2018 Annual Groundwater Monitoring Report Per EPA CCR Rule (CFR § 257.90-.98)

Asbury Generating Station CCR Impoundments Jasper County, MO

January 2019

Prepared For:

The Empire District Electric Company 602 S. Joplin Avenue Joplin, Missouri 64801





CERTIFICATE OF COMPLIANCE

Annual Groundwater Monitoring Report for Existing CCR Surface Impoundments EPA CCR Rule Section 40 CFR 257.90 (e) Empire District Electric Company – Asbury Power Plant Asbury, Missouri

The following presents the Annual Groundwater Monitoring Report for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. This serves as certification that the facility is in compliance with 40 CFR 257.90 (e) of the EPA CCR.

40 CFR 257.90 (e) states:

(e) Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report.

CERTIFICATION 257.90 (e)

The undersigned Professional Engineer (P.E.) is familiar with the requirements of 40 CFR Part 257. The above summarizes the status of the Groundwater Monitoring for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. I hereby certify that the facility is in compliance with 40 CFR 257.90 (e) and all information has been placed in the Operating Record. Notification of availability of this document should be provided to the State Director as required in section 257.107(h).

Name: Anika Careaga, P.E.	Seal:
Signature: <u>Anika Caro</u>	aga
Date: 1/29/2019	
Registration Number: 2005022085	
State: Missouri	



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1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundments groundwater monitoring sampling report is in accordance with the EPA CCR Rule.

In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater system.

The EPA CCR Rule requires the annual groundwater report be posted on-line by January 31st of the following year. The first report was due January 31, 2018. This report serves as the annual groundwater report for the 2018 sampling events that will be posted on-line by January 31, 2019. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. Empire will notify the MDNR "State Director" via e-mail when this document is posted on-line, as required in the CCR rule.

2.0 BACKGROUND DATA

The purpose of the groundwater monitoring plan is to monitor the groundwater quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of April/May and October/November. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017.

3.0 MAY 2018 SAMPLING EVENT

On May 2 and 3, 2018, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken. **Appendix A** contains the complete report for the May 2018 sampling event.

4.0 NOVEMBER 2018 SAMPLING EVENT

On November 15, 2018, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. For quality assurance and quality control measures, a duplicate sample at MW-7 was taken. **Appendix B** contains the full report for the November 2018 sampling event.



5.0 SUMMARY

This report is a summary of the 2018 sampling events and the findings of the statistical analysis of the results of the groundwater monitoring program at the Asbury Generating Station CCR Impoundments. Specific information of each sampling event can be obtained from the individual report which are included as appendices and have been placed in the Asbury Operating Record.



APPENDIX A

May 2018 Sampling Event

2018 Groundwater Monitoring, Sampling & Statistics **Per EPA CCR Rule (CFR § 257.90-.98)**

May 2018 Sampling Event

Asbury Generating Station CCR Impoundments Jasper County, MO

July 2018

Prepared For:

The Empire District Electric Company 602 S. Joplin Avenue Joplin, Missouri 64801





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1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundments groundwater monitoring sampling report is in accordance with the EPA CCR Rule.

In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater system (included in **Appendix 1**). Empire notified the MDNR "State Director" via email when this document was posted on-line, as required in the CCR rule.

The EPA CCR Rule requires the annual groundwater report be posted on-line by January 31st of the following year. The first report was due January 31, 2018. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. The annual groundwater report for the 2018 sampling events will be posted on-line by January 31, 2019.

The purpose of the groundwater monitoring plan is to monitor the ground water quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of May and October. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017 to determine if a statistically significant increase (SSI) has occurred. If an SSI is verified, additional evaluation is required to determine if the SSI was caused by the CCR impoundments.

On May 2 and 3, 2018, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken. These samples were preserved and submitted directly to the laboratory.

This report is a summary of the May 2018 sampling event and the findings of the statistical analysis of the results of the groundwater monitoring program at the Asbury Generating Station CCR Impoundments. Specific information of each sampling event can be obtained from the individual report which is part of the Asbury Operating Record.



2.0 SITE LOCATION

The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. The site is located approximately 5.5 miles north-northeast of Asbury, Missouri, about 14 miles north-northwest of Joplin, Missouri. A map showing the locations of the monitoring wells is on **Figure 2**.

2.1 History

In March 1996, five (5) groundwater monitoring wells, MW-1 through MW-5, were installed around the perimeter of the Asbury Generating Station CCR impoundments. Monitoring wells MW-1, MW-2 and MW-3 were installed to a total depth of between 27.0 to 28.5 feet below ground surface (bgs). Monitoring wells MW-4 and MW-5 were installed to a total depth of 48 feet bgs. Each of the five monitoring wells was equipped with 10.0-foot well screens. The five wells were then developed, purged, and sampled in 1996.

In 2003, two (2) additional groundwater monitoring wells were installed and identified as MW-6 and MW-7. Both wells had 2-inch diameter PVC well casings installed to an approximate total depth of 44 feet below ground surface. Both wells were installed with an above ground steel protective cover. No other construction details such as well screen lengths were available for these two (2) wells. In December 2015, two (2) additional groundwater monitoring wells were installed and identified as MW-5A and MW-6A.

All wells are registered with MDNR – Missouri Geological Survey Program.

2.2 Site Geology

Drilling and subsurface investigation activities at the Site and as part of the MDNR approved CCR landfill Detailed Site Investigation (DSI) for the adjacent landfill area identified three (3) primary geologic units at the Site. These geologic units include the surficial soil layer, Warner Sandstone (uppermost aquifer), and Riverton Shale (confining unit). The information presented herein includes the primary elements of a site characterization work plan consistent with the MDNR guidance.

<u>Surficial Soil</u>. Soils at the site consist of a surficial unit of cohesive soils (e.g., CL, SC, ML, and CH) underlain by Pennsylvanian-age bedrock. Soil thickness at the Site ranges from approximately 15-25 feet.

Warner Sandstone. The Warner Sandstone (Sandstone) is the uppermost bedrock unit in south portion of the Site. In the north area of the Site, the Sandstone is overlain by the Riverton Shale (Shale). Based on the DSI information, the Sandstone and Shale can occur as alternating layers. The Sandstone and Shale are gradational in places and transition from shaley sandstone to sandy shale. According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Warner Sandstone formation is described as follows: "Generally, the lower part is interbedded, very fine grained sandstone and claystone. The upper part is largely medium-bedded to massive channel fill sandstone. In places, the Warner consists primarily of shale and claystone, with only minor amounts of sandstone" and "ranges in thickness from 0 to 15m (49.2 ft.)."

The Sandstone is more than 25-30 feet thick in places and is generally medium hard and thin to medium bedded with occasional shale partings. The degree of induration of the Sandstone varies and generally increases with depth. Slug tests performed at selected DSI piezometers screened in



the Sandstone exhibited hydraulic conductivities ranging from approximately 1.3x10-4 cm/sec to 5.9x10-6 cm/sec. The slug test results are consistent with values for sandstone and shaley sandstone. The groundwater gradient is towards the east and Blackberry Creek.

Riverton Shale. Layers of the Riverton Shale (Shale) exhibited thicknesses ranging from approximately one foot to more than 10 feet. The Shale is generally dark gray to light gray. The Shale is mainly thin bedded with hardness ranging from soft to hard. Six packer tests were performed during the DSI to assess the hydraulic conductivity of the Shale. The packer test results ranged from approximately 3.2×10^{-6} cm/sec to 4.9×10^{-8} cm/sec. The packer test data indicates that the Shale is an effective confining unit.

According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Riverton Shale formation is described as "dark gray to black, fine-grained, relatively brittle shale and contains as many as three coal beds, each of which is underlain by underclay" and "varies in thickness from a featheredge to more than 90 feet".

<u>Unnamed Coal</u>. The Shale includes coal seams in places that range in thickness from a few inches to approximately 1.5 feet. The coal is generally black to dark gray.

2.3 Groundwater Monitoring Network Design

The groundwater monitoring system for the CCR impoundments consist of nine (9) groundwater monitoring wells. Two (2) wells are considered upgradient. Two (2) wells are considered sidegradient; one is only monitored for groundwater elevation. The remaining five (5) wells are considered downgradient.

The groundwater monitoring wells (MWs) at the Asbury Generating Station are equipped with individual dedicated poly tubing to be connected to a peristaltic pump/controller at the surface. Low-flow, micro-purge and sampling techniques and technology are utilized to collect groundwater samples from the subject wells. The groundwater sampling procedures are discussed in further detail below.

2.4 Groundwater Monitoring Network

The locations of the monitoring wells are shown on **Figure 2**. The groundwater monitoring system for the site consists of the following monitoring wells:

- MW-1 Sidegradient (water level only)
- MW-2 Upgradient
- MW-3 Upgradient
- MW-4 Downgradient
- MW-5 Downgradient
- MW-5A Downgradient
- MW-6 Downgradient
- MW-6A Downgradient
- MW-7 Sidegradient

2.5 Seasonal Variation

Historical groundwater elevation data has been limited. However, adequate lengths of well screen have been utilized during the construction of the wells to accommodate typical seasonal groundwater elevation variations seen in southwest Missouri.



2.6 Groundwater Flow Direction

Historically, the seasonally high potentiometric surface indicated the groundwater flow direction to the east. **Figure 3** is a potentiometric map for this May 2018 sampling event.

Originally MW-7 was thought to be a downgradient well but review of the potentiometric mapping from the eight background sampling events revealed that the well is actually a sidegradient well. Therefore, the designation for MW-7 has been changed from a downgradient to a sidegradient well for compliance monitoring.



3.0 BASELINE GROUNDWATER DATA

3.1 Baseline Data Collection

Per EPA CCR Rule § 257.94(b), the site initiated the detection monitoring program in January 2016 to include obtaining a minimum of eight (8) independent samples for each background and downgradient well. The eight (8) independent groundwater samples were obtained and analyzed as required by the CCR Rule under per the baseline groundwater monitoring plan. Background groundwater data was collected from January 2016 to August 2017.

Groundwater Monitoring Reports were completed for each sampling event and have been placed in the Operating Record. Summary tables of the results from each event are included in **Appendix 2**. A listing of each event is below:

- January 2016
- March 2016
- May 2016
- August 2016
- October 2016
- March 2017
- June 2017
- August 2017

Initial baseline monitoring was required at all monitoring wells. The sampling frequency was quarterly or more frequently for the first two (2) years. After the background data plus the first semi-annual sampling events, a reduced lower sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will be completed during the months of May and October.

The initial two (2) years of baseline and the first semi-annual detection monitoring included parameters listed in Appendix III and Appendix IV of the EPA CCR Rule. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. **Appendix 2** contains the list of constituents.

3.2 Baseline Data Analysis

Sanitas[™] for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas[™] training course and user manual. The background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**.

Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3). MW-3 is an up-gradient well. Trending was not removed at this time; otherwise the site would be below the minimum of eight background samples needed to run statistics.



4.0 GROUNDWATER SAMPLING EVENT

On May 2 and 3, 2018, eight (8) groundwater monitoring wells were sampled by Midwest Environmental Consultants (MEC) for the EPA CCR Rule Appendix III parameters. For quality assurance and quality control measures, a duplicate sample was taken at MW-5. The sampling protocol and methodology was to be conducted in accordance to the facility's Sampling and Analysis Plan. **Table 1** provides a list of the analytical methods employed by the subcontracted laboratory.

Table 1 – Analytical Methods								
Method	Description							
9056A	Anions, Ion Chromatography							
6020A	Metals (ICP/MS)							
SM 2540C	Solids, Total Dissolved (TDS)							
Field Sampling	Field Sampling							

Appendix 3 includes Monitoring Well Field Inspection sheets and field notes. The physical integrity of the wells was good. During sample collection each of the wells was monitored for pump discharge and formation recharge. Initially, a static water level for each well was recorded (Table 2). To ensure sufficient recharge while sampling, static water levels were collected during pumping. Prior to sample collection, field parameters for each well were measured with a flow-through meter. When the field parameters stabilized, samples for analytical testing were collected and placed on ice for hand delivery to the laboratory. At the conclusion of sample collection from each well, a final static water level measurement was obtained. The samples were collected in the appropriately pre-preserved sample containers and placed on ice for delivery.

Table 2 - Groundwater Sampling Field Parameters Summary During May 2018 Sampling Event										
WELL	STATIC WA (ft-B	гос)	PURGE RATE (mL/min)	STABILIZED pH						
	Initial	Final	(Pi.i						
MW-1*	6.26	NA	NA	NA						
MW-2	3.11	5.16	200	6.27						
MW-3	1.26	1.32	200	5.93						
MW-4	5.57	13.38	200	6.69						
MW-5	1.89	12.95	200	6.86						
MW-5A	9.21	17.66	200	7.38						
MW-6	8.77	16.65	200	7.17						
MW-6A	8.05	16.76	200	7.32						
MW-7	3.87	3.98	200	6.33						

^{*} Water Level Only N

Appendix 4 includes the initial analytical results for the sampling event. Included with this analytical report are sample information; chain of custody; wet chemistry data; and volatile data.

NA - Not Applicable



5.0 DATA VALIDATION PROCEDURES FOR GROUNDWATER MONITORING DATA

Midwest Environmental Consultants receives Data Packages from the analytical laboratory (Engineering Surveys and Services). The internal quality control/quality assurance case narratives and reported data are then reviewed. Generally the data validation procedures established by the U.S. Environmental Protection Agency *Contract Laboratory Program Functional Guidelines for Organic Data Review* and *Functional Guidelines for Inorganic Data Review* is followed. These guidelines are used to assign data qualifiers to the data. A formal data validation report for the site is not prepared; however, any significant issues are noted in the groundwater monitoring report.

MEC evaluates the data set for precision, accuracy, representativeness, comparability, and completeness (PARCC).

5.1 Precision

<u>Laboratory Precision</u>. Laboratory quality control procedures to measure precision consist of laboratory control sample (LCS) analysis and analysis of matrix spike/matrix spike duplicates (MS/MSD). These analyses are used to define analytical variability.

<u>Field Precision.</u> Analyses of duplicate samples are used to define the total variability (replicability) of the sampling/analytical system as a whole. Field replicates are collected at a rate of one per sampling event.

5.2 Accuracy

Accuracy is determined by calculating the percent recoveries for analyses of surrogate compounds, LCSs, continuing calibration check standards, and matrix spike samples. Acceptable percent recoveries are established for SW-846 and EPA methods. Field and laboratory blank analysis are also used to address measurement bias.

<u>Field Blanks.</u> Field blanks consisted of a trip blank and a field blank. One trip blank per cooler accompanies samples for volatile organic analyses.

<u>Laboratory Blanks.</u> Method blanks, artificial, matrix-less samples, are analyzed to monitor the laboratory analysis system for interferences and contamination from glassware, reagents, etc. Method blanks are taken through the entire sample preparation process. They are included with each batch of extractions or digestions prepared, or with each 20 samples, whichever is more frequent.

5.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely reflect site condition. Representativeness of the data is determined by comparing actual sampling procedures to those delineated in the field sampling plan, comparing results from field replicate samples and reviewing the results of field blanks. Field notes are reviewed as part of our data validation process.

5.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured by using established and approved



sample collection techniques and analytical methods, consistent basis of analysis, consistent reporting units, and analyzing standard reference materials.

5.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under controlled laboratory conditions. Completeness is defined as the valid data percentage of the total tests requested. Valid data are defined as those where the sample arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed chain-of-custody form. Furthermore, the sample must have been analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria were met.



6.0 STATISTICAL ANALYSIS

6.1 Sampling Results

The constituents with results above the laboratory reporting limits are included in **Table 3**. The Test America laboratory analytical results are included in **Appendix 4**.

	Table 3 – Constituents Identified Above Laboratory Reporting Limits													
During May 2018 Sampling Event														
Constituent	Units MCL MW-2 MW-3 MW-4 MW-5 MW-5A MW-6 MW-6A MV													
Appendix III														
Boron	mg/L	NA	0.13	<0.08J	<0.08J	0.31	0.4	0.38	0.44	0.26				
Calcium	mg/L	NA	33	99	250	88	210	250	170	480				
Chloride	mg/L	NA	110	47	13	5.4	23	12	23	45				
Fluoride	mg/L	4	0.28	0.22	0.1	<0.1	0.34	0.25	0.34	0.18				
рН	SU	NA	6.27	5.93	6.69	6.86	7.38	7.17	7.32	6.33				
Sulfate	mg/L	NA	88	510	610	130	880	990	730	1800				
Total Dissolved Solids	mg/L	NA	450	930	1500	590	1700	1800	1400	2800				

NA = Not Applicable

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

No constituents were detected above the Federal Safe Drinking Water maximum contaminant level (MCL) during the sampling event.

6.2 Statistical Analysis

Sanitas[™] for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas[™] training course and user manual. For most downgradient well constituents, non-parametric intrawell prediction intervals were run due to non-detectable levels in more than 50 percent of the samples or if data could not be adequately normalized. The Sanitas[™] output is included in **Appendix 5**.

Background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**. Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3), MW-3 is an up-gradient well. Trending was not removed at this time; otherwise the site would be below the minimum of eight background samples needed to run statistics.

Statistical analysis was then performed on the Appendix III constituents from the May 2018 sampling event compared to the established background dataset. Prediction interval analyses compare one or more observations to a limit set by background data. Inter-well analyses compare observations from upgradient background wells and their relation to the observations for the downgradient wells. Intra-well analyses compare background observations to current observations of the same well. Due to varying geology in the state of Missouri, intra-well analyses have been deemed a more appropriate method.

Statistical analysis results are presented below for those constituents determined to have an exceeded a prediction limit. However, EPA's "Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities," March 2009, EPA 530/R-09-007 is referenced



multiple times in the preamble of the EPA CCR regulations for groundwater sampling and analysis requirements. According to the EPA Unified Guidance, a prediction limit exceedance is not considered a statistically significant increase (SSI) until it is confirmed through retesting. SSIs generated by non-detectable results or with less than eight background events are considered statistically invalid.

Table 4 lists the parameters with exceedances of prediction limits during the May 2018 sampling event, the associated monitoring wells, if the exceedance is initial versus confirmed, the predicted limit, the measured concentration, and the MCL set forth in the National Drinking Water Regulations. The MCL is the highest level of a contaminant that is allowed in drinking water.

	Table 4 – Prediction Limit Exceedances Observed										
During May 2018 Sampling Event											
Constituent	Monitoring Well	Initial vs. Confirmed	Predicted Limit	Measured Concentration (mg/L)	Drinking Water MCLs (mg/L)						
	weii	Commined	(mg/L)	Concentration (mg/L)	(IIIg/L)						
NA	NA	NA	NA	NA	NA						

NA = Not Applicable

It should be noted that the power curve for these analyses is not considered strong (see **Appendix 5**). The data set consists of only 10 sampling events from January 2016 to May 2018. A small data set triggers a prediction limit exceedance when there is even a slight increase in concentration. Sanitas added notes to each prediction limit exceedance "Insufficient data to test for seasonality: data were not deseasonalized."

The EPA Unified Guidance Chapter 5.2.3 states "In groundwater data collection and testing, background conditions may not be static over time. Caution should be observed in removing observations which may signal a change in natural groundwater quality. Even when conditions have not changed, an apparently extreme measurement may represent nothing more than a portion of the background distribution that has yet to be observed. This is particularly true if the background data set contains fewer than 20 samples." Chapter 5.2.4 states "With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples". Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the initial prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

6.3 Results Interpretation

No intra-well prediction limits were exceeded during the May 2018 sampling event.

The October 2017 results for Total Dissolved Solids (MW-7) indicated an initial intra-well prediction limit exceedance for the listed monitoring well. However, this initial prediction limit exceedance was not confirmed during the May 2018 sampling event.

Included below is a discussion of the previous results for comparison.

October 2017

The result for Total Dissolved Solids (MW-7) indicated an initial intra-well prediction limit exceedance for the listed monitoring wells during the October 2017 sampling event. However,



the result was below the tolerance limit. There is no current primary (health based) MCL for total dissolved solids.

Review of the Total Dissolved Solids in the duplicate sample taken from the same well (MW-7) shows a result of 3,000 mg/L, which would not be an exceedance of the intra-well prediction limit of 3,069 mg/L. Due to the variances between the sample and the duplicate, the site will reevaluate MW-7 for Total Dissolved Solids during the next sampling event.

MW-7 is considered a sidegradient well, therefore no further action is needed for exceedances in sidegradient or upgradient wells.

6.4 Proposed Actions

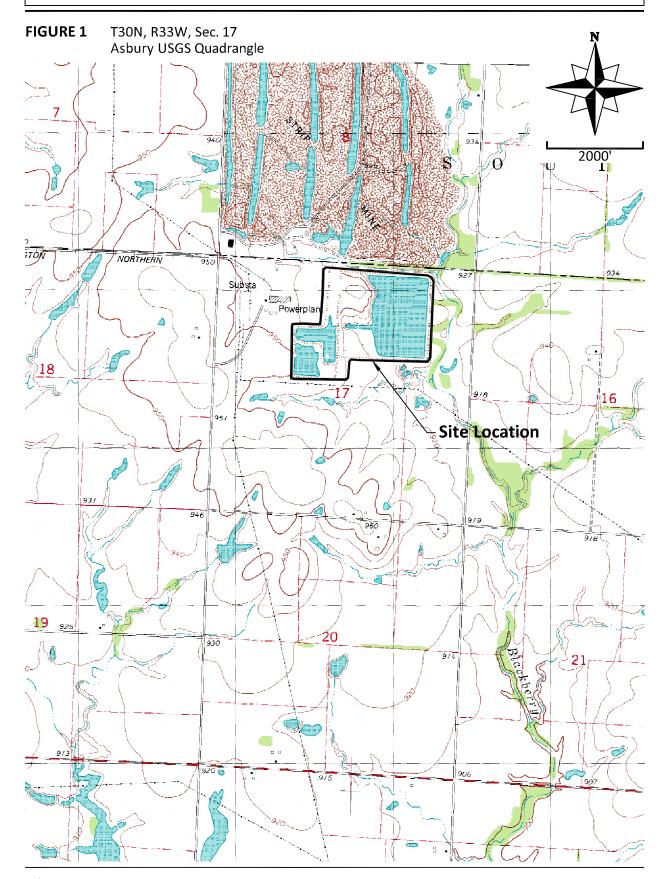
The site will continue to detection monitoring on a semi-annual basis. However, the constituents listed in Appendix IV will remain eliminated from the overall semi-annual detection monitoring plan after this review of the semi-annual groundwater sampling event analytical results, according to the EPA CCR Rule.



FIGURES



Asbury Generating Station CCR Impoundments Groundwater Sampling Event - May 2018 Site Location Map





Asbury Generating Station CCR ImpoundmentsGroundwater Sampling Event - May 2018
Groundwater Monitoring System

FIGURE 2







Well ID	Northing	Easting
MW-1	435791.18 *	2765165.35 *
MW-2	434428.46	2762861.37
MW-3	432842.77	2762720.80
MW-4	433709.99	2764938.99
MW-5	433659.27	2765966.23
MW-5A	434150.04	2765969.78
MW-6	434600.46	2765987.98
MW-6A	435071.44	2766010.46
MW-7	435505.42	2765993.13

^{*} Coordinate location is approximate

Legend

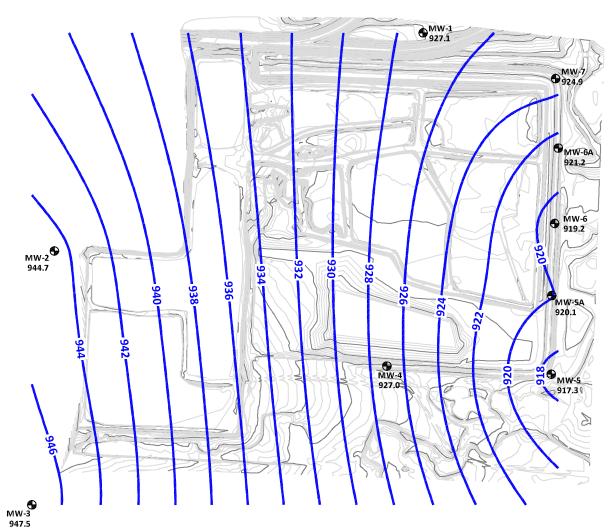
Monitoring Well



Asbury Generating Station CCR Impoundments Groundwater Sampling Event - May 2018 Groundwater Piezometric Surface Map

FIGURE 3





Well ID	Northing	Easting	Top Of Casing	Static Water Level (BTOC)	Static Water Level
MW-1	435791.18	2765165.35	933.4	6.3	927.1
MW-2	434428.46	2762861.37	947.8	3.1	944.7
MW-3	432842.77	2762720.80	948.8	1.3	947.5
MW-4	433709.99	2764938.99	932.6	5.6	927.0
MW-5	433659.27	2765966.23	919.2	1.9	917.3
MW-5A	434150.04	2765969.78	929.3	9.2	920.1
MW-6	434600.46	2765987.98	928.0	8.8	919.2
MW-6A	435071.44	2766010.46	929.3	8.1	921.2
MW-7	435505.42	2765993.13	928.8	3.9	924.9

Legend

Monitoring Well



APPENDIX 1

MDNR Groundwater System Approval

Missouri Department of

dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

NOV 0.2 2017

Mr. Kavan Stull, Senior Environmental Coordinator Empire District 602 South Joplin Avenue Joplin, MO 64802

RE: Site Characterization Workplan

Dear Mr. Stull:

The Missouri Department of Natural Resources has reviewed the document "Site Characterization Workplan" dated May 16, 2017. The site has undergone extensive characterization regarding construction of a coal combustion residual (CCR) landfill near the CCR impoundments. The department's Water Protection Program has determined, through consulting with the Missouri Geological Survey, this characterization is sufficient and may be used in whole to complete the required monitoring of the sub-surface conditions at the site. Additional submittal of site characterization is not necessary, as the previous submittal meets the requirement for special condition 19(b) of the Missouri State Operating Permit MO-0095362. The facility may proceed with the next step laid out in the permit; special condition 19(c). Enclosed is the Missouri Geological Survey concurrence.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to 10 CSR 20 1.020 and Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is by mail at Administrative Hearing Commission, United States Post Office Building, Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102, by phone at 573-751-2422, by fax at 573-751-5018, and by website at www.oa.mo.gov/ahc.



Mr. Kavan Stull Page 2

If you have any questions, please do not hesitate to contact Ms. Pam Hackler by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176, by phone at 573-526-3386; or by email at pam.hackler@dnr.mo.gov. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

Michael J. Abbott, Chief Operating Permits Section

MJA/php

Enclosure

c: Mr. Randall Willoughby, Southwest Regional Office

MEMORANDUM

DATE:

October 18, 2017

SWR18011 Jasper County

TO:

Pam Hackler- WPP- Industrial Wastewater Unit

FROM:

Fletcher N. Bone, Geologist, Environmental Geology Section, Geological Survey Program,

MGS

wie et it, peix

SUBJECT:

Site characterization for existing CCR

impoundments

Asbury Power Plant Site Characterization Work

Plan- CCR

37 21 22.66 Latitude, -94 35 4.79 Longitude,

Jasper County, Missouri

20174EDIASTY CS

October 18, 2017

The Missouri Geological Survey (MGS) has reviewed the documents titled, 'NPDES Permit MO-0095362 Asbury Power Plant, Jasper County, Missouri, Site Characterization Work Plan', prepared by Empire District Electric Company, dated September 8, 2017 and 'Site Characterization Work Plan, Coal Combustion Residuals Impoundments, Empire Electric Facility - Permit MO-0095362, Jasper County, Missouri, Geotechnology Project No. J021738.03', prepared by Geotechnology Inc., dated May 16, 2017. The MGS offers the following comment.

General Comment:

The MGS agrees that the existing Coal Combustion Residuals (CCR) impoundments (site 1) do not need further site characterization, at this time. The site characterization performed, as described in the Detailed Site Investigation Report (DSI), dated January 21, 2015, at the proposed CCR impoundment (site 2) that is approximately 1,000 feet south of the existing CCR impoundments (site 1), coupled with the geologic and hydrologic data provided that pertains to the existing CCR impoundments (site 1) (1996 to present data), provides adequate characterization of the geology and hydrology of the site 1. The geologic and hydrologic settings of both sites are similar, with geologic boring logs and potentiometric data of both sites being compared. The hydraulic conductivity testing conducted at the proposed CCR site (site 2) has demonstrated that there is a low potential for groundwater contamination for this area.

If you are in need of further assistance from our office or have questions regarding this evaluation please feel free to contact me at (573) 368-2161.



APPENDIX 2

Baseline Sampling Information

EPA CCR Rule

Appendix III to Part 257—Constituents for Detection Monitoring

Boron

Calcium

Chloride

Fluoride

рΗ

Sulfate

Total Dissolved Solids (TDS)

Appendix IV to Part 257—Constituents for Assessment Monitoring

Antimony

Arsenic

Barium

Beryllium

Cadmium

Chromium

Cobalt

Lead

Lithium

Mercury

Molybdenum

Selenium

Thallium

Radium 226 and 228 combined

1st Baseline Event – January 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7		
Appendix III												
Boron	mg/L	NA	0.33	<0.5 J	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J		
Calcium	mg/L	NA	57	74	220	84	200	250	140	570		
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38		
Fluoride	mg/L	4	0.43	0.47	0.31	0.28	0.30	0.24	0.35	<0.2 J		
рН	SU	NA	6.33	5.81	6.31	7.33	7.09	6.97	7.09	6.51		
Sulfate	mg/L	NA	260	360	1100	140	800	1000	600	1800		
Total Dissolved Solids	mg/L	NA	690	790	1900	590	1500	1800	1300	2800		
				Append	lix IV							
Antimony	mg/L	0.006	<0.002	<0.002 J								
Arsenic	mg/L	0.01	<0.002 J	0.01	<0.01 J	<0.02 J	<0.01	<0.01	<0.01	<0.01		
Barium	mg/L	2	0.044	0.0099	0.065	0.086	0.036	0.02	0.042	0.011		
Beryllium	mg/L	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.01 J	<0.01 J	<0.01 J	<0.01 J	<0.01	<0.01		
Cobalt	mg/L	NA	<0.01 J	<0.01 J	0.046	<0.002 J	0.018	0.0022	0.02	0.014		
Lead	mg/L	0.015	<0.002 J	<0.002	<0.01 J	<0.002 J	<0.002	<0.002	<0.002	<0.002 J		
Lithium	mg/L	NA	0.057	0.15	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J		
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.01 J	<0.002	<0.01 J	<0.002		
Selenium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Combined Radium	pCi/L	5	<0.477 J	<0.427 J	<2.08	<0.563 J	<0.392 J	<0.446 J	<0.306 J	<0.279 J		

<x = Less than reporting limit (nondetectable)</p>
J = Trace value seen above minimum detection limit but below reporting limit (trace)

2nd Baseline Event – March 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7		
Appendix III												
Boron	mg/L	NA	0.90	0.060	<0.25	0.29	0.29	0.34	0.34	0.29		
Calcium	mg/L	NA	120	92	260	94	190	250	160	620		
Chloride	mg/L	NA	180	70	15	4.4	23	9.0	36	34		
Fluoride	mg/L	4	0.28	0.28	0.10	0.38	0.31	0.23	0.31	0.16		
рН	SU	NA	5.82	5.68	6.72	7.15	6.94	6.79	6.98	6.22		
Sulfate	mg/L	NA	570	400	570	140	710	970	550	1800		
Total Dissolved Solids	mg/L	NA	1300	840	1600	590	1500	1800	1200	2900		
				Append	lix IV							
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002 J	<0.002	<0.002 J	<0.002		
Arsenic	mg/L	0.01	<0.002 J	0.024	0.0038	<0.002 J	0.0038	0.0026	0.0025	0.004		
Barium	mg/L	2	0.060	0.012	0.034	0.047	0.042	0.026	0.051	0.0089		
Beryllium	mg/L	0.004	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Cadmium	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Chromium	mg/L	0.1	<0.002	<0.002 J	0.0034	<0.002	<0.002	<0.002	<0.002	<0.002		
Cobalt	mg/L	NA	0.017	0.0095	0.021	<0.002 J	0.02	0.0061	0.0063	0.016		
Lead	mg/L	0.015	<0.002 J	<0.002 J	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002		
Lithium	mg/L	NA	0.20	0.15	0.074	0.074	0.14	0.22	0.14	0.30		
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002	<0.002 J	0.0041	<0.002 J	0.0038	<0.002		
Selenium	mg/L	0.05	<0.002	<0.002	<0.002	0.0021	0.0028	0.0031	0.0031	<0.002		
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Combined Radium	pCi/L	5	<0.337 J	<0.389 J	<0.84 J	<0.315 J	<0.336 J	<0.319 J	<0.348 J	<0.329 J		

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

3rd Baseline Event – May 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7			
Appendix III													
Boron	mg/L	NA	0.21	0.044	0.027	0.24	0.26	0.25	0.23	0.29			
Calcium	mg/L	NA	130	100	91	5	59	11	90	36			
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38			
Fluoride	mg/L	4	0.28	0.27	0.22	0.55	0.35	0.26	0.43	0.18			
рН	SU	NA	5.30	4.37	5.97	6.43	6.60	6.51	6.64	5.82			
Sulfate	mg/L	NA	160	540	820	150	920	1400	620	2400			
Total Dissolved Solids	mg/L	NA	500	800	1700	590	1500	1800	1100	2900			
	Appendix IV												
Antimony	mg/L	0.006	<0.002 J										
Arsenic	mg/L	0.01	0.0013	0.027	0.01	0.0043	0.01	0.007	0.0037	0.0082			
Barium	mg/L	2	0.021	0.01	0.025	0.045	0.037	0.041	0.04	0.021			
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001			
Cadmium	mg/L	0.005	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Chromium	mg/L	0.1	<0.002 J	<0.002 J	0.0025	<0.002 J							
Cobalt	mg/L	NA	0.0072	0.0073	0.0071	<0.0005J	0.00081	0.0035	<0.0005J	0.0037			
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001 J			
Lithium	mg/L	NA	<0.05 J	0.15	<0.05 J	0.074	0.16	0.31	0.12	0.22			
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002			
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0052	<0.005	<0.005			
Selenium	mg/L	0.05	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005 J	<0.005	<0.005			
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001			
Combined Radium	pCi/L	5	<0.355	<0.427 J	<0.386 J	<0.402 J	<0.377 J	<0.357 J	<0.334 J	<0.333 J			

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

4th Baseline Event – August 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7	
Appendix III											
Boron	mg/L	NA	0.19	0.057	0.067	0.27	0.27	0.29	0.27	0.22	
Calcium	mg/L	NA	38	79	110	74	180	220	130	430	
Chloride	mg/L	NA	120	77	35	6	35	12	65	49	
Fluoride	mg/L	4	0.25	0.15	0.3	0.26	0.31	0.23	0.37	0.22	
рН	SU	NA	6.04	5.73	7	7.17	7.04	6.88	7.14	6.29	
Sulfate	mg/L	NA	<0.005 J	<0.005	<0.005 J	<0.005 J					
Total Dissolved Solids	mg/L	NA	460	850	730	540	1500	1800	1100	2900	
Appendix IV											
Antimony	mg/L	0.006	<0.002 J								
Arsenic	mg/L	0.01	<0.001 J	0.013	<0.001 J	<0.001 J	0.001	<0.001 J	<0.001 J	<0.001 J	
Barium	mg/L	2	0.023	<0.01 J	0.012	0.035	0.031	0.014	0.037	<0.01 J	
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	
Cobalt	mg/L	NA	0.0052	0.0088	0.0038	<0.0005J	0.00075	<0.0005J	<0.0005J	0.015	
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001	
Lithium	mg/L	NA	<0.05 J	0.16	<0.05 J	0.078	0.16	0.22	0.11	0.34	
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	<0.005	0.0067	<0.005	
Selenium	mg/L	0.05	<0.005 J	<0.005	<0.005 J	<0.005 J					
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Combined Radium	pCi/L	5	<0.424 J	<0.465 J	<0.833	<0.441 J	<0.435 J	<0.45 J	<0.484 J	<0.418 J	

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

5th Baseline Event – October 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7	
Appendix III											
Boron	mg/L	NA	0.2	0.053	0.047	0.24	0.33	0.34	0.31	0.26	
Calcium	mg/L	NA	43	91	100	94	220	260	130	490	
Chloride	mg/L	NA	130	65	74	6	29	13	65	56	
Fluoride	mg/L	4	0.28	0.18	0.28	0.31	0.39	0.25	0.41	0.28	
рН	SU	NA	6.59	5.95	7.21	7.51	8.00	6.98	7.85	6.75	
Sulfate	mg/L	NA	99	470	120	120	1100	1100	570	1400	
Total Dissolved Solids	mg/L	NA	460	850	580	570	1500	1700	1100	2800	
Appendix IV											
Antimony	mg/L	0.006	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002 J	<0.002	
Arsenic	mg/L	0.01	<0.001	0.014	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001 J	<0.001 J	
Barium	mg/L	2	0.028	<0.01 J	0.02	0.03	0.033	0.013	0.037	<0.01 J	
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	
Cobalt	mg/L	NA	0.0051	0.0095	0.0013	0.00073	0.0072	<0.0005J	<0.0005J	0.014	
Lead	mg/L	0.015	<0.001 J	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	
Lithium	mg/L	NA	<0.05 J	0.17	<0.05	0.078	0.17	0.24	0.12	0.32	
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0066	<0.005	<0.005	
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005J	<0.005	
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Combined Radium	pCi/L	5	<0.436J	<0.478J	<0.535J	<0.503J	<0.498J	<0.464J	<0.453J	<0.424J	

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

6th Baseline Event – March 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7	
Appendix III											
Boron	mg/L	NA	0.22	0.052	0.057	0.23	0.29	0.33	0.36	0.26	
Calcium	mg/L	NA	38	93	250	86	200	260	170	500	
Chloride	mg/L	NA	130	52	19	5.3	29	11	19	39	
Fluoride	mg/L	4	0.21	0.12	<0.1 J	0.29	0.29	0.19	0.3	0.12	
рН	SU	NA	6.07	5.84	6.67	7.32	7.38	7.15	7.21	6.40	
Sulfate	mg/L	NA	130	540	630	150	1100	1000	720	1900	
Total Dissolved Solids	mg/L	NA	500	940	1600	620	1700	1900	1400	3000	
Appendix IV											
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Arsenic	mg/L	0.01	<0.001	0.037	0.0022	0.0013	0.0014	<0.001 J	0.0043	<0.001 J	
Barium	mg/L	2	0.021	0.011	0.021	0.033	0.026	0.015	0.027	<0.01 J	
Beryllium	mg/L	0.004	<0.001 J	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 J	
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.1	<0.002 J								
Cobalt	mg/L	NA	0.0071	0.0097	0.0096	<0.0005J	0.0022	0.0024	0.0017	0.014	
Lead	mg/L	0.015	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	
Lithium	mg/L	NA	<0.05 J	0.17	0.072	0.076	0.16	0.23	0.14	0.32	
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molybdenum	mg/L	NA	<0.005 J	<0.005 J	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005	
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Thallium	mg/L	0.002	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Combined Radium	pCi/L	5	0.575	1.63	0.287	1.50	0.803	2.68	1.73	1.62	

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

7th Baseline Event – June 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7	
Appendix III											
Boron	mg/L	NA	<0.08J	<0.08J	0.034	0.27	0.31	0.37	0.36	0.26	
Calcium	mg/L	NA	42	100	300	89	200	260	160	470	
Chloride	mg/L	NA	130	54	110	5.4	23	12	26	48	
Fluoride	mg/L	4	0.43	0.19	0.18	0.35	0.42	0.3	0.42	0.21	
рН	SU	NA	6.35	5.78	6.62	7.22	7.04	6.93	7.09	6.41	
Sulfate	mg/L	NA	78	650	1400	180	940	1300	780	2400	
Total Dissolved Solids	mg/L	NA	450	950	2000	610	1600	1800	1400	2900	
	Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Arsenic	mg/L	0.01	<0.001J	0.1	0.0032	<0.001J	0.0037	<0.001	0.0018	<0.001	
Barium	mg/L	2	0.03	0.016	0.048	0.04	0.026	0.017	0.025	<0.01J	
Beryllium	mg/L	0.004	<0.001	0.0031	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.1	<0.002	<0.002	<0.002J	<0.002	<0.002	<0.002	<0.002	<0.002	
Cobalt	mg/L	NA	0.004	0.0088	0.0042	<0.0005J	0.0045	0.00087	0.0059	0.0015	
Lead	mg/L	0.015	0.0033	0.001	0.0074	<0.001	<0.001	<0.001	<0.001	<0.001	
Lithium	mg/L	NA	<0.05J	0.18	0.053	0.085	0.18	0.25	0.15	0.34	
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005	<0.005J	<0.005	<0.005J	<0.005	
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Thallium	mg/L	0.002	<0.001	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	
Combined Radium	pCi/L	5	<0.397J	<0.337J	<0.403	<0.291J	<0.343J	<0.414J	<0.33J	<0.314J	

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

8th Baseline Event – August 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.16	<0.08J	<0.08J	0.28	0.33	0.34	0.38	0.27
Calcium	mg/L	NA	43	98	83	57	220	250	180	510
Chloride	mg/L	NA	130	45	8.1	5.3	23	12	26	38
Fluoride	mg/L	4	0.26	0.17	0.32	0.27	0.45	0.25	0.4	0.22
рН	SU	NA	6.2	5.7	6.7	7.3	7	7.2	7.1	6.3
Sulfate	mg/L	NA	82	550	63	140	920	1100	730	2200
Total Dissolved Solids	mg/L	NA	450	960	450	530	1600	1800	1400	2900
				Append	lix IV					
Antimony	mg/L	0.006	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002
Arsenic	mg/L	0.01	<0.001J	0.013	<0.001J	0.002	<0.001J	<0.001J	<0.001J	<0.001J
Barium	mg/L	2	0.024	0.01	0.018	0.027	0.023	0.018	0.021	<0.01J
Beryllium	mg/L	0.004	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001J
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002J	<0.002	0.0026	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0036	0.01	0.00067	<0.0005J	0.0023	<0.0005J	0.0051	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.17	<0.05J	0.073	0.18	0.22	0.15	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005J	<0.005J	<0.005J	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.42J	<0.417J	<0.473	<0.476J	<0.383J	<0.389J	<0.291J	<0.346J

NA = Not Applicable

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)



APPENDIX 3

Monitoring Well Field Inspection Sheets and Field Notes

	Facility: Asbury CCR (Permit #) Monitoring Well ID: MW-									
Purge In	formation:					Sample	Blind [Ouplicate	Field Bla	nk
	of Well Purge	: Peristalti	c Pump with	3/8 - inch Di	ameter Tu	ubing				
		Actual	Purge Volum	e Removed:		mL pos	st pump calib	ration .		
Date / Ti	me Initiated:	5- 2	-18 @	1:58	Date /	Time Com	pleted: <u>5 -</u>	- 2 -18	@	
Well Pur	ged To Dryne	ss?: Y //		Petro	leum or G	as Detecte	ed? Y N			
Purge Da	ita:									
Time	Purge Rate (mL/min)	Cumulati Volume (mL			Condi	ecific uctivity /cm)	Dissolved Oxygen	ORP		Other (Color Clarity Odor)
1:03	200	,					(mg/L)	(MV)		
202	200		16,50	7 6,26	060	7	0.65	119,		Char
:04			10,48	6,29	0.60	04	0,58	115.9		1
:06			16.5				0.51	114.0		
109	1			1						1,
00	V		6.49	6,27	O.E	03	0.30	113,4		4
					F	ield Inspec	tion	Good	<u>Fair</u>	Poor
Time san	amlod 3	10				ccess		(G)	F	P
Time sampled						ad Condition		G	E	Р -
						asing Cond ocking Cap		G G	F	P -
Weather	Conditions	Ath Cloya	wind,	1, 750/	∠ R	iser Condit		G	(P)	P
			//	,						
	vel Start	211	&			/ell ID Visib		Yes V Y	N	N/A
Water Le	vel Start	7.11			St	tanding Wa	ater	Υ	(N	N/A
			. <i>1</i>		_	lear of We		(Y	N	N/A
Water Le	vel Finish	5,16				leasuring F		_		N/A
water re	vei rinish	2,10					with MDNR e Performed	Y	(N	
							ation Norma		N N	N/A N/A
Name (M	IEC Field Sam	pler): Ryan (Ortbals and R	tick Elgin			Calibration N	ormal	N	N/A
•	'	1	111	1			nent Needed	Y	av	N/A
	1	61	4		A	ny deviatio	ons from SAP	Υ	/ N	/ N/A
Sampler :	Sampler Signature Sediment Thickness Checked Y N/A									
Ulintant	1 100 1 1	0								
Constit	Data: Avera	ge of sampli		DAMAZ 4	D 4341 3	0.004.0	D.4111. a			20016
pH	uciil		Units S.U.	MW- 1 NO TEST	MW-2 5.83	MW-3 5.08	6.30	MW-5	MW-5A	MW-6
-	Conductance	9	umhos/cm	GW	0.786	1.132	2.083	6.83 0.841	6.82 1.769	6.72 1.900
	Vell Depth		ft	Level	0.700	1.132	2,003	0.041	1.703	1.300
	e GW Depth		ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
	e GW Drop		ft	2,		1	0.55	4.02	5.52	00
2 Syste	m Volumes			DON'T	000	800	800	800	800	800
(Min Pu	urged Amoun	t)	mL	SAMPLE	800					

Facility: Asbury CCR (Permit #							/ell ID: MW		T et dans		
Purge In	formation:					Sample	Blind D	uplicate	_ Fleid Bla	nk	
Method	of Well Purge	:: Peristalti	ic Pump with	3/8 - inch Di	iameter Tu	ıbing					
		Actual	Purge Volume	Removed:		mL pos	t pump calib	ration .			
Date / Ti	me Initiated:	5- 2	-18 @	1:17	Date /	Time Com _l	pleted: <u>5 –</u>	-18	@ 2ic	79	
	ged To Dryne				leum or G		^)			
Purge Da	ata:										
Time	Purge Rate (mL/min)	Cumulati Volume (mL		pH (SU)	Condu	cific ictivity /cm)	Dissolved Oxygen (mg/L)	ORP (MV)		Oth (Cold Clari	or ity
119	200		18.00	5.95	1.03	,	0.76	110,5		Raches	h
:a)			17.91		103		0.81	1099		1	7
.23			17.7	3 5.91	1.02	0	0.86	1035			
:05			17,5		1,02		0.78	400			
640	4/		1019	0,707	1,00		V, 10	1713			_
FIN					Fi	eld Inspec	tion	Good	<u>Fair</u>	Poor	_
Time sampled 1:30					Ac Pa	ccess ad Conditions asing Cond	on	G G	F F F	P P P	
Weather	Conditions /	Partl Co	dy Wind	1 75	et Lo	ocking Cap ser Condit		G G	Æ,	P	
	_		11	/ /	<u>FI</u>	eld Inspec	<u>No</u>				
Waterle	evel Start	1 26				ell ID Visib anding Wa		Y Y	ZN ZN	N/A	
	.ver otare	1.000				ear of Wee		æ	N) N/A N/A	
\A/atov I a	evel Finish	132	1			easuring P		Ø	N	N/A	
water te	ever Finish	10101				-	with MDNR e Performed	Y	N	N/A	
	- C						ation Norma		N	N/A	
Name (M	1EC Field Sam	pler): <u>Ryan (</u>	Ortbals and Ri	ck Elgin			Calibration No	ormal 🏈	N	N/A	
		1	XI	4		•	ent Needed ons from SAP		N	N/A N/A	
						ickness Chec	ked Y	N	N/A		
Historica	I Data: Avera	ge of sampli	ing events								
Constit		Be et sampi	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	
рН			S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72	
Specific Conductance umhos/cm GW			0.786	1.132	2.083	0.841	1.769	1.900			
Total Well Depth ft Level											
	e GW Depth		ft	Only	1.24	0.4	5.39	1.32	6.92	7.86	
	e GW Drop		ft			000					
	m Volumes	+)	mL	DON'T	800	800	800	800	800	800	

Facility:	Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- Sample Blind Duplicate Field Blank									
_	formation: of Well Purge	: Peristalti	c Pump with 3	/8 - inch Dia	meter Tul	/	Billio D	upiicate [] Field bid	
		Actual	Purge Volume	Removed: _		mL pos	st pump calibi	ration .		
Date / Ti	me Initiated:	5- 3	-18 @ §	3:35	Date / T	ime Com	pleted: 5-	-18	@	
Wall Dur	ged To Dryne	2: V / A		Dotrol	011m on Co	. Dotosto	do v an			
		ssr. T/		Petron	eum or Ga	s Detecte	ed? Y N			
Purge Da	ita:				Ī	Ī			1	
Time	Purge Rate (mL/min)	Cumulati Volume (mL		pH (SU)	Spec Conduc (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color Clarity Odor
8:19	200		15.8	3 6,53	1.56	20	115	141.6		asol
:16			15.88		1.4		0.87	118.0		1
:18			15,78		14		PD	101,5		
7,20			15,78		1.4		0.65	79,4		
Water Le Water Le Name (N	evel Start evel Finish MEC Field Sam Signature al Data: Avera	5.57 1 13.38 pler): Ryan	Ortbals and Ric	ck Elgin	Ac Pa Ca Lo Ris Fie W St: Clo M Sp M De Eq Re Ar	aintenand contamir uipment developn y deviation diment Tl	on dition o & Lock tion ction ble dater eeds Point e with MDNR ce Performed nation Norma Calibration Norma Calibration Norma hickness Chec	ormal Y Y Y ked Y		N/A
Consti			Units	MW- 1	MW-2	MW-3		MW-5	MW-5A	MW-6
рН			S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
	ic Conductano	e	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
	Well Depth		ft	Level						
			1.24	0.4	5.39	1.32	6.92	7.86		
	ge GW Drop		ft							
	em Volumes urged Amour	it)	mL	DON'T SAMPLE	800	800	800	800	800	800

- Controller very random @ beginning, raining - Stuble at end of readings

				Field S	amplin	g Log				
Facilie	A alaman e	CD /D-	ш	AV.		tameter w \$47	JUID BASA	5		
racility:	Asbury (CK (Permit	#		Mon	itoring We	ell ID: MW	uplicate	Field Black	nk 🗍
Purge Inf	ormation:					Sample [X Billia D	uplicate	rieiu biai	
_		: Peristaltion	c Pump with 3	3/8 - inch Dia	meter Tub	oing		-		
		Actual I	Purge Volume	Removed: _		mL post	pump calibr	ation .		
Date / Tir	me Initiated:	5- 3	-18 @		Date / T	ime Compl	leted: <u>5 –</u>	-18 (ā	
Well Pur	ged To Dryne:	ss?: Y / N	ł	Petrole	eum or Ga	s Detected	? Y/N			
Purge Da	ta:									
Time	Purge Rate (mL/min)	Cumulati Volume (mL		pH (SU)	Spec Conduc (mS/	tivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
8:57	200		15.6 H	7.39	0.71	29	4, al	871		Cleat
179	1		idical		0.70		3,55	3/2,2		1
Page 191				14 701			4 2 2			
9:01		Reconnecte	B157		0.70		3,35	474.9		
407	U	Reconnecte	15,52	5.03	0:60		3,28	9a8.8		V
9:05		book	on	bark	of	3	shept			
			Dug	ricote		eld Inspect	ion	Good	<u>Fair</u>	Poor
Time sampled 9:05 9:15						cess		GG GG Yes	F	P
Time san	npiea	700	2,9	-10		d Condition			F F	P P
						sing Conditions		G	Ø	P P
Weather	Conditions (loud, 1	Pane. 1	630F		er Condition		G	F	P
	_	11	Rainy, E			eld Inspect		Yes	No	N/A
		1 pm		å.		ell ID Visibl		Υ	N) N/A
Water Le	evel Start	1.90			Sta	anding Wat	ter	×	N	N/A
			/			ear of Wee		Y	N	N/A
		1200	-			easuring Po		(4)	N	N/A
Water Le	evel Finish	170)			•	with MDNR Performed	Y Y	CN	N/A N/A
							e Perrormeo ation Norma	1 10	N	N/A N/A
Name (A	AFC Field Sam	nler). Rvan	Ortbals and Ri	ick Flain			alibration No		N	N/A
realite (ii	TECTICIO SOLL	pici). <u>ityuii</u>	OTEDAIS GITA III	/			ent Needed	Y	(N	N/A
	- /		MAG				ns from SAP	Υ	N	/ N/A
Sampler	Signature <u>M</u>	un t	DU		Se	diment Thi	ickness Chec	ked Y	N	N/A
Historica	al Data : Avera	ge of sampl	ing events							
Consti		Be or oarribi	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH S.U. NO TEST				5.83	5.08	6.30	6.83	6.82	6.72	
Specific Conductance umhos/cm GW				0.786	1.132	2.083	0.841	1.769	1.900	
Total Well Depth ft Level										
Average GW Depth ft Only			1.24	0.4	5.39	1.32	6.92	7.86		
Average GW Drop ft										
2 Syste	em Volumes			DON'T	900	800	800	800	800	800

800

SAMPLE

mL

(Min Purged Amount)

						•		. 1		
Facility:	Asbury C	CCR (Permit#)	Moni	toring W	ell ID: MW	_ 5/+	Field Blai	nk .
Purge In	formation:						7		J.	
_		: Peristaltic P	ump with 3/	8 - inch Dia	meter Tubi	ng				
		Actual Pur	ge Volume R	emoved: _		mL post	t pump calibr	ation .		
Date / Ti	me Initiated:	5- 3	-18 @		Date / Ti	ne Comp	oleted: _5_	-18 (<u>a</u>	
Well Pur	ged To Drynes	ss?: Y / N		Petrole	eum or Gas	Detected	d? Y/N			
Purge Da	ata:			T					1	
Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp.	pH (SU)	Specif Conduct (mS/c	ivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity Odor)
10:03	200		15,604	7.36	1.587	7	2.35	90.0		Clago
:05			15,67	7,38	1.58	7	व.वव	77.6		
707			15.65	7.38	1,58	Eq.	1,94	7//		
:09	1		15,64	7,38	1.58	8	1.96	64.3		V
Water Le Water Le Name (N	evel Start evel Finish MEC Field Sam Signature	Cloudy, K	bals and Rick		Acc Pad Cas Loc Rise Fiel We Star Clea Me Spli Ma Dec Equ Red Any	Condition Contamining Condition Cond	on ition & Lock ion tion ole ater eds	ormal Y Y Y	Fair F F NO N N N N N N N N N N N N N N N N N	Poor P P P P N/A
Consti		Re or sampling	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
рН	IN WELL			NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
	ic Conductano	e III	mhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
	Well Depth		ft	Level						
Average GW Depth ft Only		1.24	0.4	5.39	1.32	6.92	7.86			
Average GW Drop ft										
2 Syste	em Volumes Purged Amour	it)	ml	DON'T SAMPLE	800	800	800	800	800	800

Facility:	Facility:Asbury CCR (Permit #)									
_	ormation: of Well Purge	Peristalti	c Pump with :	3/8 - inch Dia	ımeter Tuk	7	XI Bling D	ирисате	rieid biar	ik [].
		Actual	Purge Volume	Removed:		mL post	pump calibr	ration .		
Date / Tir	me Initiated:	5-	-18 @		Date / T	ime Compl	eted: <u>5 –</u>	-18 (<u>a</u>	
Well Pur	ged To Drynes	ss?: Y / N	1	Petrole	eum or Ga	s Detected?	? Y / N			
Purge Da	ta:									
Time	Purge Rate (mL/min)	Cumulati Volume (mL	1	pH (SU)	Spec Conduc (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
10:44	200		19,24	7.19	160	3	3,64	140,7		Clear
46	1		15.31	7.5	1.61	3	3,56	126,09		
48			15,20	7,20	1,61		3.41	112,0		
:50	2)		15,27			V 5	3,40	104,4	1	
										1
Time sampled 10:55 Weather Conditions Rapy 700 t Water Level Start 9:77 Water Level Finish 16:65						Field Inspection Access Pad Condition Casing Condition Locking Cap & Lock Riser Condition Well ID Visible Standing Water Clear of Weeds Measuring Point Split sample with MDNR Maintenance Performed Good Fair Pood F P P P P P P P P P P P P P P P P P P				
Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin Equipment Calibration Normal Redevelopment Needed Any deviations from SAP N N N N N N N N N N N N N						N/A N/A N/A N/A N/A				
Historica	l Data: Avera	ge of sampl	ing events							
Constit	tuent		Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
рН				5.83	5.08	6.30	6.83	6.82	6.72	
	Specific Conductance umhos/cm GW			0.786	1.132	2.083	0.841	1.769	1.900	
Total Well Depth ft Level										
			1.24	0.4	5.39	1.32	6.92	7.86		
Average GW Drop ft										
2 System Volumes mL DON'T			800	800	800	800	800	800		

Facility:	Monito Sa	ring We	Blind D	uplicate	Field Blank	<u> </u>				
	ormation: of Well Purge	Peristaltic	Pump with 3/	/8 - inch Dia			ť			1
		Actual P	urge Volume F	Removed:	n	nL post	pump calibr	ation.		
Date / Tir	ne Initiated:	5 –	-18 @		Date / Tim	e Comp	leted: <u>5 –</u>	-18- @	E	
	ged To Drynes		^		eum or Gas D					
Purge Da	ta:				T			T		T
Time	Purge Rate (mL/min)	Cumulativ Volume (ml)	Temp.	pH (SU)	Specific Conductiv (mS/cm	vity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
11:23	200		15.13	7,33	1.395	3	4.93	177.4		Clear
:a4			15,17	77,41	1.398	3	48491	159.7		
,2,6			15,13	7.36	1,396		4,60	153,2		
128			15.07	7.3?	1,39	5	461	151.0		
Water Le Water Le Name (N	evel Start evel Finish MEC Field Sam Signature	Ramy, B.05 16 Inpler): Ryan (Ortbals and Ric	ck Elgin	Acce Pad 0 Casir Locki Riser Field Well Stan Clear Mea: Split Mair Decc Equi Rede Any Sedir	Condition g Condit	on ition & Lock ion tion ile oter	ormal Y	Fair F F F F NO Z Z Z Z Z Z Z Z Z Z Z Z Z Z	Poor P P P P N/A
		age of sampl	ing events for: Units	5/16 + 6/17 MW- 6A	7 MW-7			T		
Consti	tuent		S.U.	6.87	6.12					
	ic Conductan	ce	umhos/cm	1.601	2.699					
	Total Well Depth ft									
Average GW Depth ft 7.28			3.04							
Average GW Drop ft										
2 System Volumes mL 800					800					

MW-1 6.26'

Field Sampling Log

					,		T/		
Facility: _	Asbury C	CR (Permit	#)		Vell ID: MW			
					Sample	Blind D	uplicate	Field Blank	<u> </u> .
Purge Info						/ ~			
Method o	f Well Purge	: Peristaltic	Pump with 3/	8 - inch Dia	meter Tubing	U			
		Actual P	urge Volume f	Removed:	mL po	st pump calib	ration.		
Data / Tim	an Initiated:	E _	10 @		Date / Time Con	noleted: 5 –	-18- @		
Date / III	ne minateu:	_5	-10 W		Date / Time con	ipicteds_			:
Well Purg	ed To Dryne	ss?: Y / N		Petrole	eum or Gas Detecto	ed? Y/N			
Purge Da	ta:						r- T		
									Other
	Purge	Cumulativ	e		Specific	Dissolved			(Color,
	Rate	Volume	Temp.	рН	Conductivity	Oxygen	ORP		Clarity,
Time	(mL/min)	(ml)	(°C)	(SU)	(mS/cm)	(mg/L)	(MV)		Odor)
12:09	200		15,40	634	2253	,97	225.4		C
:07			15.45		4 555	.75	203.1		
:09			15,54			.77	221,5		
; (1			15,52		2.264	, 73	220.0		
				W. 7					
		l			Field Inspe	ection	Good	<u>Fair</u>	Poor
			12:	15	Access		(G)	F	P
Time can	npled		(≪ .		Pad Condit	tion	6	F	Р
THITE Sari	ipieu				Casing Cor		G		Р
		0	· = 1		Locking Ca		G	F	6
Weather	Conditions_	Rainy 1	650F		Riser Cond		(G ²)	r F	P
W Cugici		11			Field Inspe	ection	Yes O Y	No	N/A
		001	-1		Well ID Vis	sible	60	N	N/A
Water Le	evel Start	3.85	7		Standing V	Vater	Y	(N)	N/A
					Clear of W	'eeds	(A)	, N	N/A
		7	mal		Measuring	Point	60	N	N/A
Water Le	evel Finish	2	98		Split samp	le with MDNF			N/A
			•			nce Performed			N/A
						ination Norm	100	N	N/A
Name (N	AEC Field San	npler): Ryan (Ortbals and Ric	ck Elgin		t Calibration I		N	N/A
		1	-AI			ment Needed		(N	N/A
	0	$M \subset$	IAI		,	tions from SA		(N	N/A N/A
Sampler	Signature	Hope -	V Y		Sediment	Thickness Che	ecked Y	TAL.	N/A
Historica	al Data: Aver	age of sampl	ing events for:	5/16 + 6/17	7				
Consti			Units	MW- 6A	MW-7				
рН			S.U.	6.87	6.12				
Specifi	ic Conductan	ce	umhos/cm	1.601	2.699	_			
Total \	Well Depth		ft						
Averag	ge GW Depth		ft	7.28	3.04				
Averag	ge GW Drop		ft						
2 Syste	em Volumes		mL.	800	800				
III da at e	1 6	. 3	1116				1 1		

(Min Purged Amount)

i estamerica Nashville

2960 Foster Creighton Drive Nashville, TN 37204

Chain of Custody Record



Phone (615) 726-0177 Fax (615) 726-3404 Carrier Tracking No(s): COC No: Client Information Gartner, Cathy 490-46712-15725.1 Client Contact: E-Mail: Page: Mr. Rick Elgin cathy.gartner@testamericainc.com Page of Company: Job #: Midwest Environmental Consultants **Analysis Requested** Due Date Requested: Preservation Codes: 2009 East McCarty Street Suite 2 A - HCL M - Hexane TAT Requested (days): B - NaOH N - None Jefferson City C - Zn Acetate O - AsNaO2 State, Zip: 9056A_ORGFM_28D - Chloride, Fluoride, Sulfate D - Nitric Acid P - Na2O4S MO, 65101 E - NaHSO4 Q - Na2SO3 Phone: F - MeOH R - Na2S2SO3 G - Amchlor 573-636-9454(Tel) S - H2SO4 Purchase Order not required H - Ascorbic Acid T - TSP Dodecahydrate 2540C_Calcd - Total Dissolved Solids WO #: I - Ice U - Acetone relgin@mecpc.com J - DI Water V - MCAA Project Name: K-EDTA W - ph 4-5 Project #: L-EDA Empire District CCR Pond Z - other (specify) 49010011 9315_Ra226, 9320_Ra228 Site: SSOW# Other: ō Total Number Matrix Sample Type S≔solid, Sample (C=comp, Sample Identification Sample Date Time G=grab) BT=Tissue, A=Air Special Instructions/Note: Preservation Code: N D N MW-2 MW-3 1:30 Field pH: mw-4 7 Field pH: 8:25 MW-5 7 Field pH: 9:05 MW-5A Field pH: 10:10 MW-6 Field pH: 10:55 MW-6A Field pH: 11:30 7 Field pH: 12:15 Field pH: Field pH: Field pH: Possible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Month Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological Archive For_ Deliverable Requested: I, II, III, IV, Other (specify) Special Instructions/QC Requirements: 6020A* Sb,As,Ba,Be,B,Cd,Ca,Cr,Co,Pb,Li,Mo,Se,Tl Empty Kit Relinquished by: Date: Time: Method of Shipment: Relinquished by: Date/Time: Company Received by: Date/Time: Company Relinquished by: Received by: Company Relinquished by: Date/Time: Company Received by: Date/Time: Company Custody Seals Intact: Custody Seal No .: Cooler Temperature(s) °C and Other Remarks: Δ Yes Δ No



APPENDIX 4

Analytical Results from Lab



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Nashville 2960 Foster Creighton Drive Nashville, TN 37204 Tel: (615)726-0177

TestAmerica Job ID: 490-151319-2

Client Project/Site: Empire District CCR Pond

Sampling Event: Asbury Ash Pond

For:

Midwest Environmental Consultants 2009 East McCarty Street Suite 2 Jefferson City, Missouri 65101

Attn: Mr. Rick Elgin

CathyGartner

Authorized for release by: 5/22/2018 3:27:19 PM

Cathy Gartner, Project Manager II (615)301-5041

cathy.gartner@testamericainc.com

·····LINKS ······

Review your project results through

Total Access

Have a Question?



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

TestAmerica Job ID: 490-151319-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-151319-1	MW-2	Water	05/02/18 02:10	05/04/18 16:08
490-151319-2	MW-3	Water	05/02/18 01:30	05/04/18 16:08
490-151319-3	MW-4	Water	05/03/18 08:25	05/04/18 16:08
490-151319-4	MW-5	Water	05/03/18 09:05	05/04/18 16:08
490-151319-5	MW-5A	Water	05/03/18 10:10	05/04/18 16:08
490-151319-6	MW-6	Water	05/03/18 10:55	05/04/18 16:08
490-151319-7	MW-6A	Water	05/03/18 11:30	05/04/18 16:08
490-151319-8	MW-7	Water	05/03/18 12:15	05/04/18 16:08
490-151319-9	Duplicate	Water	05/03/18 09:15	05/04/18 16:08
490-151319-10	Field Blank	Water	05/03/18 08:40	05/04/18 16:08

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Case Narrative

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Job ID: 490-151319-2

Laboratory: TestAmerica Nashville

Narrative

Job Narrative 490-151319-2

Comments

No additional comments.

Receipt

The samples were received on 5/4/2018 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 3.8° C, 3.9° C and 4.2° C.

Revised analysis list is per client request.

HPLC/IC

Method(s) 9056A: The method blank for analytical batch 490-513822 contained Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 490-513822 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 9056A: The method blank for analytical batch 490-514018 contained Fluoride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The method blank for analytical batch 490-514018 contained Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The following samples were diluted due to the nature of the sample matrix: MW-2 (490-151319-1), MW-3 (490-151319-2), MW-4 (490-151319-3), MW-5 (490-151319-4), MW-5A (490-151319-5), MW-6 (490-151319-6), MW-6A (490-151319-7), MW-7 (490-151319-8) and Duplicate (490-151319-9). Elevated reporting limits (RLs) are provided.

Method(s) 9056A: The method blank for analytical batch 490-514022 contained Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: Due to the nature of the sample matrix, a matrix spike / matrix spike duplicate (MS/MSD) was not analyzed with 490-514022. However, the laboratory control sample / laboratory control sample duplicate (LCS/LCSD) recoveries were within the acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Definitions/Glossary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Qualifier Description

TestAmerica Job ID: 490-151319-2

Qualifiers

HPLC/IC Qualifier

F1	MS and/or MSD Recovery is outside acceptance limits.
В	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MADA	Minimum Data stable Astirity (Dadie showsists)

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit ML Minimum Level (Dioxin) NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

PQL **Practical Quantitation Limit**

QC **Quality Control**

RER Relative Error Ratio (Radiochemistry)

RLReporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) TEQ

TestAmerica Nashville

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Client Sample ID: MW-2

Date Collected: 05/02/18 02:10

TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-1

Matrix: Water

Date Received: 05/04/18 16:0)8							Matrix	
Method: 9056A - Anions, lo Analyte	_	aphy Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Chloride			5.0	1.0	mg/L		<u> </u>	05/10/18 17:30	
Fluoride	0.28		0.10	0.010	-			05/09/18 22:39	
Sulfate	88	В	5.0	0.15	mg/L			05/10/18 17:30	į
- Method: 6020A - Metals (IC									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Boron	0.13		0.080	0.030	mg/L		05/09/18 12:35	05/18/18 23:41	-
Calcium	33		0.50	0.12	mg/L		05/09/18 12:35	05/18/18 23:41	
- General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Total Dissolved Solids	450		10	7.0	mg/L			05/08/18 23:30	-
- Method: Field Sampling - F	ield Sampling								
Analyte		Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fa
Specific Conductance	0.603				umhos/cm			05/02/18 02:10	-
Field pH	6.27				SU			05/02/18 02:10	

5/22/2018

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

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Client Sample ID: MW-3
Date Collected: 05/02/18 01:30

Lab Sample ID: 490-151319-2

Matrix: Water

Date	Conected.	03/02/10	01.30
Date	Received:	05/04/18	16:08

Method: 9056A - Anions, lo Analyte	_	aphy Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride		- Qualifier	10					05/09/18 23:09	10
					J				10
Fluoride	0.22		0.10	0.010	J			05/09/18 22:54	1
Sulfate	510	В	20	0.60	mg/L			05/10/18 18:14	20
Method: 6020A - Metals (IC	P/MS) - Total F	Recoverable	•						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.058	J	0.080	0.030	mg/L		05/09/18 12:35	05/18/18 23:31	1
Calcium	99		0.50	0.12	mg/L		05/09/18 12:35	05/18/18 23:31	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	930		10	7.0	mg/L			05/08/18 23:30	1
Method: Field Sampling - F	ield Sampling								
Analyte		Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.023				umhos/cm			05/02/18 01:30	1
Field pH	5.93				SU			05/02/18 01:30	1

5/22/2018

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-3

Matrix: Water

Date	Collected:	05/03/18	08:25
Date	Received:	05/04/18	16:08
_			

Client Sample ID: MW-4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	13		1.0	0.20	mg/L			05/09/18 21:49	1
Fluoride	0.10	В	0.10	0.010	mg/L			05/09/18 21:49	1
Sulfate	610	В	20	0.60	mg/L			05/10/18 12:21	20
- Method: 6020A - Metals (ICF	P/MS) - Total F	Recoverable	•						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.044	J	0.080	0.030	mg/L		05/09/18 12:35	05/18/18 23:36	1
Calcium	250		0.50	0.12	mg/L		05/09/18 12:35	05/18/18 23:36	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1500		20	14	mg/L			05/08/18 23:30	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.493				umhos/cm			05/03/18 08:25	1
Field pH	6.69				SU			05/03/18 08:25	1

5/22/2018

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Client Sample ID: MW-5

Lab Sample ID: 490-151319-4

Date Collected: 05/03/18 09:05 Matrix: Water Date Received: 05/04/18 16:08

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.4		1.0	0.20	mg/L			05/09/18 22:23	1
Fluoride	ND		0.10	0.010	mg/L			05/09/18 22:23	1
Sulfate	130	В	10	0.30	mg/L			05/10/18 12:44	10
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable	;						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.31		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 00:17	1
Calcium	88		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 00:17	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	590		10	7.0	mg/L			05/08/18 23:30	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	0.697				umhos/cm			05/03/18 09:05	1
Field pH	6.86				SU			05/03/18 09:05	1

5/22/2018

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-5

Matrix: Water

Date Collected:	05/03/18 10:10
Date Received:	05/04/18 16:08

Client Sample ID: MW-5A

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	23		1.0	0.20	mg/L			05/09/18 22:35	1
Fluoride	0.34	В	0.10	0.010	mg/L			05/09/18 22:35	1
Sulfate	880	В	50	1.5	mg/L			05/10/18 13:19	50
Method: 6020A - Metals (ICF	P/MS) - Total F	Recoverable)						
Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.40		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 00:21	1
Calcium	210		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 00:21	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1700		20	14	mg/L			05/08/18 23:30	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.588				umhos/cm			05/03/18 10:10	1
Field pH	7.38				SU			05/03/18 10:10	1

5/22/2018

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

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Client Sample ID: MW-6

Lab Sample ID: 490-151319-6

Matrix: Water

Date Collected: 05/03/18 10:55 Date Received: 05/04/18 16:08

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	12		1.0	0.20	mg/L			05/09/18 22:47	1
Fluoride	0.25	В	0.10	0.010	mg/L			05/09/18 22:47	1
Sulfate	990	В	50	1.5	mg/L			05/10/18 13:42	50
Method: 6020A - Metals (ICF	P/MS) - Total F	Recoverable)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.38		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 00:26	1
Calcium	250		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 00:26	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		20	14	mg/L			05/05/18 12:58	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.611				umhos/cm			05/03/18 10:55	1
Field pH	7.17				SU			05/03/18 10:55	1

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-7

Matrix: Water

Date Collected: 05/03/18 11:30 Date Received: 05/04/18 16:08

Client Sample ID: MW-6A

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	23		1.0	0.20	mg/L			05/09/18 22:58	1
Fluoride	0.34	В	0.10	0.010	mg/L			05/09/18 22:58	1
Sulfate	730	В	20	0.60	mg/L			05/10/18 13:54	20
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable)						
Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.44		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 00:31	1
Calcium	170		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 00:31	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1400		20	14	mg/L			05/08/18 23:30	1
- Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.395				umhos/cm			05/03/18 11:30	1
Field pH	7.32				SU			05/03/18 11:30	1

5/22/2018

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-8

Matrix: Water

Date Co	llected:	05/03/18	12:15
Date Re	ceived:	05/04/18	16:08

Client Sample ID: MW-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	45		2.0	0.40	mg/L			05/10/18 14:40	2
Fluoride	0.18	В	0.10	0.010	mg/L			05/09/18 23:10	1
Sulfate	1800	В	50	1.5	mg/L			05/10/18 14:52	50
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable	.						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.26		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 01:02	1
Calcium	480		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 01:02	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2800		20	14	mg/L			05/08/18 23:30	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	2.264				umhos/cm			05/03/18 12:15	1
Field pH	6.33				SU			05/03/18 12:15	1

5/22/2018

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-9

Matrix: Water

Client Sample ID: Duplicate
Date Collected: 05/03/18 09:15
Date Received: 05/04/18 16:08

Analyte	Result	aphy Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.4		1.0	0.20	mg/L			05/09/18 23:21	1
Fluoride	0.29	В	0.10	0.010	mg/L			05/09/18 23:21	1
Sulfate	140	В	5.0	0.15	mg/L			05/10/18 15:15	5
Boron	0.31		0.080	0.030	mg/L		05/09/18 12:35	05/19/18 01:07	1
					J				1
Calcium -	88		0.50	0.12	mg/L		05/09/18 12:35	05/19/18 01:07	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Allalyte	Result	Qualifici			•	_	opa. oa	7 tildiy 200	D u.

TestAmerica Nashville

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Lab Sample ID: 490-151319-10

Matrix: Water

Date Collected: 05/03/18 08:40 Date Received: 05/04/18 16:08

Client Sample ID: Field Blank

Method: 9056A - Anions, Io Analyte	_	apny Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.1		1.0	0.20	mg/L			05/09/18 23:33	1
Fluoride	0.60	В	0.10	0.010	mg/L			05/09/18 23:33	1
Sulfate	0.41	JB	1.0	0.030	mg/L			05/09/18 23:33	1
Method: 6020A - Metals (IC	•			MDI	1114	_	Dunnanad	A l	D:: F
•	•	Recoverable Qualifier	RL 0.080	MDL 0.030		D	Prepared 05/09/18 12:35	Analyzed 05/19/18 01:11	Dil Fac
Analyte	Result		RL	0.030		<u>D</u>	05/09/18 12:35		Dil Fac
Analyte Boron Calcium	Result ND		RL 0.080	0.030	mg/L	<u>D</u>	05/09/18 12:35	05/19/18 01:11	Dil Fac 1
Analyte Boron	Result ND 1.2		RL 0.080	0.030	mg/L mg/L	<u>D</u>	05/09/18 12:35	05/19/18 01:11	Dil Fac

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 490-513814/3

Matrix: Water

Analysis Batch: 513814

Client Sample ID: Method Blank Prep Type: Total/NA

MR MR

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			05/09/18 21:14	1
Fluoride	0.0349	J	0.10	0.010	mg/L			05/09/18 21:14	1
Sulfate	0.417	J	1.0	0.030	mg/L			05/09/18 21:14	1

Lab Sample ID: LCS 490-513814/4

Matrix: Water

Analysis Batch: 513814

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Spike	LCS	LCS				%Rec.
Added	Result	Qualifier	Unit	D	%Rec	Limits
10.0	9.83		mg/L		98	80 - 120
1.00	0.998		mg/L		100	80 - 120
10.0	9.99		mg/L		100	80 - 120

Lab Sample ID: LCSD 490-513814/5

Matrix: Water

Analyte Chloride Fluoride Sulfate

Analysis Batch: 513814

Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

	S	pike LCS	D LCSD			%Rec.		RPD
Analyte	Ac	lded Resu	It Qualifier	Unit D	%Rec	Limits	RPD	Limit
Chloride		10.0 9.7	3	mg/L	97	80 - 120	1	20
Fluoride		1.00 1.0	0	mg/L	100	80 - 120	0	20
Sulfate		10.0 9.9	3	mg/L	99	80 - 120	1	20

Lab Sample ID: 490-151319-3 MS

Matrix: Water

Analysis Batch: 513814

	Sample	Sample	Spike	MS	MS				%Rec.		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Chloride	13		10.0	23.5		mg/L		100	80 - 120	 	-
Fluoride	0.10	В	1.00	1.04		ma/L		94	80 - 120		

Lab Sample ID: 490-151319-3 MSD

Matrix: Water

Analysis Ratch: 513814

Alialysis Dalcii. 313014											
-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	13		10.0	24.6		mg/L		112	80 - 120	5	20
Fluoride	0.10	В	1 00	1 17		ma/L		106	80 - 120	12	20

Lab Sample ID: MB 490-513822/3

Matrix: Water

Analysis Batch: 513822

Client Sample ID: Method Blank Prep Type: Total/NA

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			05/09/18 16:59	1
Fluoride	ND		0.10	0.010	mg/L			05/09/18 16:59	1
Sulfate	0.411	J	1.0	0.030	mg/L			05/09/18 16:59	1

TestAmerica Nashville

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Client Sample ID: MW-4

Client Sample ID: MW-4

Prep Type: Total/NA

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Method: 9056A - Anions, Ion Chromatography (Continued)

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 490-513822/4 **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 513822

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	 10.0	9.58		mg/L		96	80 - 120	
Fluoride	1.00	0.952		mg/L		95	80 - 120	
Sulfate	10.0	9.57		mg/L		96	80 - 120	

Lab Sample ID: LCSD 490-513822/5 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA **Matrix: Water**

Analysis Batch: 513822

	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Chloride	 10.0	9.46		mg/L		94	80 - 120	1	20	
Fluoride	1.00	0.956		mg/L		95	80 - 120	0	20	
Sulfate	10.0	9.53		mg/L		95	80 - 120	0	20	

Lab Sample ID: 490-151238-G-1 MS **Client Sample ID: Matrix Spike Matrix: Water Prep Type: Total/NA**

Analysis Batch: 513822

Sample Sample Spike MS MS %Rec. Result Qualifier Added Analyte Result Qualifier Unit Limits D %Rec Fluoride 1.00 1.72 F1 0.25 F1 mg/L 147 80 - 120

Lab Sample ID: 490-151238-G-1 MSD **Client Sample ID: Matrix Spike Duplicate Prep Type: Total/NA**

Matrix: Water

Analysis Batch: 513822

•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Fluoride	0.25	F1	1.00	1.90	F1	mg/L		165	80 - 120	10	20

Lab Sample ID: MB 490-514018/3 Client Sample ID: Method Blank

Matrix: Water

Analysis Batch: 514018

•	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			05/10/18 11:46	1
Fluoride	ND		0.10	0.010	mg/L			05/10/18 11:46	1
Sulfate	0.408	J	1.0	0.030	mg/L			05/10/18 11:46	1

Lab Sample ID: LCS 490-514018/4 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA**

Analysis Batch: 514018

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	10.0	9.62	-	mg/L		96	80 - 120	
Fluoride	1.00	1.06		mg/L		106	80 - 120	
Sulfate	10.0	10.3		mg/L		103	80 - 120	

TestAmerica Nashville

Prep Type: Total/NA

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 490-514018/5

Matrix: Water

Analysis Batch: 514018

Client Sample ID: Lab Control Sample Dup **Prep Type: Total/NA**

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Chloride 10.0 96 9.64 mg/L 80 - 120 0 20 Fluoride 1.00 1.05 105 80 - 120 20 mg/L 0 Sulfate 10.0 10.2 102 20 mg/L 80 - 120 1

Lab Sample ID: 490-151594-D-2 MS

Matrix: Water

Analysis Batch: 514018

Client Sample ID: Matrix Spike Prep Type: Total/NA

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	1.2		10.0	13.2		mg/L		120	80 - 120	
Fluoride	0.22		1.00	1.43		mg/L		120	80 - 120	
Sulfate	2.7	В	10.0	14.6		mg/L		119	80 - 120	

Lab Sample ID: 490-151594-D-2 MSD

Matrix: Water

Analysis Batch: 514018

Client Sample ID: Matrix Spike Duplicate **Prep Type: Total/NA**

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	1.2		10.0	11.5		mg/L		103	80 - 120	13	20
Fluoride	0.22		1.00	1.27		mg/L		104	80 - 120	12	20
Sulfate	2.7	В	10.0	13.0		mg/L		104	80 - 120	11	20

Lab Sample ID: MB 490-514022/3

Matrix: Water

Analysis Batch: 514022

Client Sample ID: Method Blank
Pron Type: Total/NA

Client Sample ID: Lab Control Sample

Client Sample ID: Lab Control Sample Dup

	IVID								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			05/10/18 12:18	1
Fluoride	ND		0.10	0.010	mg/L			05/10/18 12:18	1
Sulfate	0.389	J	1.0	0.030	mg/L			05/10/18 12:18	1
	Chloride Fluoride	Chloride ND Fluoride ND	Chloride ND Fluoride ND	Chloride ND 1.0 Fluoride ND 0.10	Chloride ND 1.0 0.20 Fluoride ND 0.10 0.010	Chloride ND 1.0 0.20 mg/L Fluoride ND 0.10 0.010 mg/L	Chloride ND 1.0 0.20 mg/L Fluoride ND 0.10 0.010 mg/L	Chloride ND 1.0 0.20 mg/L Fluoride ND 0.10 0.010 mg/L	Chloride ND 1.0 0.20 mg/L 05/10/18 12:18 Fluoride ND 0.10 0.010 mg/L 05/10/18 12:18

MR MR

Lab Sample ID: LCS 490-514022/4

Matrix: Water

Analysis Batch: 514022		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride		10.0	9.41		mg/L		94	80 - 120	 _
Fluoride		1.00	1.18		mg/L		117	80 - 120	
Sulfate		10.0	10.1		mg/L		101	80 - 120	

Lab Sample ID: LCSD 490-514022/5

Matrix: Water

Analysis Batch: 514022

Analysis Batom 514022	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	10.0	9.34		mg/L		93	80 - 120	1	20
Sulfate	10.0	10.4		mg/L		104	80 - 120	3	20

TestAmerica Nashville

Prep Type: Total/NA

Prep Type: Total/NA

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-244420/1-A

Matrix: Water

Analysis Batch: 245389

Client Sample ID: Method Blank **Prep Type: Total Recoverable** Prep Batch: 244420 MB MB

Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Analyte 0.080 0.030 mg/L Boron $\overline{\mathsf{ND}}$ 05/09/18 12:35 05/18/18 23:22 Calcium ND 0.50 0.12 mg/L 05/09/18 12:35 05/18/18 23:22

Lab Sample ID: LCS 180-244420/2-A **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total Recoverable Analysis Batch: 245389** Prep Batch: 244420 LCS LCS Spike %Rec.

Analyte Added Result Qualifier Unit %Rec Limits Boron 1.00 1.12 mg/L 112 80 - 120 Calcium 50.0 45.3 91 80 - 120 mg/L

Lab Sample ID: 490-151319-1 MS Client Sample ID: MW-2 **Matrix: Water Prep Type: Total Recoverable**

Analysis Batch: 245389

Prep Batch: 244420 MS MS Sample Sample Spike %Rec. Analyte Result Qualifier Added Result Qualifier D %Rec Limits Unit Boron 0.13 1.00 1.22 mg/L 109 75 - 125 Calcium 33 50.0 81.9 99 75 - 125 mg/L

Lab Sample ID: 490-151319-1 MSD Client Sample ID: MW-2 **Matrix: Water Prep Type: Total Recoverable**

Analysis Batch: 245389

Prep Batch: 244420 Sample Sample Spike MSD MSD %Rec. **RPD** Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits RPD Limit 0.13 Boron 1.00 1.23 mg/L 75 - 125 20 110 Calcium 33 50.0 81.0 97 mg/L 75 - 125 20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 490-512801/1 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 512801

MR MR Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Total Dissolved Solids ND 10 7.0 mg/L 05/05/18 12:58

Lab Sample ID: LCS 490-512801/2 **Client Sample ID: Lab Control Sample Matrix: Water**

Analysis Batch: 512801

Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits Analyte Total Dissolved Solids 100 109 mg/L 109 90 - 110

Lab Sample ID: 490-151297-K-1 DU **Client Sample ID: Duplicate** Prep Type: Total/NA

Matrix: Water

Analysis Batch: 512801

Sample Sample DU DU **RPD** Result Qualifier Result Qualifier D RPD Analyte Unit Limit **Total Dissolved Solids** 220 221 mg/L 20

TestAmerica Nashville

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Client: Midwest Environmental Consultants TestAmerica Job ID: 490-151319-2

Project/Site: Empire District CCR Pond

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 490-151299-A-7 DU	Client Sample ID: Duplicate
Matrix: Water	Prep Type: Total/NA

Analysis Batch: 512801

Sample Sample DU DU **RPD** Analyte Result Qualifier Result Qualifier Unit RPD Limit D

Total Dissolved Solids 3200 3190 mg/L 0.9 20

Lab Sample ID: MB 490-512931/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 512931

MB MB MDL Unit RL Analyte Result Qualifier Analyzed Dil Fac Prepared Total Dissolved Solids 10 05/08/18 23:30 $\overline{\mathsf{ND}}$ 7.0 mg/L

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 490-512931/2 **Matrix: Water Prep Type: Total/NA**

Analysis Batch: 512931

Spike LCS LCS %Rec. Added Analyte Result Qualifier Limits Unit D %Rec Total Dissolved Solids 100 103 mg/L 103 90 - 110

Lab Sample ID: 490-151308-G-1 DU **Client Sample ID: Duplicate** Prep Type: Total/NA

Matrix: Water

Analysis Batch: 512931

DU DU Sample Sample **RPD** Result Qualifier Result Qualifier Unit **RPD** Limit Total Dissolved Solids 63 126 F3 mg/L 67

Lab Sample ID: 490-151333-C-13 DU **Client Sample ID: Duplicate Matrix: Water** Prep Type: Total/NA

Analysis Batch: 512931

Sample Sample DU DU RPD Analyte Result Qualifier Result Qualifier Unit RPD Limit **Total Dissolved Solids** 230 222 20 mg/L

TestAmerica Nashville

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

HPLC/IC

Analysis Batch: 513814

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-3	MW-4	Total/NA	Water	9056A	
490-151319-4	MW-5	Total/NA	Water	9056A	
490-151319-5	MW-5A	Total/NA	Water	9056A	
490-151319-6	MW-6	Total/NA	Water	9056A	
490-151319-7	MW-6A	Total/NA	Water	9056A	
490-151319-8	MW-7	Total/NA	Water	9056A	
490-151319-9	Duplicate	Total/NA	Water	9056A	
490-151319-10	Field Blank	Total/NA	Water	9056A	
MB 490-513814/3	Method Blank	Total/NA	Water	9056A	
LCS 490-513814/4	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-513814/5	Lab Control Sample Dup	Total/NA	Water	9056A	
490-151319-3 MS	MW-4	Total/NA	Water	9056A	
490-151319-3 MSD	MW-4	Total/NA	Water	9056A	

Analysis Batch: 513822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total/NA	Water	9056A	<u> </u>
490-151319-2	MW-3	Total/NA	Water	9056A	
490-151319-2	MW-3	Total/NA	Water	9056A	
MB 490-513822/3	Method Blank	Total/NA	Water	9056A	
LCS 490-513822/4	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-513822/5	Lab Control Sample Dup	Total/NA	Water	9056A	
490-151238-G-1 MS	Matrix Spike	Total/NA	Water	9056A	
490-151238-G-1 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 514018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-3	MW-4	Total/NA	Water	9056A	
490-151319-4	MW-5	Total/NA	Water	9056A	
490-151319-5	MW-5A	Total/NA	Water	9056A	
490-151319-6	MW-6	Total/NA	Water	9056A	
490-151319-7	MW-6A	Total/NA	Water	9056A	
490-151319-8	MW-7	Total/NA	Water	9056A	
490-151319-8	MW-7	Total/NA	Water	9056A	
490-151319-9	Duplicate	Total/NA	Water	9056A	
MB 490-514018/3	Method Blank	Total/NA	Water	9056A	
LCS 490-514018/4	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-514018/5	Lab Control Sample Dup	Total/NA	Water	9056A	
490-151594-D-2 MS	Matrix Spike	Total/NA	Water	9056A	
490-151594-D-2 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 514022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total/NA	Water	9056A	-
490-151319-2	MW-3	Total/NA	Water	9056A	
MB 490-514022/3	Method Blank	Total/NA	Water	9056A	
LCS 490-514022/4	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-514022/5	Lab Control Sample Dup	Total/NA	Water	9056A	

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Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Metals

Prep Batch: 244420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total Recoverable	Water	3005A	
490-151319-2	MW-3	Total Recoverable	Water	3005A	
490-151319-3	MW-4	Total Recoverable	Water	3005A	
490-151319-4	MW-5	Total Recoverable	Water	3005A	
490-151319-5	MW-5A	Total Recoverable	Water	3005A	
490-151319-6	MW-6	Total Recoverable	Water	3005A	
490-151319-7	MW-6A	Total Recoverable	Water	3005A	
490-151319-8	MW-7	Total Recoverable	Water	3005A	
490-151319-9	Duplicate	Total Recoverable	Water	3005A	
490-151319-10	Field Blank	Total Recoverable	Water	3005A	
MB 180-244420/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-244420/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
490-151319-1 MS	MW-2	Total Recoverable	Water	3005A	
490-151319-1 MSD	MW-2	Total Recoverable	Water	3005A	

Analysis Batch: 245389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total Recoverable	Water	6020A	244420
490-151319-2	MW-3	Total Recoverable Water	Water	6020A	244420
490-151319-3	MW-4	Total Recoverable	Water	6020A	244420
490-151319-4	MW-5	Total Recoverable	Water	6020A	244420
490-151319-5	MW-5A	Total Recoverable	Water	6020A	244420
490-151319-6	MW-6	Total Recoverable	Water	6020A	244420
490-151319-7	MW-6A	Total Recoverable	Water	6020A	244420
490-151319-8	MW-7	Total Recoverable	Water	6020A	244420
490-151319-9	Duplicate	Total Recoverable	Water	6020A	244420
490-151319-10	Field Blank	Total Recoverable	Water	6020A	244420
MB 180-244420/1-A	Method Blank	Total Recoverable	Water	6020A	244420
LCS 180-244420/2-A	Lab Control Sample	Total Recoverable	Water	6020A	244420
490-151319-1 MS	MW-2	Total Recoverable	Water	6020A	244420
490-151319-1 MSD	MW-2	Total Recoverable	Water	6020A	244420

General Chemistry

Analysis Batch: 512801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-6	MW-6	Total/NA	Water	SM 2540C	
MB 490-512801/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 490-512801/2	Lab Control Sample	Total/NA	Water	SM 2540C	
490-151297-K-1 DU	Duplicate	Total/NA	Water	SM 2540C	
490-151299-A-7 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 512931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total/NA	Water	SM 2540C	_
490-151319-2	MW-3	Total/NA	Water	SM 2540C	
490-151319-3	MW-4	Total/NA	Water	SM 2540C	
490-151319-4	MW-5	Total/NA	Water	SM 2540C	
490-151319-5	MW-5A	Total/NA	Water	SM 2540C	
490-151319-7	MW-6A	Total/NA	Water	SM 2540C	

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QC Association Summary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

TestAmerica Job ID: 490-151319-2

General Chemistry (Continued)

Analysis Batch: 512931 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-8	MW-7	Total/NA	Water	SM 2540C	
490-151319-9	Duplicate	Total/NA	Water	SM 2540C	
490-151319-10	Field Blank	Total/NA	Water	SM 2540C	
MB 490-512931/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 490-512931/2	Lab Control Sample	Total/NA	Water	SM 2540C	
490-151308-G-1 DU	Duplicate	Total/NA	Water	SM 2540C	
490-151333-C-13 DU	Duplicate	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 515330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-151319-1	MW-2	Total/NA	Water	Field Sampling	
490-151319-2	MW-3	Total/NA	Water	Field Sampling	
490-151319-3	MW-4	Total/NA	Water	Field Sampling	
490-151319-4	MW-5	Total/NA	Water	Field Sampling	
490-151319-5	MW-5A	Total/NA	Water	Field Sampling	
490-151319-6	MW-6	Total/NA	Water	Field Sampling	
490-151319-7	MW-6A	Total/NA	Water	Field Sampling	
490-151319-8	MW-7	Total/NA	Water	Field Sampling	

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Client Sample ID: MW-2

Date Collected: 05/02/18 02:10 Date Received: 05/04/18 16:08

Lab Sample ID: 490-151319-1

Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			513822	05/09/18 22:39	SW1	TAL NSH
Total/NA	Analysis	9056A		5			514022	05/10/18 17:30	SW1	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/18/18 23:41	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/02/18 02:10	ELF	TAL NSH

Client Sample ID: MW-3 Lab Sample ID: 490-151319-2 **Matrix: Water**

Date Collected: 05/02/18 01:30 Date Received: 05/04/18 16:08

Batch Dil Initial Batch Final Batch Prepared **Prep Type** Type Method Run **Factor Amount Amount** Number or Analyzed Analyst Lab Total/NA Analysis 9056A 513822 05/09/18 22:54 SW1 TAL NSH Total/NA Analysis 9056A 10 513822 05/09/18 23:09 SW1 TAL NSH Total/NA Analysis 9056A 20 514022 05/10/18 18:14 SW1 TAL NSH Total Recoverable Prep 3005A 50 mL 50 mL 244420 05/09/18 12:35 KA TAL PIT Total Recoverable Analysis 6020A 245389 05/18/18 23:31 WTR TAL PIT 1 Total/NA Analysis SM 2540C 1 100 mL 100 mL 512931 05/08/18 23:30 AEC TAL NSH Total/NA Analysis Field Sampling 515330 05/02/18 01:30 ELF TAL NSH 1

Client Sample ID: MW-4 Lab Sample ID: 490-151319-3 Date Collected: 05/03/18 08:25

Date Received: 05/04/18 16:08

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			513814	05/09/18 21:49	JHS	TAL NSH
Total/NA	Analysis	9056A		20			514018	05/10/18 12:21	SW1	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/18/18 23:36	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 08:25	ELF	TAL NSH

Client Sample ID: MW-5 Lab Sample ID: 490-151319-4

Date Collected: 05/03/18 09:05 Date Received: 05/04/18 16:08

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			513814	05/09/18 22:23	JHS	TAL NSH
Total/NA	Analysis	9056A		10			514018	05/10/18 12:44	SW1	TAL NSH
Total Recoverable Total Recoverable	Prep Analysis	3005A 6020A		1	50 mL	50 mL	244420 245389	05/09/18 12:35 05/19/18 00:17		TAL PIT TAL PIT

TestAmerica Nashville

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Matrix: Water

Matrix: Water

TestAmerica Job ID: 490-151319-2

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Client Sample ID: MW-5 Lab Sample ID: 490-151319-4 Date Collected: 05/03/18 09:05

Matrix: Water

Date Received: 05/04/18 16:08

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 09:05	ELF	TAL NSH

Client Sample ID: MW-5A Lab Sample ID: 490-151319-5

Date Collected: 05/03/18 10:10 **Matrix: Water**

Date Received: 05/04/18 16:08

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			513814	05/09/18 22:35	JHS	TAL NSH
Total/NA	Analysis	9056A		50			514018	05/10/18 13:19	SW1	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/19/18 00:21	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 10:10	ELF	TAL NSH

Lab Sample ID: 490-151319-6 Client Sample ID: MW-6

Date Collected: 05/03/18 10:55 **Matrix: Water**

Date Received: 05/04/18 16:08

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	-		513814	05/09/18 22:47	JHS	TAL NSH
Total/NA	Analysis	9056A		50			514018	05/10/18 13:42	SW1	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/19/18 00:26	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	512801	05/05/18 12:58	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 10:55	ELF	TAL NSH

Client Sample ID: MW-6A Lab Sample ID: 490-151319-7 Date Collected: 05/03/18 11:30

Date Received: 05/04/18 16:08

Prep Type Total/NA Total/NA	Batch Type Analysis Analysis	Batch Method 9056A 9056A	Run	Factor 1 20	Initial Amount	Final Amount	Batch Number 513814 514018	Prepared or Analyzed 05/09/18 22:58 05/10/18 13:54	Analyst JHS SW1	Lab TAL NSH TAL NSH
Total Recoverable Total Recoverable	Prep Analysis	3005A 6020A		1	50 mL	50 mL	244420 245389	05/09/18 12:35 05/19/18 00:31		TAL PIT TAL PIT
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 11:30	ELF	TAL NSH

TestAmerica Nashville

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Matrix: Water

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

Client Sample ID: MW-7 Lab Sample ID: 490-151319-8

Date Collected: 05/03/18 12:15 **Matrix: Water** Date Received: 05/04/18 16:08

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			513814	05/09/18 23:10	JHS	TAL NSH
Total/NA	Analysis	9056A		2			514018	05/10/18 14:40	SW1	TAL NSH
Total/NA	Analysis	9056A		50			514018	05/10/18 14:52	SW1	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/19/18 01:02	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH
Total/NA	Analysis	Field Sampling		1			515330	05/03/18 12:15	ELF	TAL NSH

Lab Sample ID: 490-151319-9 **Client Sample ID: Duplicate**

Date Collected: 05/03/18 09:15 **Matrix: Water** Date Received: 05/04/18 16:08

Batch Batch Dil Initial Final Batch Prepared Method **Prep Type** Type **Factor Amount** Number or Analyzed Analyst Run **A**mount Lab Total/NA Analysis 9056A 513814 05/09/18 23:21 JHS TAL NSH Total/NA Analysis 9056A 5 514018 05/10/18 15:15 SW1 TAL NSH Total Recoverable Prep 3005A 50 mL 50 mL 244420 05/09/18 12:35 KA TAL PIT Total Recoverable 6020A 245389 05/19/18 01:07 WTR TAL PIT Analysis

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Client Sample ID: Field Blank Lab Sample ID: 490-151319-10

100 mL

100 mL

512931

05/08/18 23:30 AEC

Date Collected: 05/03/18 08:40 Date Received: 05/04/18 16:08

Analysis

SM 2540C

Total/NA

D T	Batch	Batch	D	Dil	Initial	Final	Batch	Prepared	A L 4	1 -1-
Prep Type Total/NA	Analysis	Method 9056A	Run	Factor 1	Amount	Amount	Number 513814	or Analyzed 05/09/18 23:33	Analyst JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	244420	05/09/18 12:35	KA	TAL PIT
Total Recoverable	Analysis	6020A		1			245389	05/19/18 01:11	WTR	TAL PIT
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	512931	05/08/18 23:30	AEC	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177 TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

TAL NSH

Matrix: Water

Method Summary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

/lethod	Method Description	Protocol	Laboratory
056A	Anions, Ion Chromatography	SW846	TAL NSH
6020A	Metals (ICP/MS)	SW846	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL NSH
ield Sampling	Field Sampling	EPA	TAL NSH
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177 TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

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Accreditation/Certification Summary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond

TestAmerica Job ID: 490-151319-2

Laboratory: TestAmerica Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-19
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-18
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-19
California	State Program	9	2938	10-31-18
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-18
Georgia	State Program	4	E87358(FL)/453.07(A2L A)	06-30-18
Illinois	NELAP	5	200010	12-09-18
lowa	State Program	7	131	04-01-18 *
Kansas	NELAP	7	E-10229	10-31-18
Kentucky (UST)	State Program	4	19	06-30-18
Kentucky (WW)	State Program	4	90038	12-31-18
Louisiana	NELAP	6	30613	06-30-18
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-19
Massachusetts	State Program	1	M-TN032	06-30-18
Minnesota	NELAP	5	047-999-345	12-31-18
Mississippi	State Program	4	N/A	06-30-18
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-18
New Hampshire	NELAP	1	2963	10-09-18
New Jersey	NELAP	2	TN965	06-30-18
New York	NELAP	2	11342	03-31-19
North Carolina (WW/SW)	State Program	4	387	12-31-18
North Dakota	State Program	8	R-146	06-30-18
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-18
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	06-30-18
Rhode Island	State Program	1	LAO00268	12-30-18
South Carolina	State Program	4	84009 (001)	02-28-18 *
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-18
USDA	Federal		P330-13-00306	12-01-19
Utah	NELAP	8	TN00032	07-31-18
Virginia	NELAP	3	460152	06-14-18
Washington	State Program	10	C789	07-19-18
West Virginia DEP	State Program	3	219	02-28-19
Wisconsin	State Program	5	998020430	08-31-18
Wyoming (UST)	A2LA	8	453.07	12-31-19

Laboratory: TestAmerica Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-18
California	State Program	9	2891	04-30-19
Connecticut	State Program	1	PH-0688	09-30-18

^{*} Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Nashville

5/22/2018

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Accreditation/Certification Summary

Client: Midwest Environmental Consultants Project/Site: Empire District CCR Pond TestAmerica Job ID: 490-151319-2

Laboratory: TestAmerica Pittsburgh (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date	
Florida	NELAP	4	E871008	06-30-18	
Illinois	NELAP	5	200005	06-30-18	
Kansas	NELAP	7	E-10350	01-31-19	
Louisiana	NELAP	6	04041	06-30-18	
Nevada	State Program	9	PA00164	07-31-18	
New Hampshire	NELAP	1	2030	04-04-19	
New Jersey	NELAP	2	PA005	06-30-18	
New York	NELAP	2	11182	03-31-19	
North Carolina (WW/SW)	State Program	4	434	12-31-18	
Oregon	NELAP Secondary AB	10	PA-2151	01-28-19	
Pennsylvania	NELAP	3	02-00416	04-30-19	
South Carolina	State Program	4	89014	04-30-18 *	
Texas	NELAP	6	T104704528-15-2	03-31-19	
US Fish & Wildlife	Federal		LE94312A-1	07-31-18	
USDA	Federal		P330-16-00211	06-26-19	
Utah	NELAP	8	PA001462015-4	05-31-18	
Virginia	NELAP	3	460189	09-14-18	
West Virginia DEP	State Program	3	142	01-31-19	
Wisconsin	State Program	5	998027800	08-31-18	

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^{*} Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Nashville

COOLER RECEIPT FORM



Cooler Received/Opened On_5/4/2018_@_0940_	
Time Samples Removed From Cooler 5 103 Time Samples Placed In Storage 5 20	(2 Hour Window)
1. Tracking #(last 4 digits, FedEx) Courier: FedEx_	
IR Gun ID_31470368 pH Strip Lot Chlorine Strip Lot	
2. Temperature of rep. sample or temp blank when opened: Degrees Celsius	
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NO. (NA)
4. Were custody seals on outside of cooler?	YESNONA
4. Were custody seals on outside of cooler? If yes, how many and where:	
5. Were the seals intact, signed, and dated correctly?	YES. NONA
6. Were custody papers inside cooler?	YES. NONA
I certify that I opened the cooler and answered questions 1-6 (intial)	$\overline{}$
7. Were custody seals on containers: YES (NO) and Intact	YESNO.(NA
Were these signed and dated correctly?	YESNONA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Pape	r Other None
9. Cooling process: (ce) Ice-pack Ice (direct contact) Dry ice	Other None
10. Did all containers arrive in good condition (unbroken)?	YESNONA
11. Were all container labels complete (#, date, signed, pres., etc)?	ESNONA
12. Did all container labels and tags agree with custody papers?	FESNONA
13a. Were VOA vials received?	YESNONA
b. Was there any observable headspace present in any VOA vial?	YESNO.(.NA)
Larger than this.	
14. Was there a Trip Blank in this cooler? YES. NO. NA If multiple coolers, sequence	e# .
certify that I unloaded the cooler and answered questions 7-14 (intial)	K/
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNO. NA
b. Did the bottle labels indicate that the correct preservatives were used	YES/NONA
16. Was residual chlorine present?	YESNO. (NA)
certify that I checked for chlorine and pH as per SOP and answered guestions 15-16 (intial)	
17. Were custody papers properly filled out (ink, signed, etc)?	YESNONA
18. Did you sign the custody papers in the appropriate place?	YESNONA
19. Were correct containers used for the analysis requested?	YESNONA
20. Was sufficient amount of sample sent in each container?	YES NO NA
certify that I entered this project into LIMS and answered questions 17-20 (intial)	~ Ki)
certify that I attached a label with the unique LIMS number to each container (intial)	KD_
21. Were there Non-Conformance issues at login? YES(NO) Was a NCM generated? YES(NO)#	· · · · · · · · · · · · · · · · · · ·

COOLER RECEIPT FORM

Cooler Received/Opened On 5/4/2018 @ 0940	
Time Samples Removed From Cooler 15:03 Time Samples Placed In Storage	(2 Hour Window)
1. Tracking # 7305 (last 4 digits, FedEx) Courier: FedEx	
IR Gun ID 31470366 pH Strip Lot N Chlorine Strip Lot V	
2. Temperature of rep. sample or temp blank when opened: 3-9 Degrees Celsius	
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NO.
4. Were custody seals on outside of cooler?	(YES: NONA
If yes, how many and where:	
5. Were the seals intact, signed, and dated correctly?	ESNONA
6. Were custody papers inside cooler?	YES (NONA
certify that I opened the cooler and answered questions 1-6 (intial)	
7. Were custody seals on containers: YES (NO) and Intact	YESNO(NA
Were these signed and dated correctly?	YESNO(NA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Pape	er Other None
9. Cooling process: (ce lce-pack lce (direct contact) Dry ice	Other None
10. Did all containers arrive in good condition (unbroken)?	YESNONA
11. Were all container labels complete (#, date, signed, pres., etc)?	ESNONA
12. Did all container labels and tags agree with custody papers?	YESNONA
13a. Were VOA vials received?	YESNONA
b. Was there any observable headspace present in any VOA vial?	YESNO(NA)
	•
Larger than this.	
44. Was those Tris Blank in this analysis	
14. Was there a Trip Blank in this cooler? YES(0.).NA If multiple coolers, sequence	• #/\
I certify that I unloaded the cooler and answered questions 7-14 (intial)	VES NO NA
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNO.NA
b. Did the bottle labels indicate that the correct preservatives were used	VEC NO AIR
16. Was residual chlorine present?	YESNO. (NA)
I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) 17. Were custody papers properly filled out (ink, signed, etc)?	YE\$NONA
18. Did you sign the custody papers in the appropriate place?	\mathcal{A}
19. Were correct containers used for the analysis requested?	YESNONA
·	YESNONA
20. Was sufficient amount of sample sent in each container?	VESINONA
I certify that I entered this project into LIMS and answered questions 17-20 (intial) I certify that I attached a label with the unique LIMS number to each container (intial)	TV
	*
21. Were there Non-Conformance issues at login? YES. NO) Was a NCM generated? YES. (NO)	7

BIS = Broken in shipment Cooler Receipt Form.doc

LF-1 End of Form Revised 8/23/17

Nashville, TN

COOLER RECEIPT FORM

Cooler Received/Opened On_5/4/2018 @_0940_	
Time Samples Removed From Cooler 5 03 Time Samples Placed In Storage	(2 Hour Window)
1. Tracking # (last 4 digits, FedEx) Courier: FedEx	
IR Gun ID 31470368 pH Strip Lot V A Chlorine Strip Lot V	
2. Temperature of rep. sample or temp blank when opened: 10 Degrees Celsius	~)
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NO. (NA
4. Were custody seals on outside of cooler?	YES NO NA
If yes, how many and where:	
5. Were the seals intact, signed, and dated correctly?	YES. NONA
6. Were custody papers inside cooler?	YESNO)NA
I certify that I opened the cooler and answered questions 1-6 (intial)	
7. Were custody seals on containers: YES (NO) and Intact	YESNONA
Were these signed and dated correctly?	YESNONA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper	er Other None
9. Cooling process: Ice lce-pack Ice (direct contact) Dry ice	Other None
10. Did all containers arrive in good condition (unbroken)?	YE/SNONA
11. Were all container labels complete (#, date, signed, pres., etc)?	YESNONA
12. Did all container labels and tags agree with custody papers?	YESNONA
13a. Were VOA vials received?	YES(10)NA
b. Was there any observable headspace present in any VOA vial?	YESNONA
Larger than this.	
14. Was there a Trip Blank in this cooler? YES(O)NA If multiple coolers, sequence	e#
certify that I unloaded the cooler and answered questions 7-14 (intial)	KD
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNO.(.NA
b. Did the bottle labels indicate that the correct preservatives were used	(ES)NONA
16. Was residual chlorine present?	YES,NONA
I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)	
17. Were custody papers properly filled out (ink, signed, etc)?	FESNONA
18. Did you sign the custody papers in the appropriate place?	YESNONA
19. Were correct containers used for the analysis requested?	YESNONA
20. Was sufficient amount of sample sent in each container?	YESNONA
I certify that I entered this project into LIMS and answered questions 17-20 (intial)	<u> </u>
certify that I attached a label with the unique LIMS number to each container (intial)	<u> ED</u>
21. Were there Non-Conformance issues at login? YES. NO Was a NCM generated? YESNO.	#

BIS = Broken in shipment Cooler Receipt Form.doc

LF-1 End of Form Revised 8/23/17

TestAmerica Nashville

2960 Foster Creighton Drive Nashville, TN 37204

Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING

Phone (615) 726-0177 Fax (615) 726-3404																		/IRONMENTAL TESTING	
Client Information	Sampler: Rick	Elair)		tner, Cathy						Са	Carrier Tracking No(s):					COC No: 490-46712-15725.1		
Client Contact: Mr. Rick Elgin	Phone: 573-6	36-445	4	E-Ma cath		.gartner@testamericainc.com											Page: Page of		
Company: Midwest Environmental Consultants					Analysis Re							equested					Job #:		
Address: 2009 East McCarty Street Suite 2	Due Date Request	ed:															Preservation Codes:		
City:	TAT Requested (d	TAT Requested (days):															A - HCL B - NaOH	M - Hexane N - None	
Jefferson City State, Zip:	1						Sulfate			İ							C - Zn Acetate D - Nitric Acid E - NaHSO4	O - AsNaO2 P - Na2O4S Q - Na2SO3	
MO, 65101 Phone:	PO#:				- 1						Lo	oc: 4	90	·			F - MeOH	R - Na2S2SO3 S - H2SO4	
573-636-9454(Tel)	Purchase Orde	r not require	<u></u>		- 9 8		Fluoride,	Solids			1	51	31	Q			H - Ascorbic Acid	T - TSP Dodecahydrate	
Email: relgin@mecpc.com	WO#:		*		Nor		ide, Fi	og pa				•	• .	•		2		U - Acetone V - MCAA	
Project Name: Empire District CCR Pond	Project #: 49010011				ع چ	88	ō	70A Mercury - Total Dissolved							İ	ntainers	K - EDTA L - EDA	W - ph 4-5 Z - other (specify)	
Site:	49010011 SSOW#;				巃	Ra22	0-0	Mercury tal Diss								cont	Other:		
,					- Sal	9320_Ra228	'''	7470A M	1 1	İ							`	/	
			Sample Type	Matrix (w= _{water,}	Filtere	ka226,	ъ. I	, 74, Calcd								Total Number of	pH/	eard.	
Sample Identification	Sample Date	Sample Time	(C=comp, G=grab)	S=solid, O=waste/oil, ST=Tissue, A=Air	Field	9315_Ra226,	9056A	6020A 2540C								Total	Special Ins	tructions/Note:	
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MW-5A		10:10										\perp				7			
MW-6		10:55			Ш		\coprod	Ш			_					17		1,1.611	
MW-6A		11:30														7	Field pH: 7.3	2/1,395	
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Duplicate		9:15			\coprod											7	Field pH:	<u></u>	
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Non-Hazard Flammable Skin Irritant Pois Deliverable Requested: I, II, III, IV, Other (specify)	on B Unkn	own F	Radiological		s			To Clie		guiren		6020			Ba.Be.	Arch B.Cd	ive For,Ca,Cr,Co,Pb,Li,M	_ <i>Months</i> o.Se TI	
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Δ Yes Δ No		·						-				J	18	3	<u> </u>	11			



TestAmerica Nashville

2960 Foster Creighton Drive

Nashville, TN 37204

Page 34 of 36

Phone (615) 726-0177 Fax (615) 726-3404

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Chain of Custody Record





THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler,			Lab PM: Gartne		, Cathy					Carrier Tracking No(s):					COC No. 490-72546.1		
Client Contact.	Phone:			E-Mail		rtner@testamericains com						te of Orig	u:			Page:		
Shipping/Receiving Company				_	_	artner@testamericainc.com creditations Required (See note):						ssouri			_	Page 1 of 2		
TestAmerica Laboratories, Inc.						The state of the s								490-151319-2				
Address. 301 Alpha Drive, RIDC Park,	Due Date Requeste 5/16/2018	d:							Analy	rsis R	Requested					Preservation Codes:		
City	F810000000000	TAT Requested (days):							Anaiy	313 1	requesteu					A - HCL B - NaOH	M - Hexane N - None	
Pittsburgh				1	福	1						1				C - Zn Acetate	O - AsNaO2	
State, Zip. PA, 15238	20.4															D - Nitric Acid E - NaHSO4 F - MeOH	P - Na2O4S Q - Na2SO3 R - Na2S2O3	3
Phone: 412-963-7058(Tel) 412-963-2468(Fax)	PO #			-							1					G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dode	ecahydrafe
Email	WO #			7	No)	Pb.,Mo									yo.	I - Ice J - Di Water	U - Acetone V - MCAA	nanyarana
Project Name Empire District CCR	Project #: 49010011														tainer	K - EDTA L - EDA	W - pH 4-5 Z - other (spe	ecify)
Site: Midwest Env Consultants - Empire CCR	SSOW#				Sample ISD (Y	(MOD) B,Cd,Ca,	(MOD) Lithium								of cor	Other:		
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Sample Identification - Client ID (Lab ID)	Sample Date	Time -	G=grab) BT=Tissue. Preservation Co			S S	σ	68/49	1 20	100	GE 30	186			V	Sp 8		i :
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MW-3 (490-151319-2)	5/2/18	01:30 Central	Wat	ter	T	x	x								1	0		
MW-4 (490-151319-3)	5/3/18	08:25 Central	Wat	ter		X	х								1			
MW-5 (490-151319-4)	5/3/18	09:05 Central	Wat	ter		х	х								1		Š I	
MW-5A (490-151319-5)	5/3/18	10:10 Central	Wat	ter		х	х								1		stoo	
MW-6 (490-151319-6)	5/3/18	10:55 Central	Wat	ter		Х	х								1		Y	
MW-6A (490-151319-7)	5/3/18	11:30 Central	Wat	ter		X	X								1			
MW-7 (490-151319-8)	5/3/18	12:15 Central	Wat	ter		х	х								1			
Duplicate (490-151319-9)	5/3/18	09:15 Central	Wat	ter		x	x								1		1	
Note: Since laboratory accreditations are subject to change, TestAmerica currently maintain accreditation in the State of Origin listed above for ana Laboratories, Inc. attention immediately. If all requested accreditations are	alysis/tests/matrix being analyze	d, the samples	s must be shipped back to	to the Tes	stAme	rica lat	borator	y or othe	er instruc	tions wi	This sa	mple ship vided. An	ment is for y changes	rwarded un to accredi	nder ch Itation	hain-of-custody. If the status should be bro	e laboratory doe ught to TestAme	s not erica
Possible Hazard Identification					Sa					may b				s are re	taine	ed longer than 1	month)	
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Ver: 09/20/2016









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TestAmerica Nashville

Phone (615) 726-0177 Fax (615) 726-3404

2960 Foster Creighton Drive Nashville, TN 37204

Chain of Custody Record

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			2000

THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:				PM: rtner,	Cathy						Carrier Tracking No(s):					COC No: 490-72546.2			
Client Contact	Phone			E-M	lail		State of O									P	Page:			
Shipping/Receiving Company:				cat		rtner@testamericainc.com Miss reditations Required (See note):						/IISSOU	SOUII				Page 2 of 2			
TestAmerica Laboratories, Inc.									100	7			-					490-151319-2		
Address 301 Alpha Drive, RIDC Park,	Due Date Requested 5/16/2018	:							1	Analy	vsis	Rem	ester	1	Preservation Codes:					
City:	TAT Requested (day	s):			1	166	Analysis Requested							T	T			A - HCL B - NaOH	M - Hexane N - None	
Pittsburgh State, Zip		-																	O - AsNaO2 P - Na2O4S	
PA, 15238					181			1		1				1 1				E - NaHSO4	Q - Na2SO3	(Valid)
Phone. 412-963-7058(Tel) 412-963-2468(Fax)	PO#	PO#															-	F - MeOH G - Amchlor	R - Na2S2O3 S - H2SO4	
Email:	Wo#				- 2		Mo							1		1		I - Ice U - A	T - TSP Dodecahye U - Acetone	drate
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Project Name Empire District CCR	Project #: 49010011				٤	0 50	0,70												Z - other (specify)	
Site:	SSOW#				I du	٤	5 0	6	1									Other:		
Midwest Env Consultants - Empire CCR			ı —		- Sa	INSI	B,Cd,	S S	1			1					<u> </u>			1-
			Sample	Matrix (w=water,	Field Filtered Sample (Yes or No	Perform MS/MSD (Yes	Sb,As,Ba,Be,E	6010C/3005A (MOD) Lithium									Number			
	1 1	Sample	Type (C=comp,	S=solid, O=waste/oil,	E P	form	As,B	0C/3					1	1			ž			
Sample Identification - Client ID (Lab ID)	Sample Date	Time	G=grab)	T=Tissue, A=Ai	·) ii	Pe	Sb,	60									Total	Special Ins	structions/Note	17
UA BARRES - CONTRACTOR - CONTRA		$>\!\!<$	Preservat	ion Code:	X	\times		10		N IB							X			EVEN.
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Possible Hazard Identification					L	C		Diene	1/	A 6		L		J 15			•			
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Ver: 09/20/2016

Login Sample Receipt Checklist

Client: Midwest Environmental Consultants

Job Number: 490-151319-2

List Source: TestAmerica Pittsburgh
List Number: 2
List Creation: 05/08/18 02:45 PM

Creator: Watson, Debbie

Answer	Comment
N/A	
True	
N/A	
	N/A True True True True True True True True

3

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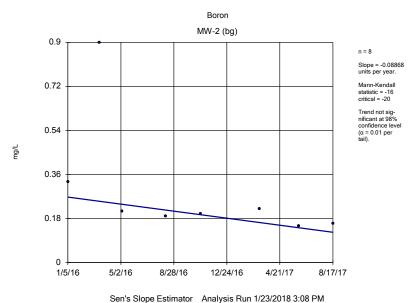
APPENDIX 5

Statistical Analysis

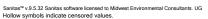


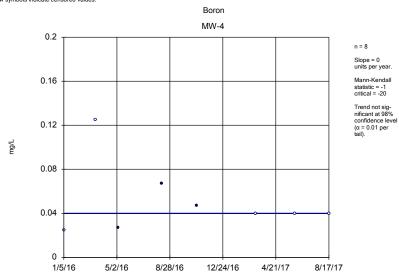
Sanitas[™] Output – Background

Trending Analysis



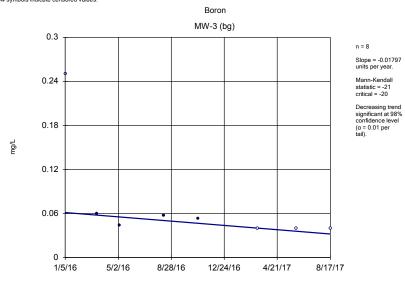
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

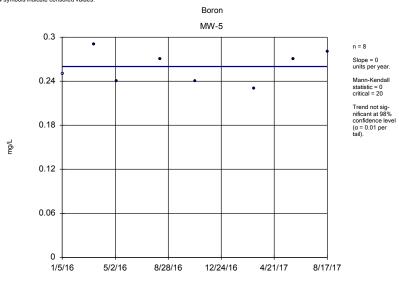
Sanitas $^{\text{™}}$ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

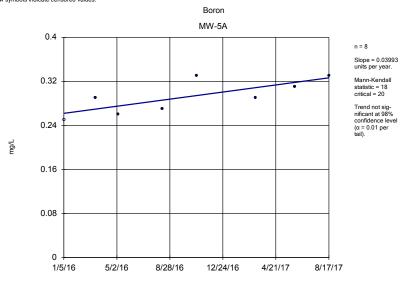
Sanitas ** v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

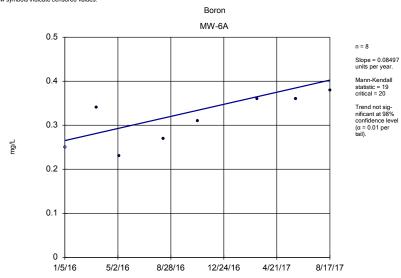
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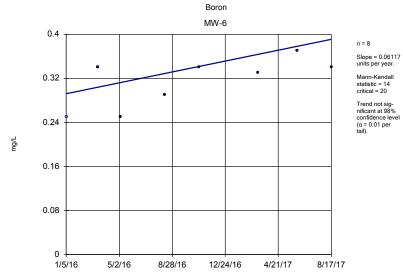
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

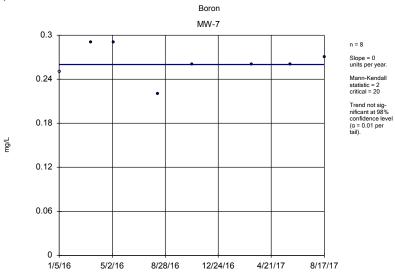
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Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

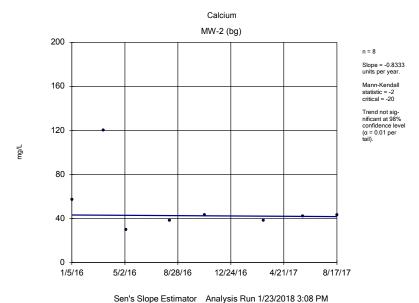
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas $^{\text{™}}$ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

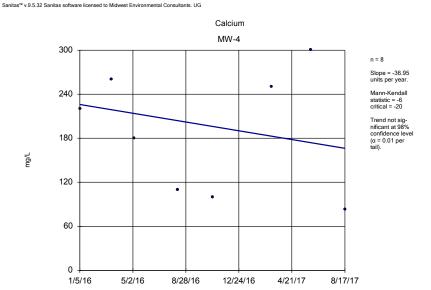


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

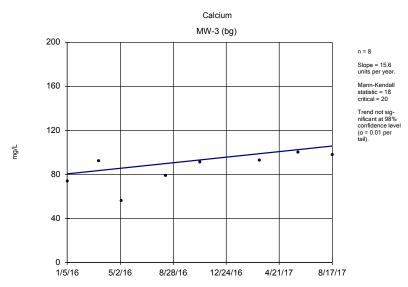


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



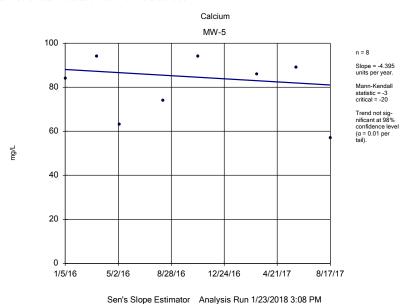
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

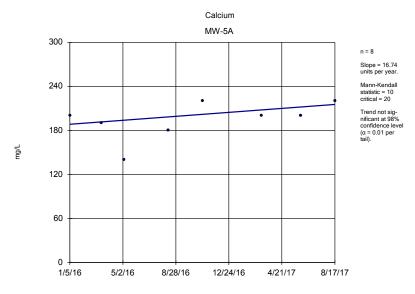


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

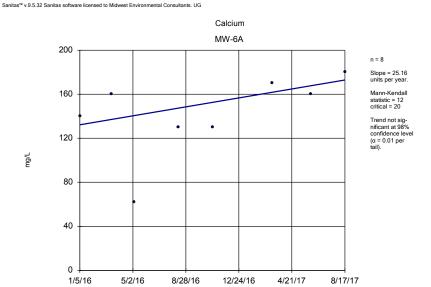


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



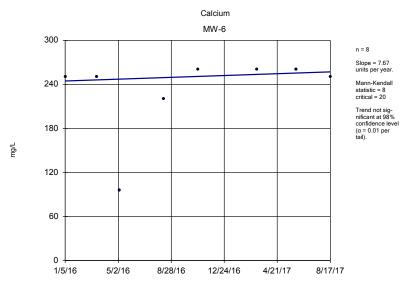
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

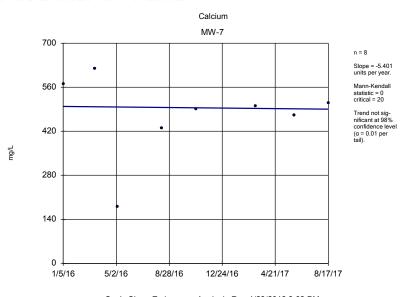
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

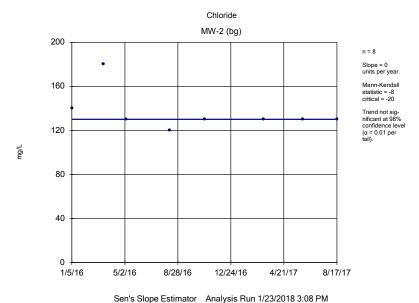
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

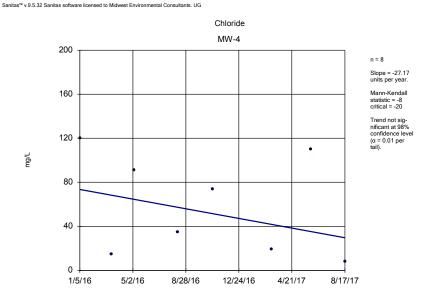


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

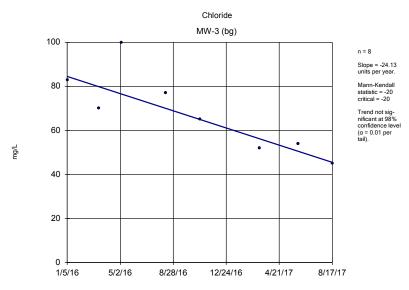


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



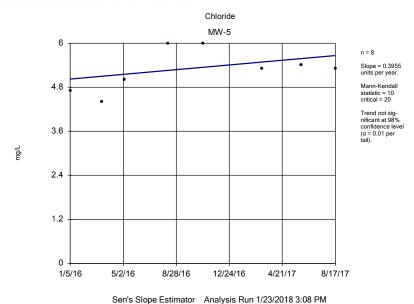
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

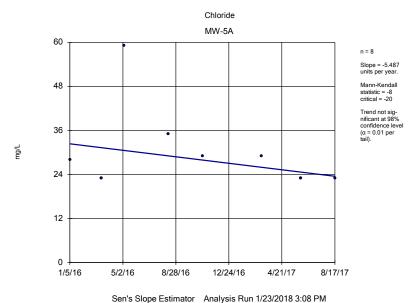


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

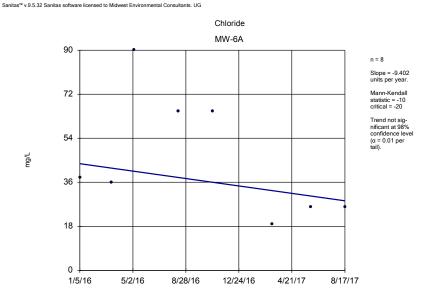
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

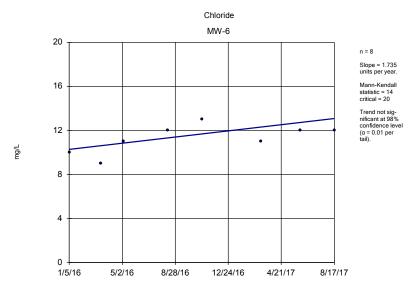


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



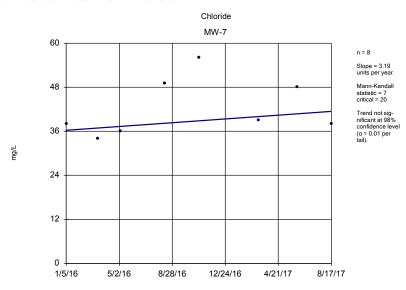
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



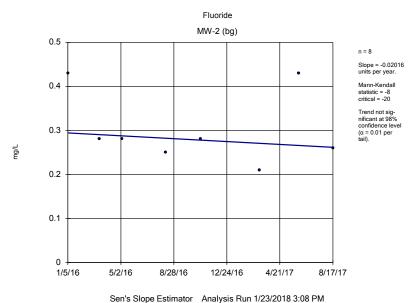
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

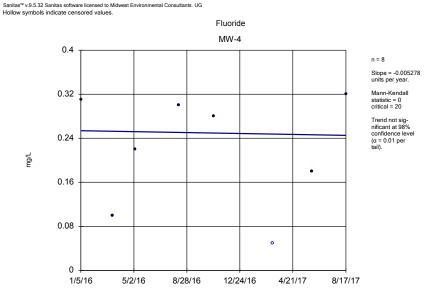


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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

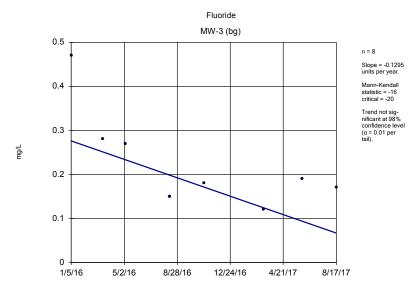


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



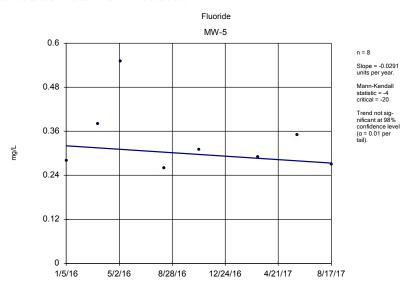
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



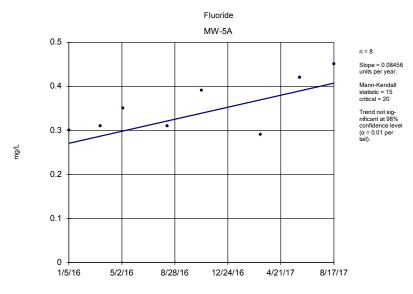
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



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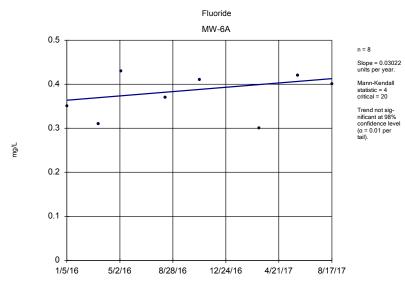
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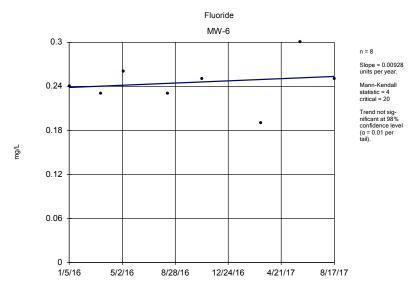
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





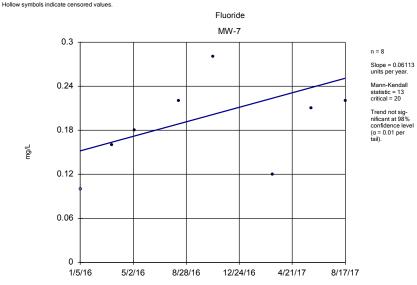
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

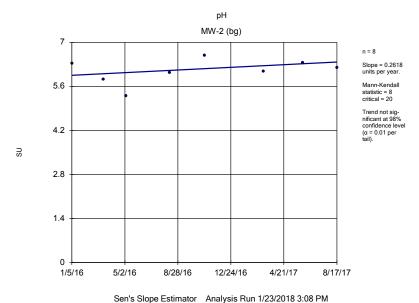
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

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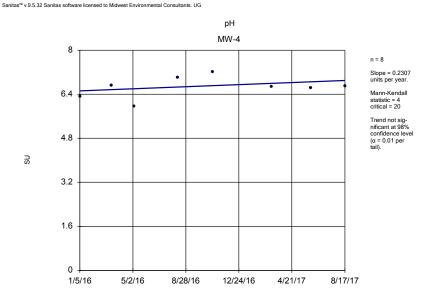


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

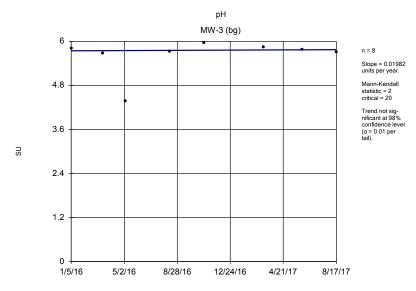


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



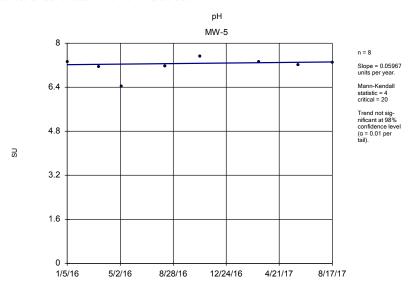
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



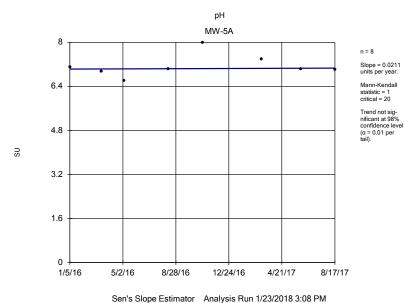
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

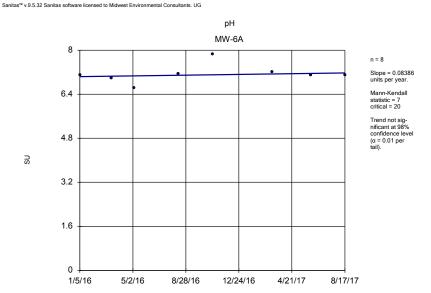


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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

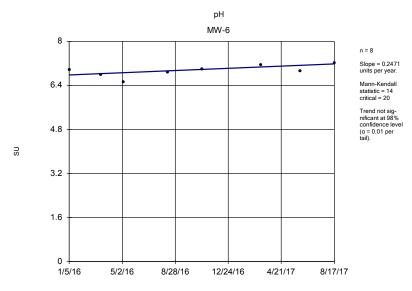


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

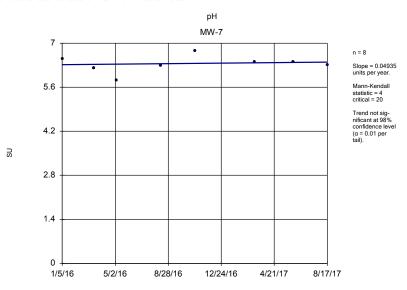
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

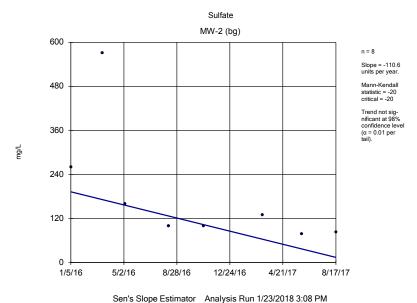
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



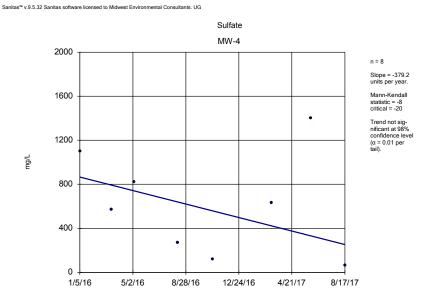


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

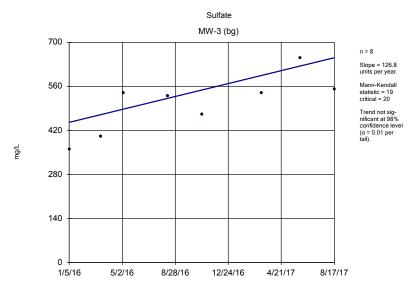


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



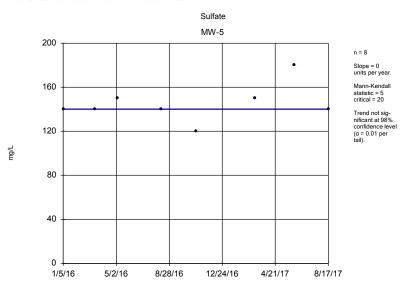
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

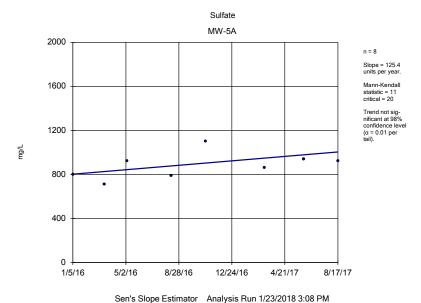


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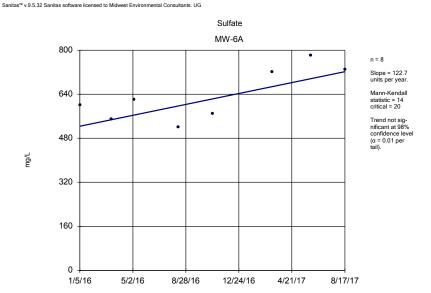
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

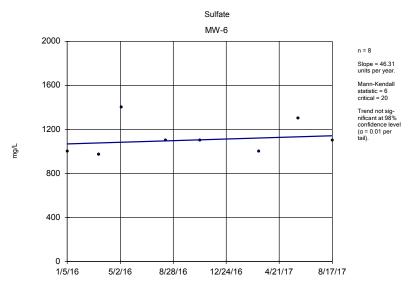


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



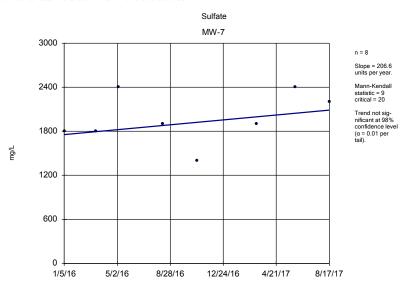
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



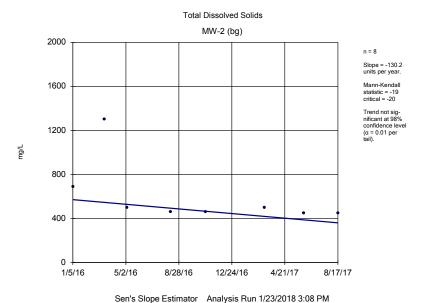
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

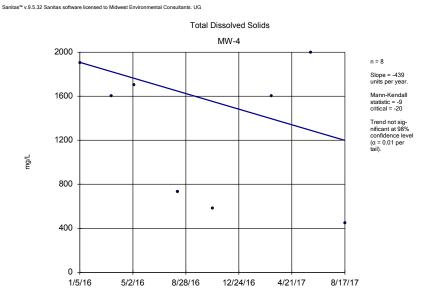


Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

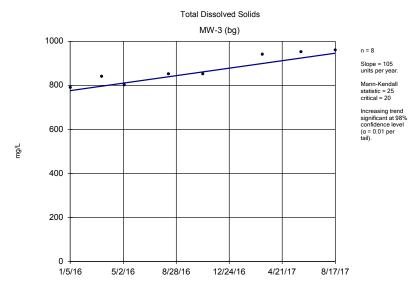


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



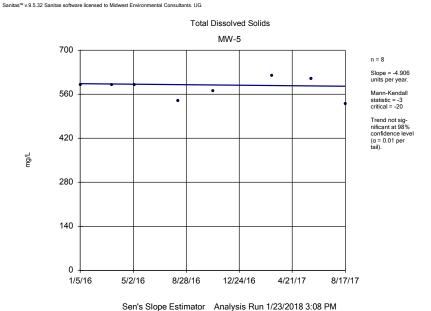
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

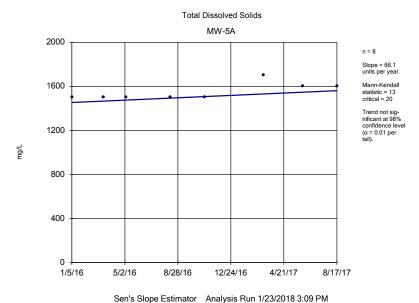


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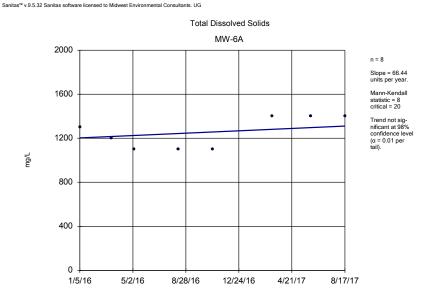
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

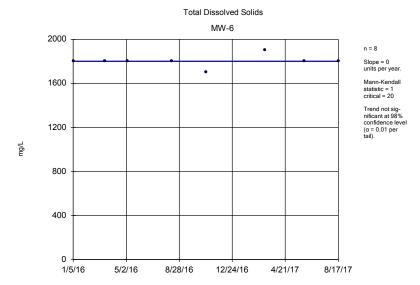


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



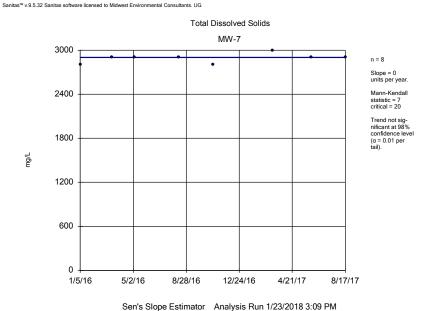
Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Trend Test

	The Empire District	Client: Midwest Envi	ronmental Consu	Data: Asbury CCR I	mpoundmer	Printed 1/23/2018, 3:10 PM						
<u>Constituent</u>		<u>Well</u>	Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Boron (mg/L)		MW-2 (bg)	-0.08868	-16	-20	No	8	0	n/a	n/a	0.02	NP
Boron (mg/L)		MW-3 (bg)	-0.01797	-21	-20	Yes	8	50	n/a	n/a	0.02	NP
Boron (mg/L)		MW-4	0	-1	-20	No	8	62.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-5	0	0	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-5A	0.03993	18	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-6	0.06117	14	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-6A	0.08497	19	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-7	0	2	20	No	8	12.5	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-2 (bg)	-0.8333	-2	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-3 (bg)	15.6	18	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-4	-36.95	-6	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-5	-4.395	-3	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-5A	16.74	10	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-6	7.67	8	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-6A	25.16	12	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-7	-5.401	0	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-2 (bg)	0	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-3 (bg)	-24.13	-20	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-4	-27.17	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-5	0.3955	10	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-5A	-5.487	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-6	1.735	14	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-6A	-9.402	-10	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-7	3.19	7	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-2 (bg)	-0.02016	-8	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-3 (bg)	-0.1295	-16	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-4	-0.00	0	20	No	8	12.5	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-5	-0.0291	-4	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-5A	0.08456	15	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-6	0.00928	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-6A	0.03022	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-7	0.06113	13	20	No	8	12.5	n/a	n/a	0.02	NP
pH (SU)		MW-2 (bg)	0.2618	8	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-3 (bg)	0.01982	2	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-4	0.2307	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-5	0.05967	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-5A	0.0211	1	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-6	0.2471	14	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-6A	0.08386	7	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-7	0.04935	4	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-2 (bg)	-110.6	-20	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-3 (bg)	126.8	19	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-4	-379.2	-8	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-5	0	5	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-5A	125.4	11	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-6	46.31	6	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-6A	122.7	14	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-7	206.6	9	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-2 (bg)	-130.2	-19	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-3 (bg)	105	25	20	Yes	8	0	n/a	n/a	0.02	NP

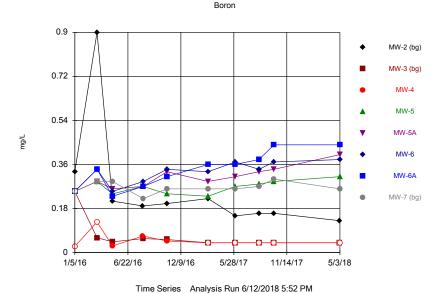
Trend Test

	The Empire District	Client: Midwest Er	nvironmental Cons	ultants	Data: Asbury CCR Im	poundmer	Printed 1/23/2018, 3:10 PM					
Constituent		<u>Well</u>	Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Total Dissolved Solids (mg/L)		MW-4	-439	-9	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-5	-4.906	-3	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-5A	66.1	13	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-6	0	1	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-6A	66.44	8	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-7	0	7	20	No	8	0	n/a	n/a	0.02	NP



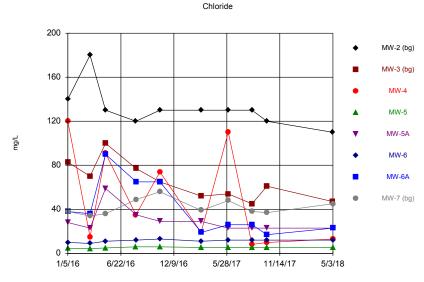
Sanitas[™] Output – Sampling Event

Time Series Analysis



The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

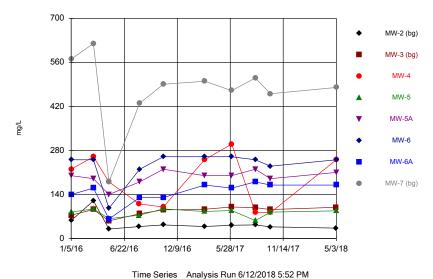




Time Series Analysis Run 6/12/2018 5:52 PM

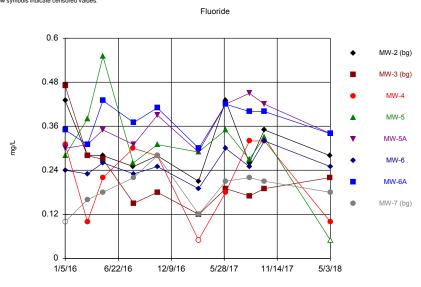
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Calcium



The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

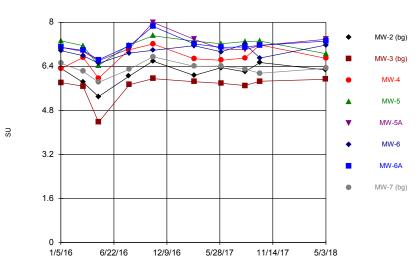
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.



Time Series Analysis Run 6/12/2018 5:52 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background



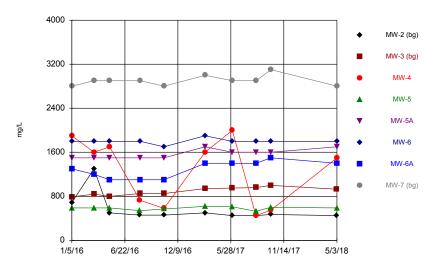


Time Series Analysis Run 6/12/2018 5:52 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

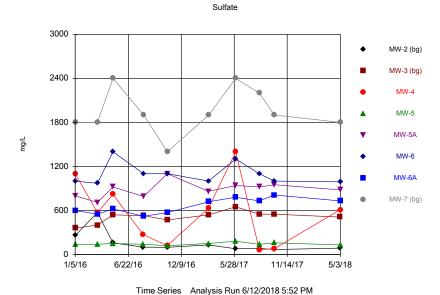
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids



Time Series Analysis Run 6/12/2018 5:52 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background



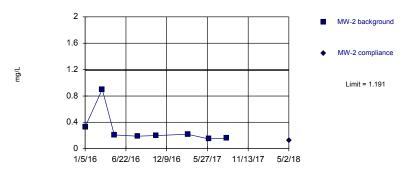
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background



Sanitas[™] Output – Sampling Event Prediction Limits

Within Limit Boron

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=-1.411, Std. Dev=0.5788, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7677, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

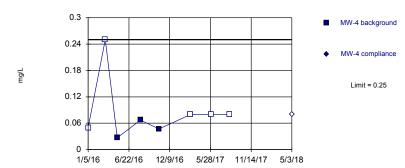
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

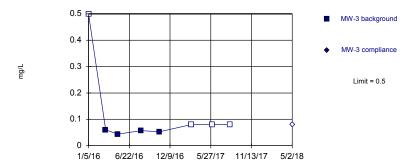
Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. 50% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

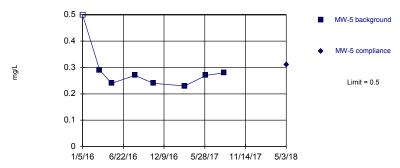
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. 12.5% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Within Limit Boron

Intrawell Parametric



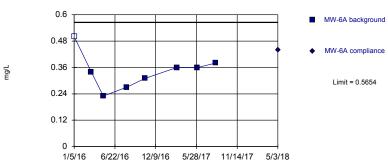
Background Data Summary (based on square root transformation): Mean=0.5649, Std. Dev.=0.06204, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7696, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Boron Within Limit Intrawell Parametric



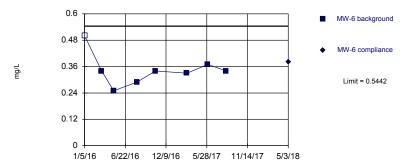
Background Data Summary: Mean=0.3438, Std. Dev.=0.08088, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9453, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Parametric



Background Data Summary: Mean=0.345, Std. Dev.=0.0727, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8597, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

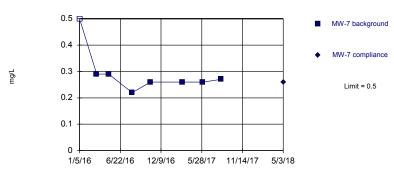
Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit

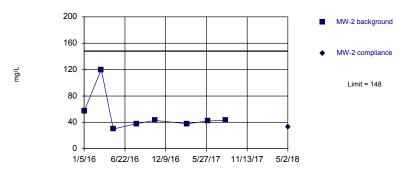
Boron Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. 12.5% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Within Limit Calcium

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=3.846, Std. Dev.=0.4202, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7931, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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1/5/16

Within Limit Calcium
Intrawell Parametric

MW-4 background

MW-4 compliance

Limit = 413.6

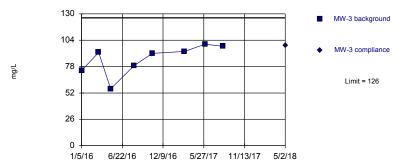
Background Data Summany: Mean=187.9, Std. Dev=82.39, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9158, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

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Within Limit Calcium

Intrawell Parametric



Background Data Summary: Mean=85.38, Std. Dev =14.83, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.011, calculated = 0.8756, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

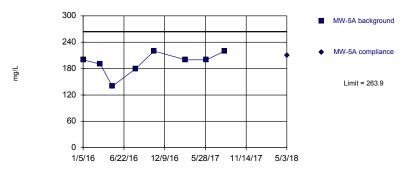
1/5/16

Within Limit Calcium Intrawell Parametric MW-5 background MW-5 compliance Limit = 118.6

Background Data Summary: Mean=80.13, Std. Dev.=14.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8847, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limit Calcium

Intrawell Parametric



Background Data Summary: Mean=193.8, Std. Dev=25.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8601, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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1/5/16

Within Limit

Calcium

Intrawell Parametric

MW-6A background

MW-6A compliance

Limit = 242.8

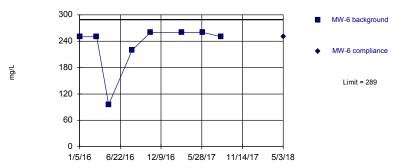
Background Data Summany: Mean=141.5, Std. Dev=36.97, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8547, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

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Within Limit Calcium

Intrawell Parametric

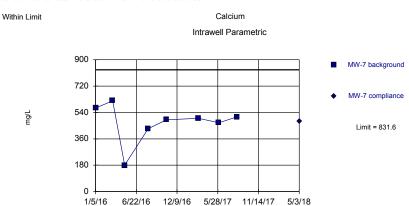


Background Data Summary (based on x⁻⁵ transformation): Mean=8.8e11, Std. Dev.=4.2e11, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7705, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

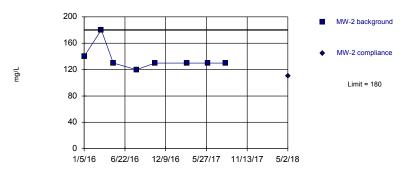
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Background Data Summary: Mean=471.3, Std. Dev=131.5, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8357, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limit Chloride

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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Within Limit Chloride
Intrawell Parametric

200
160
120
MW-4 background

MW-4 compliance

Limit = 182.7

Background Data Summary: Mean=59.01, Std. Dev.=45.16, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.887, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

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Within Limit Chloride





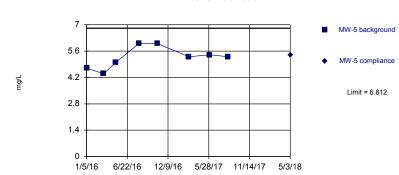
Background Data Summary: Mean=68.25, Std. Dev=18.22, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.011, calculated = 0.9663, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

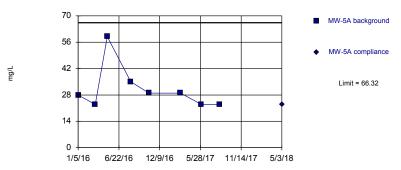
Within Limit Chloride
Intrawell Parametric



Background Data Summary: Mean=5.263, Std. Dev.=0.5655, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9383, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Chloride Within Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=5.506, Std. Dev.=0.9627, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7519, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Chloride

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1/5/16

Within Limit Intrawell Parametric 120 MW-6A background 96 MW-6A compliance 72 ng/L Limit = 113.9 48 24

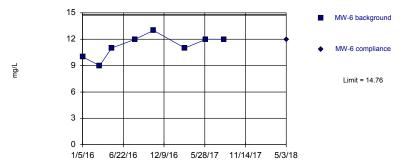
Background Data Summary: Mean=45.63, Std. Dev.=24.93, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8899, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

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Chloride Within Limit

Intrawell Parametric

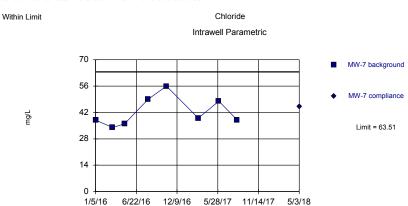


Background Data Summary: Mean=11.25, Std. Dev.=1.282, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9378, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

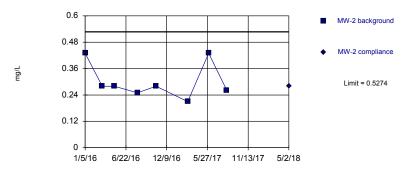
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Background Data Summary: Mean=42.25, Std. Dev.=7.76, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.877, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limit Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.3025, Std. Dev.=0.08207, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7948, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

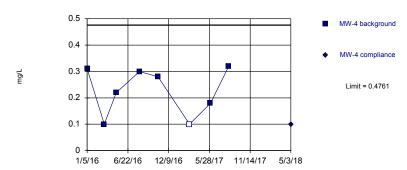
Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Fluoride

Intrawell Parametric

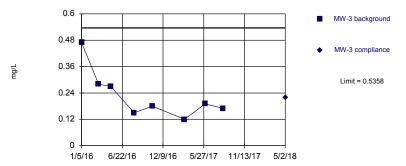


Background Data Summany: Mean=0.2263, Std. Dev.=0.09117, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.001, calculated = 0.8613, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.2288, Std. Dev=0.1121, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8353, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Fluoride

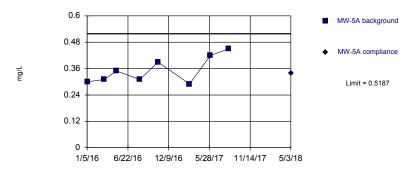
Intrawell Parametric



Background Data Summary: Mean=0.3363, Std. Dev.=0.09561, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7816, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limit Fluoride

Intrawell Parametric



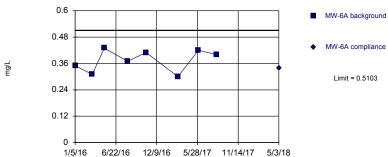
Background Data Summary: Mean=0.3525, Std. Dev.=0.06065, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8853, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Fluoride
Intrawell Parametric

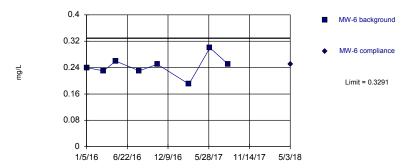


Background Data Summary: Mean=0.3738, Std. Dev.=0.04984, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9076, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.2438, Std. Dev=0.03114, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9455, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

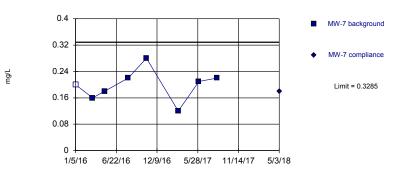
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Fluoride

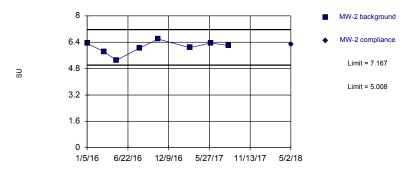
Intrawell Parametric



Background Data Summary: Mean=0.1988, Std. Dev.=0.04734, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9699, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limits pH

Intrawell Parametric



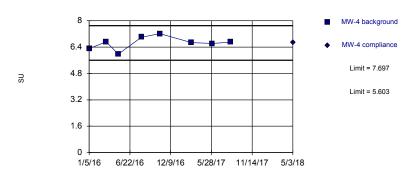
Background Data Summary: Mean=6.088, Std. Dev.=0.3941, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9314, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH
Intrawell Parametric



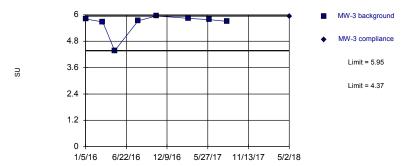
Background Data Summany: Mean=6.65, Std. Dev.=0.3822, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.011, calculated = 0.9541, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH

Intrawell Non-parametric



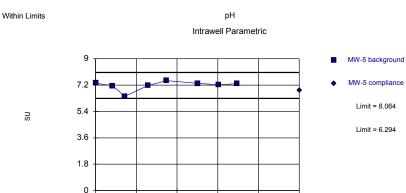
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.08484. Individual comparison alpha = 0.04288 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

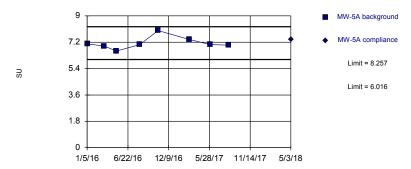
1/5/16



Background Data Summary: Mean=7.179, Std. Dev.=0.323, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7521, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limits pH

Intrawell Parametric



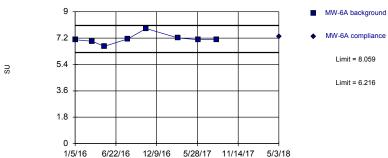
Background Data Summary: Mean=7.136, Std. Dev.=0.409, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8579, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.0011504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH
Intrawell Parametric



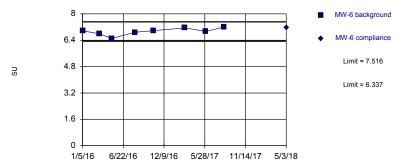
Background Data Summary: Mean=7.138, Std. Dev.=0.3362, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8382, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH





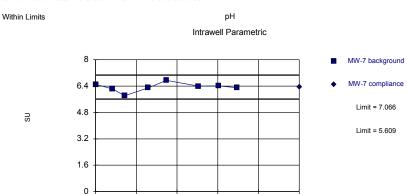
Background Data Summary: Mean=6.926, Std. Dev=0.2151, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9382, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

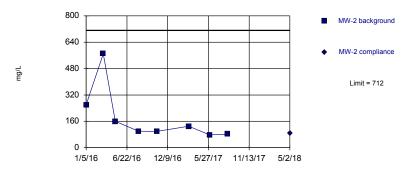
1/5/16



Background Data Summary: Mean=6.338, Std. Dev =0.2657, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9384, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Sulfate Within Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=12.74, Std. Dev.=5.09, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7794, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Sulfate

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1/5/16

Within Limit Intrawell Parametric 2000 MW-4 background 1600 MW-4 compliance 1200 ng/L Limit = 1917 800 400

Background Data Summary: Mean=621.6, Std. Dev.=472.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9492, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

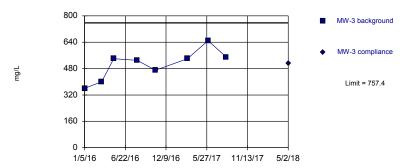
The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

Prediction Limit Analysis Run 6/12/2018 6:08 PM

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate Within Limit

Intrawell Parametric



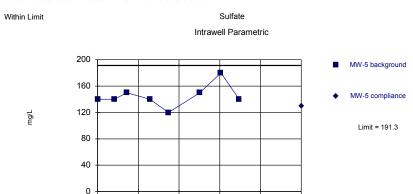
Background Data Summary: Mean=505, Std. Dev.=92.12, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9355, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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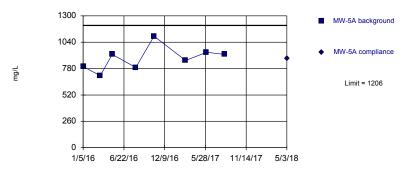
1/5/16



Background Data Summary: Mean=145, Std. Dev.=16.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8495, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Sulfate Within Limit

Intrawell Parametric



Background Data Summary: Mean=880, Std. Dev.=118.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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1/5/16

Sulfate Within Limit Intrawell Parametric 900 MW-6A background 720 MW-6A compliance 540 ng/L Limit = 897 360 180

Background Data Summary: Mean=636.3, Std. Dev.=95.16, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9206, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

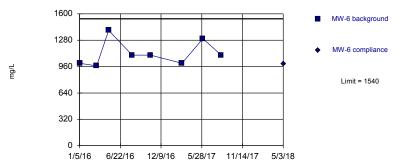
6/22/16 12/9/16 5/28/17 11/14/17 5/3/18

Prediction Limit Analysis Run 6/12/2018 6:08 PM

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Sulfate Within Limit

Intrawell Parametric



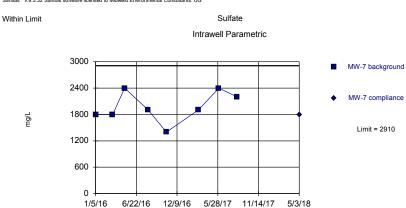
Background Data Summary: Mean=1121, Std. Dev.=152.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8502, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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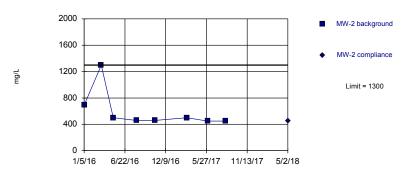
1/5/16



Background Data Summary: Mean=1975, Std. Dev.=341.2, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9176, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Total Dissolved Solids Within Limit

Intrawell Non-parametric

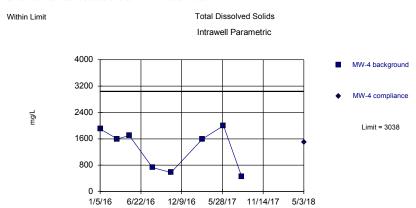


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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Background Data Summary: Mean=1320, Std. Dev.=627.1, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8446, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

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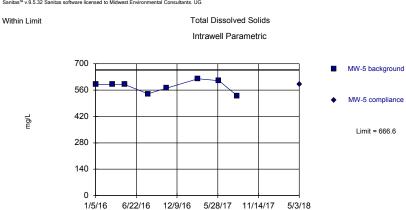


Background Data Summary: Mean=872.5, Std. Dev.=67.98, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8701, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

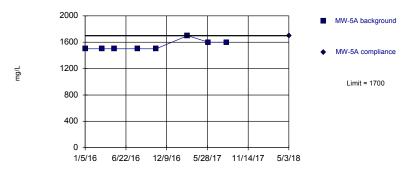
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Background Data Summary: Mean=580, Std. Dev.=31.62, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9166, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Within Limit Total Dissolved Solids

Intrawell Non-parametric

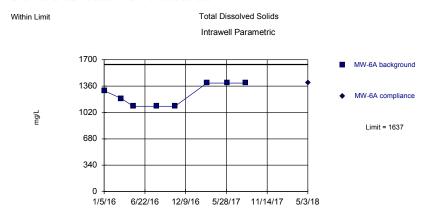


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

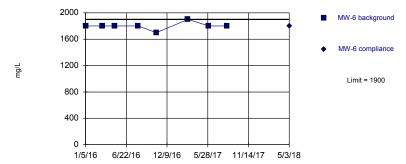
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Background Data Summary: Mean=1250, Std. Dev.=141.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7986, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

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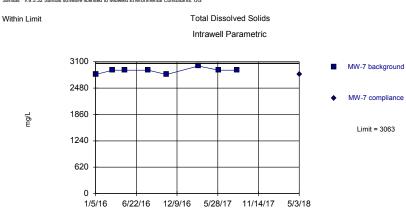


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 6/12/2018 6:08 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-18 App 3 Asbury ponds with background

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Background Data Summary: Mean=2888, Std. Dev.=64.09, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8108, critical = 0.749. Kappa = 2.74 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504.

Prediction Limit

	The Empire Distric	Client: Midwest Environmental Consultants		Data: 5-18 App 3 Asbury ponds with background			ground Printed 6/1	Printed 6/12/2018, 6:09 PM			
Constituent	Well	Upper Lim.	Lower Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	Transform	<u>Alpha</u>	Method
Boron (mg/L)	MW-2	1.191	n/a	5/2/2018	0.13	No	8	0	In(x)	0.001504	Param Intra 1 of 2
Boron (mg/L)	MW-3	0.5	n/a	5/2/2018	0.08ND	No	8	50	n/a	0.02144	NP Intra (normality)
Boron (mg/L)	MW-4	0.25	n/a	5/3/2018	0.08ND	No	8	62.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Boron (mg/L)	MW-5	0.5	n/a	5/3/2018	0.31	No	8	12.5	n/a	0.02144	NP Intra (normality)
Boron (mg/L)	MW-5A	0.5401	n/a	5/3/2018	0.4	No	8	12.5	sqrt(x)	0.001504	Param Intra 1 of 2
Boron (mg/L)	MW-6	0.5442	n/a	5/3/2018	0.38	No	8	12.5	No	0.001504	Param Intra 1 of 2
Boron (mg/L)	MW-6A	0.5654	n/a	5/3/2018	0.44	No	8	12.5	No	0.001504	Param Intra 1 of 2
Boron (mg/L)	MW-7	0.5	n/a	5/3/2018	0.26	No	8	12.5	n/a	0.02144	NP Intra (normality)
Calcium (mg/L)	MW-2	148	n/a	5/2/2018	33	No	8	0	In(x)	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-3	126	n/a	5/2/2018	99	No	8	0	No	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-4	413.6	n/a	5/3/2018	250	No	8	0	No	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-5	118.6	n/a	5/3/2018	88	No	8	0	No	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-5A	263.9	n/a	5/3/2018	210	No	8	0	No	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-6	289	n/a	5/3/2018	250	No	8	0	x^5	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-6A	242.8	n/a	5/3/2018	170	No	8	0	No	0.001504	Param Intra 1 of 2
Calcium (mg/L)	MW-7	831.6	n/a	5/3/2018	480	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-2	180	n/a	5/2/2018	110	No	8	0	n/a	0.02144	NP Intra (normality)
Chloride (mg/L)	MW-3	118.2	n/a	5/2/2018	47	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-4	182.7	n/a	5/3/2018	13	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-5	6.812	n/a	5/3/2018	5.4	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-5A	66.32	n/a	5/3/2018	23	No	8	0	sqrt(x)	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-6	14.76	n/a	5/3/2018	12	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-6A	113.9	n/a	5/3/2018	23	No	8	0	No	0.001504	Param Intra 1 of 2
Chloride (mg/L)	MW-7	63.51	n/a	5/3/2018	45	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-2	0.5274	n/a	5/2/2018	0.28	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-3	0.5358	n/a	5/2/2018	0.22	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-4	0.4761	n/a	5/3/2018	0.1	No	8	12.5	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-5	0.5982	n/a	5/3/2018	0.1ND	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-5A	0.5187	n/a	5/3/2018	0.34	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-6	0.3291	n/a	5/3/2018	0.25	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-6A	0.5103	n/a	5/3/2018	0.34	No	8	0	No	0.001504	Param Intra 1 of 2
Fluoride (mg/L)	MW-7	0.3285	n/a	5/3/2018	0.18	No	8	12.5	No	0.001504	Param Intra 1 of 2
pH (SU)	MW-2	7.167	5.008	5/2/2018	6.27	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-3	5.95	4.37	5/2/2018	5.93	No	8	0	n/a	0.04288	NP Intra (normality)
pH (SU)	MW-4	7.697	5.603	5/3/2018	6.69	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-5	8.064	6.294	5/3/2018	6.86	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-5A	8.257	6.016	5/3/2018	7.38	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-6	7.516	6.337	5/3/2018	7.17	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-6A	8.059	6.216	5/3/2018	7.32	No	8	0	No	0.000752	Param Intra 1 of 2
pH (SU)	MW-7	7.066	5.609	5/3/2018	6.33	No	8	0	No	0.000752	Param Intra 1 of 2
Sulfate (mg/L)	MW-2	712	n/a	5/2/2018	88	No	8	0	sqrt(x)	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-3	757.4	n/a	5/2/2018	510	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-4	1917	n/a	5/3/2018	610	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-5	191.3	n/a	5/3/2018	130	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-5A	1206	n/a	5/3/2018	880	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-6	1540	n/a	5/3/2018	990	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-6A	897	n/a	5/3/2018	730	No	8	0	No	0.001504	Param Intra 1 of 2
Sulfate (mg/L)	MW-7	2910	n/a	5/3/2018	1800	No	8	0	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-2	1300	n/a	5/2/2018	450	No	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-3	1059	n/a	5/2/2018	930	No	8	0	No	0.001504	Param Intra 1 of 2

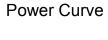
Prediction Limit Page 2

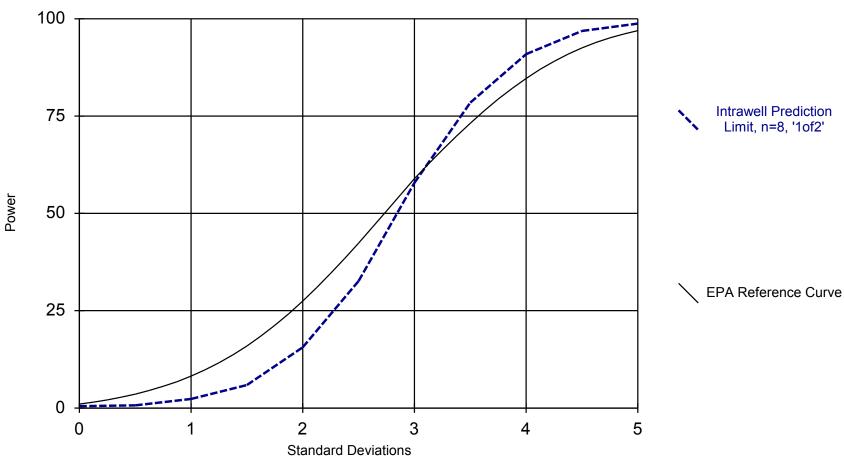
	The Empire Distr	ict Client: Midw	est Environmental	Consultants	Data: 5-18 App	p 3 Asbu	ıry pond	s with back	ground Printed 6/1	2/2018, 6:09	PM
Constituent	Well	Upper Lim.	Lower Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	<u>Transform</u>	<u>Alpha</u>	Method
Total Dissolved Solids (mg/L)	MW-4	3038	n/a	5/3/2018	1500	No	8	0	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-5	666.6	n/a	5/3/2018	590	No	8	0	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-5A	1700	n/a	5/3/2018	1700	No	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-6	1900	n/a	5/3/2018	1800	No	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-6A	1637	n/a	5/3/2018	1400	No	8	0	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-7	3063	n/a	5/3/2018	2800	No	8	0	No	0.001504	Param Intra 1 of 2



Sanitas[™] Output – Sampling Event

Power Curve





Kappa = 2.74, based on 5 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 6/12/2018 6:11 PM

The Empire District
Client: Midwest Environmental Consultants
Data: 5-18 App 3 Asbury ponds with background



APPENDIX B

November 2018 Sampling Event

2018 Groundwater Monitoring, Sampling & Statistics **Per EPA CCR Rule (CFR § 257.90-.98)**

November 2018 Sampling Event

Asbury Generating Station CCR Impoundments Jasper County, MO

January 2019

Prepared For:

The Empire District Electric Company 602 S. Joplin Avenue Joplin, Missouri 64801





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1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundments groundwater monitoring sampling report is in accordance with the EPA CCR Rule.

In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater system (included in **Appendix 1**). Empire notified the MDNR "State Director" via email when this document was posted on-line, as required in the CCR rule.

The EPA CCR Rule requires the annual groundwater report be posted on-line by January 31st of the following year. The first report was due January 31, 2018. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. The annual groundwater report for the 2018 sampling events will be posted on-line by January 31, 2019.

The purpose of the groundwater monitoring plan is to monitor the ground water quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of May and October. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017 to determine if a statistically significant increase (SSI) has occurred. If an SSI is verified, additional evaluation is required to determine if the SSI was caused by the CCR impoundments.

On November 15, 2018, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. For quality assurance and quality control measures, a duplicate sample at MW-7 was taken. These samples were preserved and submitted directly to the laboratory.

This report is a summary of the November 2018 sampling event and the findings of the statistical analysis of the results of the groundwater monitoring program at the Asbury Generating Station CCR Impoundments. Specific information of each sampling event can be obtained from the individual report which is part of the Asbury Operating Record.



2.0 SITE LOCATION

The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. The site is located approximately 5.5 miles north-northeast of Asbury, Missouri, about 14 miles north-northwest of Joplin, Missouri. A map showing the locations of the monitoring wells is on **Figure 2**.

2.1 History

In March 1996, five (5) groundwater monitoring wells, MW-1 through MW-5, were installed around the perimeter of the Asbury Generating Station CCR impoundments. Monitoring wells MW-1, MW-2 and MW-3 were installed to a total depth of between 27.0 to 28.5 feet below ground surface (bgs). Monitoring wells MW-4 and MW-5 were installed to a total depth of 48 feet bgs. Each of the five monitoring wells was equipped with 10.0-foot well screens. The five wells were then developed, purged, and sampled in 1996.

In 2003, two (2) additional groundwater monitoring wells were installed and identified as MW-6 and MW-7. Both wells had 2-inch diameter PVC well casings installed to an approximate total depth of 44 feet below ground surface. Both wells were installed with an above ground steel protective cover. No other construction details such as well screen lengths were available for these two (2) wells. In December 2015, two (2) additional groundwater monitoring wells were installed and identified as MW-5A and MW-6A.

All wells are registered with MDNR – Missouri Geological Survey Program.

2.2 Site Geology

Drilling and subsurface investigation activities at the Site and as part of the MDNR approved CCR landfill Detailed Site Investigation (DSI) for the adjacent landfill area identified three (3) primary geologic units at the Site. These geologic units include the surficial soil layer, Warner Sandstone (uppermost aquifer), and Riverton Shale (confining unit). The information presented herein includes the primary elements of a site characterization work plan consistent with the MDNR guidance.

<u>Surficial Soil</u>. Soils at the site consist of a surficial unit of cohesive soils (e.g., CL, SC, ML, and CH) underlain by Pennsylvanian-age bedrock. Soil thickness at the Site ranges from approximately 15-25 feet.

Warner Sandstone. The Warner Sandstone (Sandstone) is the uppermost bedrock unit in south portion of the Site. In the north area of the Site, the Sandstone is overlain by the Riverton Shale (Shale). Based on the DSI information, the Sandstone and Shale can occur as alternating layers. The Sandstone and Shale are gradational in places and transition from shaley sandstone to sandy shale. According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Warner Sandstone formation is described as follows: "Generally, the lower part is interbedded, very fine grained sandstone and claystone. The upper part is largely medium-bedded to massive channel fill sandstone. In places, the Warner consists primarily of shale and claystone, with only minor amounts of sandstone" and "ranges in thickness from 0 to 15m (49.2 ft.)."

The Sandstone is more than 25-30 feet thick in places and is generally medium hard and thin to medium bedded with occasional shale partings. The degree of induration of the Sandstone varies and generally increases with depth. Slug tests performed at selected DSI piezometers screened in



the Sandstone exhibited hydraulic conductivities ranging from approximately 1.3x10-4 cm/sec to 5.9x10-6 cm/sec. The slug test results are consistent with values for sandstone and shaley sandstone. The groundwater gradient is towards the east and Blackberry Creek.

Riverton Shale. Layers of the Riverton Shale (Shale) exhibited thicknesses ranging from approximately one foot to more than 10 feet. The Shale is generally dark gray to light gray. The Shale is mainly thin bedded with hardness ranging from soft to hard. Six packer tests were performed during the DSI to assess the hydraulic conductivity of the Shale. The packer test results ranged from approximately 3.2×10^{-6} cm/sec to 4.9×10^{-8} cm/sec. The packer test data indicates that the Shale is an effective confining unit.

According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Riverton Shale formation is described as "dark gray to black, fine-grained, relatively brittle shale and contains as many as three coal beds, each of which is underlain by underclay" and "varies in thickness from a featheredge to more than 90 feet".

<u>Unnamed Coal</u>. The Shale includes coal seams in places that range in thickness from a few inches to approximately 1.5 feet. The coal is generally black to dark gray.

2.3 Groundwater Monitoring Network Design

The groundwater monitoring system for the CCR impoundments consist of nine (9) groundwater monitoring wells. Two (2) wells are considered upgradient. Two (2) wells are considered sidegradient; one is only monitored for groundwater elevation. The remaining five (5) wells are considered downgradient.

The groundwater monitoring wells (MWs) at the Asbury Generating Station are equipped with individual dedicated poly tubing to be connected to a peristaltic pump/controller at the surface. Low-flow, micro-purge and sampling techniques and technology are utilized to collect groundwater samples from the subject wells. The groundwater sampling procedures are discussed in further detail below.

2.4 Groundwater Monitoring Network

The locations of the monitoring wells are shown on **Figure 2**. The groundwater monitoring system for the site consists of the following monitoring wells:

- MW-1 Sidegradient (water level only)
- MW-2 Upgradient
- MW-3 Upgradient
- MW-4 Downgradient
- MW-5 Downgradient
- MW-5A Downgradient
- MW-6 Downgradient
- MW-6A Downgradient
- MW-7 Sidegradient

2.5 Seasonal Variation

Historical groundwater elevation data has been limited. However, adequate lengths of well screen have been utilized during the construction of the wells to accommodate typical seasonal groundwater elevation variations seen in southwest Missouri.



2.6 Groundwater Flow Direction

Historically, the seasonally high potentiometric surface indicated the groundwater flow direction to the east. **Figure 3** is a potentiometric map for this May 2018 sampling event.

Originally MW-7 was thought to be a downgradient well but review of the potentiometric mapping from the eight background sampling events revealed that the well is actually a sidegradient well. Therefore, the designation for MW-7 has been changed from a downgradient to a sidegradient well for compliance monitoring.



3.0 BASELINE GROUNDWATER DATA

3.1 Baseline Data Collection

Per EPA CCR Rule § 257.94(b), the site initiated the detection monitoring program in January 2016 to include obtaining a minimum of eight (8) independent samples for each background and downgradient well. The eight (8) independent groundwater samples were obtained and analyzed as required by the CCR Rule under per the baseline groundwater monitoring plan. Background groundwater data was collected from January 2016 to August 2017.

Groundwater Monitoring Reports were completed for each sampling event and have been placed in the Operating Record. Summary tables of the results from each event are included in **Appendix 2**. A listing of each event is below:

- January 2016
- March 2016
- May 2016
- August 2016
- October 2016
- March 2017
- June 2017
- August 2017

Initial baseline monitoring was required at all monitoring wells. The sampling frequency was quarterly or more frequently for the first two (2) years. After the background data plus the first semi-annual sampling events, a reduced lower sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will be completed during the months of May and October.

The initial two (2) years of baseline and the first semi-annual detection monitoring included parameters listed in Appendix III and Appendix IV of the EPA CCR Rule. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. **Appendix 2** contains the list of constituents.

3.2 Baseline Data Analysis

Sanitas[™] for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas[™] training course and user manual. The background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**.

Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3). MW-3 is an up-gradient well. Trending was not removed at this time; otherwise the site would be below the minimum of eight background samples needed to run statistics.



4.0 GROUNDWATER SAMPLING EVENT

On November 15, 2018, eight (8) groundwater monitoring wells were sampled by Midwest Environmental Consultants (MEC) for the EPA CCR Rule Appendix III parameters. For quality assurance and quality control measures, a duplicate sample was taken at MW-7. The sampling protocol and methodology was to be conducted in accordance to the facility's Sampling and Analysis Plan. **Table 1** provides a list of the analytical methods employed by the subcontracted laboratory.

Table 1 – Analytical Methods							
Method	Description						
9056A	Anions, Ion Chromatography						
6020A	Metals (ICP/MS)						
SM 2540C	Solids, Total Dissolved (TDS)						
Field Sampling	Field Sampling						

Appendix 3 includes Monitoring Well Field Inspection sheets and field notes. The physical integrity of the wells was good. During sample collection each of the wells was monitored for pump discharge and formation recharge. Initially, a static water level for each well was recorded (Table 2). To ensure sufficient recharge while sampling, static water levels were collected during pumping. Prior to sample collection, field parameters for each well were measured with a flow-through meter. When the field parameters stabilized, samples for analytical testing were collected and placed on ice for hand delivery to the laboratory. At the conclusion of sample collection from each well, a final static water level measurement was obtained. The samples were collected in the appropriately pre-preserved sample containers and placed on ice for delivery.

Table 2 - Groundwater Sampling Field Parameters Summary During November 2018 Sampling Event								
WELL	STATIC WA (ft-B		PURGE RATE	STABILIZED				
ID	Initial	Final	(mL/min)	рН				
MW-1*	6.54	NA	NA	NA				
MW-2	3.09	6.60	200	6.36				
MW-3	0.71	0.78	200	5.74				
MW-4	5.36	12.65	200	6.89				
MW-5	0	7.22	200	7.19				
MW-5A	8.46	17.22	200	7.06				
MW-6	8.22	16.42	200	6.89				
MW-6A	7.58	15.97	200	7.12				
MW-7	4.50	4.64	200	6.28				

^{*} Water Level Only NA

NA - Not Applicable

Appendix 4 includes the initial analytical results for the sampling event. Included with this analytical report are sample information; chain of custody; wet chemistry data; and volatile data.



5.0 DATA VALIDATION PROCEDURES FOR GROUNDWATER MONITORING DATA

Midwest Environmental Consultants receives Data Packages from the analytical laboratory (Engineering Surveys and Services). The internal quality control/quality assurance case narratives and reported data are then reviewed. Generally the data validation procedures established by the U.S. Environmental Protection Agency *Contract Laboratory Program Functional Guidelines for Organic Data Review* and *Functional Guidelines for Inorganic Data Review* is followed. These guidelines are used to assign data qualifiers to the data. A formal data validation report for the site is not prepared; however, any significant issues are noted in the groundwater monitoring report.

MEC evaluates the data set for precision, accuracy, representativeness, comparability, and completeness (PARCC).

5.1 Precision

<u>Laboratory Precision</u>. Laboratory quality control procedures to measure precision consist of laboratory control sample (LCS) analysis and analysis of matrix spike/matrix spike duplicates (MS/MSD). These analyses are used to define analytical variability.

<u>Field Precision.</u> Analyses of duplicate samples are used to define the total variability (replicability) of the sampling/analytical system as a whole. Field replicates are collected at a rate of one per sampling event.

5.2 Accuracy

Accuracy is determined by calculating the percent recoveries for analyses of surrogate compounds, LCSs, continuing calibration check standards, and matrix spike samples. Acceptable percent recoveries are established for SW-846 and EPA methods. Field and laboratory blank analysis are also used to address measurement bias.

<u>Field Blanks.</u> Field blanks consisted of a trip blank and a field blank. One trip blank per cooler accompanies samples for volatile organic analyses.

<u>Laboratory Blanks.</u> Method blanks, artificial, matrix-less samples, are analyzed to monitor the laboratory analysis system for interferences and contamination from glassware, reagents, etc. Method blanks are taken through the entire sample preparation process. They are included with each batch of extractions or digestions prepared, or with each 20 samples, whichever is more frequent.

5.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely reflect site condition. Representativeness of the data is determined by comparing actual sampling procedures to those delineated in the field sampling plan, comparing results from field replicate samples and reviewing the results of field blanks. Field notes are reviewed as part of our data validation process.

5.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured by using established and approved



sample collection techniques and analytical methods, consistent basis of analysis, consistent reporting units, and analyzing standard reference materials.

5.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under controlled laboratory conditions. Completeness is defined as the valid data percentage of the total tests requested. Valid data are defined as those where the sample arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed chain-of-custody form. Furthermore, the sample must have been analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria were met.



6.0 STATISTICAL ANALYSIS

6.1 Sampling Results

The constituents with results above the laboratory reporting limits are included in **Table 3**. The Test America laboratory analytical results are included in **Appendix 4**.

Table 3 – Constituents Identified Above Laboratory Reporting Limits										
			During	Novembe	er 2018 Sa	mpling Ev	ent			
Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.091	0.047	0.048	0.27	0.4	0.34	0.4	0.23
Calcium	mg/L	NA	26	83	86	87	200	230	160	420
Chloride	mg/L	NA	110	69	9.3	5.3	25	12	17	42
Fluoride	mg/L	4	0.21	0.14	0.32	0.34	0.37	0.28	0.35	0.17
рН	SU	NA	6.36	5.74	6.89	7.19	7.06	6.89	7.12	6.28
Sulfate	mg/L	NA	100	440	160	140	900	970	700	1800
Total Dissolved Solids	mg/L	NA	430	870	480	600	1800	1900	1500	2900

NA = Not Applicable

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

No constituents were detected above the Federal Safe Drinking Water maximum contaminant level (MCL) during the sampling event.

6.2 Statistical Analysis

Sanitas[™] for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas[™] training course and user manual. For most downgradient well constituents, non-parametric intrawell prediction intervals were run due to non-detectable levels in more than 50 percent of the samples or if data could not be adequately normalized. The Sanitas[™] output is included in **Appendix 5**.

Background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**. Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3), MW-3 is an up-gradient well. Trending was not removed at this time; otherwise the site would be below the minimum of eight background samples needed to run statistics.

Statistical analysis was then performed on the Appendix III constituents from the November 2018 sampling event compared to the established background dataset. Prediction interval analyses compare one or more observations to a limit set by background data. Inter-well analyses compare observations from upgradient background wells and their relation to the observations for the downgradient wells. Intra-well analyses compare background observations to current observations of the same well. Due to varying geology in the state of Missouri, intra-well analyses have been deemed a more appropriate method.

Statistical analysis results are presented below for those constituents determined to have an exceeded a prediction limit. However, EPA's "Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities," March 2009, EPA 530/R-09-007 is referenced



multiple times in the preamble of the EPA CCR regulations for groundwater sampling and analysis requirements. According to the EPA Unified Guidance, a prediction limit exceedance is not considered a statistically significant increase (SSI) until it is confirmed through retesting. SSIs generated by non-detectable results or with less than eight background events are considered statistically invalid.

Table 4 lists the parameters with exceedances of prediction limits during the November 2018 sampling event, the associated monitoring wells, if the exceedance is initial versus confirmed, the predicted limit, the measured concentration, and the MCL set forth in the National Drinking Water Regulations. The MCL is the highest level of a contaminant that is allowed in drinking water.

Table 4 – Prediction Limit Exceedances Observed								
During November 2018 Sampling Event								
Constituent	Constituent Monitoring Initial vs. Predicted Limit Measured Drinking Water Well Confirmed (mg/L) Concentration (mg/L) MCLs (mg/L)							
Total Dissolved Solids	MW-5A	Initial	1700	1800	NA			

NA = Not Applicable

It should be noted that the power curve for these analyses is not considered strong (see **Appendix 5**). The data set consists of only 11 sampling events from January 2016 to November 2018. A small data set triggers an SSI when there is even a slight increase in concentration. Sanitas added notes to each SSI "Insufficient data to test for seasonality: data were not deseasonalized."

The EPA Unified Guidance Chapter 5.2.3 states "In groundwater data collection and testing, background conditions may not be static over time. Caution should be observed in removing observations which may signal a change in natural groundwater quality. Even when conditions have not changed, an apparently extreme measurement may represent nothing more than a portion of the background distribution that has yet to be observed. This is particularly true if the background data set contains fewer than 20 samples." Chapter 5.2.4 states "With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples". Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the initial prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

6.3 Results Interpretation

The result for Total Dissolved Solids (MW-5A) indicated an initial intra-well prediction limit exceedance for the listed monitoring well during the November 2018 sampling event. There is no current primary (health based) MCL for total dissolved solids. The facility plans to resample MW-5A for Total Dissolved Solids as part of the May 2019 sampling event.

During the May 2018, no intra-well prediction limits were exceeded. Therefore, there were no initial prediction limit exceedances to confirm during the November 2018 sampling event.

Included below is a discussion of the previous results for comparison.

May 2018

No intra-well prediction limits were exceeded during the May 2018 sampling event.



The October 2017 results for Total Dissolved Solids (MW-7) indicated an exceedance of the predicted limit for the listed monitoring wells. However, this initial prediction limit exceedance was not confirmed during the May 2018 sampling event.

October 2017

The result for Total Dissolved Solids (MW-7) indicated an initial intra-well prediction limit exceedance for the listed monitoring wells during the October 2017 sampling event. However, the result was below the tolerance limit. There is no current primary (health based) MCL for total dissolved solids.

Review of the Total Dissolved Solids in the duplicate sample taken from the same well (MW-7) shows a result of 3,000 mg/L, which would not be an exceedance of the intra-well prediction limit of 3,069 mg/L. Due to the variances between the sample and the duplicate, the site will reevaluate MW-7 for Total Dissolved Solids during the next sampling event.

MW-7 is considered a sidegradient well, therefore no further action is needed for exceedances in sidegradient or upgradient wells.

6.4 Proposed Actions

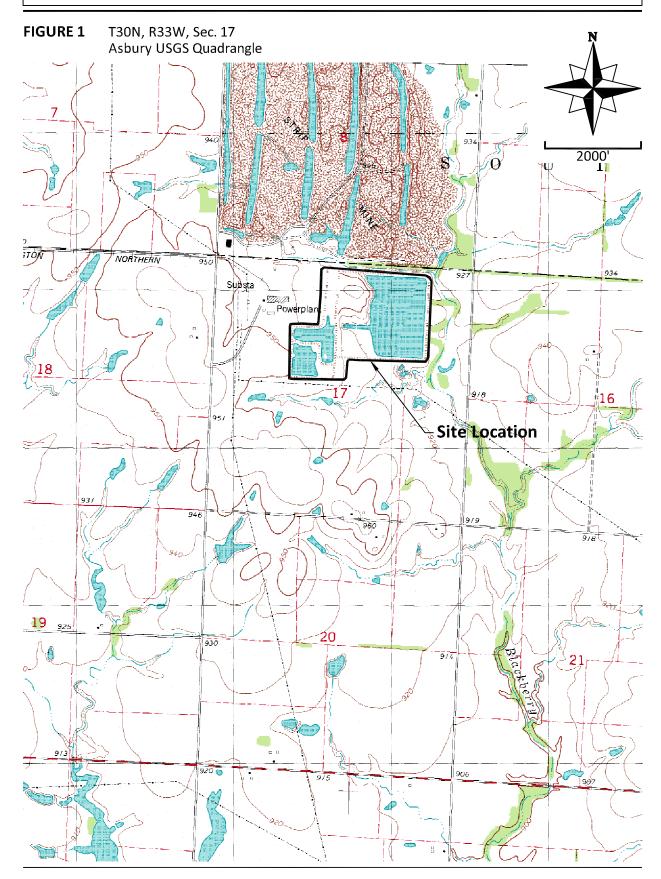
The site will continue to detection monitoring on a semi-annual basis. However, the constituents listed in Appendix IV will remain eliminated from the overall semi-annual detection monitoring plan after this review of the semi-annual groundwater sampling event analytical results, according to the EPA CCR Rule.



FIGURES



Asbury Generating Station CCR Impoundments Groundwater Sampling Event - November 2018 Site Location Map





Asbury Generating Station CCR ImpoundmentsGroundwater Sampling Event - November 2018
Groundwater Monitoring System

FIGURE 2







Well ID	Northing	Easting
MW-1	435791.18 *	2765165.35 *
MW-2	434428.46	2762861.37
MW-3	432842.77	2762720.80
MW-4	433709.99	2764938.99
MW-5	433659.27	2765966.23
MW-5A	434150.04	2765969.78
MW-6	434600.46	2765987.98
MW-6A	435071.44	2766010.46
MW-7	435505.42	2765993.13

^{*} Coordinate location is approximate

Legend

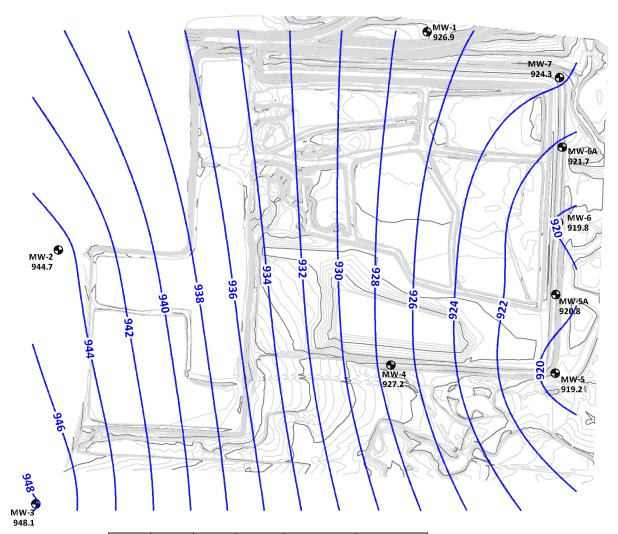
Monitoring Well



Asbury Generating Station CCR Impoundments Groundwater Sampling Event - November 2018 Groundwater Piezometric Surface Map

FIGURE 3





Well ID	Northing	Easting	Top Of Casing	Static Water Level (BTOC)	Static Water Level
MW-1	435791.18	2765165.35	933.4	6.5	926.9
MW-2	434428.46	2762861.37	947.8	3.1	944.7
MW-3	432842.77	2762720.80	948.8	0.7	948.1
MW-4	433709.99	2764938.99	932.6	5.4	927.2
MW-5	433659.27	2765966.23	919.2	0.0	919.2
MW-5A	434150.04	2765969.78	929.3	8.5	920.8
MW-6	434600.46	2765987.98	928.0	8.2	919.8
MW-6A	435071.44	2766010.46	929.3	7.6	921.7
MW-7	435505.42	2765993.13	928.8	4.5	924.3

Legend

Monitoring Well



APPENDIX 1

MDNR Groundwater System Approval

Missouri Department of

dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

NOV 0.2 2017

Mr. Kavan Stull, Senior Environmental Coordinator Empire District 602 South Joplin Avenue Joplin, MO 64802

RE: Site Characterization Workplan

Dear Mr. Stull:

The Missouri Department of Natural Resources has reviewed the document "Site Characterization Workplan" dated May 16, 2017. The site has undergone extensive characterization regarding construction of a coal combustion residual (CCR) landfill near the CCR impoundments. The department's Water Protection Program has determined, through consulting with the Missouri Geological Survey, this characterization is sufficient and may be used in whole to complete the required monitoring of the sub-surface conditions at the site. Additional submittal of site characterization is not necessary, as the previous submittal meets the requirement for special condition 19(b) of the Missouri State Operating Permit MO-0095362. The facility may proceed with the next step laid out in the permit; special condition 19(c). Enclosed is the Missouri Geological Survey concurrence.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to 10 CSR 20 1.020 and Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is by mail at Administrative Hearing Commission, United States Post Office Building, Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102, by phone at 573-751-2422, by fax at 573-751-5018, and by website at www.oa.mo.gov/ahc.

Mr. Kavan Stull Page 2

If you have any questions, please do not hesitate to contact Ms. Pam Hackler by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176, by phone at 573-526-3386; or by email at pam.hackler@dnr.mo.gov. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

Michael J. Abbott, Chief Operating Permits Section

MJA/php

Enclosure

c: Mr. Randall Willoughby, Southwest Regional Office

MEMORANDUM

DATE:

October 18, 2017

SWR18011 Jasper County

TO:

Pam Hackler- WPP- Industrial Wastewater Unit

FROM:

Fletcher N. Bone, Geologist, Environmental Geology Section, Geological Survey Program,

MGS

SUBJECT:

Site characterization for existing CCR

impoundments

Asbury Power Plant Site Characterization Work

Plan- CCR

37 21 22.66 Latitude, -94 35 4.79 Longitude,

Jasper County, Missouri



October 18, 2017

The Missouri Geological Survey (MGS) has reviewed the documents titled, 'NPDES Permit MO-0095362 Asbury Power Plant, Jasper County, Missouri, Site Characterization Work Plan', prepared by Empire District Electric Company, dated September 8, 2017 and 'Site Characterization Work Plan, Coal Combustion Residuals Impoundments, Empire Electric Facility - Permit MO-0095362, Jasper County, Missouri, Geotechnology Project No. J021738.03', prepared by Geotechnology Inc., dated May 16, 2017. The MGS offers the following comment.

General Comment:

The MGS agrees that the existing Coal Combustion Residuals (CCR) impoundments (site 1) do not need further site characterization, at this time. The site characterization performed, as described in the Detailed Site Investigation Report (DSI), dated January 21, 2015, at the proposed CCR impoundment (site 2) that is approximately 1,000 feet south of the existing CCR impoundments (site 1), coupled with the geologic and hydrologic data provided that pertains to the existing CCR impoundments (site 1) (1996 to present data), provides adequate characterization of the geology and hydrology of the site 1. The geologic and hydrologic settings of both sites are similar, with geologic boring logs and potentiometric data of both sites being compared. The hydraulic conductivity testing conducted at the proposed CCR site (site 2) has demonstrated that there is a low potential for groundwater contamination for this area.

If you are in need of further assistance from our office or have questions regarding this evaluation please feel free to contact me at (573) 368-2161.



APPENDIX 2

Baseline Sampling Information

EPA CCR Rule

Appendix III to Part 257—Constituents for Detection Monitoring

Boron

Calcium

Chloride

Fluoride

рΗ

Sulfate

Total Dissolved Solids (TDS)

Appendix IV to Part 257—Constituents for Assessment Monitoring

Antimony

Arsenic

Barium

Beryllium

Cadmium

Chromium

Cobalt

Lead

Lithium

Mercury

Molybdenum

Selenium

Thallium

Radium 226 and 228 combined

1st Baseline Event – January 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
			II.	Append	lix III					
Boron	mg/L	NA	0.33	<0.5 J	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Calcium	mg/L	NA	57	74	220	84	200	250	140	570
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.43	0.47	0.31	0.28	0.30	0.24	0.35	<0.2 J
рН	SU	NA	6.33	5.81	6.31	7.33	7.09	6.97	7.09	6.51
Sulfate	mg/L	NA	260	360	1100	140	800	1000	600	1800
Total Dissolved Solids	mg/L	NA	690	790	1900	590	1500	1800	1300	2800
				Append	ix IV					
Antimony	mg/L	0.006	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.002 J	0.01	<0.01 J	<0.02 J	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	2	0.044	0.0099	0.065	0.086	0.036	0.02	0.042	0.011
Beryllium	mg/L	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.01 J	<0.01 J	<0.01 J	<0.01 J	<0.01	<0.01
Cobalt	mg/L	NA	<0.01 J	<0.01 J	0.046	<0.002 J	0.018	0.0022	0.02	0.014
Lead	mg/L	0.015	<0.002 J	<0.002	<0.01 J	<0.002 J	<0.002	<0.002	<0.002	<0.002 J
Lithium	mg/L	NA	0.057	0.15	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.01 J	<0.002	<0.01 J	<0.002
Selenium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.477 J	<0.427 J	<2.08	<0.563 J	<0.392 J	<0.446 J	<0.306 J	<0.279 J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

2nd Baseline Event – March 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.90	0.060	<0.25	0.29	0.29	0.34	0.34	0.29
Calcium	mg/L	NA	120	92	260	94	190	250	160	620
Chloride	mg/L	NA	180	70	15	4.4	23	9.0	36	34
Fluoride	mg/L	4	0.28	0.28	0.10	0.38	0.31	0.23	0.31	0.16
рН	SU	NA	5.82	5.68	6.72	7.15	6.94	6.79	6.98	6.22
Sulfate	mg/L	NA	570	400	570	140	710	970	550	1800
Total Dissolved Solids	mg/L	NA	1300	840	1600	590	1500	1800	1200	2900
				Append	lix IV					
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002 J	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.002 J	0.024	0.0038	<0.002 J	0.0038	0.0026	0.0025	0.004
Barium	mg/L	2	0.060	0.012	0.034	0.047	0.042	0.026	0.051	0.0089
Beryllium	mg/L	0.004	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002 J	0.0034	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.017	0.0095	0.021	<0.002 J	0.02	0.0061	0.0063	0.016
Lead	mg/L	0.015	<0.002 J	<0.002 J	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Lithium	mg/L	NA	0.20	0.15	0.074	0.074	0.14	0.22	0.14	0.30
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002	<0.002 J	0.0041	<0.002 J	0.0038	<0.002
Selenium	mg/L	0.05	<0.002	<0.002	<0.002	0.0021	0.0028	0.0031	0.0031	<0.002
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.337 J	<0.389 J	<0.84 J	<0.315 J	<0.336 J	<0.319 J	<0.348 J	<0.329 J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

3rd Baseline Event – May 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.21	0.044	0.027	0.24	0.26	0.25	0.23	0.29
Calcium	mg/L	NA	130	100	91	5	59	11	90	36
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.28	0.27	0.22	0.55	0.35	0.26	0.43	0.18
рН	SU	NA	5.30	4.37	5.97	6.43	6.60	6.51	6.64	5.82
Sulfate	mg/L	NA	160	540	820	150	920	1400	620	2400
Total Dissolved Solids	mg/L	NA	500	800	1700	590	1500	1800	1100	2900
				Append	lix IV					
Antimony mg/L 0.006 <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J <0.002 J										<0.002 J
Arsenic	mg/L	0.01	0.0013	0.027	0.01	0.0043	0.01	0.007	0.0037	0.0082
Barium	mg/L	2	0.021	0.01	0.025	0.045	0.037	0.041	0.04	0.021
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	0.0025	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0072	0.0073	0.0071	<0.0005J	0.00081	0.0035	<0.0005J	0.0037
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001 J
Lithium	mg/L	NA	<0.05 J	0.15	<0.05 J	0.074	0.16	0.31	0.12	0.22
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0052	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005 J	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001
Combined Radium	pCi/L	5	<0.355	<0.427 J	<0.386 J	<0.402 J	<0.377 J	<0.357 J	<0.334 J	<0.333 J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

4th Baseline Event – August 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.19	0.057	0.067	0.27	0.27	0.29	0.27	0.22
Calcium	mg/L	NA	38	79	110	74	180	220	130	430
Chloride	mg/L	NA	120	77	35	6	35	12	65	49
Fluoride	mg/L	4	0.25	0.15	0.3	0.26	0.31	0.23	0.37	0.22
рН	SU	NA	6.04	5.73	7	7.17	7.04	6.88	7.14	6.29
Sulfate	mg/L	NA	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Total Dissolved Solids	mg/L	NA	460	850	730	540	1500	1800	1100	2900
				Append	lix IV					
Antimony	mg/L	0.006	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.001 J	0.013	<0.001 J	<0.001 J	0.001	<0.001 J	<0.001 J	<0.001 J
Barium	mg/L	2	0.023	<0.01 J	0.012	0.035	0.031	0.014	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0052	0.0088	0.0038	<0.0005J	0.00075	<0.0005J	<0.0005J	0.015
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001
Lithium	mg/L	NA	<0.05 J	0.16	<0.05 J	0.078	0.16	0.22	0.11	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	<0.005	0.0067	<0.005
Selenium	mg/L	0.05	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.424 J	<0.465 J	<0.833	<0.441 J	<0.435 J	<0.45 J	<0.484 J	<0.418 J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

5th Baseline Event – October 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.2	0.053	0.047	0.24	0.33	0.34	0.31	0.26
Calcium	mg/L	NA	43	91	100	94	220	260	130	490
Chloride	mg/L	NA	130	65	74	6	29	13	65	56
Fluoride	mg/L	4	0.28	0.18	0.28	0.31	0.39	0.25	0.41	0.28
рН	SU	NA	6.59	5.95	7.21	7.51	8.00	6.98	7.85	6.75
Sulfate	mg/L	NA	99	470	120	120	1100	1100	570	1400
Total Dissolved Solids	mg/L	NA	460	850	580	570	1500	1700	1100	2800
				Append	lix IV					
Antimony	mg/L	0.006	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.001	0.014	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001 J	<0.001 J
Barium	mg/L	2	0.028	<0.01 J	0.02	0.03	0.033	0.013	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0051	0.0095	0.0013	0.00073	0.0072	<0.0005J	<0.0005J	0.014
Lead	mg/L	0.015	<0.001 J	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	<0.05	0.078	0.17	0.24	0.12	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0066	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005J	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.436J	<0.478J	<0.535J	<0.503J	<0.498J	<0.464J	<0.453J	<0.424J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

6th Baseline Event – March 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	0.22	0.052	0.057	0.23	0.29	0.33	0.36	0.26
Calcium	mg/L	NA	38	93	250	86	200	260	170	500
Chloride	mg/L	NA	130	52	19	5.3	29	11	19	39
Fluoride	mg/L	4	0.21	0.12	<0.1 J	0.29	0.29	0.19	0.3	0.12
рН	SU	NA	6.07	5.84	6.67	7.32	7.38	7.15	7.21	6.40
Sulfate	mg/L	NA	130	540	630	150	1100	1000	720	1900
Total Dissolved Solids	mg/L	NA	500	940	1600	620	1700	1900	1400	3000
				Append	lix IV					
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001	0.037	0.0022	0.0013	0.0014	<0.001 J	0.0043	<0.001 J
Barium	mg/L	2	0.021	0.011	0.021	0.033	0.026	0.015	0.027	<0.01 J
Beryllium	mg/L	0.004	<0.001 J	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 J
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0071	0.0097	0.0096	<0.0005J	0.0022	0.0024	0.0017	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	0.072	0.076	0.16	0.23	0.14	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005 J	<0.005 J	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	0.575	1.63	0.287	1.50	0.803	2.68	1.73	1.62

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

7th Baseline Event – June 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	dix III					
Boron	mg/L	NA	<0.08J	<0.08J	0.034	0.27	0.31	0.37	0.36	0.26
Calcium	mg/L	NA	42	100	300	89	200	260	160	470
Chloride	mg/L	NA	130	54	110	5.4	23	12	26	48
Fluoride	mg/L	4	0.43	0.19	0.18	0.35	0.42	0.3	0.42	0.21
рН	SU	NA	6.35	5.78	6.62	7.22	7.04	6.93	7.09	6.41
Sulfate	mg/L	NA	78	650	1400	180	940	1300	780	2400
Total Dissolved Solids	mg/L	NA	450	950	2000	610	1600	1800	1400	2900
				Append	lix IV					
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001J	0.1	0.0032	<0.001J	0.0037	<0.001	0.0018	<0.001
Barium	mg/L	2	0.03	0.016	0.048	0.04	0.026	0.017	0.025	<0.01J
Beryllium	mg/L	0.004	<0.001	0.0031	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.004	0.0088	0.0042	<0.0005J	0.0045	0.00087	0.0059	0.0015
Lead	mg/L	0.015	0.0033	0.001	0.0074	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.18	0.053	0.085	0.18	0.25	0.15	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005	<0.005J	<0.005	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.397J	<0.337J	<0.403	<0.291J	<0.343J	<0.414J	<0.33J	<0.314J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)

8th Baseline Event – August 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
				Append	lix III					
Boron	mg/L	NA	0.16	<0.08J	<0.08J	0.28	0.33	0.34	0.38	0.27
Calcium	mg/L	NA	43	98	83	57	220	250	180	510
Chloride	mg/L	NA	130	45	8.1	5.3	23	12	26	38
Fluoride	mg/L	4	0.26	0.17	0.32	0.27	0.45	0.25	0.4	0.22
рН	SU	NA	6.2	5.7	6.7	7.3	7	7.2	7.1	6.3
Sulfate	mg/L	NA	82	550	63	140	920	1100	730	2200
Total Dissolved Solids	mg/L	NA	450	960	450	530	1600	1800	1400	2900
				Append	lix IV					
Antimony mg/L 0.006 <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J <0.002J										
Arsenic	mg/L	0.01	<0.001J	0.013	<0.001J	0.002	<0.001J	<0.001J	<0.001J	<0.001J
Barium	mg/L	2	0.024	0.01	0.018	0.027	0.023	0.018	0.021	<0.01J
Beryllium	mg/L	0.004	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001J
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002J	<0.002	0.0026	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0036	0.01	0.00067	<0.0005J	0.0023	<0.0005J	0.0051	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.17	<0.05J	0.073	0.18	0.22	0.15	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005J	<0.005J	<0.005J	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.42J	<0.417J	<0.473	<0.476J	<0.383J	<0.389J	<0.291J	<0.346J

<x = Less than reporting limit (nondetectable)</pre>

J = Trace value seen above minimum detection limit but below reporting limit (trace)



APPENDIX 3

Monitoring Well Field Inspection Sheets and Field Notes

Facility:	Asbury	CCR (Permit #)	. N	lonitoring	Well 10: MV	N- 2		
Purga In	formation:						e Blind I		Field Blank	: <u> </u>
		e: Peristaltic P	ump with 3	8/8 - inch I	Diamotor 7	Frihing (
			anny with 5	70 - IIICH I	Jameter	ubing				
		Actual Pur	ge Volume	Removed		mL p	ost pump calib	ration.		
Date / Ti	me Initiated:	11- 19	-18 @		Date	/ Time Cor	mplotodi 11	4.0	_	
					Date	/ Time Coi	iihietea:	18-	(0)	20
Well Pur	ged To Dryne	ss?: Y / N		Petr	oleum or (Gas Detect	ted? Y/N			1
Purge Da	ıta:									
	Purge	Cumulative			Sn	ecific				Other
	Rate	Volume	Temp.	рН		uctivity	Dissolved	ODD		(Color
Time	(mL/min)	(ml)	(°C)	(SU)		S/cm)	Oxygen (mg/L)	ORP (MV)		Odor)
11:32	200		14.66	655	- 0	597	the same of the same of	S 5450 T		
-34			1490	7 (10		2	5.53	45,2		Cher
36						603	9.36	49.4		+
70			15,38	6.30		608	9, 35	54.6		
- 70	J		15,41	6,36	Ou l	510	9,21	37.9		1
										V
					F	ield Inspe	ction	Good	<u>Fair</u>	Poor
Time =	ala d	11:45				ccess		(G)	F	P
rime sam	pied	11:1)				ad Condit		G)	F	P
						asing Con		G	Fan	PS
Weather	Conditions (The same	BOPF			ocking Cap		G	(F)	PNO G
vvcatner	conditions_c	(41)				iser Condi		G	F	(P)
		3,091				ield Inspe		<u>Yes</u>	No	N/A
Water Lev	el Start	709				Vell ID Visi		Υ	(N)	N/A
	7,0					tanding W lear of We		Y	N	N/A
		111				leasuring			N	N/A
Water Lev	el Finish	6,60				_	e with MDNR	Y	N	N/A
							ce Performed	Y	N	N/A N/A
							nation Normal		N	N/A N/A
Name (M	EC Field Samp	ler): <u>Ryan Ortb</u>	als and Rick	Elgin			Calibration No		N	N/A
	0	6	11/				nent Needed	Y	N	N/A
	16	// //	1				ons from SAP	Y	1 N /	N/A
Sampler Si	ignature <u>M</u>	Am M	V		Si	ediment T	hickness Checl		(N	N/A
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Constitu	ent			MW- 6A		7	T			
рН			S.U.	6.87	MW-7 6.12					
	Conductance		hos/cm	1.601	2.699					
Total We		GIIII	ft	1.001	4.033					
	GW Depth		ft	7.28	3.04					
	GW Drop		ft	7.20	3.04	 				
2 System Volumes						-				
	ged Amount)		mL	800	800					

Facility:	Asbury (CCR (Permi	it#			Mor		ell ID: MW		7 5: 1181	. i
	formation : of Well Purge	: Peristalt	ic Pum	ıp with 3,	/8 - inch Dia	ameter Tu		Blind D	uplicate [_ Field Bla	ink [].
		Actual	Purge	Volume i	Removed:		mL post	t pump calibi	ration .		
			1						/		
Date / Ti	me Initiated:	11-		18 @		_ Date / 1	Time Comp	oleted: <u>11</u> -	- / (-18	@	-
Well Pur	ged To Dryne	ss?: Y //	N		Petrol	eum or Ga	s Detected	d? Y/N)		
Purge Da	nta:					T					
Time	Purge Rate (mL/min)	Cumulat Volum (mL		Temp. (°C)	pH (SU)	Spec Condu- (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color Clarity Odor
12:58	200			11.46	5,74	0,4	101	3.68	36,1		Redist
1:00				12. 16	5,74	0, 3		3,68	90.6		- Court
:02				2. 36	5.74	0.8		3,72	93.9		
:04				2,75	9.74	0,9		3,76	95,2	0	Clear
:1:					1						
Field Inspection								tion	Good	<u>Fair</u>	Poor
		110					cess		G	F	Р
Time san	npled	110				Pa	d Conditio	on	6	F	Р
							sing Condi		G	F	Р
		01	010	E			cking Cap		(6)	F	P
Weather	Conditions	rar	25	<u> </u>		Ris	ser Conditi	ion	(G)	F	P
							eld Inspect		Yes	No	N/A
		A				W	ell ID Visib	ole	Υ	N	N/A
Water Le	evel Start	0.71					anding Wa		Υ	N	N/A
							ear of Wee		Ø Ø	N	N/A
147-41		017	7				easuring P			N	N/A
water Le	evel Finish	0,77	-					with MDNR	Υ	(N	N/A
								e Performed	Υ .		N/A
Nama (N	450 E: ald Came	alam\. Dozav	ا ۽ جا جا	and Bir	Licher			ation Normal		N	N/A
ivairie (iv	1EC Field Sam	pier): <u>Ryan</u>	Ortbai	s and Ric	KEIgIN			Calibration No		N	N/A
		A	m	-1				ent Needed	Y	IN	N/A
Sampler		Z				ns from SAP ickness Chec	ked Y	(N	N/A N/A		
Historica	l Data: Avera	ge of sampl	ling eve	ents							
Constit				nits	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
рН			_	.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
	c Conductance	e		os/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
	Vell Depth			ft	Level						
	e GW Depth			ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop ft											
	Average GW Drop ft DON'T 800 800 800 800 800										

800

SAMPLE

mL

(Min Purged Amount)

Facility:	Asbury (CCR (Permi	t #)		Moi	_	Vell ID: MV						
Domes Inf	Sample Blind Duplicate Field Blank Purge Information: Method of Well Purge: Peristaltic Pump with 3/8 - inch Diameter Tubing													
_		· Doristalt	ic Dump with	2/0 in	sh Dia	motor Tu	hima	<i>,</i> v						
Wiethou	or well ruige	. renstan	ic rullip with	1 3/0 - 1110	.II Dia	illeter Tu	Dirig							
		Actual	Purge Volun	ne Remov	ed:		mL po	st pump calib	ration.					
Date / Tir	me Initiated:	11-	7 -18 @	3		_ Date / -	Time Com	pleted: <u>11</u>	- lb -18-	@				
	ged To Dryne							ed? Y N						
Purge Da	ta:													
Time	Purge Rate (mL/min)	Cumulat Volum (ml	e Tem		oH SU)	Spe Condu (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)	.10	Other (Color, Clarity, Odor)			
10:59	200		13.5	1 7	02	05	36	1,41	23.6		Clear			
11:01			94			0.49	26,1		1					
03	13,91 6,91						43	0.34	28,5					
:05							-							
.0)	17,010,0						9 0.543 0,34 30.0							
	ne sampled						cess d Condit sing Con- cking Cap ser Condi	ion dition o & Lock	Good G G Yes Y	Fair F F F	Poor P P P/6 La			
Water Le	vel Start	9,30	6			Fic W St Cl	eld Inspe ell ID Visi anding W ear of We easuring	ction ble ater eeds	Yes Y	No N N N	N/A N/A N/A N/A N/A			
Water Le	vel Finish	19.6	7					e with MDNR ce Performed	Y	N N	N/A N/A			
	pler Signature					Eq Re Ar	uipment developr y deviati	nation Norma Calibration N nent Needed ons from SAP hickness Chec	ormal Y Y Y	N N N	N/A N/A N/A N/A N/A			
		0					•		-		, .			
	Data: Avera	ge of sampl												
	Constituent Units MW- 6A pH S.U. 6.87					MW-7								
-	Conductors	^	umhos/cm		_	6.12								
	Specific Conductance umhos/cm 1.601 Total Well Depth ft					2.699								
	Average GW Depth ft 7.28					2.04								
Average GW Depth # 7.28 Average GW Drop ft					3.04									
	2 System Volumes							-						
	2 System Volumes mL 800 Min Purged Amount)													

Facility:	Asbury (CCR (Permit	#		Moi	_	ell ID: MW		Field Bla	I.
	f ormation : of Well Purge	: Peristaltion	c Pump with	3/8 - inch Dia	ameter Tu	1	Billia D	uplicate [j rieid bia	пк
		Actual I	Purge Volum	e Removed: ¸		mL pos	t pump calibi	ration .		
		15	=			_	pleted: <u>11-</u>	15		
Date / Tir	me Initiated:	11- (2	-18 @		_ Date / T	Time Com	pleted: <u>11</u> -	-19	@	
Well Purg	ged To Dryne	ss?: Y/N	9	Petrol	eum or Ga	s Detecte	d? (N			
Purge Da	ıta:									
Time	Purge Rate (mL/min)	Cumulati Volume (mL		. рН (SU)	Spe Condu (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
10:27	200		12,4	9 7,24	0,7	43	0.72	370	7	Clear
129			13.81		0.7		0.45	35,6		1
171			13,0				0.32	34.5		
: 33	1		13,10		0.7		0,91	33,3		
- //	V		1/10	0 211	E: 1	90	Vi I	741		
						111		0 1	<u> </u>	
	npled				Ad Pa Ca	eld Inspectors ccess and Condition ising Conducting Cap	on dition	Good GGGG Yes	<u>Fair</u> F F F	Poor P P P P No L
Weather	Conditions_	Clear	250		Ri	ser Condit	tion	G	F	Р
	evel Start				W	e <mark>ld Inspec</mark> ell ID Visik anding Wa	ole	Yes) No	N/A N/A N/A
	-		1		Cl	ear of We	eds		N	N/A
Water Le	evel Finish	7,2	2'		Sp		Point with MDNR se Performed	Y	N N	N/A N/A N/A
Name (M	1EC Field Sam	pler): <u>Ryan (</u>	Ortbals and R	lick Elgin	De Ec	econtamin Juipment (nation Norma Calibration N		N	N/A N/A
Sampler	Signature <u></u>	Got	Al	1	Ar	ny deviatio	nent Needed ons from SAP nickness Chec	Y Y ked Y	N N	N/A N/A N/A
Historica	l Data: Avera	ge of sampli	ng events							K)
Constit		ge or sample	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
рН			S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
_	c Conductanc	e	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total V	Total Well Depth ft Level									
Averag	Average GW Depth ft Only					0.4	5.39	1.32	6.92	7.86
Averag										
	m Volumes urged Amoun	t)	mL	DON'T SAMPLE	800	800	800	800	800	800

Facility:	ity: Asbury CCR (Permit #) Monitoring Well ID: MW- Sample Blind Duplicate Field Blank .										
_	formation: of Well Purge:	Peristalti	c Pump with	3/8 - inch Di	ameter Tu	, ,	X Blind D	uplicate [∫ Field Bla	nk	
		Actual	Purge Volum	e Removed:		mL post	pump calibr	ation .			
Date / Tii	me Initiated:	11- /	5 -18 @		Date / 1	Time Comp	oleted: 11 -	-15 -18	@		
		2	\bigcirc					10	Co		
Well Pur	ged To Drynes	s?: Y /G	X.	Petro	leum or Ga	s Detected	45 A(\\\)				
Purge Da	ıta:										
Time	Purge Rate (mL/min)	Cumulati Volume	-	. pH (SU)	Spec Condu (mS/	ctivity	Dissolved Oxygen	ORP		Other (Color, Clarity, Odor)	
12000000		(IIIE					(mg/L)	(MV)		0001)	
9:53	200		13.3		117	70	1.20	441		Clear	
155			13.51	608	1170	t3	1,04	43.8			
:57			13,5	4 7.07	11.7	54	0.61	42.0			
:59			13.61	7.06	4.79		0.32	348			
					Fic	eld Inspect	tion	Good	<u>Fair</u>	Poor	
		100	00			cess		Good Good Good Yes	F	P	
Time san	npled	10.0	OE _			ıd Conditio		G	F	Р	
						ising Condi		G	F	Ρ , ,	
	Conditions	11	250F	2		cking Cap		G	F	pNo La	
Weather	Conditions	(lear,	a) i			_ Riser Condition 6 F					
		6	,			eld Inspect		Yes	<u>No</u>		
	1.5.	2.14	0			ell ID Visib		\mathcal{C}	N	N/A	
water Le	vei Start	01-18	2			anding Wa		2		N/A	
						ear of Wee		Q	N	N/A	
Waterle	vel Finish	173	\mathcal{L}			easuring Po	with MDNR	\mathcal{O}	N	N/A	
vvater Le	vei Fillisii	LLIV	14		-	•	e Performed	Y Y	(N	N/A N/A	
							ation Norma	Sec.) N	N/A N/A	
Name (M	IEC Field Samp	nler). Rvan	Orthals and B	ick Flain			Calibration No	R 🗻	N N	N/A	
	rea samp	A Ityani	m	1			ent Needed	y Y	AN.	N/A	
	1	1 -	-1111	4			ns from SAP	Y	(N	N/A	
Sampler	Signature 🏒	you	00			-	ickness Chec		N	N/A	
Historica	l Data : Averag	ze of sampl	ing events								
Constit			Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	
рН			S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72	
	c Conductance	2	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900	
	Vell Depth		ft	Level							
	e GW Depth		ft	Only	1.24	0.4	5.39	1.32	6.92	7.86	
-	e GW Drop		ft								
	m Volumes		w-1	DON'T	900	800	800	800	800	800	

800

SAMPLE

mL

(Min Purged Amount)

Facility:	Asbury (CCR (Permi	t#		Mor		ell ID: MW Blind D		Field Bla	nk 🗀	
Purge Inf	formation:					Jampie [t		_ Tield bla		
Method	of Well Purge	: Peristalti	c Pump with	3/8 - inch Di	ameter Tu	bing					
			Purge Volum								
Date / Ti	me Initiated:	11- L	·18 @		_ Date / 1	Time Comp	leted: <u>11</u> -	- 15-18	@		
	ged To Dryne						_				
Purge Da	ita:										
Time	Purge Rate (mL/min)	Cumulati Volume (mL		. рН (SU)	Spec Condu (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Othe (Cole Clari Odo	or, ty
7:23	200		12,13	3 6.95	1.64	3 (0.95	18,2		Clean	
:25	1		12,44		1.660		071	91,7		1	_
:27			12.69		1.680		0,55	23,9			
:29	1		113,69	4.0		1	0,93	25.8		1/	
1			11-110)	210	1,00			1/10			
		<u> </u>			Fie	eld Inspect	ion .	Good	Fair	Poor	_
Time san	npled	9:30	2			cess d Conditio	n	3.4 ~ (3) 10 (10) (10) (10) (10) (10) (10) (10)	F F	P P	
						sing Condi		(G)	F F	P p No	/
Weather	Conditions_	Clear,	30°F			cking Cap & ser Condition		G	r F	P	Emi
		×2.0				eld Inspect		Yes	<u>No</u>		
Water Le	vel Start	8,7	12			ell ID Visibl anding Wa		Ÿ	N	N/A N/A	
						ear of Wee		EY.) N	N/A	
Waterla	vel Finish	164	2			easuring Po		0	N	N/A	
water Le	vei riiisii	10,1	9				with MDNR Performed	Y Y	N	N/A	
							ation Norma	0	N	N/A	
Name (M	IEC Field Sam	pler): <u>Ryan</u>	Ortbals and R	ick Elgin			alibration No	ormal (Y)	N	N/A	
	i	1	1/2/	11			ent Needed ns from SAP	Y	/N	N/A N/A	
Sampler :	Signature	MAN .	1111				ickness Chec	ked Y	Y N/	N/A	
Historica	I Data: Avers	of samuel			*						
Constit	l Data: Avera	ge or sampi	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	
рН			S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72	
	Conductanc	е	umhos/cm	GW.	0.786	1.132	2.083	0.841	1.769	1.900	
	Vell Depth		ft	Level							
Averag	e GW Depth		ft	Only	1.24	0.4	5.39	1.32	6.92	7.86	
Averag	e GW Drop		ft								
	m Volumes urged Amoun	t)	mL	DON'T SAMPLE	800	800	800	800	800	800	

Facility:	Asbury (CCR (Permi	t #)		Mon	nitoring We	ell ID: MW	uplicate	Field Bla	nk .
_	of Well Purge	: Peristalti	ic Pump wi	th 3/8 - i	inch Dia	meter Tul		V 3	a priocite	J 11010 DIG	
		Actual	Purge Volu	me Rem	oved: _		mL post	pump calibr	ration .		
Date / Ti	ime Initiated:	11- 15	-18	@		Date / T	ime Comp	leted: <u>11</u> -	- 15 -18	@	
Well Pur	rged To Dryne	ss?: Y /[V		Petrole	eum or Ga	s Detected	1? Y /N			
Purge Da	ata:										
Time	Purge Rate (mL/min)	Cumulat Volum (mL	e Ter	mp. C)	pH (SU)	Spec Conduc (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
8:45	200		Ile	421	7,20	1,4	27	137	13.0	9.5	Clean
:47			11,	73 "	717	1	33	0,37	3,9		
:49			12,		7.14	1,40		0.60	-2.7		
:57	1				712	1.44	-	0.54	-5.8		
									-		
						Fie	eld Inspect	ion	Good	Fair	Poor
		10:05					cess		GO GO Yes	F	P
Time sar	mpled	カッフノ					d Conditio		G	F	Р
				_			sing Condi		G) F	P No Le
Westher	r Conditions <u>/</u>	Clear	20°F				cking Cap &		9	F	p /0/2 ==
weather	Conditions	war,	-10 .				er Condition		Vac	F	P N/A
	evel Start		1				ell ID Visibl		<u>res</u>	No N	
Water Le	evel Start	155					anding Wat			N N	N/A N/A
77414.		. , , , ,	,				ear of Wee		R	N	N/A
		19,9					easuring Po		Y	N	N/A
Water Le	evel Finish	1719					0	with MDNR	Y	CN	N/A
								Performed	Υ	N	N/A
						De	contamina	ation Normal	ı 🞉	N	N/A
Name (N	MEC Field Sam	pler): <u>Rvan</u>	Ortbals and	Rick El	gin		•	alibration No	ormal 🛱	N	N/A
			n				•	ent Needed	Υ	N	N/A
Sampler	Signature <u></u>	Jun	CHY					ns from SAP ickness Chec	ked Y	(N)	N/A N/A
Historica	al Data: Avera	e of sampl	ling events								
Consti			Units	M	W- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pН			S.U.		TEST	5.83	5.08	6.30	6.83	6.82	6.72
	ic Conductanc	e	umhos/cr		w	0.786	1.132	2.083	0.841	1.769	1.900
	Well Depth		ft		evel						
Averag	ge GW Depth		ft	0	nly	1.24	0.4	5.39	1.32	6.92	7.86
Averag	ge GW Drop		ft								
2 Syste	em Volumes		ml	DC	DN'T	900	800	800	800	800	800

800

SAMPLE

mL

(Min Purged Amount)

Facility:	Asbury (CR (Permi	t #		1	Mor	nitoring W	ell ID: MW	<u>. ' /</u>	7	
	formation: of Well Purge	: Peri stalti	ic Pump	with 3/8	3 - inch Dia	ameter Tul		Blind D	uplicate	Field Bla	nk X
		Actual	Purge V	/olume Re	amoved:		ml nos	t pump calibr	ration		
Date / Ti	me Initiated:	11-	-18	8 @		_ Date / 1	Time Comp	pleted: <u>11</u> -	- (^y -18	@	
Well Pur	ged To Drynes	ss?: Y /d	V)		Petrol	leum or Ga	s Detecte	d? Y /N	7		
Purge Da	ita:										
Time	Purge Rate (mL/min)	Cumulati Volumo (mL	- 1	Temp. (°C)	pH (SU)	Spec Condu (mS/	ctivity	Dissolved Oxygen (mg/L)	ORP (MV)		Other (Color, Clarity, Odor)
1:179	200			14,28	6,27	2,4	13	1.80	57,1		Clear
2:01			1	4.33	6,28	110.00	124	0.83	43,4		10
203			- 2/	() () () () () () () () () ()	6.28		33	0.67	35.4		
:05					6.28			0.64	30,4		
								0,0(
Time sam	npled	2:10	/:	2: 20	plicate	Filed Filed Filed Part Act	eld Inspec cess		Good	Fair F	Poor P
						Ris	ser Condit	& Lock ion	6	F • F	P No L
Water Le						W	ell ID Visib anding Wa	ole ater	Y Y Y	No N N	N/A N/A N/A N/A
Time sampled A									N N	N/A N/A N/A	
Name (M	IEC Field Sam	pler): <u>Ryan</u>	Ortbals /	and Rick	Elgin	Eq	uipment (developm	Calibration No ent Needed	ormal (Y	N N	N/A N/A N/A
Sampler S	Signature	Min	1	11			-	nickness Chec		N	N/A N/A
Historica	l Data: Avera	ge of sampl	ing ever	nts							
Constit			Uni		MW-1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
рН			S.U		IO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific	Conductance	e	umhos		GW	0.786	1.132	2.083	0.841	1.769	1.900
	/ell Depth		ft		Level						
	e GW Depth		ft		Only	1.24	0.4	5.39	1.32	6.92	7.86
	e GW Drop		ft		-						
	m Volumes				DON'T	900	800	800	800	800	800

800

SAMPLE

mL

(Min Purged Amount)



APPENDIX 4

Analytical Results from Lab



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Nashville 2960 Foster Creighton Drive Nashville, TN 37204 Tel: (615)726-0177

TestAmerica Job ID: 490-163429-2

Client Project/Site: Asbury Ash Pond Sampling Event: Asbury Ash Pond

Revision: 1

For:

Midwest Environmental Consultants 2009 East McCarty Street Suite 2 Jefferson City, Missouri 65101

Attn: Mr. Rick Elgin

CathyGartner

Authorized for release by: 1/6/2019 5:51:48 PM

Cathy Gartner, Project Manager II (615)301-5041

cathy.gartner@testamericainc.com

·····LINKS ·······

Review your project results through

Total Access

Have a Question?



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative	4
Definitions	6
Client Sample Results	7
QC Sample Results	17
QC Association	22
Chronicle	25
Method Summary	28
Certification Summary	29
Chain of Custody	31

3

4

9

Sample Summary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-163429-1	MW-2	Water	11/15/18 11:45	11/16/18 10:15
490-163429-2	MW-3	Water	11/14/18 13:10	11/16/18 10:15
490-163429-3	MW-4	Water	11/15/18 11:10	11/16/18 10:15
490-163429-4	MW-5	Water	11/15/18 10:35	11/16/18 10:15
490-163429-5	MW-5A	Water	11/15/18 10:00	11/16/18 10:15
490-163429-6	MW-6	Water	11/15/18 09:30	11/16/18 10:15
490-163429-7	MW-6A	Water	11/15/18 08:55	11/16/18 10:15
490-163429-8	MW-7	Water	11/14/18 14:10	11/16/18 10:15
490-163429-9	Dup	Water	11/14/18 00:01	11/16/18 10:15
490-163429-10	Blank	Water	11/14/18 00:01	11/16/18 10:15

3

4

5

7

8

0

10

Case Narrative

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Job ID: 490-163429-2

Laboratory: TestAmerica Nashville

Narrative

Job Narrative 490-163429-2

Revised report

Analysis list was updated per client request.

This replaces the report generated on 12/7/18.

Receipt

The samples were received on 11/16/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.6° C.

HPLC/IC

Method(s) 9056A: The method blank for analytical batch 490-559248 contained Chloride, Fluoride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 490-559248 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 9056A: The method blank for analytical batch 490-559248 contained Chloride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The method blank for analytical batch 490-559248 contained Fluoride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The following samples were diluted due to the result exceeding the calibration curve: MW-3 (490-163429-2) and MW-7 (490-163429-8). Elevated reporting limits (RLs) are provided.

Method(s) 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for analytical batch 490-559971 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory sample control duplicate (LCS/LCSD) precision was within acceptance limits.

Method(s) 9056A: The following sample was diluted due to the nature of the sample matrix: (CCB 490-559971/21) and MW-3 (490-163429-2). Elevated reporting limits (RLs) are provided.

Method(s) 9056A: The method blank for analytical batch 490-559971 contained Chloride above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The method blank for analytical batch 490-559971 contained Chloride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 9056A: The following samples were diluted due to the nature of the sample matrix: MW-2 (490-163429-1), MW-4 (490-163429-3), MW-5 (490-163429-4), MW-5A (490-163429-5), MW-6 (490-163429-6) and MW-6A (490-163429-7). Elevated reporting limits (RLs) are provided.

Method(s) 9056A: The method blank for analytical batch 490-560335 contained sulfate above the method detection limit (MDL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Case Narrative

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Job ID: 490-163429-2 (Continued)

Laboratory: TestAmerica Nashville (Continued)

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Definitions/Glossary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
E	Result exceeded calibration range.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
В	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
Metals	

MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit Minimum Level (Dioxin) ML NC Not Calculated

Not Detected at the reporting limit (or MDL or EDL if shown) ND

PQL **Practical Quantitation Limit**

QC **Quality Control**

RER Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

Relative Percent Difference, a measure of the relative difference between two points **RPD**

TEF Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) TEQ

TestAmerica Nashville

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-2

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-1

Matrix: Water

Date Collected: 11/15/18 11:45 Date Received: 11/16/18 10:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110	В	10	2.0	mg/L			11/28/18 16:30	10
Fluoride	0.21		0.10	0.010	mg/L			11/28/18 03:40	1
Sulfate	100		10	0.30	mg/L			11/28/18 16:30	10
Method: 6020A - Metals (ICP	/MS) - Total F	Recoverable)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.091		0.020	0.016	mg/L		11/21/18 14:00	11/23/18 11:17	1
Calcium	26		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:17	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	430		25	7.0	mg/L			11/21/18 11:02	1
Method: Field Sampling - Fie	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	0.610				umhos/cm			11/15/18 11:45	1
Field pH	6.36				SU			11/15/18 11:45	1

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-3

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-2

Matrix: Water

Date Collected: 11/14/18 13:10 Date Received: 11/16/18 10:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	69	В	10	2.0	mg/L			11/23/18 00:48	10
Fluoride	0.14	В	0.10	0.010	mg/L			11/22/18 22:40	1
Sulfate	440	В	20	0.60	mg/L			11/29/18 12:01	20
Method: 6020A - Metals (ICP/M	S) - Total F	Recoverable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.047		0.020	0.016	mg/L		11/21/18 14:00	11/23/18 11:19	1
Calcium	83		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:19	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	870		25	7.0	mg/L			11/21/18 11:02	1
Method: Field Sampling - Field	Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	0.901	-			umhos/cm			11/14/18 13:10	1
Field pH	5.74				SU			11/14/18 13:10	1

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Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-4

TestAmerica Job ID: 490-163429-2

11/15/18 11:10

Lab Sample ID: 490-163429-3

Matrix: Water

Date Collected: 11/15/18 11:10 Date Received: 11/16/18 10:15

Field pH

Method: 9056A - Anions, lo Analyte	_	apny Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.3	B	1.0	0.20	mg/L			11/28/18 04:30	1
Fluoride	0.32		0.10	0.010	mg/L			11/28/18 04:30	1
Sulfate	160		10	0.30	mg/L			11/28/18 16:46	10
Method: 6020A - Metals (IC	P/MS) - Total F	Recoverable)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.048		0.020	0.016	mg/L		11/21/18 14:00	11/23/18 11:22	1
Calcium	86		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:22	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	480		25	7.0	mg/L			11/21/18 11:02	1
Method: Field Sampling - F	ield Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	0.543				umhos/cm			11/15/18 11:10	1

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6.89

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Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-5

Date Received: 11/16/18 10:15

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-4

Date Collected: 11/15/18 10:35 **Matrix: Water**

Method: 9056A - Anions, Ion Chromatography Analyte Result Qualifier RL **MDL** Unit Dil Fac D Prepared Analyzed Chloride 5.3 B 1.0 0.20 mg/L 11/28/18 04:47 0.10 0.010 mg/L 11/28/18 04:47 **Fluoride** 0.34 1 **Sulfate** 140 10 0.30 mg/L 11/28/18 17:53 10 Method: 6020A - Metals (ICP/MS) - Total Recoverable Result Qualifier RL **MDL** Unit Prepared Analyte Analyzed

Dil Fac 0.016 mg/L 0.020 11/21/18 14:00 11/23/18 11:24 Boron 0.27 **Calcium** 87 0.58 mg/L 11/21/18 14:00 11/23/18 11:24 1.0

General Chemistry Analyte Result Qualifier RL MDL Unit D Analyzed Dil Fac Prepared 25 **Total Dissolved Solids** 600 7.0 mg/L 11/21/18 11:02

Method: Field Sampling - Field Sampling Analyte Result Qualifier NONE **NONE Unit** D Prepared Analyzed Dil Fac **Specific Conductance** 0.750 umhos/cm 11/15/18 10:35 Field pH SU 11/15/18 10:35 7.19

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-5

Matrix: Water

Date Collected: 11/15/18 10:00 Date Received: 11/16/18 10:15

Client Sample ID: MW-5A

Method: 9056A - Anions, lor	Chromatogr	aphy							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	25	В	2.0	0.40	mg/L			11/28/18 18:26	2
Fluoride	0.37		0.10	0.010	mg/L			11/28/18 05:03	1
Sulfate	900		200	6.0	mg/L			11/28/18 18:42	200
- Method: 6020A - Metals (ICF	P/MS) - Total F	Recoverable)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.40		0.10	0.080	mg/L		11/21/18 14:00	11/23/18 12:12	5
Calcium	200		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:26	1
- General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		25	7.0	mg/L			11/21/18 11:02	1
- Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.756				umhos/cm			11/15/18 10:00	1
Field pH	7.06				SU			11/15/18 10:00	1

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Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-6

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-6

Matrix: Water

Date Collected: 11/15/18 09:30 Date Received: 11/16/18 10:15

Method: 9056A - Anions, Io	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Analyte							Frepareu		DII Fac
Chloride	12	В	1.0	0.20	mg/L			11/28/18 05:20	1
Fluoride	0.28		0.10	0.010	mg/L			11/28/18 05:20	1
Sulfate	970		200	6.0	mg/L			11/28/18 19:16	200
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable)						
Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.34		0.10	0.080	mg/L		11/21/18 14:00	11/23/18 12:14	5
Calcium	230		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:28	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1900		25	7.0	mg/L			11/21/18 11:02	1
- Method: Field Sampling - F	ield Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.683				umhos/cm			11/15/18 09:30	1
Field pH	6.89				SU			11/15/18 09:30	1

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-7

. Matrix: Water

Date Collected: 11/15/18 08:55 Date Received: 11/16/18 10:15

Client Sample ID: MW-6A

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17	В	1.0	0.20	mg/L			11/28/18 05:36	1
Fluoride	0.35		0.10	0.010	mg/L			11/28/18 05:36	1
Sulfate	700		100	3.0	mg/L			11/28/18 19:49	100
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable	1						
Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.40		0.10	0.080	mg/L		11/21/18 14:00	11/23/18 12:16	5
Calcium	160		1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:31	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1500		25	7.0	mg/L			11/21/18 11:02	1
Method: Field Sampling - Fi	eld Sampling								
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1.448				umhos/cm			11/15/18 08:55	1
Field pH	7.12				SU			11/15/18 08:55	1

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Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: MW-7

Specific Conductance

Field pH

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-8

Matrix: Water

11/14/18 14:10

11/14/18 14:10

Date Collected: 11/14/18 14:10 Date Received: 11/16/18 10:15

Method: 9056A - Anions, Ion Chromatography Analyte Result Qualifier RL **MDL** Unit Dil Fac D Prepared Analyzed Chloride 42 B 10 2.0 mg/L 11/23/18 00:59 10 0.10 0.010 mg/L 11/22/18 22:52 **Fluoride** 0.17 B 1 **Sulfate** 1800 B 50 1.5 mg/L 11/23/18 01:11 50 Method: 6020A - Metals (ICP/MS) - Total Recoverable Result Qualifier RL **MDL** Unit Prepared Analyte Analyzed Dil Fac 0.016 mg/L 0.020 <u>11/21/18 14:00</u> <u>11/23/18 11:33</u> Boron 0.23 **Calcium** 420 0.58 mg/L 11/21/18 14:00 11/23/18 11:33 1.0 **General Chemistry** Analyte Result Qualifier RL MDL Unit D Analyzed Dil Fac Prepared 50 **Total Dissolved Solids** 2900 14 mg/L 11/21/18 11:02 Method: Field Sampling - Field Sampling Analyte Result Qualifier NONE **NONE Unit** D Prepared Analyzed Dil Fac

umhos/cm

SU

2.441

6.28

Client Sample Results

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: Dup

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-9

Matrix: Water

Date Collected: 11/14/18 00:01 Date Received: 11/16/18 10:15

Method: 6020A - Metals (ICP/I	MS) - Total Recoverable)						
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.21	0.040	0.032	mg/L		11/21/18 14:00	11/23/18 12:07	2
Calcium	400	1.0	0.58	mg/L		11/21/18 14:00	11/23/18 11:44	1

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Client Sample Results

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Client Sample ID: Blank

TestAmerica Job ID: 490-163429-2

Lab Sample ID: 490-163429-10

Matrix: Water

Date Collected: 11/14/18 00:01 Date Received: 11/16/18 10:15

Method: 6020A - Metals (ICP/	MS) - Total Recoverable							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	0.020	0.016	mg/L		11/21/18 14:00	11/23/18 12:09	1
Calcium	ND	1.0	0.58	mg/L		11/21/18 14:00	11/23/18 12:09	1

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Project/Site: Asbury Ash Pond

Method: 9056A - Anions, Ion Chromatography

MR MR

Lab Sample ID: MB 490-559248/4

Matrix: Water

Analysis Batch: 559248

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Client Sample ID: Matrix Spike

Client Sample ID: Matrix Spike Duplicate

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.322	J	1.0	0.20	mg/L			11/22/18 20:21	1
Fluoride	0.0185	J	0.10	0.010	mg/L			11/22/18 20:21	1
Sulfate	0.305	J	1.0	0.030	mg/L			11/22/18 20:21	1
	Chloride Fluoride	AnalyteResultChloride0.322Fluoride0.0185	Chloride 0.322 J Fluoride 0.0185 J	Analyte Result Older Qualifier Older RL Older Chloride 0.322 J Older 1.0 Older Fluoride 0.0185 J Older 0.10	Analyte Result Oualifier Qualifier RL Oualifier MDL Oualifier Chloride 0.322 J	Analyte Result Oualifier Qualifier RL NDL Oualitier MDL Oualitier Unit Oualitier Chloride 0.322 J 1.0 0.20 mg/L Fluoride 0.0185 J 0.10 0.010 mg/L	Analyte Result Chloride Qualifier RL MDL mg/L Unit pmg/L D mg/L Fluoride 0.0185 J 0.10 0.010 mg/L	Analyte Result Chloride Qualifier Output RL Discrete MDL Discrete Unit Discrete D Discrete Prepared Fluoride 0.0185 J 0.10 0.010 mg/L mg/L	Analyte Result Chloride Qualifier Output RL Pluoride MDL Pluoride Unit Pluoride D Prepared Manalyzed Analyzed Prepared Pluoride Fluoride 0.0185 J 0.10 0.010 mg/L J 11/22/18 20:21

Lab Sample ID: LCS 490-559248/5

Matrix: Water

Analysis Batch: 559248

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	10.0	9.95		mg/L		99	80 - 120	
Fluoride	1.00	0.900		mg/L		90	80 - 120	
Sulfate	10.0	9.35		mg/L		93	80 - 120	

Lab Sample ID: LCSD 490-559248/6

Matrix: Water

Analysis Batch: 559248

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	10.0	9.81		mg/L		98	80 - 120	1	20
Fluoride	1.00	0.900		mg/L		90	80 - 120	0	20
Sulfate	10.0	9.25		mg/L		92	80 - 120	1	20

Lab Sample ID: 490-163308-B-8 MS

Matrix: Water

Analysis Batch: 559248

/ indigolo Batom coca-io										
_	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	15	В	10.0	24.6		mg/L		94	80 - 120	
Fluoride	0.13	B F1	1.00	0.922	F1	mg/L		79	80 - 120	
Sulfate	35	В	10.0	43.5	E	mg/L		89	80 - 120	

Lab Sample ID: 490-163308-B-8 MSD

Matrix: Water

Analysis Batch: 559248

-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	15	В	10.0	25.1		mg/L		99	80 - 120	2	20
Fluoride	0.13	B F1	1.00	0.954		mg/L		83	80 - 120	3	20
Sulfate	35	В	10.0	43.7	E	mg/L		91	80 - 120	1	20

Lab Sample ID: MB 490-559971/5

Matrix: Water

Analysis Batch: 559971

7 , 0.0 0000	MB	МВ							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.262	J	1.0	0.20	mg/L			11/27/18 23:48	1
Fluoride	ND		0.10	0.010	mg/L			11/27/18 23:48	1
Sulfate	ND		1.0	0.030	mg/L			11/27/18 23:48	1

TestAmerica Nashville

Project/Site: Asbury Ash Pond

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 490-559971/6

Matrix: Water

Matrix: Water

Analysis Batch: 559971

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 10.0 Chloride 9.42 mg/L 94 80 - 120 Fluoride 1.00 0.934 93 80 - 120 mg/L Sulfate 10.0 9.55 mg/L 95 80 - 120

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Type: Total/NA

Analysis Batch: 559971

Spike LCSD LCSD %Rec. **RPD** Analyte Added Result Qualifier D %Rec Limits RPD Limit Unit Chloride 10.0 80 - 120 9.55 mg/L 95 1 20 Fluoride 1.00 0.939 mg/L 94 80 - 120 0 20 Sulfate 10.0 9.54 95 80 - 120 20 mg/L n

Lab Sample ID: 490-163385-E-1 MS

MD MD

Matrix: Water

Lab Sample ID: LCSD 490-559971/7

Analysis Batch: 559971

MS MS %Rec. Sample Sample Spike Result Qualifier Added D %Rec Limits **Analyte** Result Qualifier Unit Chloride 7500 EB 10.0 7330 E 4 mg/L -1964 80 - 120 Fluoride ND F1 1.00 ND F1 mg/L 0 80 - 120 Sulfate 10.0 83.6 E4 81 E mg/L 24 80 - 120

Lab Sample ID: 490-163385-E-1 MSD

Matrix: Water

Analysis Batch: 559971

•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Chloride	7500	EΒ	10.0	7320	E 4	mg/L		-2065	80 - 120		20	
Fluoride	ND	F1	1.00	ND	F1	mg/L		0	80 - 120	NC	20	
Sulfate	81	E	10.0	83.7	E 4	mg/L		24	80 - 120	0	20	

Lab Sample ID: MB 490-560160/5

Matrix: Water

Analysis Batch: 560160

Client Sample ID: Method Blank Prep Type: Total/NA

Client Sample ID: Lab Control Sample

Client Sample ID: Matrix Spike Duplicate

	IND	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.242	J	1.0	0.20	mg/L			11/28/18 13:27	1
Fluoride	ND		0.10	0.010	mg/L			11/28/18 13:27	1
Sulfate	ND		1.0	0.030	mg/L			11/28/18 13:27	1

Lab Sample ID: LCS 490-560160/6

Matrix: Water

Analysis Batch: 560160

Analysis Batom 000100								
-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	10.0	9.44		mg/L		94	80 - 120	
Fluoride	1.00	0.938		mg/L		94	80 - 120	
Sulfate	10.0	9.62		mg/L		96	80 - 120	

TestAmerica Nashville

Prep Type: Total/NA

Project/Site: Asbury Ash Pond

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 490-560160/7

Matrix: Water

Analysis Batch: 560160

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Client Sample ID: Method Blank

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit D	%Rec	Limits	RPD	Limit
Chloride	10.0	9.61		mg/L	96	80 - 120	2	20
Fluoride	1.00	0.940		mg/L	94	80 - 120	0	20
Sulfate	10.0	9.64		mg/L	96	80 - 120	0	20

Lab Sample ID: MB 490-560335/3

Matrix: Water

Analysis Batch: 560335

MB MB

Prep Type: Total/NA

Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND ND	1.0	0.20 mg/L			11/29/18 09:44	1
Fluoride	ND	0.10	0.010 mg/L			11/29/18 09:44	1
Sulfate	0.266 J	1.0	0.030 mg/L			11/29/18 09:44	1

Lab Sample ID: LCS 490-560335/4

Matrix: Water

Analysis Batch: 560335

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Client Sample ID: Lab Control Sample Dup

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride		10.0	9.72		mg/L		97	80 - 120	
Fluoride		1.00	0.872		mg/L		87	80 - 120	
Sulfate		10.0	9.68		mg/L		97	80 - 120	

Lab Sample ID: LCSD 490-560335/5

Matrix: Water

Analysis Batch: 560335

	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Chloride	10.0	9.78		mg/L		98	80 - 120	1	20	
Fluoride	1.00	0.875		mg/L		87	80 - 120	0	20	
Sulfate	10.0	9.73		mg/L		97	80 - 120	0	20	

Analysis Batch: 560335

Sulfate	10.0	9.73	mg/L	97 80 - 120	0 20
Lab Sample ID: 490-163308-C-8 DU				Client Sample ID: Do	uplicate
Matrix: Water				Prep Type: T	otal/NA

, , , , , , , , , , , , , , , , , , , ,	Sample	Sample	DU	DU					RPD
Analyte	Result	Qualifier	Resul	Qualifier	Unit	D		RPD	Limit
Chloride	15		14.6		mg/L		 -	0.07	20
Fluoride	0.13		0.132		mg/L			0.2	20
Sulfate	34	В	34.3		mg/L			0	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 240-356540/1-A

Matrix: Water

Analysis Batch: 356824

Client Sample ID: Method Blank Prep Type: Total Recoverable Prep Batch: 356540

> Analyzed Dil Fac

Prep Type: Total/NA

MB MB Analyte Result Qualifier RL MDL Unit Prepared Boron ND 0.020 0.016 mg/L 11/21/18 14:00 11/23/18 11:37 ND 0.58 mg/L 11/21/18 14:00 11/23/18 11:37 Calcium 1.0

TestAmerica Nashville

Client Sample ID: Matrix Spike

Prep Type: Total Recoverable

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Client Sample ID: MW-7

Prep Type: Total/NA

RPD Limit

20

Client Sample ID: Matrix Spike Duplicate

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Lab Sample ID: LCS 240-356540/2-A **Client Sample ID: Lab Control Sample Prep Type: Total Recoverable**

Matrix: Water

Analysis Batch: 356824							Prep Ba	tch: 356540
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Boron	0.100	0.0910		mg/L		91	80 - 120	
Calcium	10.0	8.95		mg/L		90	80 - 120	

Lab Sample ID: 240-104631-C-1-B MS

Matrix: Water							P	rep Typ	e: Total Recoverable
Analysis Batch: 356824									Prep Batch: 356540
	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Calcium	210		10.0	223	4	mg/L		107	75 - 125

Lab Sample ID: 240-104631-C-1-C MSD

Matrix: Water

Analysis Batch: 356824 Prep Batch: 356540 MSD MSD Sample Sample Spike %Rec. Result Qualifier Added Result Qualifier Limits Analyte Unit D %Rec Calcium 210 10.0 223 4 mg/L 103 75 - 125

MR MR

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 490-558642/1

Matrix: Water

Analysis Batch: 558642

	1410	141.0							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		25	7.0	mg/L			11/21/18 11:02	1

Lab Sample ID: LCS 490-558642/2

Matrix: Water

Analysis Batch: 558642

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Dissolved Solids	100	104		mg/L		104	90 - 110	

Lab Sample ID: LCSD 490-558642/3

Matrix: Water

Analysis Batch: 558642

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Dissolved Solids	 100	94.0		mg/L		94	90 - 110	10	20

Lab Sample ID: 490-163429-8 DU

Matrix: Water

Analysis Batch: 558642									
_	Sample	Sample	DU	DU					RPD
Analyte	Result	Qualifier	Result	Qualifier	Unit	D		RPD	Limit
Total Dissolved Solids	2900		2860		mg/L			2	20

TestAmerica Nashville

QC Sample Results

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 490-163513-H-2 DU

Matrix: Water

Analysis Batch: 558642

-2 DU		Client Sample ID: Duplicate Prep Type: Total/NA
Sample Sample	DU DU	RPD

AnalyteResultQualifierResultQualifierUnitDRPDLimitTotal Dissolved Solids450453mg/L0.220

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TestAmerica Job ID: 490-163429-2

Client: Midwest Environmental Consultants Project/Site: Asbury Ash Pond

HPLC/IC

Analysis Batch: 559248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-2	MW-3	Total/NA	Water	9056A	
490-163429-2	MW-3	Total/NA	Water	9056A	
490-163429-8	MW-7	Total/NA	Water	9056A	
490-163429-8	MW-7	Total/NA	Water	9056A	
490-163429-8	MW-7	Total/NA	Water	9056A	
MB 490-559248/4	Method Blank	Total/NA	Water	9056A	
LCS 490-559248/5	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-559248/6	Lab Control Sample Dup	Total/NA	Water	9056A	
490-163308-B-8 MS	Matrix Spike	Total/NA	Water	9056A	
490-163308-B-8 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 559971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total/NA	Water	9056A	_
490-163429-3	MW-4	Total/NA	Water	9056A	
490-163429-4	MW-5	Total/NA	Water	9056A	
490-163429-5	MW-5A	Total/NA	Water	9056A	
490-163429-6	MW-6	Total/NA	Water	9056A	
490-163429-7	MW-6A	Total/NA	Water	9056A	
MB 490-559971/5	Method Blank	Total/NA	Water	9056A	
LCS 490-559971/6	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-559971/7	Lab Control Sample Dup	Total/NA	Water	9056A	
490-163385-E-1 MS	Matrix Spike	Total/NA	Water	9056A	
490-163385-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 560160

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total/NA	Water	9056A	
490-163429-3	MW-4	Total/NA	Water	9056A	
490-163429-4	MW-5	Total/NA	Water	9056A	
490-163429-5	MW-5A	Total/NA	Water	9056A	
490-163429-5	MW-5A	Total/NA	Water	9056A	
490-163429-6	MW-6	Total/NA	Water	9056A	
490-163429-7	MW-6A	Total/NA	Water	9056A	
MB 490-560160/5	Method Blank	Total/NA	Water	9056A	
LCS 490-560160/6	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-560160/7	Lab Control Sample Dup	Total/NA	Water	9056A	

Analysis Batch: 560335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-2	MW-3	Total/NA	Water	9056A	
MB 490-560335/3	Method Blank	Total/NA	Water	9056A	
LCS 490-560335/4	Lab Control Sample	Total/NA	Water	9056A	
LCSD 490-560335/5	Lab Control Sample Dup	Total/NA	Water	9056A	
490-163308-C-8 DU	Duplicate	Total/NA	Water	9056A	

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TestAmerica Job ID: 490-163429-2

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

Metals

Prep Batch: 356540

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total Recoverable	Water	3005A	
490-163429-2	MW-3	Total Recoverable	Water	3005A	
490-163429-3	MW-4	Total Recoverable	Water	3005A	
490-163429-4	MW-5	Total Recoverable	Water	3005A	
490-163429-5	MW-5A	Total Recoverable	Water	3005A	
490-163429-6	MW-6	Total Recoverable	Water	3005A	
490-163429-7	MW-6A	Total Recoverable	Water	3005A	
490-163429-8	MW-7	Total Recoverable	Water	3005A	
490-163429-9	Dup	Total Recoverable	Water	3005A	
490-163429-10	Blank	Total Recoverable	Water	3005A	
MB 240-356540/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-356540/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-104631-C-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
240-104631-C-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 356824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total Recoverable	Water	6020A	356540
490-163429-2	MW-3	Total Recoverable	Water	6020A	356540
490-163429-3	MW-4	Total Recoverable	Water	6020A	356540
490-163429-4	MW-5	Total Recoverable	Water	6020A	356540
490-163429-5	MW-5A	Total Recoverable	Water	6020A	356540
490-163429-5	MW-5A	Total Recoverable	Water	6020A	356540
490-163429-6	MW-6	Total Recoverable	Water	6020A	356540
490-163429-6	MW-6	Total Recoverable	Water	6020A	356540
490-163429-7	MW-6A	Total Recoverable	Water	6020A	356540
490-163429-7	MW-6A	Total Recoverable	Water	6020A	356540
490-163429-8	MW-7	Total Recoverable	Water	6020A	356540
490-163429-9	Dup	Total Recoverable	Water	6020A	356540
490-163429-9	Dup	Total Recoverable	Water	6020A	356540
490-163429-10	Blank	Total Recoverable	Water	6020A	356540
MB 240-356540/1-A	Method Blank	Total Recoverable	Water	6020A	356540
LCS 240-356540/2-A	Lab Control Sample	Total Recoverable	Water	6020A	356540
240-104631-C-1-B MS	Matrix Spike	Total Recoverable	Water	6020A	356540
240-104631-C-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	356540

General Chemistry

Analysis Batch: 558642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total/NA	Water	SM 2540C	
490-163429-2	MW-3	Total/NA	Water	SM 2540C	
490-163429-3	MW-4	Total/NA	Water	SM 2540C	
490-163429-4	MW-5	Total/NA	Water	SM 2540C	
490-163429-5	MW-5A	Total/NA	Water	SM 2540C	
490-163429-6	MW-6	Total/NA	Water	SM 2540C	
490-163429-7	MW-6A	Total/NA	Water	SM 2540C	
490-163429-8	MW-7	Total/NA	Water	SM 2540C	
MB 490-558642/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 490-558642/2	Lab Control Sample	Total/NA	Water	SM 2540C	

TestAmerica Nashville

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QC Association Summary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

General Chemistry (Continued)

Analysis Batch: 558642 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 490-558642/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	<u> </u>
490-163429-8 DU	MW-7	Total/NA	Water	SM 2540C	
490-163513-H-2 DU	Duplicate	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 561129

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-163429-1	MW-2	Total/NA	Water	Field Sampling	
490-163429-2	MW-3	Total/NA	Water	Field Sampling	
490-163429-3	MW-4	Total/NA	Water	Field Sampling	
490-163429-4	MW-5	Total/NA	Water	Field Sampling	
490-163429-5	MW-5A	Total/NA	Water	Field Sampling	
490-163429-6	MW-6	Total/NA	Water	Field Sampling	
490-163429-7	MW-6A	Total/NA	Water	Field Sampling	
490-163429-8	MW-7	Total/NA	Water	Field Sampling	

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Client: Midwest Environmental Consultants Project/Site: Asbury Ash Pond

Client Sample ID: MW-2 Lab Sample ID: 490-163429-1 **Matrix: Water**

Date Collected: 11/15/18 11:45 Date Received: 11/16/18 10:15

_	Batch	Batch Method		Dil	Initial Amount	Final Amount	Batch Number	Prepared		
Prep Type	Туре		Run	Factor				or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 03:40	SW1	TAL NSH
Total/NA	Analysis	9056A		10			560160	11/28/18 16:30	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:17	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	вмс	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/15/18 11:45	MMW	TAL NSH

Lab Sample ID: 490-163429-2 **Client Sample ID: MW-3** Date Collected: 11/14/18 13:10 **Matrix: Water**

Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559248	11/22/18 22:40	T1C	TAL NSF
Total/NA	Analysis	9056A		10			559248	11/23/18 00:48	T1C	TAL NSH
Total/NA	Analysis	9056A		20			560335	11/29/18 12:01	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:19	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	BMC	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/14/18 13:10	MMW	TAL NSI

Client Sample ID: MW-4 Lab Sample ID: 490-163429-3 Date Collected: 11/15/18 11:10

Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 04:30	SW1	TAL NSH
Total/NA	Analysis	9056A		10			560160	11/28/18 16:46	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:22	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	ВМС	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/15/18 11:10	MMW	TAL NSH

Client Sample ID: MW-5 Lab Sample ID: 490-163429-4 Date Collected: 11/15/18 10:35

Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 04:47	SW1	TAL NSH
Total/NA	Analysis	9056A		10			560160	11/28/18 17:53	JHS	TAL NSH
Total Recoverable Total Recoverable	- 1	3005A 6020A		1	50 mL	50 mL	356540 356824	11/21/18 14:00 11/23/18 11:24		TAL CAN TAL CAN

TestAmerica Nashville

Matrix: Water

Matrix: Water

Project/Site: Asbury Ash Pond

Client Sample ID: MW-5 Lab Sample ID: 490-163429-4 **Matrix: Water**

Date Collected: 11/15/18 10:35 Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	ВМС	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/15/18 10:35	MMW	TAL NSH

Client Sample ID: MW-5A Lab Sample ID: 490-163429-5

Date Collected: 11/15/18 10:00 **Matrix: Water**

Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 05:03	SW1	TAL NSH
Total/NA	Analysis	9056A		2			560160	11/28/18 18:26	JHS	TAL NSH
Total/NA	Analysis	9056A		200			560160	11/28/18 18:42	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:26	DSH	TAL CAN
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		5			356824	11/23/18 12:12	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	BMC	TAL NS
Total/NA	Analysis	Field Sampling		1			561129	11/15/18 10:00	MMW	TAL NSI

Client Sample ID: MW-6 Lab Sample ID: 490-163429-6 **Matrix: Water**

Date Collected: 11/15/18 09:30 Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 05:20	SW1	TAL NSH
Total/NA	Analysis	9056A		200			560160	11/28/18 19:16	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:28	DSH	TAL CAN
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		5			356824	11/23/18 12:14	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	558642	11/21/18 11:02	BMC	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/15/18 09:30	MMW	TAL NSH

Client Sample ID: MW-6A Lab Sample ID: 490-163429-7 Date Collected: 11/15/18 08:55 **Matrix: Water**

Date Received: 11/16/18 10:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559971	11/28/18 05:36	SW1	TAL NSH
Total/NA	Analysis	9056A		100			560160	11/28/18 19:49	JHS	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:31	DSH	TAL CAN
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN

TestAmerica Nashville

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Project/Site: Asbury Ash Pond

Client: Midwest Environmental Consultants

Client Sample ID: MW-6A Lab Sample ID: 490-163429-7

Date Collected: 11/15/18 08:55 **Matrix: Water** Date Received: 11/16/18 10:15

Batch Dil Initial Final Batch Batch Prepared Method **Prep Type** Type Run **Factor Amount Amount** Number or Analyzed Analyst Lab Total Recoverable Analysis 6020A 5 356824 11/23/18 12:16 DSH TAL CAN Total/NA Analysis SM 2540C 1 100 mL 100 mL 558642 11/21/18 11:02 BMC TAL NSH Total/NA Analysis Field Sampling 1 561129 11/15/18 08:55 MMW TAL NSH

Client Sample ID: MW-7 Lab Sample ID: 490-163429-8

Date Collected: 11/14/18 14:10 **Matrix: Water**

Date Received: 11/16/18 10:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1			559248	11/22/18 22:52	T1C	TAL NSH
Total/NA	Analysis	9056A		10			559248	11/23/18 00:59	T1C	TAL NSH
Total/NA	Analysis	9056A		50			559248	11/23/18 01:11	T1C	TAL NSH
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:33	DSH	TAL CAN
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	558642	11/21/18 11:02	вмс	TAL NSH
Total/NA	Analysis	Field Sampling		1			561129	11/14/18 14:10	MMW	TAL NSH

Client Sample ID: Dup Lab Sample ID: 490-163429-9 **Matrix: Water**

Date Collected: 11/14/18 00:01 Date Received: 11/16/18 10:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A		-	50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 11:44	DSH	TAL CAN
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		2			356824	11/23/18 12:07	DSH	TAL CAN

Client Sample ID: Blank Lab Sample ID: 490-163429-10

Date Collected: 11/14/18 00:01 **Matrix: Water** Date Received: 11/16/18 10:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	356540	11/21/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6020A		1			356824	11/23/18 12:09	DSH	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

TestAmerica Nashville

1/6/2019 (Rev. 1)

Method Summary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL NSH
6020A	Metals (ICP/MS)	SW846	TAL CAN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL NSH
Field Sampling	Field Sampling	EPA	TAL NSH
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396 TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

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Accreditation/Certification Summary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Laboratory: TestAmerica Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-19
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-19
California	State Program	9	2938	10-31-18 *
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-19
Georgia	State Program	4	NA: NELAP & A2LA	12-31-19
Illinois	NELAP	5	200010	12-09-18 *
lowa	State Program	7	131	04-01-20
Kansas	NELAP	7	E-10229	10-31-19
Kentucky (UST)	State Program	4	19	06-30-19
Kentucky (WW)	State Program	4	90038	12-31-19
Louisiana	NELAP	6	30613	06-30-19
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-19
Massachusetts	State Program	1	M-TN032	06-30-19
Minnesota	NELAP	5	047-999-345	12-31-19
Mississippi	State Program	4	N/A	06-30-19
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-19
New Hampshire	NELAP	1	2963	10-09-19
New Jersey	NELAP	2	TN965	06-30-19
New York	NELAP	2	11342	03-31-19
North Carolina (WW/SW)	State Program	4	387	12-31-19
North Dakota	State Program	8	R-146	06-30-19
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-19
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	07-31-19
Rhode Island	State Program	1	LAO00268	12-30-19
South Carolina	State Program	4	84009 (001)	02-28-19
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-19
USDA	Federal		P330-13-00306	12-01-19
Utah	NELAP	8	TN00032	07-31-19
Virginia	NELAP	3	460152	06-14-19
Washington	State Program	10	C789	07-19-19
West Virginia DEP	State Program	3	219	02-28-19
Wisconsin	State Program	5	998020430	08-31-19
Wyoming (UST)	A2LA	8	453.07	12-31-19

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program Chata Browns	EPA Region	Identification Number	Expiration Date
California Connecticut	State Program State Program	9 1	2927 PH-0590	02-23-19 * 12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19

^{*} Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Nashville

1/6/2019 (Rev. 1)

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Accreditation/Certification Summary

Client: Midwest Environmental Consultants

Project/Site: Asbury Ash Pond

TestAmerica Job ID: 490-163429-2

Laboratory: TestAmerica Canton (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Kansas	NELAP	7	E-10336	01-31-19 *
Kentucky (UST)	State Program	4	58	02-23-19 *
Kentucky (WW)	State Program	4	98016	12-31-18 *
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19 *
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-19 *
West Virginia DEP	State Program	3	210	12-31-19

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^{*} Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Nashville

COOLER RECEIPT FORM



Cooler Received/Opened On11/16/2018@1015	
Time Samples Removed From Cooler 20:12 Time Samples Placed In Storage	(2 Hour Window)
1. Tracking # 263 (last 4 digits, FedEx) Courier: FedEx	,
IR Gun ID_31470368 pH Strip Lot Chlorine Strip Lot	f
2. Temperature of rep. sample or temp blank when opened: 3 4 Degrees Celsius	
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NO. (NA)
4. Were custody seals on outside of cooler?	YES)NONA
If yes, how many and where:	
5. Were the seals intact, signed, and dated correctly?	YESNONA
6. Were custody papers inside cooler?	YESNONA
I certify that I opened the cooler and answered questions 1-6 (intial)	
7. Were custody seals on containers: YES NO and Intact	YESNO.(NA
Were these signed and dated correctly?	YESNONA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Pape	er Other None
9. Cooling process: Ide Ice-pack Ice (direct contact) Dry Ice	Other None
10. Did all containers arrive in good condition (unbroken)?	YESNONA
11. Were all container labels complete (#, date, signed, pres., etc)?	PESNONA
12. Did all container labels and tags agree with custody papers?	YESNONA
13a. Were VOA vials received?	YES ANONA
b. Was there any observable headspace present in any VOA vial?	YESNOMA
Larger than this.	
14. Was there a Trip Blank in this cooler? YESNONA If multiple coolers, sequence	e #
I certify that I unloaded the cooler and answered questions 7-14 (intial)	
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNONA
b. Did the bottle labels indicate that the correct preservatives were used	YESNONA
16. Was residual chlorine present?	YESNONA
I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)	HCF
17. Were custody papers properly filled out (ink, signed, etc)?	YESNONA
18. Did you sign the custody papers in the appropriate place?	YESNONA
19. Were correct containers used for the analysis requested?	YESNONA
20. Was sufficient amount of sample sent in each container?	YESNONA
I certify that I entered this project into LIMS and answered questions 17-20 (intial)	
I certify that I attached a label with the unique LIMS number to each container (intial)	5
21. Were there Non-Conformance issues at login? YES. Was a NCM generated YES. No	#
A(8,114)	

BIS = Broken in shipment Cooler Receipt Form.doc

LF-1 End of Form Page 31 of 38

Revised 8/23/17

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING Nashville, TN

COOLER RECEIPT FORM

Cooler Received/Opened On11/16/2018@1015	
Time Samples Removed From Cooler 20112 Time Samples Placed In Storage	(2 Hour Window)
1. Tracking # 2647 (last 4 digits, FedEx) Courier: FedEx	
IR Gun ID_31470368 pH Strip Lot M4 Chlorine Strip Lot M	
2. Temperature of rep. sample or temp blank when opened: 2. Degrees Celsius	
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NO NA
4. Were custody seals on outside of cooler?	JESNONA
If yes, how many and where:	
5. Were the seals intact, signed, and dated correctly?	YESNONA
6. Were custody papers inside cooler?	YESNONA
I certify that I opened the cooler and answered questions 1-6 (intial)	
7. Were custody seals on containers: YES NO and Intact	YESNO(NA)
Were these signed and dated correctly?	YESNONA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Pap	er Other None
9. Cooling process: lce lce-pack lce (direct contact) Dry ice	Other None
10. Did all containers arrive in good condition (unbroken)?	YESNONA
11. Were all container labels complete (#, date, signed, pres., etc)?	YES NO NA
12. Did all container labels and tags agree with custody papers?	YESNONA
13a. Were VOA vials received?	YES NO NA
b. Was there any observable headspace present in any VOA vial?	YESNONA
Larger than this.	
14. Was there a Trip Blank in this cooler? YESNONA If multiple coolers, sequence	ce#
I certify that I unloaded the cooler and answered questions 7-14 (intial)	
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNO.(NA
b. Did the bottle labels indicate that the correct preservatives were used	VESNONA
16. Was residual chlorine present?	YESNO(NA)
I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)	- 1839
17. Were custody papers properly filled out (ink, signed, etc)?	YES NONA
18. Did you sign the custody papers in the appropriate place?	YESNONA
19. Were correct containers used for the analysis requested?	XESNONA
20. Was sufficient amount of sample sent in each container?	VES NO NA
certify that entered this project into LIMS and answered questions 17-20 (Intial)	5
certify that I attached a label with the unique LIMS number to each container (intial)	==
21. Were there Non-Conformance issues at login? YES NO Was a NCM generated? ES No	#
BIS = Broken in shipment	

Cooler Receipt Form.doc

LF-1

Revised 8/23/17

End of Form

Phone: 573-636-9454

Monager: Rick Elgin

Well	l pH	spec.	Time	Sample of *
MW-2	6.36	0,610	11:45	16-15-18
MW-3	5.74	0,901	1:10	11-14-18
MW-4	6.89	0,543	16:10	11-15-18
MW-5	7,19	0,750	10:35	11-15-18
MW-5A	7,06	1,756	(0:00	11-15-18
MW-6	6.89	1.683	9:30	11-15-18
MW- 6A	7,12	1.448	8:55	11-15-18
MW-7	6,29	2,441	2110	11-14-181

Rym AN 11/15/18, 1:30 p.m.

* Custom COC not printed,
have previous analysis on file

* Will contact test America on Friday, 11/16/18 to verify analysis

Dup 11-14-18 e nw-7 Blank 11-148 e 2:30

1.2/3.6

FedEX, 11/15/18, 1:30 p.m.

Page 34 of 38

1/6/2019 (Rev. 1)

Chain of Custody Record



Client Information	Sampler:				PM:	PM: ner, Cathy				Ct	Carrier Tracking No(s):			COC No: 490-52767-15725.1		
Client Contact: Mr. Rick Elgin	Phone:			E-N			0						1		Page:	
Company:				car	iny.gai	rtner	@testa	americ	cainc	.com			\rightarrow		Page 1 of 1 Job #:	
Midwest Environmental Consultants									Ar	nalysi	s Requ	ested			30D #.	
Address: 2009 East McCarty Street Suite 2	Due Date Reques	ted:				900	37778					П			Preservation Co	des:
City: Jefferson City	TAT Requested (lays):				1 3	77 De								A - HCL B - NaOH	M - Hexane N - None
State, Zip: MO, 65101							lids					D - Nitric Acid F E - NaHSO4	O - AsNaO2 P - Na2O4S Q - Na2SO3			
Phone: 573-636-9454(Tel)	PO #: Purchase Orde	r not require	ed		0		and Combined 226/228		ed So	ions					F - MeOH G - Amchlor H - Ascorbic Acid	R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate
Email: relgin@mecpc.com	W0 #:				S or N	200			ssolv	Special instructions				2	I - Ice J - DI Water K - EDTA	V - MCAA W - ph 4-5
Project Name: Asbury Ash Pond	Project #: 49010011				(Ye	0 0	Fluoride,		E D	al ii.	8	7		containers	L - EDA	Z - other (specify)
Site:	SSOW#:				ample		SSZU KB ZZO P, Fluoride, S	2	- Tot	Specie				of com		
Sample identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oll, BT=Tissue, A=Air)	Field Filtered S	Perform misums	9056 Chloride,	7470A - Mercury	2540C_Calcd - Total Dissolved Solids	Metals - See \$				Total Number of	Special In	structions/Note:
		><	Preserva	tion Code:	X	XD	100	100,00	33.100	D	The Later			X		
					П										Field pH:	
					H										Field pH:	
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															Field pH:	
Possible Hazard Identification					S									_	ed longer than 1	month)
Non-Hazard Flammable Skin Irritant Pois	son B Unkr	own 🖳	Radiologica	<u> </u>	_		Retun				Disp	osal By L	ab L		nive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)					S	specia	al Instr	uction	ns/Q(C Requ	rements:	6020A/6	010C - Sb,A	∖s,Ba,B	e,B,Cd,Ca,Cr,Co	,Pb,,Mo, Li
Empty Kit Relinquished by:		Date:			Time	e:						Method of	Shipment:			
Relinquished by:	Date/Time:			Company		Re	ceived I	by:					Date/Time:			Company
Relinquished by:	Date/Time:			Company		Re	ceived I	by:					Date/Time:			Company
Refinquished by:	Date/Time:			Company		Re	ceived I	by:					Date/Time:			Company
Custody Seals Intact: Custody Seal No.:						Co	oler Ter	nperet	/a)	°C and O	ther Remar	ks:				

TestAmerica Nashville

2960 Foster Creighton Drive

Nashville, TN 37204

Chain of Custody Record



<u>TestAmerica</u>

HE LEADER IN ENVIRONMENTAL TESTING

Phone (615) 726-0177 Fax (615) 726-3404 Client Information (Sub Contract Lab)	Sampler:			Lab I		Cathy	_			C	arrier Tracki	ng No(s):		COC No: 490-82495.1	
Client Contact:	Phone:				Gartner, Cathy -Mail:					S	State of Origin:			Page:	
Shipping/Receiving				cath	_	_	_	_	ainc.com	N	issouri			Page 1 of 2	
Company: TestAmerica Laboratories, Inc.					Accre	editation	s Req	uired (See note):					Job #: 490-163429-2	
Address: 4101 Shuffel Street NW,	Due Date Requeste 11/30/2018	ed:							Analysis	Regu	ested			Preservation Cod	
City:	TAT Requested (da	iys):			T	T	П		- Indiyore	T	TT	TT	T	A - HCL B - NaOH	M - Hexane N - None
North Canton State, Zip:									11					C - Zn Acetate D - Nitric Acid E - NaHSO4	O - AsNaO2 P - Na2O4S Q - Na2SO3
OH, 44720 Phone:	PO #:				11					11		11		F - MeOH G - Amchlor	R - Na2S2O3 S - H2SO4
330-497-9396(Tel) 330-497-0772(Fax) Email:	WO#:				or No)	(Yes or No)	b.,Mo	(CVAA)						H - Ascorbic Acid I - Ice J - DI Water	T - TSP Dodecahydrate U - Acetone V - MCAA
Project Name: Empire District CCR	Project #: 49010011				Yes	s or No)	r,Co,P	Mercury (0					containers	K-EDTA L-EDA	W - pH 4-5 Z - other (specify)
Site: Midwest Env Consultants - Empire CCR	SSOW#:				ample	SD (Yes	OD)	ep Mer					of cont	Other:	
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	-	Matrix (W=water, S=solid, O=wastefoll, BY=Tissue, A=Air)	Field Filtered S	6020A/3005A (MOD Sh As Ba Be B Cd	8020A/3005A (MOD) Sb,As,Ba,Be,B,Cd,Ca,Cr,Co,Pb,,Mo	7470A/7470A_Prep					Total Number o	Special In	structions/Note:
MW 27400 453420 43		11:45	Preserva	tion Code:	Y	Υ	-			++			X	double method upl	nad
MW-2 (490-163429-1)	11/15/18	Central 13:10		Water	11	X	-	X		-	++	-	1		
MW-3 (490-163429-2)	11/14/18	Central		Water		X	X	X					1	double method up	
MW-4 (490-163429-3)	11/15/18	11:10 Central		Water		X	X	X					1	double method up	oad
MW-5 (490-163429-4)	11/15/18	10:35 Central		Water		X	×	X					1	double method up	oad
MW-5A (490-163429-5)	11/15/18	10:00 Central		Water	П	X	X	×					1	double method up	oad
MW-6 (490-163429-6)	11/15/18	09:30 Central		Water	П	×	×	×					1	double method up	load
MW-6A (490-163429-7)	11/15/18	08:55 Central		Water		X	X	×					1	double method up	load
MW-7 (490-163429-8)	11/14/18	14:10 Central		Water	П	X	×	X					1	double method up	oad
Dup (490-163429-9)	11/14/18	00:01 Central		Water	П	X	×	X					1	double method up	beo
Note: Since laboratory accreditations are subject to change, TestAmerica currently maintain accreditation in the State of Origin listed above for ana Laboratories, Inc. attention immediately. If all requested accreditations ar	ysis/tests/matrix being analy	zed, the sam	ples must be si	hipped back to	the Te	estAmer	ica lab	orator	y or other instru	ctions will					
Possible Hazard Identification					15	Sampl	e Dis	posa	I (A fee ma					ed longer than	month)
Unconfirmed							200		Client		oosal By I	Lab	Arch	ive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliver	able Rank:	2		15	Specia	Instr	ructio	ns/QC Requ	irement	3;				
Empty Kit Relinquished by:		Date:			Tim	e:					Method	of Shipment.			
Relinquished by: Relinquished by:	Date/Time:	1/35		Company Company			eived	//	19/	1		Date/Time	20-1	18 9:50	Company C
Relinquished by:	Date/Time:			Company		Rec	eived	by:				Date/Time	e:		Company
Custody Saala Intent						1									
Custody Seal No.: Δ Yes Δ No						Coc	Her Te	mpera	ture(s) °C and (лпег Кеп	larks.				

Ver: 09/20/2016

TestAmerica Nashville

2960 Foster Creighton Drive Nashville, TN 37204

Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING

Phone (615) 726-0177 Fax (615) 726-3404																	THE LEADER IN EN	IVIRONMENTAL TESTING
Client Information (Sub Contract Lab)	Sampler:				Lab PM: Gartner, Cathy					Carrier Tracking No(s):						COC No: 490-82495.2		
Client Contact: Shipping/Receiving	Phone:			E-Ma cath	al: ny.gartner@testamericainc.com					State of Origin: Missouri				Page: Page 2 of 2				
Company: TestAmerica Laboratories, Inc.					Accre	edita	tions F	Require	ed (Se	e note):							Job #: 490-163429-2	
Address: 4101 Shuffel Street NW,	Due Date Requeste 11/30/2018	Due Date Requested: 11/30/2018							Analysis Requested								Preservation Code	es: M - Hexane
Gity: North Canton	TAT Requested (da	ays):															B - NaOH C - Zn Acetate	N - None O - AsNaO2
State, Zip. OH, 44720					11										1	- 1	D - Nitric Acid E - NaHSO4 F - MeOH	P - Na2O4S O - Na2SO3 R - Na2S2O3
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:				(0)		Mo	0 3	a								G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahydrate
Email:	WO #:				s or N	No.	LiPb.,	Pb.M	(CVAA)							8	J - Ice J - DI Water	U - Acetone V - MCAA
Project Name: Empire District CCR	Project #: 49010011				اعرا	(Yes or	Cr.Co.	Cr,Co,	Mercury					}	1		K - EDTA L - EDA	W - pH 4-5 Z - ather (specify)
Site: Midwest Env Consultants - Empire CCR	SSOW#:				Samp	SD (Y	Cd,Ca	S,Cd,Ca	rep M							of co	Other:	
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab) a		Field Filtered	Perform MS/MSD	3e.	Sb,As,Ba,Be,B,	7470A/7470A_Prep							Total Number	Special Ins	structions/Note:
Blank (490-163429-10)	11/14/18	00:01	Preservati	Water	PY	4	X	X	X	+	-	+	++			A	double method uplo	oad
	10,000	Central				1						1						
					H		1		-	1								
					H	+	+	+	+			-						
					П													
Note: Since laboratory accreditations are subject to change. TestAmeric currently maintain accreditation in the State of Origin listed above for an Laboratories, Inc. attention immediately. If all requested accreditations	alysis/tests/matrix being analy	yzed, the sam	ples must be shi	pped back to	the Te	estAr	merica	labora	atory o	r other in	struction	ories. Th	nis sampi e provide	e shipment d. Any cha	t is forward anges to ac	led u	inder chain-of-custod ditation status should	y. If the laboratory does no be brought to TestAmeric
Possible Hazard Identification					1	San			ACCOUNT (*)		may b	7		340 000			ed longer than 1	
Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliver	able Rank;	2		-	Spe			To Cli	ent /QC Re	equirer		sal By	Lab	- A	rchi	ve For	Months
Empty Kit Relinquished by:		Date:			Tim	ie:				-	÷		Method	of Shipme	ent:	-		
Relinquished by: Relinquished by:	Date/Time: 11-19-18 @	_		TANA	_	1		ved by:	91/	A.	1			Date/T	ime: -20 -	18	9:50	Company / C
	Date/Time:		C	ompany		1	Receiv	ed by:	/					Date/T	ime:			Company
Relinquished by:	Date/Time:		C	ompany		1	Receiv	ed by	1					Date/T	lime:			Company
Custody Seals Intact: Custody Seal No.: A Yes A No						(Cooler	Temp	erature	e(s) °C a	nd Othe	r Remar	ks.					

Ver: 09/20/2016











TestAmerica Canton Canton Facility	Sample Receipt For	m/Narrative		Login # :	
77	Vashville	Site Name		Coole	r unpacked by:
		Opened on //	1-20-10	-	MIS
Cooler Received on	TIDE FAC Clim				7700
	UPS FAS Clippe	er Chent Drop On	TestAmerica Con Storage Loca	the state of the s	/
Receipt After-hours:	7 AC Foam I	Day Client Caster		er	
	ised: Bubble Wrap	Foam Plastic Bag	None Other None	er	
IR GUN# IR-8 (C IR GUN#36 (C	e upon receipt CF +0.9 °C) Observed CF +0.6 °C) Observed C	Cooler Temp.	See Multiple Co C Corrected Co C Corrected Cool	oler Temp	°C
2. Were tamper/custo -Were the seals o -Were tamper/cust -Were tamper/cust	dy seals on the outside on the outside of the coostody seals on the bottle stody seals intact and uralip attached to the coole	of the cooler(s)? If Ye bler(s) signed & dated? e(s) or bottle kits (LLH neompromised?	es Quantity 2		
 Did custody papers Were the custody p 	accompany the sample apers relinquished & si on(s) who collected the	e(s)? gned in the appropriat		Yes No Yes No Yes No	Tests that are not checked for pH by
Did all bottles arriv Could all bottle lab	e in good condition (Ur els be reconciled with the	nbroken)? he COC?	iod on the COC!	Ves No	VOAs Oil and Grease
	(s) used for the test(s) in received to perform ind re samples?			Yes No Yes No	TOC TOC
2. Were all preserved 3. Were VOAs on the 4. Were air bubbles >6 5. Was a VOA trip bla	2-16 have been checked sample(s) at the correct COC? 6 mm in any VOA vials ank present in the cooler be Hg trip blank present?	pH upon receipt? Larger tl r(s)? Trip Blank Lot #	han this.	Yes No NA Yes No NA Yes No NA Yes No Yes No	pH Strip Lot# <u>HC85024</u>
ontacted PM	Date	by	via Verl	bal Voice Mail	Other
oncerning					1
7. CHAIN OF CUST	ODY & SAMPLE DIS	SCREPANCIES		Samp	oles processed by:
B. SAMPLE CONDIT				1.145	
				holding time had eived in a broker	
31 12 23 10 10			ed with bubble >6		
. SAMPLE PRESER	RVATION				
mple(s)			we	re further preserv	ved in the laboratory.
	Preservative(s)				

TestAmerica Multiple Cooler Receipt Form/Narrative Login #: Canton Facility										
Cooler#	IR Gun#	Observed Temp °C	Corrected Temp °C	Coolant						
TA	8	13.2	14.1							
11	(1	2.8	3.7							
THE RESERVE TO SERVE THE PARTY OF THE PARTY										
			3							
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N										
- X - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1										
	6									

X: X-Drive Document Control SOPs Work Instructions Word Version Work Instructions WI-NC-099H-071615 Cooler Receipt Form_page 2 - Multiple Coolers.doc rls



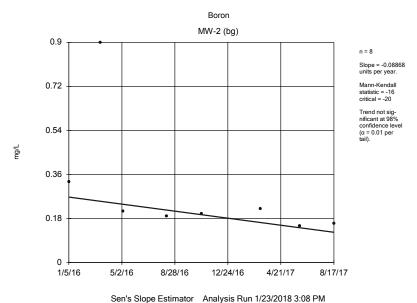
APPENDIX 5

Statistical Analysis



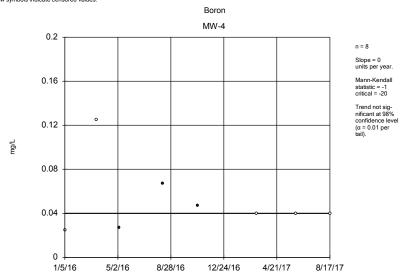
Sanitas[™] Output – Background

Trending Analysis



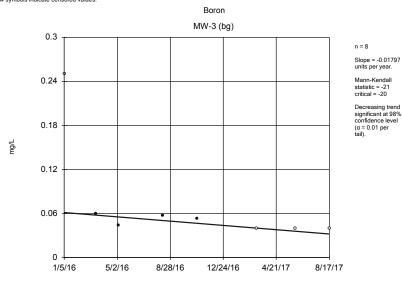
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

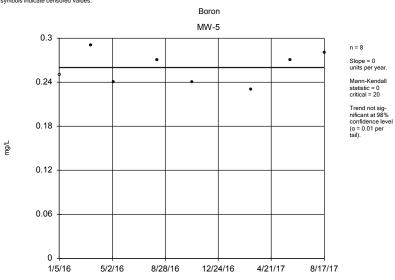
Sanitas $^{\text{™}}$ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.



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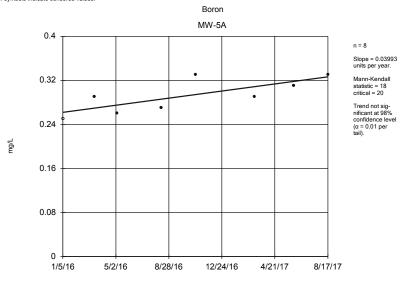
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

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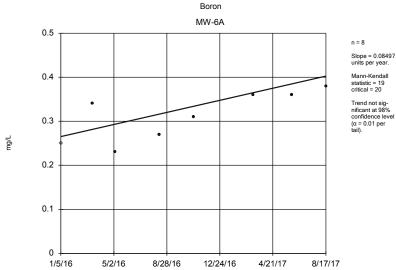
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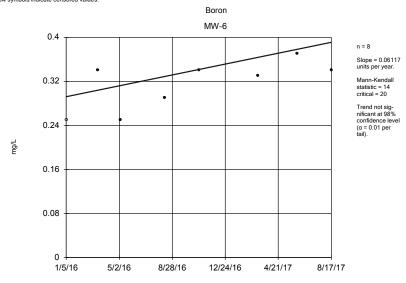
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

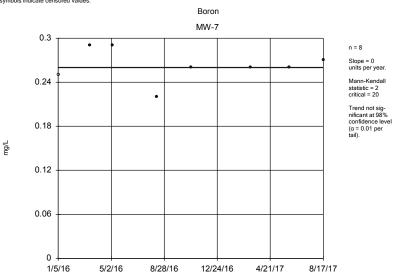
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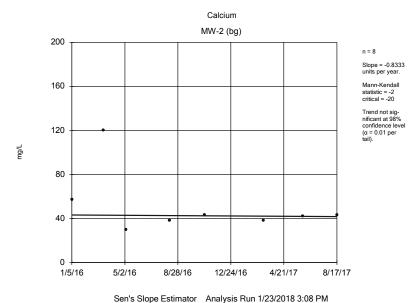
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

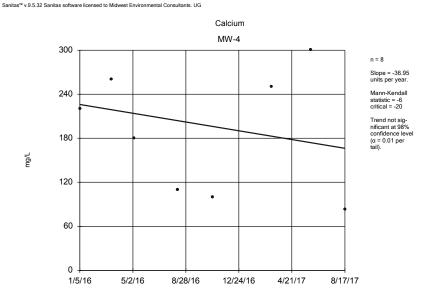
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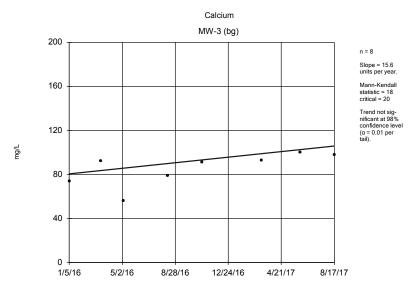


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



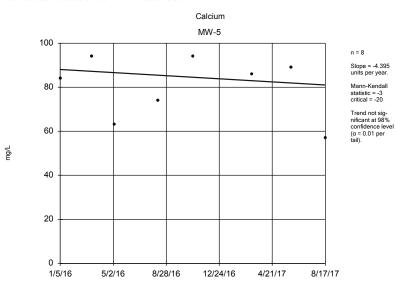
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

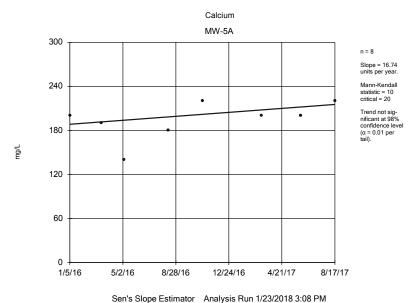


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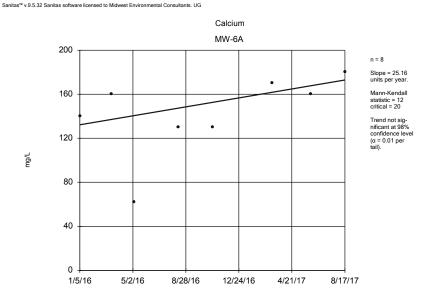
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

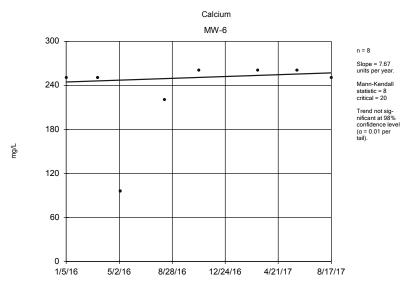


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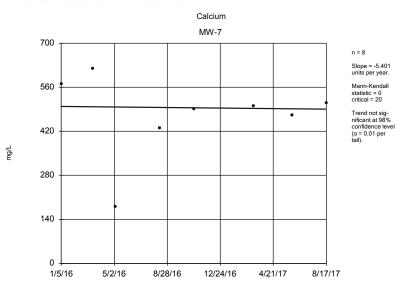
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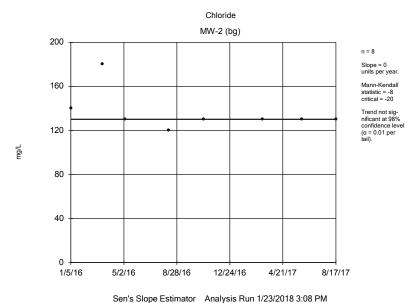


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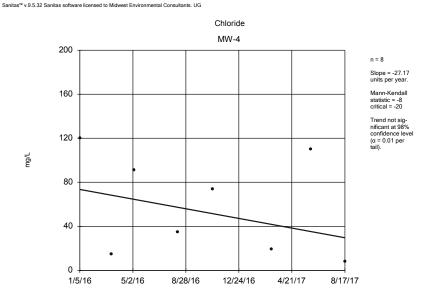
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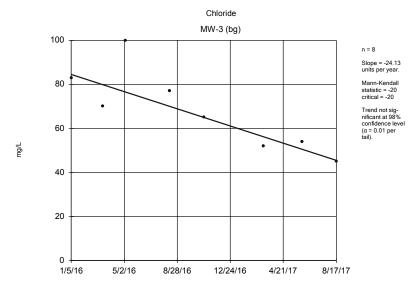


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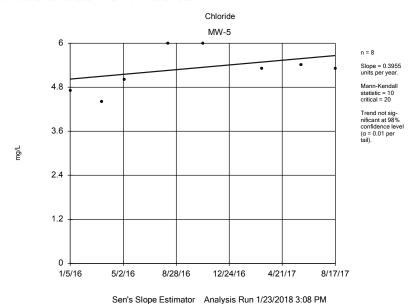
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

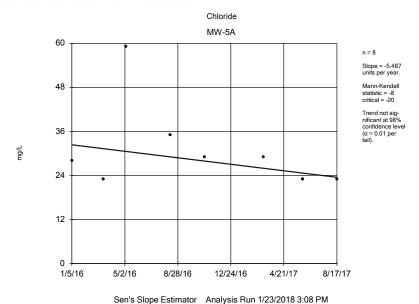


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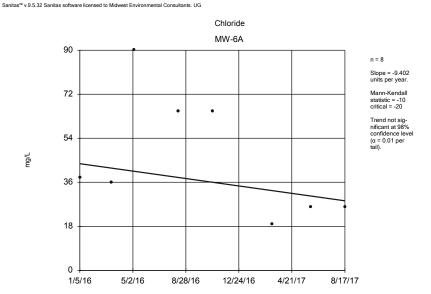
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

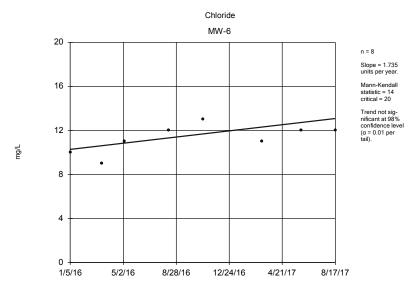


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



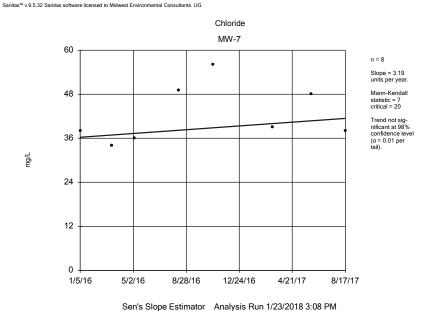
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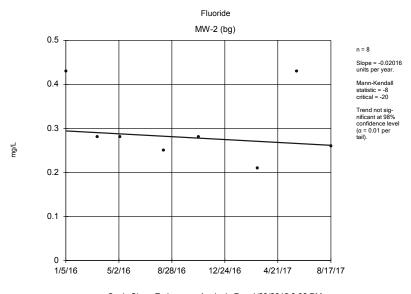


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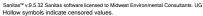


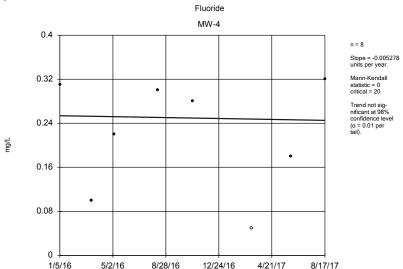
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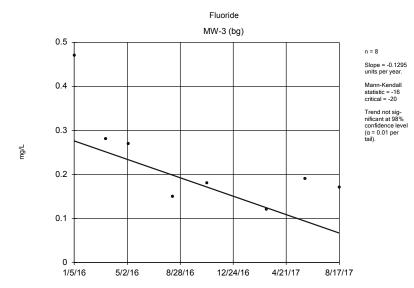
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The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3





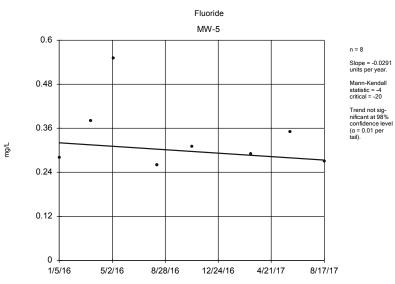
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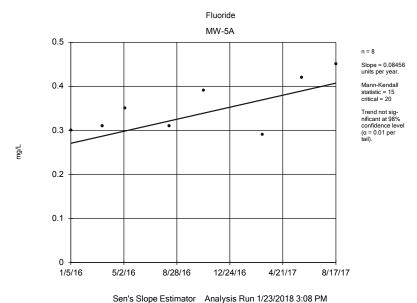
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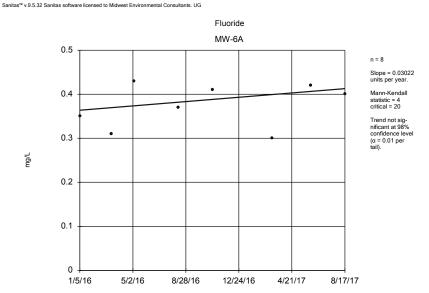
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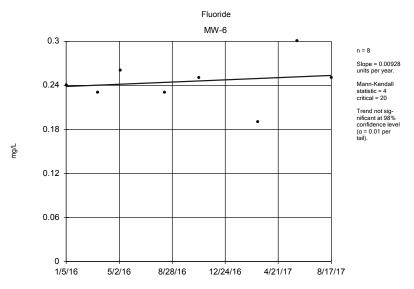


The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



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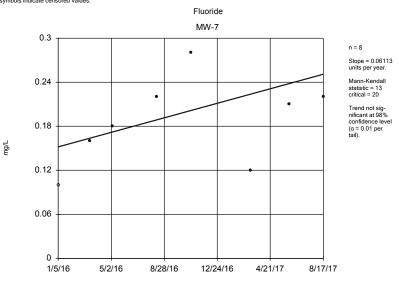
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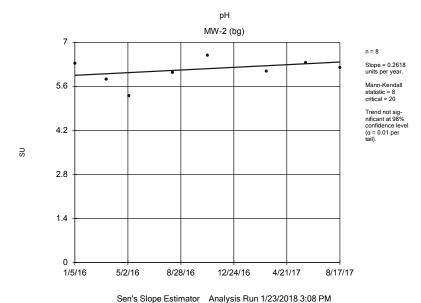
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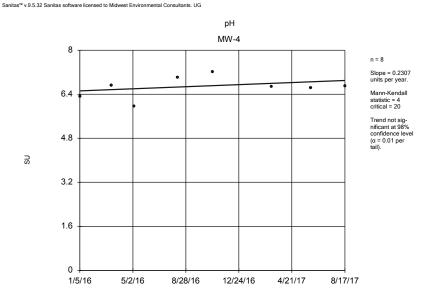


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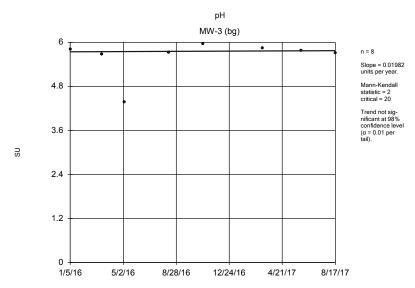


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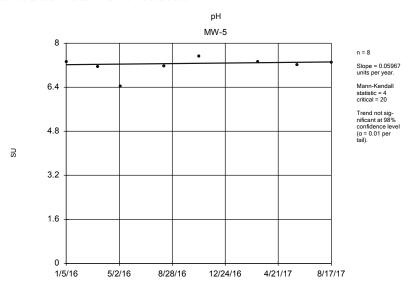
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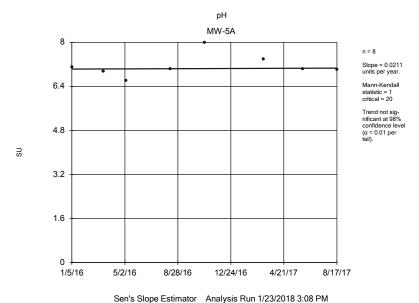
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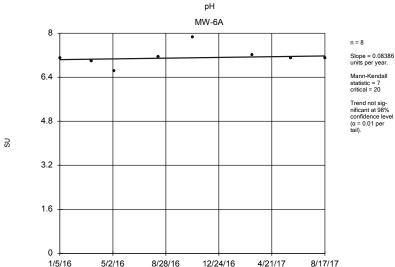


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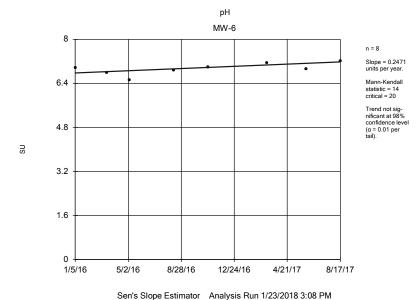
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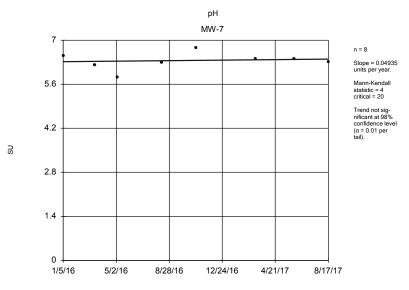


Trend not sig-nificant at 98% confidence level

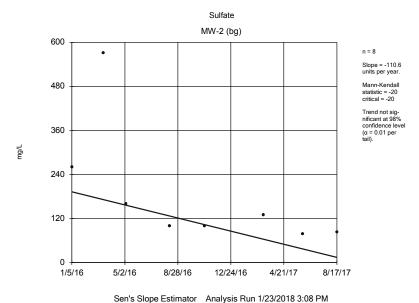


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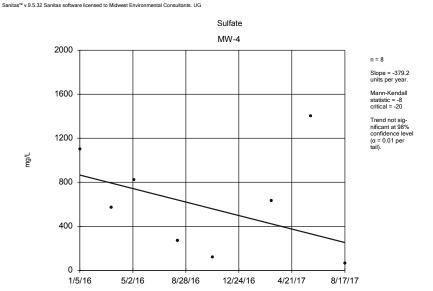




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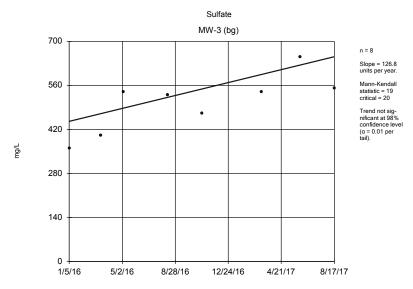


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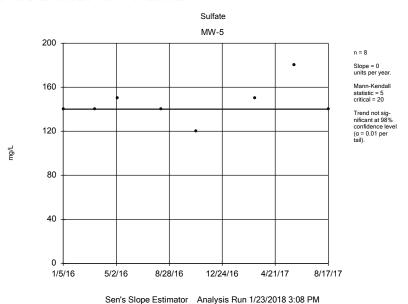
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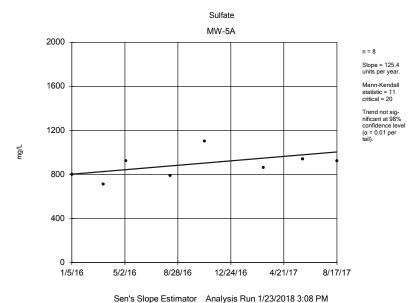


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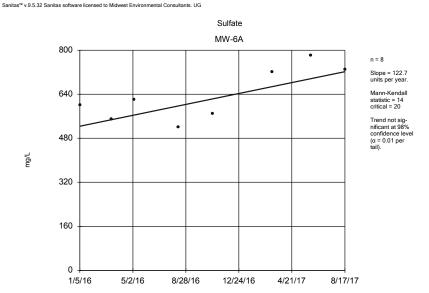
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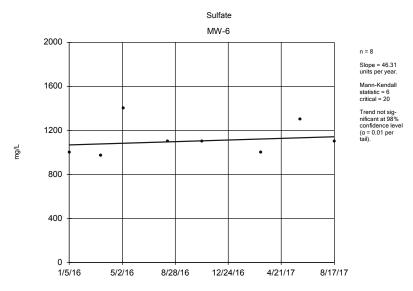


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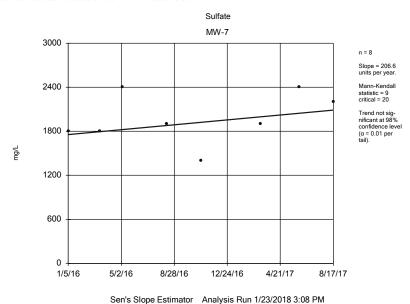
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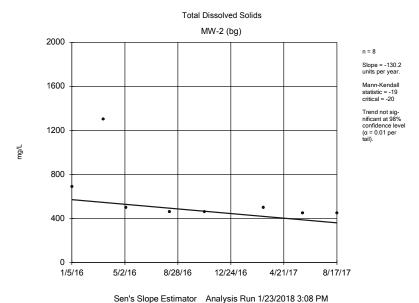


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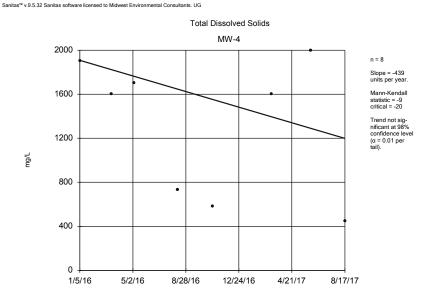
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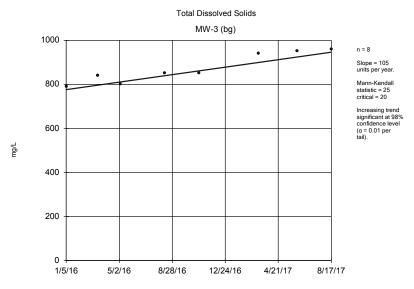


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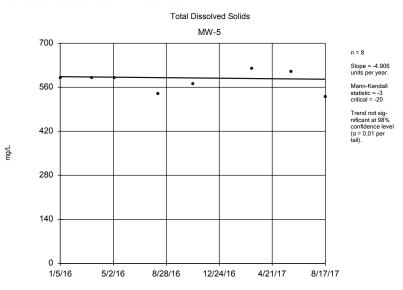
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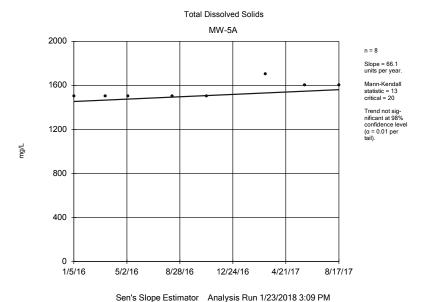
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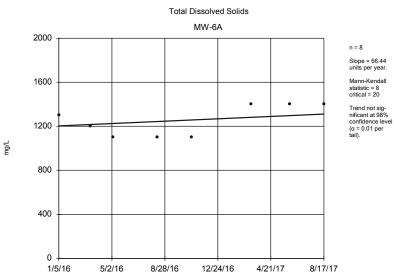


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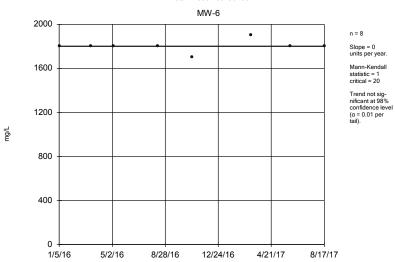
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



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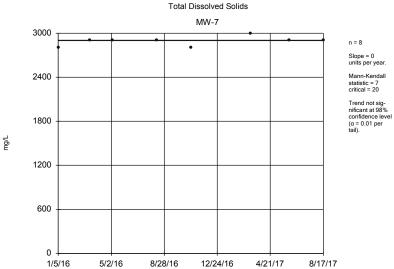
Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

Total Dissolved Solids



Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3



Trend Test

	The Empire District	Client: Midwest Envi	ronmental Consu	ultants	Data: Asbury CCR I	mpoundmer	nts GW Ba	aseline Datab	pase - App 3 only	Printed 1/2	23/2018, 3:10 PI	М
<u>Constituent</u>		Well	Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Boron (mg/L)		MW-2 (bg)	-0.08868	-16	-20	No	8	0	n/a	n/a	0.02	NP
Boron (mg/L)		MW-3 (bg)	-0.01797	-21	-20	Yes	8	50	n/a	n/a	0.02	NP
Boron (mg/L)		MW-4	0	-1	-20	No	8	62.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-5	0	0	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-5A	0.03993	18	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-6	0.06117	14	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-6A	0.08497	19	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)		MW-7	0	2	20	No	8	12.5	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-2 (bg)	-0.8333	-2	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-3 (bg)	15.6	18	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-4	-36.95	-6	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-5	-4.395	-3	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-5A	16.74	10	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-6	7.67	8	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-6A	25.16	12	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)		MW-7	-5.401	0	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-2 (bg)	0	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-3 (bg)	-24.13	-20	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-4	-27.17	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-5	0.3955	10	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-5A	-5.487	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-6	1.735	14	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-6A	-9.402	-10	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)		MW-7	3.19	7	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-2 (bg)	-0.02016	-8	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-3 (bg)	-0.1295	-16	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-4	-0.00	0	20	No	8	12.5	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-5	-0.0291	-4	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-5A	0.08456	15	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-6	0.00928	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-6A	0.03022	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)		MW-7	0.06113	13	20	No	8	12.5	n/a	n/a	0.02	NP
pH (SU)		MW-2 (bg)	0.2618	8	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-3 (bg)	0.01982	2	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-4	0.2307	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-5	0.05967	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-5A	0.0211	1	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-6	0.2471	14	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-6A	0.08386	7	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)		MW-7	0.04935	4	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-2 (bg)	-110.6	-20	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-3 (bg)	126.8	19	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-4	-379.2	-8	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-5	0	5	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-5A	125.4	11	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-6	46.31	6	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-6A	122.7	14	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)		MW-7	206.6	9	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-2 (bg)	-130.2	-19	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-3 (bg)	105	25	20	Yes	8	0	n/a	n/a	0.02	NP

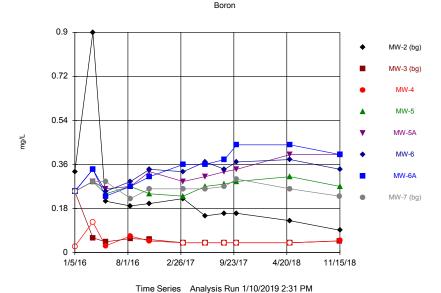
Trend Test

	The Empire District	Client: Midwest Er	Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Data				ase - App 3 onl	y Printed 1/	'23/2018, 3:10 Pl	М		
Constituent		<u>Well</u>	Slope	Calc.	<u>Critical</u>	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Total Dissolved Solids (mg/L)		MW-4	-439	-9	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-5	-4.906	-3	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-5A	66.1	13	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-6	0	1	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-6A	66.44	8	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)		MW-7	0	7	20	No	8	0	n/a	n/a	0.02	NP



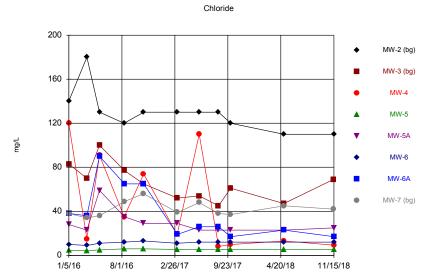
Sanitas[™] Output – Sampling Event

Time Series Analysis



The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

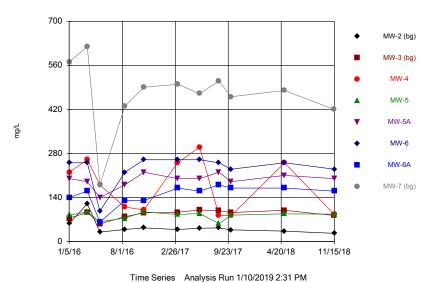




Time Series Analysis Run 1/10/2019 2:31 PM

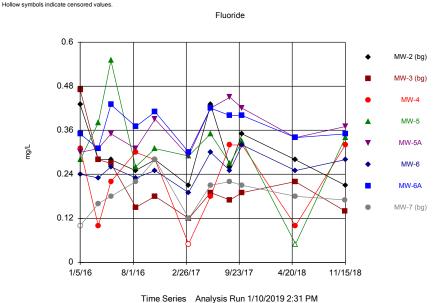
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Calcium

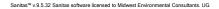


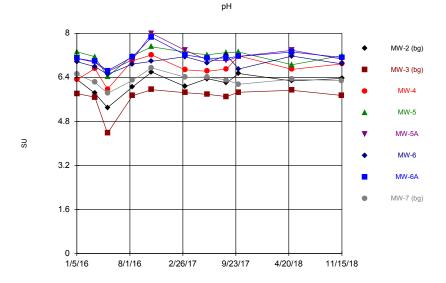
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background



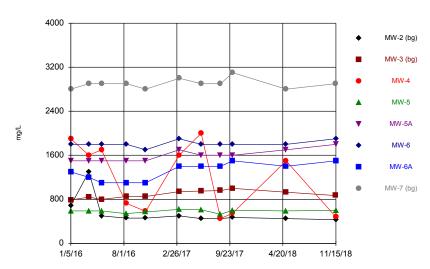


Time Series Analysis Run 1/10/2019 2:31 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

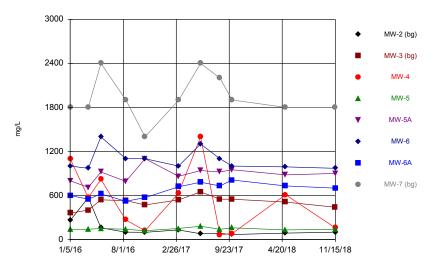
Total Dissolved Solids



Time Series Analysis Run 1/10/2019 2:31 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background





Time Series Analysis Run 1/10/2019 2:31 PM

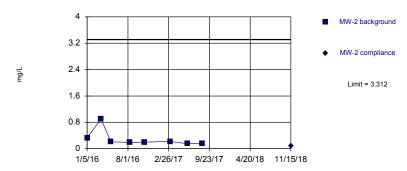
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background



Sanitas[™] Output – Sampling Event Prediction Limits

Within Limit Boron

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=-1.411, Std. Dev=0.5788, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7677, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

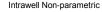
Prediction Limit Analysis Run 1/10/2019 3:50 PM

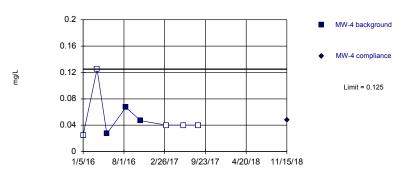
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Boron





Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

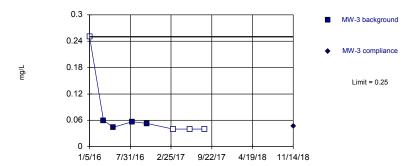
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. 50% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

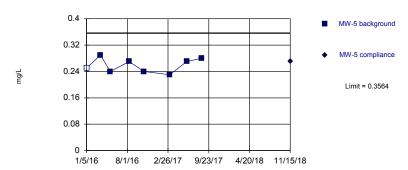
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Parametric



Background Data Summary: Mean=0.2588, Std. Dev.=0.02167, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9309, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Boron





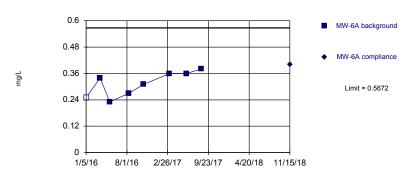
Background Data Summary: Mean=0.2913, Std. Dev.=0.03044, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9267, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Boron Within Limit Intrawell Parametric

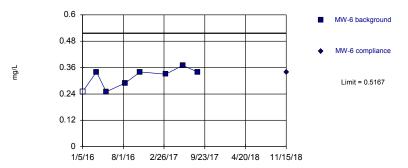


Background Data Summary: Mean=0.3125, Std. Dev.=0.05651, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9144, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Boron

Intrawell Parametric



Background Data Summary: Mean=0.3138, Std. Dev.=0.04502, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8587, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

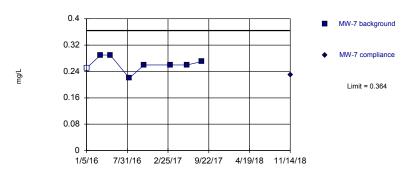
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Boron Within Limit

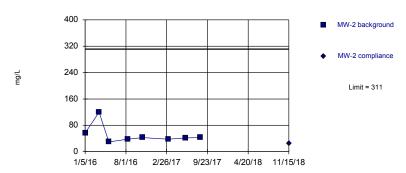
Intrawell Parametric



Background Data Summary: Mean=0.2625, Std. Dev.=0.02252, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9076, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Calcium

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=3.846, Std. Dev.=0.4202, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7931, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

1/5/16

Within Limit

Calcium

Intrawell Parametric

MW-4 background

480

MW-4 compliance

Limit = 559.2

Background Data Summary: Mean=187.9, Std. Dev.=82.39, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9158, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

2/26/17 9/23/17 4/20/18 11/15/18

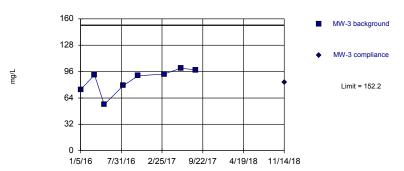
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Calcium

Intrawell Parametric

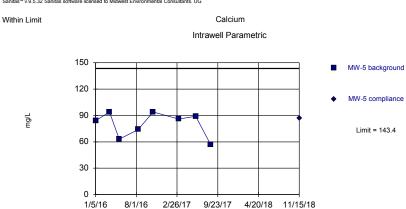


Background Data Summary: Mean=85.38, Std. Dev=14.83, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8756, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

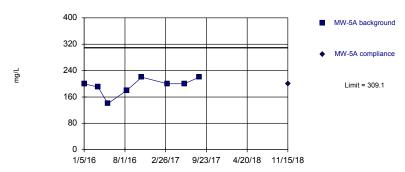
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Background Data Summary: Mean=80.13, Std. Dev =14.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8847, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Calcium

Intrawell Parametric



Background Data Summany: Mean=193.8, Std. Dev=25.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8601, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

1/5/16

Within Limit

Calcium

Intrawell Parametric

MW-6A background

MW-6A compliance

Limit = 308.1

Background Data Summary: Mean=141.5, Std. Dev=36.97, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8547, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

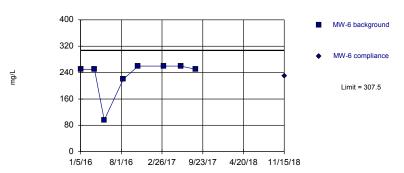
2/26/17 9/23/17 4/20/18 11/15/18

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Calcium

Intrawell Parametric



Background Data Summary (based on x⁻⁵ transformation): Mean=8.8e11, Std. Dev.=4.2e11, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7705, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

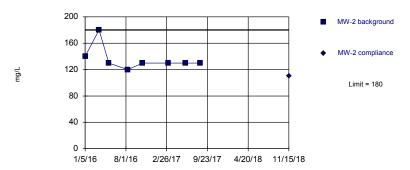
Within Limit Calcium Intrawell Parametric MW-7 background MW-7 compliance Limit = 1064

Background Data Summary: Mean=471.3, Std. Dev.=131.5, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8357, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

1/5/16 7/31/16 2/25/17 9/22/17 4/19/18 11/14/18

Within Limit Chloride

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

Within Limit Chloride
Intrawell Parametric

300
240

MW-4 background

MW-4 compliance

Limit = 262.5

Background Data Summary: Mean=59.01, Std. Dev.=45.16, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.887, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

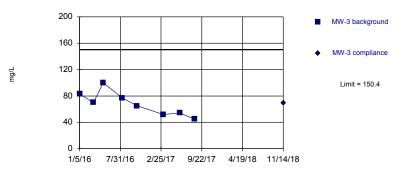
2/26/17 9/23/17 4/20/18 11/15/18

Prediction Limit Analysis Run 1/10/2019 3:51 PM

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Intrawell Parametric



Background Data Summary: Mean=68.25, Std. Dev=18.22, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9663, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

1/5/16

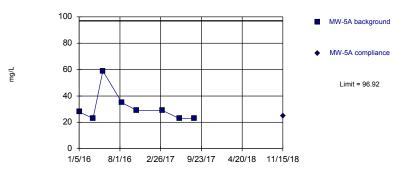
Within Limit Chloride Intrawell Parametric MW-5 background MW-5 compliance Limit = 7.811

Background Data Summary: Mean=5.263, Std. Dev =0.5655, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9383, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

2/26/17 9/23/17 4/20/18 11/15/18

Within Limit Chloride

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=5.506, Std. Dev.=0.9627, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7519, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

1/5/16

Within Limit

Chloride
Intrawell Parametric

MW-6A background

MW-6A compliance

Limit = 158

Background Data Summary: Mean=45.63, Std. Dev.=24.93, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8899, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

2/26/17 9/23/17 4/20/18 11/15/18

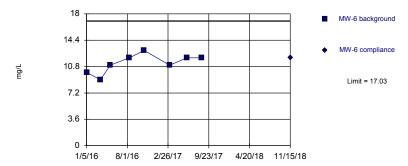
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Chloride

Intrawell Parametric

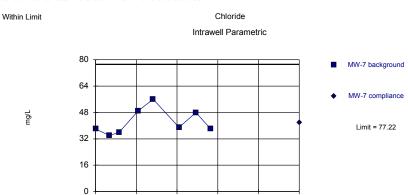


Background Data Summary: Mean=11.25, Std. Dev=1.282, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9378, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

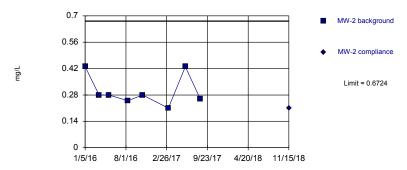


1/5/16 7/31/16 2/25/17 9/22/17 4/19/18 11/14/18

Background Data Summary: Mean=42.25, Std. Dev.=7.76, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.877, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Fluoride

Intrawell Parametric



Background Data Summany: Mean=0.3025, Std. Dev.=0.08207, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7948, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

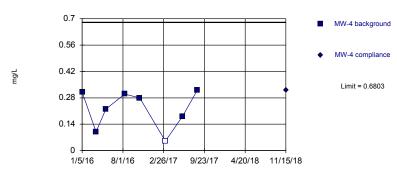
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG Hollow symbols indicate censored values.

Within Limit Fluoride





Background Data Summary: Mean=0.22, Std. Dev.=0.1021, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8847, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

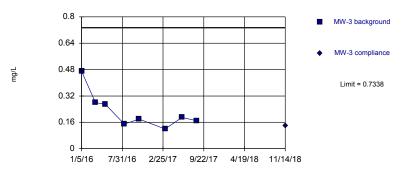
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.2288, Std. Dev=0.1121, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8353, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

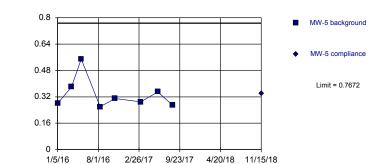
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

ng/L

Within Limit Fluoride

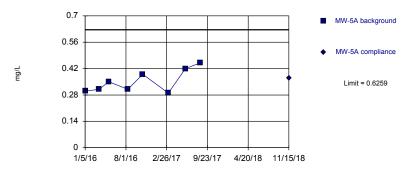
Intrawell Parametric



Background Data Summary: Mean=0.3363, Std. Dev.=0.09561, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7816, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Fluoride

Intrawell Parametric



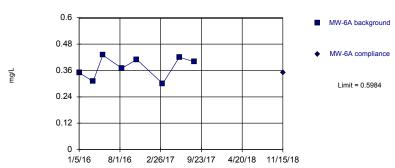
Background Data Summary: Mean=0.3525, Std. Dev.=0.06065, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8853, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride Within Limit Intrawell Parametric

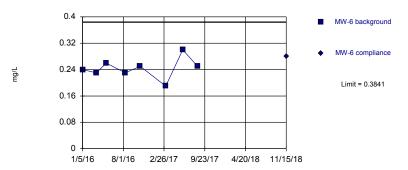


Background Data Summary: Mean=0.3738, Std. Dev.=0.04984, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9076, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.2438, Std. Dev.=0.03114, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9455, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

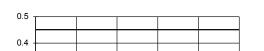
The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Intrawell Parametric

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Fluoride Within Limit

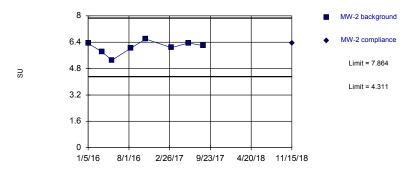




Background Data Summary: Mean=0.1863, Std. Dev.=0.05878, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9642, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

рΗ Within Limits

Intrawell Parametric



Background Data Summary: Mean=6.088, Std. Dev.=0.3941, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9314, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

рΗ

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

1/5/16

Within Limits

Intrawell Parametric MW-4 background MW-4 compliance Limit = 8.373 S I imit = 4 927 36 1.8

Background Data Summary: Mean=6.65, Std. Dev.=0.3822, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9541, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

8/1/16 2/26/17 9/23/17 4/20/18 11/15/18

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

рΗ Within Limits

Intrawell Non-parametric



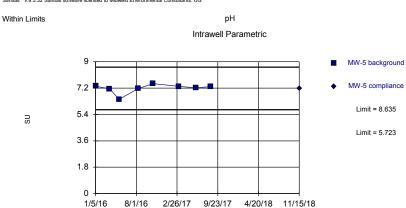
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.08484. Individual comparison alpha = 0.04288 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

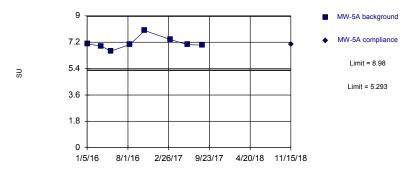
1/5/16



Background Data Summary: Mean=7.179, Std. Dev.=0.323, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7521, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limits pH

Intrawell Parametric



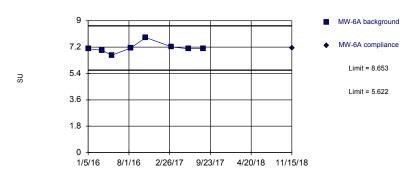
Background Data Summary: Mean=7.136, Std. Dev.=0.409, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8579, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.0000997.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH
Intrawell Parametric



Background Data Summary: Mean=7.138, Std. Dev.=0.3362, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8382, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

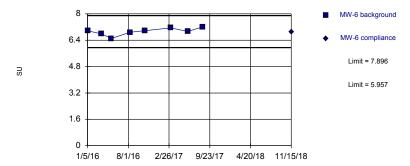
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limits pH





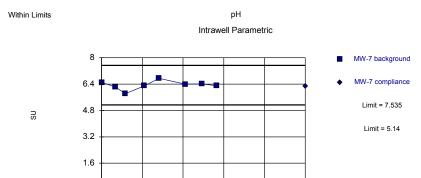
Background Data Summary: Mean=6,926, Std. Dev =0.2151, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9382, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

0

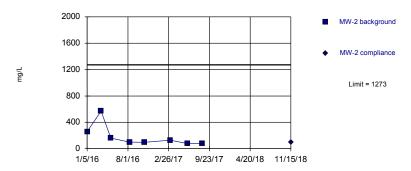


Background Data Summary: Mean=6.338, Std. Dev =0.2657, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9384, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

1/5/16 7/31/16 2/25/17 9/22/17 4/19/18 11/14/18

Within Limit Sulfate

Intrawell Parametric



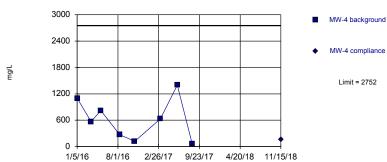
Background Data Summary (based on square root transformation): Mean=12.74, Std. Dev.=5.09, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.794, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Sulfate
Intrawell Parametric



Background Data Summany: Mean=621.6, Std. Dev =472.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9492, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

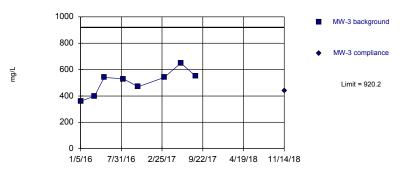
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Sulfate

Intrawell Parametric



Background Data Summary: Mean=505, Std. Dev.=92.12, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9355, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

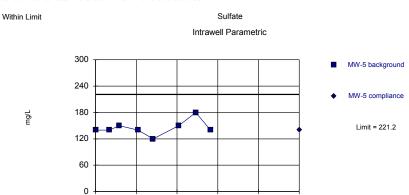
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

8/1/16

1/5/16

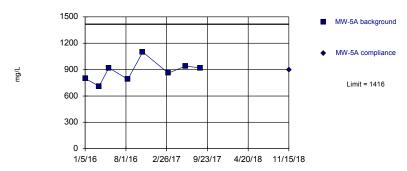


Background Data Summary: Mean=145, Std. Dev.=16.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8495, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

2/26/17 9/23/17 4/20/18 11/15/18

Within Limit Sulfate

Intrawell Parametric



Background Data Summary: Mean=880, Std. Dev.=118.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Sulfate
Intrawell Parametric



Background Data Summany: Mean=636.3, Std. Dev =95.16, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9206, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

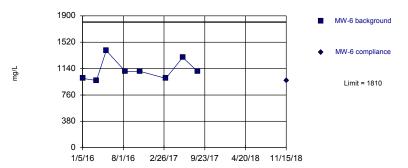
Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Sulfate

Intrawell Parametric



Background Data Summary: Mean=1121, Std. Dev.=152.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @aipha = 0.01, calculated = 0.8502, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit

Sulfate
Intrawell Parametric

MW-7 background

MW-7 compliance

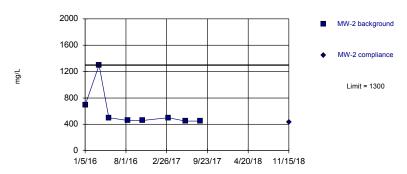
Limit = 3513

1/5/16 7/31/16 2/25/17 9/22/17 4/19/18 11/14/18

Background Data Summary: Mean=1975, Std. Dev.=341.2, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9176, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Within Limit Total Dissolved Solids

Intrawell Non-parametric

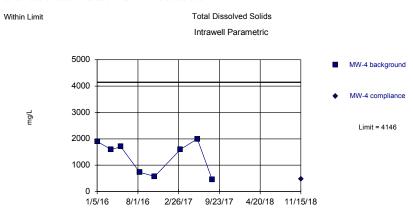


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

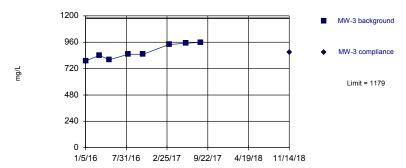
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Background Data Summary: Mean=1320, Std. Dev.=627.1, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8446, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit Total Dissolved Solids
Intrawell Parametric

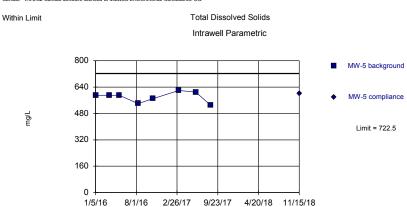


Background Data Summary: Mean=872.5, Std. Dev=67.98, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8701, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

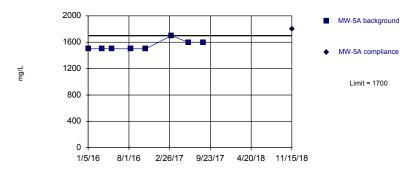
Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



Background Data Summary: Mean=580, Std. Dev.=31.62, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9166, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Exceeds Limit Total Dissolved Solids

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

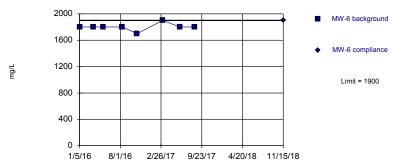
Total Dissolved Solids Within Limit Intrawell Parametric 1900 MW-6A background 1520 MW-6A compliance 1140 ng/L Limit = 1887 760 380 8/1/16 2/26/17 9/23/17 4/20/18 11/15/18 1/5/16

Background Data Summary: Mean=1250, Std. Dev.=141.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7986, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

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Within Limit Total Dissolved Solids
Intrawell Non-parametric

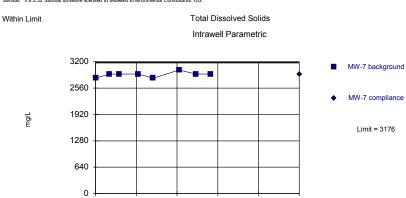


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Prediction Limit Analysis Run 1/10/2019 3:51 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-18 App 3 Asbury ponds with background

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG



1/5/16 7/31/16 2/25/17 9/22/17 4/19/18 11/14/18

Background Data Summary: Mean=2888, Std. Dev.=64.09, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8108, critical = 0.749. Kappa = 4.507 (c=24, w=22, 1 of 2, event alpha = 0.05132). Report alpha = 0.00009977.

Prediction Limit

	The Empire District	The Empire District		Data: 11-18 App 3 Asbury ponds with background Printed 1/10						52 PM	
Constituent	Well	Upper Lim.	Lower Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	<u>Transform</u>	<u>Alpha</u>	Method
Boron (mg/L)	MW-2	3.312	n/a	11/15/2018	0.091	No	8	0	ln(x)	0.000	Param Intra 1 of 2
Boron (mg/L)	MW-3	0.25	n/a	11/14/2018	0.047	No	8	50	n/a	0.02144	NP Intra (normality)
Boron (mg/L)	MW-4	0.125	n/a	11/15/2018	0.048	No	8	62.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Boron (mg/L)	MW-5	0.3564	n/a	11/15/2018	0.27	No	8	12.5	No	0.000	Param Intra 1 of 2
Boron (mg/L)	MW-5A	0.4285	n/a	11/15/2018	0.4	No	8	12.5	No	0.000	Param Intra 1 of 2
Boron (mg/L)	MW-6	0.5167	n/a	11/15/2018	0.34	No	8	12.5	No	0.000	Param Intra 1 of 2
Boron (mg/L)	MW-6A	0.5672	n/a	11/15/2018	0.4	No	8	12.5	No	0.000	Param Intra 1 of 2
Boron (mg/L)	MW-7	0.364	n/a	11/14/2018	0.23	No	8	12.5	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-2	311	n/a	11/15/2018	26	No	8	0	ln(x)	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-3	152.2	n/a	11/14/2018	83	No	8	0	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-4	559.2	n/a	11/15/2018	86	No	8	0	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-5	143.4	n/a	11/15/2018	87	No	8	0	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-5A	309.1	n/a	11/15/2018	200	No	8	0	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-6	307.5	n/a	11/15/2018	230	No	8	0	x^5	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-6A	308.1	n/a	11/15/2018	160	No	8	0	No	0.000	Param Intra 1 of 2
Calcium (mg/L)	MW-7	1064	n/a	11/14/2018	420	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-2	180	n/a	11/15/2018	110	No	8	0	n/a	0.02144	NP Intra (normality)
Chloride (mg/L)	MW-3	150.4	n/a	11/14/2018	69	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-4	262.5	n/a	11/15/2018	9.3	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-5	7.811	n/a	11/15/2018	5.3	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-5A	96.92	n/a	11/15/2018	25	No	8	0	sqrt(x)	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-6	17.03	n/a	11/15/2018	12	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-6A	158	n/a	11/15/2018	17	No	8	0	No	0.000	Param Intra 1 of 2
Chloride (mg/L)	MW-7	77.22	n/a	11/14/2018	42	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-2	0.6724	n/a	11/15/2018	0.21	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-3	0.7338	n/a	11/14/2018	0.14	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-4	0.6803	n/a	11/15/2018	0.32	No	8	12.5	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-5	0.7672	n/a	11/15/2018	0.34	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-5A	0.6259	n/a	11/15/2018	0.37	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-6	0.3841	n/a	11/15/2018	0.28	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-6A	0.5984	n/a	11/15/2018	0.35	No	8	0	No	0.000	Param Intra 1 of 2
Fluoride (mg/L)	MW-7	0.4512	n/a	11/14/2018	0.17	No	8	12.5	No	0.000	Param Intra 1 of 2
pH (SU)	MW-2	7.864	4.311	11/15/2018	6.36	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-3	5.95	4.37	11/14/2018	5.74	No	8	0	n/a	0.04288	NP Intra (normality)
pH (SU)	MW-4	8.373	4.927	11/15/2018	6.89	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-5	8.635	5.723	11/15/2018	7.19	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-5A	8.98	5.293	11/15/2018	7.06	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-6	7.896	5.957	11/15/2018	6.89	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-6A	8.653	5.622	11/15/2018	7.12	No	8	0	No	0.000	Param Intra 1 of 2
pH (SU)	MW-7	7.535	5.14	11/14/2018	6.28	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-2	1273	n/a	11/15/2018	100	No	8	0	sqrt(x)	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-3	920.2	n/a	11/14/2018	440	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-4	2752	n/a	11/15/2018	160	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-5	221.2	n/a	11/15/2018	140	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-5A	1416	n/a	11/15/2018	900	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-6	1810	n/a	11/15/2018	970	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-6A	1065	n/a	11/15/2018	700	No	8	0	No	0.000	Param Intra 1 of 2
Sulfate (mg/L)	MW-7	3513	n/a	11/14/2018	1800	No	8	0	No	0.000	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-2	1300	n/a	11/15/2018	430	No	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-3	1179	n/a	11/14/2018		No	8	0	No	0.000	Param Intra 1 of 2
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Prediction Limit Page 2

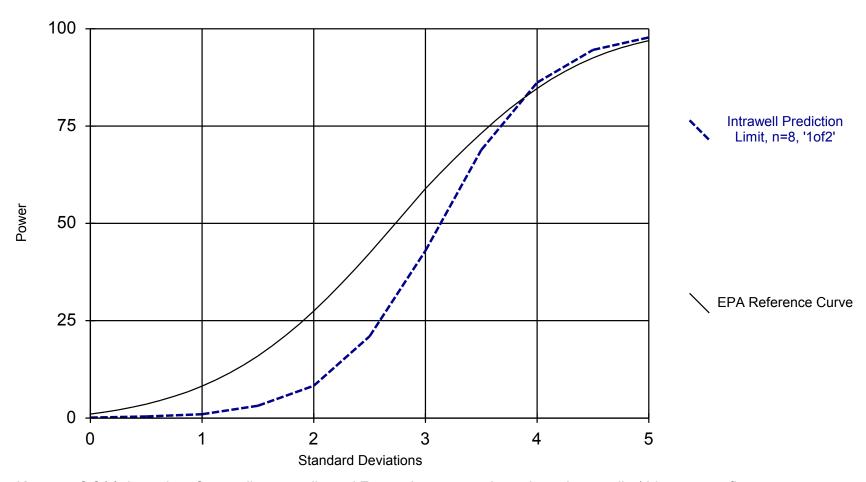
	The Empire District	Client: Midwes	Data: 11-18 App	3 Asb	ury pond	ds with back	ground Printed 1/	10/2019, 3:52	2 PM		
Constituent	Well	Upper Lim.	Lower Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	<u>Transform</u>	<u>Alpha</u>	Method
Total Dissolved Solids (mg/L)	MW-4	4146	n/a	11/15/2018	480	No	8	0	No	0.000	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-5	722.5	n/a	11/15/2018	600	No	8	0	No	0.000	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-5A	1700	n/a	11/15/2018	1800	Yes	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-6	1900	n/a	11/15/2018	1900	No	8	0	n/a	0.02144	NP Intra (normality)
Total Dissolved Solids (mg/L)	MW-6A	1887	n/a	11/15/2018	1500	No	8	0	No	0.000	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-7	3176	n/a	11/14/2018	2900	No	8	0	No	0.000	Param Intra 1 of 2



Sanitas[™] Output – Sampling Event

Power Curve





Kappa = 3.014, based on 8 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/10/2019 4:13 PM