to the original sample. This procedure is applicable of collection of duplicate samples of all liquids and flowable sludges.

II. PROJECT-SPECIFIC REQUIREMENTS:

NUMBER/FREQUENCY OF DUPLICATE SAMPLING:

DUPLICATE NUMBERING SYSTEM: *[Indicate how sample numbers are to be assigned to duplicates, and whether "blind" numbers should be assigned.]*

III. METHODOLOGY

A. Prepare sample bottles for the target sample and its duplicate.

B. Collect the liquid sample in accordance with the appropriate SOP.

C. When filling sample bottles, fill each type of bottle for the sample and duplicate in sequence. Fill both VOA vials, then both metals bottles, etc. This will assure that the duplicate is as similar to the original sample as possible.

D. Preserve the sample and duplicate identically.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Failure to fill bottles alternately between the sample and duplicate may result in poor reproducibility between analyses.

B. Samples with free product or multiple phases present special problems. The phase distribution must be the same in both aliquots.

V. DOCUMENTATION: List the sample and duplicate on the Groundwater Monitoring Data Sheet as separate samples, describing the duplicate in the "Comments" column. If a Groundwater Monitoring Data Sheet is not appropriate, incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-01-01 WATER-LEVEL MEASUREMENT IN MONITORING WELLS

I. SCOPE AND APPLICABILITY: This procedure is applicable to the measurement of water levels in monitoring wells and open boreholes.

II. PROJECT-SPECIFIC REQUIREMENTS

A. REQUIRED READINGS:

B. APPLICABLE METHODS:

III. METHODOLOGY: Water levels should always be recorded to ±0.01 foot. Measurements should be made from a marked point on the inner casing for monitoring wells, and from the ground surface for open boreholes. Equipment should be decontaminated in accordance with SOP 01-01-00 after each measurement. The following methods may be used:

A. CHALKED-TAPE METHOD

1. Check records for historic water levels in the well, if available.

2. Rub the first five feet of a steel surveyor's chain or fiberglass tape with carpenter's chalk.

3. Lower the tape into the well until the end of the tape enters the water.

4. Record the tape footing at the wellhead to within 0.01 feet.

5. Pull the tape out of the well and read the tape footage of the water mark to within 0.01 feet. The difference between the readings is the water level.

B. SOUNDING

1. Attach a small float or hollow-bottom weight or sounder to the end of a tape measure.

2. Lower the sounder into the well and listen for the sound of the weight hitting the water surface.

3. When this is heard, pull the sounder back a few inches and redrop it by 1/4-inch increments until the sound is heard again.

4. Subsequent smaller increments of lowering the sounder will allow water-level measurements to within 0.01 feet.

5. Measure the length from the zero mark on the tape measure to the bottom of the weight. Add this value to all field measurements made with the sounder.

C. ELECTRIC-WATER LEVEL METER (Solinst)

1. Turn the Solinst on by turning the knob clockwise. This knob is also the volume control. Test the Solinst to see if the battery is dead by pushing the button next to the volume knob.If the battery is charged the Solinst will emit an audible tone and the red indicator light will illuminate.
2. Lower the end of the probe into the well or borehole. The probe will cause the unit to emit the tone and illuminate the light when it contacts water.

3. Pull the probe back a few inches and lower the probe in smaller increments until the water level is measured to within 0.01 feet.

4. The water level is read directly from the Solinst tape, and already includes a correction for the length of the probe on the bottom of the tape.

D. INTERFACE PROBE: This is the only reliable method for wells with floating free product.

1. Push the On/Off button to turn unit on. Lower the probe into the liquid. The horn will sound a steady tone and the yellow light will illuminate when the probe contacts an oil product. Slowly raise probe until sound stops, lower until sound is heard again to refine the oil level.

2. Read the tape marking and note as the surface level of product.

3. Slowly lower the probe through the oil product, searching for the oil-water interface. When the probe reaches water the tone will switch from steady to a beeping tone and the red light will illuminate. Slowly move probe up and down to refine the oil/water interface to within 0.01 feet. Read the water level directly from the tape. The length of the probe is already considered.

NOTE: Auto Shutoff Feature: After approximately five minutes of power on, the unit will auto-shut off. A chirping sound will be heard, warning impending shut off. Press

<POWER ON/RENEW> to continue operation. During five minute interval, short "alive" beep is heard.

IV. PRECAUTIONS AND COMMON PROBLEMS:

1. Be sure to allow sufficient time after development, purging or pumping to allow the well to recover to static conditions.

2. Sounding may be difficult with very deep water levels or in noisy conditions because the sound is hard to hear.

3. Measurement of water levels in pumping wells or wells/boreholes with cascading water can be difficult. Installing a narrow PVC access tube inside the well casing can make obtaining accurate readings easier.

4. Free product floating on the water table depresses the natural water level. If a true water level is required, the product of the oil thickness and the oil specific gravity must be added to the oil/water interface elevation.

5. If there is no measurement mark on the well riser, add one in indelible ink.

V. DOCUMENTATION

1. Record water levels in a field notebook or Groundwater Monitoring Data Sheet (SOP 07-02-01). Be sure to record the date and time of the measurement.

2. Data should be incorporated into the Trip Report (SOP 07-02-04). Method of measurement should be reported.

VI. REFERENCES: None

07-01-01 MAINTAINING SAMPLE CHAIN OF CUSTODY

I. SCOPE AND APPLICABILITY: This procedure is to be employed whenever samples are collected for laboratory analysis, and is designed to ensure that sample integrity is maintained. These procedures are necessary to assure that samples are defensible.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

A. SAMPLE CUSTODY: The sampling personnel must maintain custody of the samples until they are delivered to the laboratory, at which time the laboratory takes over the custody record. A sample is considered to be in custody if:

- it is in the investigator's actual possession
- it is in view of the investigator
- it has been placed in a secure area
- a signed custody seal has been placed on the sample container such that the seal would be destroyed if the container was opened.

B. CUSTODY RECORD

1. Complete a Chain-of-Custody Form for each shipping container of samples as described in SOP 07-02-02. Place the white copy of the completed form in the shipping container with the samples, as discussed in SOP 07-01-03.

2. Affix a signed custody seal to secure all samples. Seals may be placed across the lids of individual sample bottles, or on each shipping container of samples. If seals are placed on shipping containers, at least two seals must be used, and they must be placed such that the container cannot be opened without breaking the seals.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. It may be necessary to cover custody seals with clear postal tape to prevent them from falling off.

B. Deliver or fax a copy of the custody form to the Project Manager within 24 hours of shipping the samples so that any errors can be corrected before the laboratory begins processing the samples.

V. DOCUMENTATION

A. The pink copy of the Chain-of-Custody Form should be submitted to the Project Manager as soon as possible after the samples are shipped.

B. The Project Manager or a designee must review the form for completeness and correctness. Any errors should be flagged, and the laboratory should be contacted if errors could affect analysis. The reviewer should initial and date the form, then place it in the Project File.

C. Compliance or problems with custody procedures should be documented in the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA Region IV; 1991. Environmental Compliance Branch, Standard Operating Procedures and Quality Assurance Manual. Athens, Georgia.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.

APPENDIX E

HOUSE ENGINEERING LLC- CHLORIDE SUMMARY AND APRIL 2013 GROUNDWATER REPORT

Introduction

The purpose of this document is to present the results of the tasks outlined in the January 9, 2013 Groundwater Review Work Plan (Work Plan) prepared by House Engineering LLC (HE) for the Environmental Waste Solutions (EWS) Class II Landfill located at 200 Omar Circle in Camden, Tennessee. Specifically, the Work Plan was developed to determine the source of salts and nutrients in the surface water drainage basin and uppermost groundwater aquifer system beneath portions of the EWS Class II Landfill facility located at 200 Omar Circle in Camden, Tennessee. The development of the Work Plan resulted from the detection of chemical compounds from samples taken from the groundwater well designated as MW-2. Those compounds of concern detected in MW-2 included chloride, nitrate and sulfate. Based upon observations of the location of a Sanitary Sewer manhole and the depth to groundwater within the vicinity of MW-2 it was the opinion of HE that the well was vulnerable to anthropogenic influences. HE utilized laboratory analytical test results from a sample of the waste water taken from within the Sanitary Sewer manhole approximately 47 feet southeast of MW-2 to input into the computer EPA Multi Med computer software fate and transport model so as to estimate anthropogenic impacts to MW-2. Based upon the results of the fate and transport modeling of a slug of water overflowing from the manhole the predicted concentration of chloride in MW-2 was within a few parts per million of the actual concentration determined from groundwater samples laboratory analyzed from MW-2. Therefore, with an increasing concentration of Chloride in MW-2 it was decided by EWS to develop a work plan to further evaluate the source of the chloride and nitrates in the groundwater beneath portions of the EWS facility.

Work Plan Tasks

The following tasks have been completed which were detailed in the Work Plan submitted by HE on behalf of EWS:

- Review Existing Data and Information
- Install New Downgradient Groundwater Monitoring Well
- Develop New Downgradient Groundwater Monitoring Well
- Sample and Test Groundwater from new Groundwater Monitor Well
- Perform Sampling and Analytical Testing of Landfill Leachate
- Evaluate Head on the Liner
- Perform Surface Water Sampling / Evaluate Force Main

A copy of the new groundwater monitor well log is included as an attachment with this report. The new well has been designated as MW-4. The new well has been developed, groundwater samples taken and laboratory analysis performed on the groundwater samples for the compounds defined in the Tennessee Division of Solid Waste Management (TDSWM) Regulations as the Appendix I parameters. The head of leachate (depth of landfill liquid) within the sump was measured to determine if the leachate head was equal to or less than one foot as required in the TDSWM Regulations. In addition, the sediment pond and the stream were tested with a Horiba U22X Multimeter for specific conductivity which can be an indicator of the presence of compounds resulting from anthropogenic influences.

Summary of Results

A review of the results of laboratory tests performed on the initial samples taken from MW-4 revealed that Chloride was present at a concentration of 270 parts per million (PPM) which exceeded the EPA Secondary Drinking Water Standard of 250 ppm. Nitrate was detected in MW-4 at 29 ppm which exceeded the EPA Maximum Contaminant Level (MCL) of 10 ppm. Therefore, the TDSWM was contacted and MW-4 was re-sampled as detailed in the TDSWM 0400-11-01.04 (7) 5. to determine if there was an alternate source of impact to MW-4.

Measurements of conductivity within the sediment pond revealed a reading of 67 micro-Siemens per centimeter ($\mu S \cdot cm^{-1}$) while the stream revealed a reading of 16 $\mu S \cdot cm^{-1}$.

Samples of the manhole upgradient of MW-4 and MW-4 were tested for chloride and nitrate. The additional testing of the upgradient sanitary sewer manhole revealed the presence of Chloride at 250 ppm and Nitrate at 11 ppm. The re-sample of MW-4 revealed Chloride at 150 ppm and Nitrate at 16 ppm. Historical testing of the landfill leachate indicates Chloride concentrations exceeding 20,000 ppm.

In addition to the Chloride and Nitrate lab testing, it was decided to include Bromide in the supplemental testing. Bromide was not detected in groundwater samples taken from MW-4 or from water taken from the sanitary sewer manhole southwest of MW-4. However, Bromide was present at a concentration of 19 ppm from samples taken of the landfill leachate.

Measurements taken within the leachate sump indicated that the depth of leachate above the liner was less than 1 foot.

Conclusions and Recommendations

HE decided to include Bromide in the laboratory testing in attempt to identify the source of elevated concentrations of Chloride and Nitrate detected in MW-4. Bromide was selected because of its' excellent performance as a tracer in fate and transport studies. (See attached paper by Flury and Papritz) Furthermore, the Chloride content of soils usually is much larger than the Bromide content, since there is much more Chloride in crustal rock (Bowen, 1979) and since large quantities of Chloride enter the soil in manures, fertilizers, and defrosting agents. Because Bromide occurs in much smaller background concentrations, it often is preferred as a tracer in transport studies (e.g., Owens et al., 1985; Gish et al., 1986; Butters et al., 1989)

Since Bromide was detected in the leachate at a concentration of 19 ppm and was not detected in MW-4 or the manhole it would appear that the landfill leachate is not the source of chloride in MW-4. Again, the mobility/movement of Bromide through the soil overburden is equally as fast as water. Ostensibly, if the landfill leachate was responsible for the elevated Chloride and Nitrate concentrations, Bromide would also be present in the groundwater.

In conclusion, it is the opinion of HE that MW-4 is not presently impacted from the EWS Class II Landfill disposal operations and should not be placed into the assessment phase of groundwater monitoring. This opinion is based upon the results of the sampling detailed in this document and observations made during numerous site inspections over the past year.

EXECUTIVE SUMMARY:

This report documents the first semi-annual monitoring event of 2013 for the Environmental Waste Solutions, LLC (EWS) Class II Landfill. The Class II landfill is registered with the Tennessee Division of Solid Waste Management (TDSWM) with permit number IDL 03-0212. The EWS Camden Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/ longitude 88°05'16" W).

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

Upgradient Monitoring Point	Downgradient Monitoring Points
MW-1	MW-3, MW-4

Groundwater samples were collected on March 27, 2013 and April 11, 2013. ESC Lab Sciences performed the analysis and reported the results on April 5, and April 25, 2013, respectively. All monitoring wells were sampled during the event, with the exception of MW-2, which was recently replaced by MW-4. MW-2 has subsequently been removed from the monitoring network due to the continued lack of a sufficient volume of water required for representative sampling. MW-2 remains in place, and will continue to be monitored for field parameters and water level data. The collected groundwater samples were analyzed for Appendix I inorganics as well as parameters which are present in the landfill leachate which include Chloride, Nitrate, Sulfate, Ammonia (NH3), Boron, and a short list of ions.

Since additional waste streams have been approved for disposal in the EWS Class II Landfill, 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 groundwater constituents. The groundwater was sampled by House Engineering LLC (HE) on July 2, 2013 and taken to the Environmental Science Laboratory in Mt. Juliet, Tennessee for analysis and were reported to HE on July 9, 2013.

In addition to the VOCs several Bromide and Coliform Bacteria were added to the list of parameters to assist in the determination of increases in specific inorganic parameters such as Chloride and Nitrate.

Bromide was selected because of its' excellent performance as a tracer in fate and transport studies. (See attached paper by Flury and Papritz) Furthermore, the Chloride content of soils usually is much larger than the Bromide content, since there is much more Chloride in crustal rock (Bowen, 1979) and since large quantities of Chloride enter the soil in manures, fertilizers, and defrosting agents. Because Bromide occurs in much smaller background concentrations, it often is preferred as a tracer in transport studies (e.g., Owens et al., 1985; Gish et al., 1986; Butters et al., 1989)

The proximity of the Camden sanitary sewer pipe system (**See Figure 2**) was also considered as a potential source of chloride and nitrate detected in groundwater samples.

Since chloride and nitrate are present in the landfill leachate and the sanitary sewer effluent, it was necessary to add yet another parameter to the list which is generally present only in the sanitary sewer effluent. Coliform bacteria were selected for laboratory testing since its presence indicates contamination with human or animal wastes. The EWS Landfill leachate, Camden sanitary sewer effluent and EWS groundwater well samples were tested for Coliform bacteria to assist in the determination in the source of the chloride and nitrate detected in the groundwater.

The results of the laboratory analytical testing of sewer effluent, groundwater and leachate samples taken since 2011 is presented in Table 2 of this report.

Inter-well prediction interval analysis was used to identify statistically significant increases (SSIs) over background concentrations for the analyzed water quality parameters. 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 analysis is conducted on the data. Only parameters reported above the detection limits of the laboratory were evaluated. The results of the analysis are summarized as follows:

- One SSI over background was identified for chloride and barium at MW-3 as a result of the analysis. This is consistent with historical data.

The next semi-annual monitoring event is tentatively scheduled for October, 2013.

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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 accepts household waste
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
HE – House Engineering LLC
HI – Hydrogeologic Investigation
MCL – Maximum Contaminant Level
$\mu S \cdot cm^{-1}$ - micro-Siemens per centimeter
mg/L – milligrams per Liter
MW – Monitor Well
NPPL - Non-parametric prediction limit analysis
ORP – Oxidation Reduction Potential
POTW – Publically Operated Treatment Works
ppm – parts per million*
PQL – Practical Quantitation Limit
QC – Quality Control
SNL – Sanitary Landfill
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

I Introduction

A. Site Location

EWS, LLC. owns and operates the Camden Class II landfill located just off highway US 70 at 200 Omar Circle, Camden, Tennessee. The site can be located on the Camden, Tennessee USGS quadrangle at north latitude 36° 3' 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 indicated in **Figure 1- Site location Map**. The landfill footprint can be viewed in **Figure 2 - Potentiometric Surface Map.**

B. Current Activities

The EWS Camden Class II Landfill currently receives secondary aluminum smelter waste for disposal including aluminum dross and salt cakes and other industrial wastes approved by the TDSWM.

II Aquifer Characteristics

A. 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. However, the large cuts within the site boundaries have exposed the underlying geologic formations. 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.

Camden and Harriman Formations

The Camden and Harriman Formations are described as follows:
Chert, gray with specks and mottlings 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, 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 indicate that the uppermost

aquifer is sloped to the southwest. Comparisons of the water bearing zone elevations to static groundwater elevations for both indicate an unconfined aquifer.

B. Monitor Well Integrity & Static Water Levels

The groundwater monitoring network for the Class II Landfill consists of monitor wells MW-1, MW-3, and MW-4. Monitor well MW-1 serves as an up-gradient monitoring point while monitor wells MW-3 and MW-4 serve as down-gradient monitoring points.

The integrity of each monitor 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 monitor well. Once the watertight seal is removed from the top of each monitor well's casing, the well is allowed to de-pressurize. A decontaminated electronic probe is slowly lowered into the monitor well to establish the distance between the established top of casing and the elevation of free groundwater. 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 monitor well. The electronic probe is capable of determining this distance to within one, one-hundredth of one foot (0.01 foot). This distance is written in the site-specific field book as depth-to-water. Upon collection of this data, the electronic water level probe is removed from the monitor 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. Groundwater elevations are listed in **Table 1 - Field Parameters & Potentiometric Data, Appendix A**.

C. Groundwater Flow Direction

Groundwater flow at the landfill appears to flow in a southwesterly direction towards Charlie Creek. Groundwater flow in the vicinity of the Class II Landfill appears to flow from a topographic high north, northeast of the landfill toward the southwest where monitor wells MW-3 and MW-4 are positioned to intercept any possible groundwater contaminants leaching from the landfill.

D. Potentiometric Gradient

The Potentiometric surface of the first aquifer occurring beneath the Class II Landfill occurs at approximately twenty-two (23) feet below ground surface at the up-gradient monitor well MW-1 to approximately six (8) feet below ground surface at monitor well MW-2. 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 is sloped to the southwest. 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 in March and July of 2013 ranged from 3.56% to approximately 2.2 % slope.

The potentiometric gradient from measurements taken on March 27, 2013 has been calculated according to the following formula:

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

$$\frac{(394.05' \text{ at MW-1}) - (358.4' \text{ at MW-2})}{1{,}000'} * 100 = 3.56\%$$

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

E. Hydraulic Conductivity

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

III Groundwater Sampling Procedures

A. Instrumentation

Depth to groundwater measurements were collected by CEC using a Solinst® electronic water level indicator, model # 122. CEC also employed a YSI 556 Multi-parameter probe is used to record pH, specific conductance, temperature, dissolved oxygen and ORP during groundwater sampling events at the landfill. A LaMotte model 2020 turbidity meter or equivalent is used to collect turbidity readings. Each instrument is either checked against known standards or calibrated as per manufacturers' specifications prior to the commencement of sampling activities.

HE utilized a Keck Water Level Meter with 100 feet of tape to check groundwater levels in the monitor wells. HE also utilized a Horiba U22X Multi-parameter probe to record pH, specific conductivity, temperature, dissolved oxygen, ORP and turbidity of the groundwater within each groundwater well prior to and at the time of sampling.

B. Purging and Collection of Field Parameter Values

The total volume of groundwater residing in each monitor well is calculated by subtracting the depth to water from the total depth of each well. This linear distance is next multiplied by 0.163 gallons per foot in a 2 inch (I.D.) monitor well. For purging, a disposable polyethylene bailer with sufficient nylon twine is slowly lowered into the water column. The bailer is allowed to completely submerse into the water column prior to extracting the bailer from the monitor well. The first bailer of purged groundwater is collected in a clean, high-density polyethylene (HDPE) reservoir where it is observed for Temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP) and turbidity. These values are noted in the site specific field book as V_0 and then the collected groundwater is discarded onto the ground, away from the monitor well. Groundwater shall be purged using either a decontaminated down-well pump using new tubing or using new tubing connected to a peristaltic pump or in the case of a pump malfunction, a new disposable bailer.

Normally, bailers are not used at the EWS Camden Class II Landfill. However, if bailers are used due to pump malfunction, bailers shall be constructed of either polyethylene or Teflon. Bailers shall be factory decontaminated and sealed as to allow no environmental contaminants to interact with the bailer. New nylon twine shall be fixed to each bailer via a tied knot.

The collected groundwater will be decanted into a flow-through cell where it will be observed for pH, specific conductance, temperature, and turbidity. These values will be noted in the site specific field book as V_0 and then the collected groundwater will be poured onto the ground, down-gradient from the monitor well.

Groundwater shall be purged from the monitor well for a specific period of time that allows for a new volume of water to have passed into the flow-through cell. Once this volume of water has been purged, the field chemistry parameters will again be observed and recorded in the field book as V_1. This procedure for purging groundwater continues for an additional well volume, if sufficient groundwater is available. After the second purged well volume has been observed for field parameter values, the values are checked against values for V_1. If the pH and specific

conductance values for each volume purged vary no more than 10% from V_1 to V_2 and the temperature has stabilized to within one degree Celsius, preparations are made to collect a groundwater sample for submittal to an analytical laboratory. If the field parameters have not stabilized, the purging procedure shall continue until either one of the following conditions are met:

1. Field stabilization occurs,
2. Well is purged dry, or
3. Five well volumes have been purged.

If the monitor well is purged dry, then the recharging groundwater shall be collected within twenty-four hours.

Field parameter values are presented in **Table 1 – Groundwater Field Data, Appendix A**. A detailed account of each purge and sample procedure conducted at each monitor well is presented in **Appendix B**.

C. Sample Collection & Preservation

Groundwater samples are collected from monitor wells once field parameter data indicates that stagnant water has been purged from the well. Groundwater is placed in laboratory supplied sample vessels in the following order if analyzed: Appendix I inorganics – one (1), five-hundred (500) ml preserved with nitric (HNO3) acid; Chloride, Nitrate, Sulfate – one (1), two-hundred fifty (250) ml unpreserved HDPE jar; Ammonia – one (1), two-hundred fifty (250) ml HDPE jar preserved with sulfuric (H2SO4) acid.

D. Quality Assurance & Quality Control

Field blanks were collected for each sample collection event performed to date at the EWS Class II Landfill. CEC collected a field blank next to monitoring well MW-3. HE collected a field blank next to MW-4. The field blanks were collected by pouring deionized water into a duplicate set of sample bottles. Thereby, allowing any airborne contaminants a chance to enter the field blank sample. Laboratory analytical testing of the field blanks did not reveal the presence of any of the EWS Class II Landfill site specific target compounds.

In addition, a duplicate sample was collected from MW-3 for laboratory quality control purposes. The reported values for the duplicate sample are similar to the original MW-3 sample with the exception of Aluminum and Iron. Aluminum was detected at a concentration of 0.82 mg/L in the original sample from MW-3 and at a concentration of 0.38 mg/L in the duplicate from MW-3. Iron was detected at a concentration of 0.3 mg/L in

the original sample from MW-3 and at a concentration of 0.17 mg/L in the duplicate from MW-3.

E. Sample Chain-of-Custody

A sample Chain-of-Custody (COC) traveled along with each sample kit from ESC to EWS and finally back to ESC for the sampling events. The CEC SOP for Chain of Custody 07-01-01 may be found in **Appendix E**.

IV Laboratory Analytical Procedures

A. Analytical Methods

All laboratory testing of groundwater samples taken in 2013 were performed by the Environmental Science Corporation (ESC) located in Mt. Juliet, Tennessee. However, the leachate analytical tests were performed by TEC Lab in Jackson, Tennessee. The analytical methods chosen for this monitoring event are the most appropriate procedures as directed 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 (if necessary) were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry
Method 6020	ICP – Mass Spectrometry
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 9056	Determination of Inorganic Anions by Ion Chromatography (Fluoride)
Method 9222D	Fecal Coliform Membrane Filter Procedure

B. Laboratory Analytical Results

Laboratory reports from the analysis of groundwater samples collected from the EWS Camden Class II Landfill during the semi-annual monitoring event were prepared by ESC and reported to CEC on August 13, 2012. Copies of the laboratory reports are located in **Appendix C –**

Laboratory Analytical Reports. Constituent values from all laboratory analysis along with applicable maximum contaminant levels (MCLs) are presented in **Table 2 – Analytical Results, Appendix A**.

C. 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. One QC qualifier code was indicated during the laboratory analysis of groundwater samples during this monitoring event and can be viewed along with the **Laboratory Analytical Reports, Appendix C**.

V Statistical Analysis

A. 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 analysis as part of the evaluation of groundwater monitoring data. Several methods may be employed for this endeavor. EWS Camden Class II Landfill has chosen to use Inter-well and intra-well non-parametric prediction limit analysis (NPPL) at this time.

First, the distribution of the data was evaluated for normality. For all wells, the data was not normally distributed; therefore, non-parametric statistical methods were chosen. Inter-well and intra-well 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 to the concentrations observed at the up-gradient monitoring location during this monitoring event. For the Class II Landfill, monitor well MW-1 was considered as background. Intra-well analysis was also utilized at MW-1 to compare the concentrations observed during the July 2012 groundwater sampling event to the established background data set.

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 analysis is conducted on the data.

The computer program ChemStat was used for all statistical computations. Worksheets indicating inter-well and intra-well statistical analysis sheets and time versus concentration charts may be viewed in **Appendix D, Statistical and Trend Analysis**.

B. Results

Review of the statistical analysis performed on the available data indicated that there were two statistically significant increases (SSI's) over background data. The SSI's over background data were limited to Barium (MW-3), and Chloride (MW-3). The Barium and Chloride detections at MW-3 are well below their associated MCL's.

Trend analysis utilizing the limited data available from the monitoring events showed no distinct trends for the site monitoring wells.

VI Conclusions and Recommendations

Representative groundwater samples were collected from monitor wells MW-1, MW-3 and MW-4. Groundwater samples have been analyzed for Appendix I inorganics, Bromide, Chloride, Nitrate, Sulfate, Ammonia (NH_3), a short list of ions, and Coliform bacteria.

EWS Groundwater Quality Relative to the EPA Primary Drinking Water Standards

Laboratory analytical results for the groundwater samples collected from the facility monitor wells for the EWS Class II Landfill indicated that two compounds were detected at concentrations which exceeded the EPA maximum contaminant levels (MCL). Specifically, the concentration of Arsenic in MW-1 and the concentration of Nitrate in MW-4 were detected above their respective maximum contaminant levels (MCL).

Arsenic was detected in MW-1 at a concentration of (0.049 mg/l). The MCL for Arsenic is (0.01 mg/l). Arsenic has been detected at concentrations exceeding the primary drinking water MCL prior to the disposal of waste in the landfill. More specifically, 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. Therefore, the presence of Arsenic in the groundwater is attributable to naturally occurring deposits in the soil overburden since there is no immediate development up-gradient of the well.

Nitrate was detected at MW-4 at a concentration of (29 mg/L) on March 27, 2013 and at (16 mg/L) on April 11, 2013. The MCL for Nitrate is (10 mg/L). A discussion relative to the source of the Nitrate in the groundwater is provided in a later section of this document.

EWS Groundwater Quality Relative to the Tennessee Secondary Drinking Water Standards

Laboratory analytical results for the groundwater samples collected in March and April of 2013 from the EWS Class II Landfill groundwater monitor well network indicated that four of the site specific groundwater monitor list of compounds were detected at concentrations which exceeded the Tennessee Public Water Supply Secondary Drinking Water Standards (2DW). Those parameters included Iron and Manganese in the upgradient groundwater well identified as MW-1, Aluminum and Manganese in MW-3, and Chloride, Nitrate, and Manganese in MW-4.

Aluminum has been detected historically in each of the groundwater monitor wells. A review of the Tennessee Division of Geology (TDOG) publication titled "Geologic Source and Chemical Quality of Public Groundwater Supplies in Western Tennessee" written by C.R. Lanphere reported Aluminum concentrations of 1.3 mg/L and 1.2 mg/L in two wells owned and used by the city of Camden for drinking water. Each of the aforementioned concentrations exceeds the Tennessee Secondary Drinking Water Standard for Public Water Supply sources. The Aluminum which was detected in groundwater samples taken from MW-3 during the March 2013 sample event was present at a concentration of 0.82 mg/L which is under the concentration which has been reported by the TDOG for Camden drinking water supply wells.

Iron was detected at a concentration of 26 mg/L in MW-1 prior to the placement of waste. Therefore, the concentration in the groundwater sample taken during the March 2013 sample event of 16 mg/L is not considered the result of a new offsite source.

Manganese has been detected in at least one of the wells since groundwater sampling was initiated at the site. Therefore, it is believed that the Manganese is occurs naturally in the site soils. The high turbidity of the groundwater during the July 2013 sample event would increase the potential for detection of Manganese.

Chloride has historically been detected in MW-3 at concentrations ranging from 8.2 mg/L to 25 mg/L even prior to waste placement in the landfill. Chloride has also been historically detected in MW-1 at concentrations ranging from 1.9 mg/L to 2.9 mg/L even prior to waste placement.

The Chloride detected in MW-4 was detected in the groundwater samples taken during the March 2013 groundwater sample event at 270 mg/L which exceeds the Tennessee Secondary Drinking Water Standard for Public Water Supply sources. Therefore, EWS requested a second sample event be performed to verify the concentration and determine the potential source of the Tennessee Secondary Drinking Water Standard for Public Water Supply Standard exceedence. The second sample of groundwater was secured in April and the laboratory testing reported the Chloride concentration at 150 mg/L which is below the Tennessee Secondary Drinking Water Standard for Public Water Supply maximum concentration of 250 mg/L.

Evaluation of the Source of Chloride and Nitrate Impacts to MW-4 Groundwater

From a review of the laboratory test results performed on the initial groundwater sample taken from MW-4 it was evident that the elevated concentration Chloride, Nitrate and Ammonia Nitrate in the groundwater was attributable to anthropogenic sources. Due to the presence of both Ammonia at concentrations exceeding 3,000 mg/L and Chloride present at concentrations exceeding 30,000 mg/L in the EWS landfill leachate it was necessary to further evaluate if the landfill leachate was the source of the high concentration of inorganic parameters in the groundwater.

Specific Conductivity Measurements

EWS initially measured the **specific conductivity** of the water within the sediment pond below the current waste disposal cell which is upgradient of MW-4 in an attempt to determine if the landfill leachate was leaking from the landfill. Based upon the base elevation of the sediment pond and landfill sump the sediment basin would also be impacted by the high concentration of Chloride and Nitrates within the landfill leachate. Measurements taken by HE with a Horiba U22x Multi-parameter meter determined the conductivity of the pond water at 67 micro-Siemens

per centimeter ($\mu S \cdot cm^{-1}$). Measurements taken by CEC with a YSI 556 Multi-parameter probe revealed that the conductivity of the groundwater within MW-4 was as high as 1041 $\mu S \cdot cm^{-1}$ on March 27, 2013 and as high as 977 $\mu S \cdot cm^{-1}$ on April 11, 2013. CEC also measured the effluent within the Camden POTW manhole on April 11, 2013 and the result was 984 $\mu S \cdot cm^{-1}$. HE measured the groundwater from within MW-4 on July 2, 2013 at 690 $\mu S \cdot cm^{-1}$. It should be noted that CEC reported groundwater measurements of specific conductivity on the other downgradient well designated as MW-3 at a concentration of 138 $\mu S \cdot cm^{-1}$ on March 27, 2013. HE reported groundwater measurements of specific conductivity in MW-3 at a concentration of 260 $\mu S \cdot cm^{-1}$ on July 2, 2013. All specific conductivity measurements taken from MW-3 were substantially lower than those taken from MW-4 and the Camden POTW manhole. It should also be noted that MW-3 is closer to the waste footprint than MW-4.

Groundwater Tracer Parameters

Prior to the promulgation of the EPA Subtitle D landfill regulations chloride was a compound routinely used for evaluating impacts to groundwater from landfill leachate due to its mobility in through even low permeability clay soils. However, since large quantities of Chloride enter the soil in manures, fertilizers, and defrosting agents and since there is often a naturally occurring concentration of Chloride in both the soil overburden and crustal rock it has been replaced as the most reliable compound to determine impacts from anthropogenic sources. Chloride has been replaced as a groundwater tracer by Bromide because it occurs in much smaller background concentrations and migrates through the natural environment more rapidly. Thus, it has become the preferred tracer in of many groundwater professionals who perform transport studies (e.g., Owens et al., 1985; Gish et al., 1986; Butters et al., 1989).

Chloride Summary

Historical Evaluation of Elevated Chloride Concentration in MW-2

In 2011 an evaluation was performed to determine the potential source of the Chloride in the EWS groundwater monitor well designated as MW-2. Initially, EWS sampled the landfill leachate and sent the sample to the lab to determine the concentration of Appendix 1 parameters for comparison with the parameters detected in the groundwater from within MW-2. Another potential source of impact to the groundwater in MW-2 was also identified. The sanitary sewer manhole located 45 feet southeast of MW-2 had been observed to overflow on numerous occasions both before and since MW-2 was sampled in 2011. The overflow of the manhole resulted in standing water adjacent to and around MW-2. Therefore, EWS staff sampled the overflow of water from the manhole and delivered the sample to TEC Environmental Laboratories, Inc. in Jackson, Tennessee, for testing. The pH of the sample was also determined along with the concentration of Aluminum and Chloride.

A review was performed of the results of both the landfill leachate testing and the Camden POTW manhole waste water testing. The results of the testing revealed Chloride concentrations in the water from the manhole at 367 mg/L and Aluminum at 0.284 mg/L. The results of the testing of the leachate revealed Chloride concentrations at 23,100 mg/L while Aluminum was not detected. Based upon this analytical testing it appears that the source of the detected Chloride at a measured concentration of 44 mg/L in MW-2 was most likely not attributable to the migration of leachate from the landfill. This opinion was based upon the fact that the concentration of chloride in the landfill leachate along with the proximity of the landfill limits would potentially result in much higher concentrations of chloride in the groundwater than 44 mg/L. This in combination with the fact that no aluminum was detected in the leachate while the sanitary sewer

waste water revealed aluminum concentrations within the range detected in MW-2. Therefore, the impacts of chloride and aluminum in MW-2 could possibly be more attributable to the recent problems with overflows from the Camden sanitary sewer system.

To further substantiate this claim the EPA computer developed fate and transport program referred to as Multi-Med was used to predict the concentration of chloride in MW-2 with a transient condition such as an overflow from the Camden POTW manhole. The results of the modeling resulted in a predicted concentration of 48 mg/L in MW-2 based on the concentration of chloride in the manhole. This predicted concentration of Chloride at 48 mg/l in MW-2 was extremely accurate since the actual concentration of Chloride in MW-2 was determined in the laboratory at 44 mg/L.

Current Evaluation of Elevated Chloride in MW-4

As previously discussed Chlorides were detected in groundwater samples taken from MW-4 at concentrations ranging from 150 mg/L to 270 mg/L. In addition, laboratory testing of leachate samples taken at the site has revealed Chloride concentrations in excess of 30,000 mg/L. Finally, a Camden POTW manhole located within close proximity (less than 50 feet) of MW-4 has been sampled and tested for Chloride in April of 2013. The results indicate the concentration of Chloride in the Camden POTW of 250 mg/L in a waste water sample taken the same day as a groundwater sample was taken from MW-4. The lab tests performed on the groundwater sample taken from MW-4 measured the Chloride concentration at 150 mg/L.

Bromide Summary

Bromide testing was performed on the landfill leachate, the groundwater from MW-4, and on waste water samples secured from the Camden POTW manhole closest to MW-4. The laboratory analytical testing revealed the presence of Bromide in the leachate at a concentration of 19 mg/L. However, Bromide was not detected in the groundwater sample taken from MW-4 or the waste water sample taken from the Camden POTW manhole.

Anthropogenic Indicator Parameters

As previously mentioned the proximity of the Camden POTW to the groundwater monitor network at the EWS Class II Landfill along with observations of overflows from the pipe network manholes warranted an investigation of the POTW as a possible source of groundwater impact. EWS has previously sampled (November 2011) the groundwater from MW-2 and delivered the sample to ESC so they could perform the test for Fecal Coliform. ESC reported Fecal Coliform in the groundwater sample from MW-2 at 99 col/100ml.

A review of the results of the initial testing of groundwater samples from MW-4 also created a suspicion that the Camden POTW may be a potential source of the high levels of chloride particularly since MW-4 is even closer to the Camden POTW pipe network than MW-2. It is estimated that MW-4 is situated within approximately 15 feet of the Camden POTW pipe network. Therefore, samples were collected from MW-4 and taken to ESC to determine if **Coliform** was present in the groundwater from within MW-4. ESC reported a total coliform concentration within the groundwater from MW-4 at 720 MPN/100ml which again would suggest impact from the Camden POTW pipe network which transmits sewer wastes to the treatment lagoons adjacent to the EWS Class II Landfill property. This opinion is also based upon recent laboratory analytical testing of the landfill leachate for the presence of e coli, fecal coliform and total coliform. None of the aforementioned coliform parameters were detected in the landfill leachate.

In conclusion, it is the opinion of HE that MW-4 is not presently impacted from the EWS Class II Landfill disposal operations and should not be placed into the assessment phase of groundwater monitoring. This opinion is based upon the results of the laboratory analytical testing of groundwater, leachate and POTW effluent and the detailed discussions presented in the previous sections of this report.

The next semi-annual groundwater monitoring event for the EWS Class II Landfill is tentatively scheduled for October, 2013.