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GREDELL Engineering Resources, Inc.

Sikeston Power Station

2018 Annual Groundwater Monitoring and Corrective Action Report for Bottom Ash Pond For Compliance with USEPA 40 CFR 257.90(e)

Prepared for:

BMU Sikeston Board of Municipal Utilities

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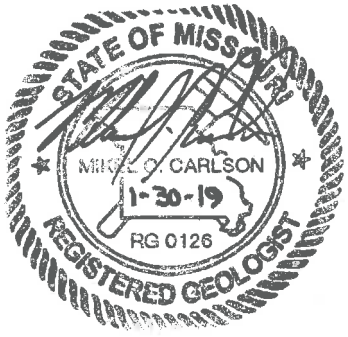

January 30, 2019

Sikeston Power Station

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1.0 INTRODUCTION

The Sikeston Power Station (SPS), owned and operated by the Sikeston Board of Municipal Utilities (SBMU), is an electric power producer and distributor located within the western city limits of Sikeston, in southern Scott County, Missouri. The SBMU-SPS began operation in 1981 and produces approximately 235 megawatts. Coal combustion residuals (approximately 10,000 tons per annum) are currently sold or placed in the facility's two coal ash surface impoundments located immediately east of the power station. Both impoundments are on properties owned and controlled by SBMU. One coal ash impoundment measuring approximately 61 acres in size is actively used for bottom ash disposal. The second coal ash impoundment measuring approximately 30 acres in size is primarily used for fly ash disposal. It is subject to the alternate compliance schedule specified by the United States Environmental Protection Agency (USEPA) under 40 CFR Part 257.100(e)(5)(ii) due to its initial inactive status and the Response to Partial Vacatur (the Direct Final Rule). Consequently this report pertains specifically to the bottom ash pond.

Pursuant to USEPA's 40 CFR Part 257 (§257) Federal Criteria for Classification of Solid Waste Disposal Facilities and Practices, Subpart D – Standards for Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments (ponds), the establishment of a groundwater monitoring system and routine detection sampling and reporting is required at all coal ash surface impoundments. The purpose of a monitoring well system is to accurately evaluate the quality of groundwater as it passes beneath the waste mass within an impoundment. Groundwater samples are collected and analyzed on a semi-annual basis in accordance with §257.93, or as otherwise detailed in a site-specific Groundwater Monitoring and Sampling Plan (GMSAP) (Gredell Engineering, 2018a). Analytical data also are subjected to statistical analysis in accordance with §257.93(f), with the results included in an Annual Groundwater Monitoring and Corrective Action Report in accordance with §257.90(e). If results suggest that a statistically significant increase (SSI) in one or more constituents for detection monitoring listed in Appendix III of §257 has occurred, a written demonstration is required to determine if the SSI is attributable to an ash pond release or to other causative factors. If a successful demonstration is not made, an assessment monitoring program must be initiated as required under §257.95.

This report describes the results of the second and third semi-annual detection groundwater sampling events conducted at the Sikeston Power Station bottom ash pond on June 13 and November 26, 2018, respectively. Included is a description of the sampling event, groundwater elevations, water table surface, summary of field activities, analytical results, and statistical analysis results. Field sampling and reporting activities were conducted in accordance with the site-specific GMSAP (Gredell Engineering, 2018a). Statistical analysis was performed in accordance with §257.93(f) using the appropriate statistical analysis method as filed in the SBMU-SPS operating record on October 17, 2017.

2.0 GROUNDWATER MONITORING SYSTEM

The SBMU-SPS bottom ash pond groundwater monitoring system consists of five monitoring wells that yield water from the uppermost aquifer. The five wells are designated MW-3, MW-4, MW-5, MW-6, and MW-8. MW-3 through MW-6 were installed during characterization of the site. MW-8 was installed in April 2017 to serve as an additional downgradient monitoring well as discussed in the Site Characterization Report (Gredell Engineering, 2017). The Site Characterization Report also concluded that MW-4, MW-5 and MW-8 are hydraulically downgradient of the bottom ash pond. MW-3 and MW-6 are hydraulically upgradient of the bottom ash pond. The bottom ash pond monitoring system is described in more detail in the site-specific GMSAP for this facility (Gredell Engineering, 2018a).

Table 1 presents a construction summary of the wells comprising the bottom ash pond groundwater monitoring system. Figures 1 and 2 depict well locations and groundwater contour maps of the uppermost aquifer for the June and November, 2018 semi-annual sampling events respectively. These maps confirm that water in the uppermost aquifer continues to move in a west-southwesterly direction, consistent with the conclusions of the Site Characterization Report (Gredell Engineering, 2017). All groundwater wells are equipped with dedicated tubing for use with a peristaltic pump. This system has been used for chemical sampling since inception of groundwater sampling with the bottom ash pond monitoring system.

3.0 FIELD SAMPLING SUMMARY

SPS environmental staff performed groundwater sampling on June 13 and November 26, 2018. These sampling events were the second and third semi-annual detection groundwater sampling events conducted at the Sikeston Power Station, and each event was conducted in the same manner as described in the following paragraphs.

Groundwater samples were collected from all five monitoring wells using low-flow sampling techniques and dedicated sampling equipment. Field tests of indicator parameters were performed using an In-Situ, Inc. SmarTROLL ™ MP flow cell unit and HF Scientific MicroTPI field portable turbidimeter. Each groundwater sample was subsequently analyzed for the constituents listed in §257 Appendix III. All five monitoring wells produced sufficient volumes of groundwater for full analysis during both sampling events.

During each sampling event, the environmental staff inspected each monitoring well upon arrival. Wells appeared to be in satisfactory condition and had locks in place. Staff initially gauged water levels in the monitoring wells using a standard electronic water level meter graduated in increments of 0.01 feet. Static water levels were recorded on forms provided in the GMSAP. Each well was then purged and field measurement of pH was collected. Staff monitored water quality until indicator parameters (pH and specific conductance) stabilized in accordance with the criteria in the GMSAP. Additional indicator parameters (turbidity, temperature, dissolved oxygen, and oxidation/reduction potential) were monitored for general stability prior to groundwater sample collection. The pumping rate of the peristaltic pump during purging and sampling was limited to less than 500 mL/min.

Field notes documenting the sampling events and a copy of the chain-of-custody forms are presented in Appendix 1 and are arranged by sampling event. Field sampling notes from each sampling event are summarized in Table 3, including initial and final water level measurements, purge volumes, and pH. Raw analytical laboratory data sheets for each sample, including the field blank and sample replicate, are included in Appendix 2 and are also arranged by sampling event. Quality Assurance/Quality Control (QA/QC) documentation for each sampling event is presented in Appendix 3. A summary of background and detection monitoring analytical data and field parameters is presented in Appendix 4

3.1 Field Quality Assurance/Quality Control

Field QA/QC during both the June 13 and November 26, 2018 sampling events included the collection of one field blank and one field replicate sample per sampling event. During both events, the replicate was collected from MW-6 (identified as DUP in Table 5). Rinsate blanks were not collected because dedicated sampling equipment was used. Samples were immediately shipped to PDC Laboratories' primary facility located in Peoria, Illinois using standard chain-of-custody documentation/ procedures.

Samples from the June sampling event were received by the primary facility on June 15, 2018 and subsequently analyzed for the six detection monitoring constituents listed in §257 Appendix

III and required under §257.94(b) (Table 4). Final hard copy analytical results for the June sampling event were received from PDC Laboratories on June 25, 2018.

Samples from the November sampling event were received by the primary facility on November 28, 2018 and subsequently analyzed for the six detection monitoring constituents listed in §257 Appendix III and required under §257.94(b) (Table 4). Final hard copy analytical results for the November sampling event were received from PDC Laboratories on December 7, 2018.

4.0 ANALYTICAL SUMMARY

Hard copy analytical data for each monitoring well sampled during the June and November 2018 detection monitoring events are provided in Appendix 2. The data pertain to water quality results from the uppermost aquifer in the area bordering the bottom ash pond, along with sample replicate and field blank results.

4.1 Laboratory Quality Control

Laboratory analytical data for the June and November 2018 sampling events were completed by PDC Laboratories, Inc., of Peoria, Illinois, and were accompanied by appropriate QA/QC documentation. That documentation is presented in Appendix 3.

4.2 Precision and Accuracy

Precision is a measure of the reproducibility of analytical results, generally expressed as a *Relative Percent Difference (RPD)*. 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. Accuracy is defined as the degree of agreement between the measured amount of a species and the amount actually known to be present, expressed as a percentage. It is generally determined by calculating the percent recoveries for analyses of surrogate compounds, laboratory control samples, continuing calibration check standards and matrix spike samples. Acceptable percent recoveries are established for SW-846 and USEPA methods. Field and laboratory blank analyses are also used to address measurement bias.

The analyses were performed within appropriate hold times and both initial and continuing calibrations met acceptance criteria for all analyses. Similarly, method blanks and LCS analyses met acceptance criteria. The case narrative indicates that all quality controls met acceptance criteria except some QC samples. During analysis for each sampling event, the QC sample for TDS was flagged “M” due to RPD exceeding acceptance criteria, and the QC sample for Sulfate was flagged “Q4” because the sample value was greater than four times the spike value. During the analysis of samples for the June 2018 sampling event, the QC sample for Calcium was flagged “Q4” because the sample value was greater than four times the spike value.

Additional QA/QC comments include the following:

- *Field Replicates:* Analyses of replicate samples are used to define the total variability of the sampling/analytical system as a whole. One field replicate from MW-6 was collected during each of the 2018 sampling events. The RPD was calculated for all detected chemical parameters for each sampling event. Accordingly RPDs were calculated for all parameters during both sampling events except Fluoride during the June 2018 sampling event. A summary table showing the results of the RPD calculations is included as Table 5. Using a tolerance level of $\pm$20 percent, all calculated RPDs were within acceptable ranges for each parameter.

- *Field Blank:* One field blank was incorporated into the data set for each sampling event in 2018. Results for the field blank from the June 2018 event showed that it contained a reportable concentration of Calcium (0.31 mg/L). All other parameters during the June event and all parameters during the November event were below detection limits.

- *Laboratory Blanks:* Method blanks, artificial, and matrix-less samples are analyzed to monitor the laboratory system for interferences and contamination from glassware, reagents, etc. Method blanks are taken throughout the entire sample preparation process. They are included with each batch of extractions or digestions prepared, or with each 20 samples, whichever was more frequent. Reference to Appendix 3 should be made for comments related to these and other laboratory control samples.

4.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely reflect site conditions. 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.

Approved sampling procedures are described in the GMSAP (Gredell Engineering, 2018a). Procedures specified in that plan have been followed. Approved sampling procedures should be reviewed annually. Groundwater monitoring data is evaluated using an intrawell statistical analysis methodology and is conducted separately for each constituent in each monitoring well using prediction limits in accordance with §257.93(f)(3) and the performance standards in §257.93(g). The stated statistical approach, along with supporting documentation and engineering certification, are available in the SBMU-SPS On-Site Operating Record.

4.4 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

4.5 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 (Appendix 3). Furthermore, the sample must have been analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria are met.

5.0 STATISTICAL ANALYSIS

The statistical analysis approach used to evaluate groundwater within the uppermost aquifer for the bottom ash pond monitoring well network at SBMU-SPS consists of intra-well analysis using prediction limits. The analysis is conducted separately for each constituent in each of the five monitoring wells for each sampling event in accordance with §257.93(f)(3). This statistical method complies with the accepted performance standards listed in §257.93(g).

A complete background data set has been obtained for groundwater, representing the uppermost aquifer, moving below the bottom ash pond at the SPS. The background data used to evaluate current groundwater quality is based on eight rounds of groundwater sampling of MW-3, MW-4, MW-5, and MW-6 spanning November 2016 to July 2017 and MW-8 spanning May 2017 to September 2017. The background may be updated every two years but any SSIs will not be included in background unless they are unconfirmed in accordance with Unified Guidance (USEPA, 2009).

Statistical analysis was performed in accordance with §257.93 using Sanitas™ for Ground Water (Version 9.5.32; 2017). Intra-well prediction intervals were compared at the 99 percent confidence level for each constituent. The groundwater results from the June 2018 and November 2018 detection monitoring events were compared to the prediction limits (Table 6) to determine if statistically significant increases (SSIs) over background exist in the data set.

If the number of reportable concentrations of a given constituent in a given well is not sufficient to permit parametric analysis, non-parametric prediction interval analysis is conducted. Both parametric and non-parametric prediction limit analysis were performed for the bottom ash pond groundwater monitoring well network data. Prediction intervals are based on the background monitoring data sets (Appendix 4), including concentrations reported as below detection limits. Initially, outlier analysis was performed for the background data set using Exploratory Data Analysis (EDA) with Sanitas™, time-series plots, and box and whiskers plots. However, because the background data span a collection period of less than one year, variance in the data set may be attributable to natural seasonal variation. Therefore, all background data have been retained as recommended by Unified Guidance (USEPA, 2009) when no basis for likely error or discrepancy can be identified. Following future updates to the background data set, the identification of potential outliers will be re-evaluated.

The results of the statistical analysis for the 2018 sampling events are described below. A statistical power curve, based on the background data, is provided in Appendix 5. Trend analysis (time-series) plots of background data for all detection monitoring constituents are presented in Appendix 6. A complete database summarizing the sample results, dates of sampling, and the purpose of sampling event, as per §257.90(e)(3), is provided in Appendix 4. Box and whiskers plots of background data are presented in Appendix 7. Prediction limit charts are provided in Appendix 8.

5.1 Statistical Results

June 13, 2018 Sampling Event

The results of the statistical analysis for the bottom ash pond groundwater monitoring system suggest the presence of three suspected SSIs in the June 13, 2018 data set. They are specific to MW-8 and include Calcium, Chloride, and Sulfate. The prediction limits for Calcium, Chloride, and Sulfate in MW-8 are 101.7 mg/L, 58.72 mg/L, and 131.1 mg/L, respectively, whereas the reported concentrations were 120 mg/L, 65 mg/L, and 150 mg/L, respectively. MW-8 was resampled on July 10, 2018 and the initial results for Chloride, Sulfate, and Calcium data were confirmed on July 24, 2018. These subsequent results for Calcium, Chloride, and Sulfate were 120 mg/L, 68 mg/L, and 140 mg/L, respectively (Table 1). A replicate sample also taken from MW-8 during the July 10, 2018 resampling event showed that reported concentrations of Calcium, Chloride, and Sulfate were 120 mg/L, 71, mg/L, and 150 mg/L, respectively.

In accordance with §257.94, an Alternate Source Demonstration (ASD) was prepared to address the three suspected SSIs (Gredell Engineering, 2018b). The ASD was completed successfully and certified in accordance with §257.94(e)(2) on September 26, 2018. The ASD report documents that the suspected SSIs of Chloride, Sulfate, and Calcium in MW-8 resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. As a result of the successful ASD, detection monitoring in accordance with §257.94 has continued on a semi-annual basis as specified in §257.94(b). The ASD is presented for review in Appendix 9.

November 26, 2018 Sampling Event

The results of the statistical analysis for the bottom ash pond groundwater monitoring system do not suggest the presence of apparent SSIs in the November 26, 2018 data set. Therefore, detection monitoring in accordance with §257.94 should continue on a semi-annual basis as specified in §257.94(b).

6.0 SUMMARY

The statistical analysis results for samples obtained during the second and third groundwater detection monitoring events conducted on June 13 and November 26, 2018, respectively, do not indicate the presence of SSIs associated with the bottom ash pond groundwater monitoring system. Suspected SSIs in MW-8 were shown to be attributable to an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, as documented in the ASD prepared and certified in accordance with §257.94(e)(2) and included in Appendix 9. Therefore, it is recommended that detection monitoring of the bottom ash pond continue on a semi-annual basis in accordance with §257.94(b).

7.0 REFERENCES

GREDELL Engineering Resources, Inc., 2017, *Sikeston Power Station Site Characterization for Compliance with Missouri State Operating Permit #MO-0095575*, dated May 2017.

GREDELL Engineering Resources, Inc., 2018a, *Sikeston Power Station Groundwater Monitoring and Sampling Plan for Compliance with Missouri State Operating Permit #MO-0095575*, dated September 2018.

GREDELL Engineering Resources, Inc., 2018b, *Sikeston Board of Municipal Utilities Sikeston Power Station* Detection Monitoring Program for Bottom Ash Pond Alternate Source Demonstration, dated September 2018.

Sanitas Statistical Software, © 1992-2017 SANITAS TECHNOLOGIES, Alamosa Colorado 81101-0012.

U.S. Environmental Protection Agency, March 2009, Statistical Analysis of Groundwater Monitoring *Data at RCRA Facilities Unified Guidance*: USEPA 530/R-09-007, Office of Resource Conservation and Recovery, Program Implementation and Information Division, Washington, D.C.

TABLES

Annual Groundwater Monitoring and Corrective Action Report
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Scott County, Missouri

Table 1
Groundwater Monitoring Network Summary - Bottom Ash Pond

Monitoring Well ID[1,2]	Northing Location[3,4]	Easting Location[3,4]	Ground Surface Elevation[3,4] (feet)	Top of Riser Elevation[3,4] (feet)	Well Depth[5] (feet)	Base of Well Elevation[6] (feet)	Screen Length[7] (feet)	Top of Screen Elevation (feet)
MW-3	381130.00	1079946.62	306.11	308.55	37.21	271.34	10	281.5
MW-4	380804.62	1077766.95	303.26	305.61	37.55	268.06	10	278.3
MW-5	379858.94	1078477.85	303.57	305.91	37.17	268.74	10	278.9
MW-6	379874.77	1079384.36	305.37	307.72	38.03	269.69	10	279.9
MW-8	380311.20	1077940.08	302.37	304.77	37.41	267.36	10	277.6

NOTES:

1. Refer to Figure 1 for monitoring well locations.
2. Refer to Sikeston Power Station On-Site Operating Record for well construction diagrams.
3. Monitoring well survey data provided by Bowen Engineering & Surveying, Inc.
4. Horizontal Datum: Missouri State Plane Coordinates - NAD 83 (Feet), Vertical Datum: NAVD 88 (Feet).
5. Depth measurements relative to surveyed point on top of well casing.
6. Sump installed at base of screen (0.2 feet length).
7. Actual screen length (9.7 feet) is the machine-slotted section of the 10-foot length of Schedule 40 PVC pipe.

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Table 2
Historical Groundwater Level Summary

Well ID	MW-3	MW-4	MW-5	MW-6	MW-8
Date	Groundwater Elevation (feet MSL)				
05/12/16	298.13	296.01	296.68	297.41	NM
06/28/16	297.58	294.75	295.51	296.57	NM
07/15/16	297.37	294.77	295.53	296.44	NM
08/08/16	297.05	294.66	294.87	295.77	NM
09/08/16	296.76	294.40	294.96	295.84	NM
10/05/16	296.40	294.02	294.70	295.57	NM
11/01/16	296.10	293.99	294.49	295.24	NM
11/30/16	296.03	294.26	294.80	295.37	NM
01/24/17	296.35	294.73	295.19	295.77	NM
01/26/17	296.35	294.73	295.19	295.77	NM
02/22/17	296.00	294.40	294.81	295.41	NM
02/24/17	296.00	294.40	294.81	295.41	NM
03/20/17	296.45	295.10	295.46	295.97	NM
04/19/17	296.35	294.73	295.19	295.81	NM
04/27/17	296.72	295.41	295.78	296.20	NM
05/17/17	297.81	295.76	296.31	297.11	NM
05/18/17	NM	NM	NM	NM	295.67
06/08/17	297.81	295.64	296.17	296.96	NM
06/09/17	NM	NM	NM	NM	295.57
07/13/17	296.98	294.60	295.22	296.06	294.70
08/03/17	NM	NM	NM	NM	294.12
08/15/17	NM	NM	NM	NM	294.02
08/30/17	NM	NM	NM	NM	293.72
09/14/17	NM	NM	NM	NM	293.57
09/27/17	NM	NM	NM	NM	293.26
10/31/17	295.22	293.11	293.65	294.41	293.20
06/13/18	297.33	294.93	295.60	296.47	295.02
11/26/18	295.63	293.76	294.27	294.91	293.88

NOTES:

1. Refer to Figure 1 for monitoring well locations.
2. Refer to Sikeston Power Station On-Site Operating Record for well construction diagrams.
3. NM - Not Measured.
4. Maximum and minimum groundwater elevations are shaded.

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Table 3
Water Levels and Field Parameter Summary
June 13, 2018

Monitoring Well I.D.	Hydraulic Position	Initial Water Level (ft, BTOC[2])	Final Water Level (ft, BTOC[2])	Minimum[3] Purge Vol. (ml[4])	Actual Purge Vol. (ml[4])	pH (S.U.[5])
MW-3	Upgradient	11.22	11.22	300	4,300	6.59
MW-4	Downgradient	10.68	10.68	300	7,140	7.32
MW-5	Downgradient	10.31	10.31	300	4,240	6.77
MW-6	Upgradient	11.25	11.25	300	3,120	6.67
MW-8	Downgradient	9.75	9.75	300	7,720	7.11

Water Levels and Field Parameter Summary
November 26, 2018

Monitoring Well I.D.	Hydraulic Position	Initial Water Level (ft, BTOC[2])	Final Water Level (ft, BTOC[2])	Minimum[3] Purge Vol. (ml[4])	Actual Purge Vol. (ml[4])	pH (S.U.[5])
MW-3	Upgradient	12.92	12.92	300	5,360	6.50
MW-4	Downgradient	11.85	11.85	300	3,060	7.36
MW-5	Downgradient	11.64	11.64	300	3,000	6.74
MW-6	Upgradient	12.81	12.81	300	2,840	6.72
MW-8	Downgradient	10.89	10.89	300	7,460	7.17

NOTES:

1. Sequence of sampling is MW-3, MW-6, MW-5, MW-8, MW-4.
2. BTOC: Below Top of Casing
3. Purge calculations based on 1/4" ID tubing and complete evacuation of single tubing volume.
4. ml: milliliter
5. S.U.: Standard Unit.

Prepared by: GREDELL Engineering Resources, Inc.

Prepared by: KAE
Checked by: MCC

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Table 4
Groundwater Monitoring Constituents

USEPA 40 CFR 257			
Appendix III - Constituents for Detection Monitoring		**Appendix IV - Constituents for Assessment Monitoring**	
Chemical Constituent	**Method**	**Chemical Constituent**	**Method**
pH (S.U.)	Field	Antimony (µg/L)	SW 6020
Boron (µg/L)	SW 6020	Arsenic (µg/L)	SW 6020
Calcium (mg/L)	SW 6020	Barium (µg/L)	SW 6020
Chloride (mg/L)	EPA 300.0	Beryllium (µg/L)	SW 6020
Fluoride (mg/L)	EPA 300.0	Cadmium (µg/L)	SW 6020
Sulfate (mg/L)	EPA 300.0	Chromium (µg/L)	SW 6020
Total Dissolved Solids (mg/L)	SM 2540C	Cobalt (µg/L)	SW 6020
		Fluoride (mg/L)	EPA 300
		Lead (µg/L)	SW 6020
		Lithium (µg/L)	SW 6020
		Mercury (µg/L)	SW 6020
		Molybdenum (µg/L)	SW 6020
		Selenium (µg/L)	SW 6020
		Thallium (µg/L)	SW 6020
		Radium 226 and 228 combined (pCi/L)	EPA 903.1 & 904.0

NOTES:
1. S.U. = Standard Unit.
2. µg/L = micrograms per liter.
3. mg/L = milligrams per liter.
4. pCi/L = picocurie per liter.

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Table 5
Relative Percent Differences Summary -
June 13, 2018

Chemical Parameter	Units	MW-6	DUP	Relative Percent Difference
pH	S.U.	6.67	6.67	0.00
Boron	µg/L	43	42	2.35
Calcium	mg/L	41	44	7.06
Chloride	mg/L	2.3	2.5	8.33
Fluoride	mg/L	<0.250	0.253	N/A
Sulfate	mg/L	32	33	3.08
Total Dissolved Solids	mg/L	160	180	11.76

Relative Percent Differences Summary -
November 26, 2018

Chemical Parameter	Units	MW-6	DUP	Relative Percent Difference
pH	S.U.	6.72	6.72	0.00
Boron	µg/L	46	46	0.00
Calcium	mg/L	36	43	17.72
Chloride	mg/L	1.5	1.4	6.90
Fluoride	mg/L	0.313	0.284	9.72
Sulfate	mg/L	29	26	10.91
Total Dissolved Solids	mg/L	180	210	15.38

NOTES:

1. S.U. = Standard Unit.
2. µg/L = micrograms per liter.
3. mg/L = milligrams per liter.
4. Relative Percent Difference tolerance = 20%.
5. N/A = Not applicable - parameter concentration below reporting limit.

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Table 6
Intra-Well Prediction Limit Summary

Chemical Parameter	Units	MW-3	MW-4	MW-5	MW-6	MW-8
40 CFR 257 Appendix III Constituents for Detection Monitoring						
pH Upper	S.U.	7.189	7.529	7.078	7.075	7.285
pH Lower	S.U.	6.363	7.291	6.697	6.575	7.018
Boron	µg/L	57.21	1734	5700	60.62	596.7
Calcium	mg/L	25.46	95.25	240	49.29	101.7
Chloride	mg/L	2.565	18.69	17.45	3.083	58.72
Fluoride	mg/L	0.4819	0.259	0.255	0.331	0.25
Sulfate	mg/L	33.73	147.6	484.6	44.8	131.1
Total Dissolved Solids	mg/L	191.6	407.2	577.5	250.2	448

NOTES:

1. Prediction limits for MW-3 through MW-6 based on background data set spanning November 2016 to July 2017.
2. Prediction limits for MW-8 calculated using background data set spanning May 2017 to September 2017.

FIGURES

N

SCALE: 1" = 400'

0 200 400

LEGEND

PROPERTY LINE	PL
GROUNDWATER CONTOUR	
MONITORING WELL	MW
UP GRADIENT MONITORING LOCATION	UG
DOWN GRADIENT MONITORING LOCATION	DG
GENERAL FLOW DIRECTION	

NOTES:

1. IMAGE PROVIDED BY BING MAPS.
2. MONITORING WELL LOCATIONS, CASING ELEVATIONS & UNDERGROUND CULVERT ELEVATIONS SURVEYED BY BOWEN ENGINEERING & SURVEYING.
3. GROUNDWATER ELEVATIONS MEASURED BY SIKESTON POWER STATION STAFF ON JUNE 13, 2018.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER® SOFTWARE.
5. RANGE OF GROUNDWATER FLOW GRADIENT AS DETERMINED BY SURFER® SOFTWARE 0.0004 FT./FT. TO 0.001 FT./FT.

WELL ID	GROUNDWATER ELEVATION	CASING ELEVATION	NORTHING	EASTING
MW-3	297.33	308.55	381130.00	1079946.62
MW-4	294.93	305.61	380804.62	1077766.95
MW-5	295.60	305.91	379858.94	1078477.85
MW-6	296.47	307.72	379874.77	1079384.36
MW-8	295.02	304.77	380311.20	1077940.08

THE GEOLOGIST WHO REVIEWED AND APPROVED THIS REPORT ASSUMES RESPONSIBILITY ONLY FOR GEOLOGIC INTERPRETATIONS OF DATA APPEARING ON THE PAGE AND DISCLAIMS PURSUANT TO SECTION 256.456 RSMO ANY RESPONSIBILITY FOR ALL OTHER PLANS, SPECIFICATIONS, ESTIMATES, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS NOT PREPARED UNDER THE SUPERVISION OF THE GEOLOGIST RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE PROJECT TO WHICH THIS FIGURE REFERS.

FIGURE 1
GROUNDWATER CONTOUR MAP
JUNE 13, 2018

SHEET # 1 OF 1

FILE NAME GWCONT BAP 06-2018

PROJECT NAME SIKESTON/GWMAP/BAP

SCALE AS NOTED

DATE 12/2018

APPROVED MCC

CHECKED KE

DRAWN CP

DESIGNED NA

SURVEYED NA

SIKESTON POWER STATION
BOTTOM ASH POND
2018 ANNUAL GROUNDWATER
MONITORING & CORRECTIVE
ACTION REPORT

GREDELL Engineering Resources, Inc.
ENVIRONMENTAL ENGINEERING LAND - AIR - WATER
1505 East High Street
Jefferson City, Missouri
Telephone: (573) 659-9078
Facsimile: (573) 659-9079
MO CORP. ENGINEERING LICENSE NO. E-2001019469

N

SCALE: 1" = 400'

0 200 400

LEGEND

PROPERTY LINE	PL
GROUNDWATER CONTOUR	
MONITORING WELL	MW
UP GRADIENT MONITORING LOCATION	UG
DOWN GRADIENT MONITORING LOCATION	DG
GENERAL FLOW DIRECTION	

NOTES:

1. IMAGE PROVIDED BY BING MAPS.
2. MONITORING WELL LOCATIONS, CASING ELEVATIONS & UNDERGROUND CULVERT ELEVATIONS SURVEYED BY BOWEN ENGINEERING & SURVEYING.
3. GROUNDWATER ELEVATIONS MEASURED BY SIKESTON POWER STATION STAFF ON NOVEMBER 26, 2018.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER® SOFTWARE.
5. RANGE OF GROUNDWATER FLOW GRADIENT AS DETERMINED BY SURFER® SOFTWARE 0.0003 FT./FT. TO 0.0009 FT./FT.

WELL ID	GROUNDWATER ELEVATION	CASING ELEVATION	NORTHING	EASTING
MW-3	295.63	308.55	381130.00	1079946.62
MW-4	293.76	305.61	380804.62	1077766.95
MW-5	294.27	305.91	379858.94	1078477.85
MW-6	294.91	307.72	379874.77	1079384.36
MW-8	293.88	304.77	380311.20	1077940.08

THE GEOLOGIST WHO REVIEWED AND APPROVED THIS REPORT ASSUMES RESPONSIBILITY ONLY FOR GEOLOGIC INTERPRETATIONS OF DATA APPEARING ON THE PAGE AND DISCLAIMS PURSUANT TO SECTION 256.456 RSMO ANY RESPONSIBILITY FOR ALL OTHER PLANS, SPECIFICATIONS, ESTIMATES, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS NOT PREPARED UNDER THE SUPERVISION OF THE GEOLOGIST RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE PROJECT TO WHICH THIS FIGURE REFERS.

FIGURE 2
GROUNDWATER CONTOUR MAP
NOVEMBER 26, 2018

SIKESTON POWER STATION
BOTTOM ASH POND
2018 ANNUAL GROUNDWATER
MONITORING & CORRECTIVE
ACTION REPORT

SURVEYED	DESIGNED	DRAWN	CHECKED	APPROVED	DATE	SCALE	PROJECT NAME	FILE NAME	SHEET #
NA	NA	CP	KE	MCC	12/2018	AS NOTED	SIKESTON/GWMAP/BAP	GWCONT BAP 11-2018	1 OF 1

GREDELL Engineering Resources, Inc.
ENVIRONMENTAL ENGINEERING LAND - AIR - WATER
1505 East High Street Telephone: (573) 659-9078
Jefferson City, Missouri Facsimile: (573) 659-9079
MO CORP. ENGINEERING LICENSE NO. E-2001019469

M:\Share\CADDFiles\SIKESTON\GROUNDWATER MAP\BAP\GW CONT MAP BAP 11-2018.dwg, GW CONT MAP BAP, 1/9/2019 10:46:29 AM

APPENDICES

Appendix 1

Field Sampling Notes

Field Sampling Notes – June 13, 2018

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 3
Name (Field Staff): A Patel D Dillingham
Date: 6-13-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification [signature] Lab Tech 6-13-18
Signed Title Date

Field Sampling Log

Monitoring Well ID: MW 3 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

itial Water Level (feet btoc): 11.22 Date: 6-13-18

itial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

URGE INFORMATION

ate: 6-13-18

ame (Sample Collector): D Dillingham

ethod of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

me Purging Initiated: 0816 One (1) Well Volume (mL): NA

eginning Water Level (feet btoc): 11.22 Total Volume Purged (mL): 4300

eginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

ell Total Depth (feet btoc): 36.97 Water Level after Sampling (feet btoc): 11.22 (i.e., pump is off)

asing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0842

URGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
818		340	19.63	196.3	1.03	7.16	93.0	19.61	11.22	Red Flake
820	240	820	18.17	199.6	0.76	6.84	79.6	19.89	11.22	" "
822	240	1300	17.55	199.4	0.64	6.67	67.5	17.94	11.22	" "
824	250	1800	17.33	198.5	0.57	6.60	61.5	14.54	11.22	" "
826	220	2240	17.24	197.5	0.53	6.57	53.3	12.18	11.22	" "
828	260	2760	17.27	197.1	0.49	6.58	53.1	12.18	11.22	" "
830	260	3280	17.23	195.4	0.47	6.57	47.9	7.94	11.22	" "
832	260	3800	17.19	195.4	0.46	6.58	47.3	8.22	11.22	" "
834	250	4300	17.19	194.2	0.42	6.59	42.3	7.57	11.22	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 3

..npling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.22

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-13-18 0834	250	17.19	194.2	0.42	6.59	42.3	7.57

nstrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight Breeze

Sample Characteristics: Red Flake, odorless

Sample Collection Order: Per SAP

Comments and Observations:

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 6-13-18 By: [signature] Title: Lab Tech

Prepared by: GREDELL Engineering Resources, Inc.

January 2017

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 4
Name (Field Staff): A Patel D Dillingham
Date: 6-13-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification [signature] Lab Tech 6-13-18
Signed Title Date

Field Sampling Log

Monitoring Well ID: MW 4 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

tial Water Level (feet btoc): 10.68 Date: 6-13-18

tial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / N

JRGE INFORMATION

ate: 6-13-18

ame (Sample Collector): D Dillingham

ethod of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

me Purging Initiated: 1218 One (1) Well Volume (mL): NA

eginning Water Level (feet btoc): 10.68 Total Volume Purged (mL): 7140

eginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

ell Total Depth (feet btoc): 37.23 Water Level after Sampling (feet btoc): 10.68 (i.e., pump is off)

asing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 12.55

JRGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
220		340	24.62	441.4	0.78	7.31	-130.5	52.78	10.68	orange Flake
222	240	820	21.04	471.9	0.68	7.32	-125.9	34.05	10.68	" "
224	240	1300	19.77	481.9	0.62	7.32	-123.8	32.21	10.68	" "
226	250	1800	19.21	491.0	0.58	7.32	-122.9	25.96	10.68	Clear
228	240	2280	19.11	489.2	0.55	7.32	-122.5	21.64	10.68	" "
230	240	2760	19.09	489.6	0.50	7.32	-122.5	22.83	10.68	" "
232	240	3240	19.08	493.6	0.49	7.32	-122.2	25.39	10.68	" "
234	240	3720	19.05	498.5	0.46	7.32	-121.6	24.89	10.68	" "
236	240	4200	18.92	500.3	0.45	7.32	-121.6	18.47	10.68	" "
238	250	4700	18.85	501.2	0.42	7.32	-121.1	25.87	10.68	" "
240	240	5180	18.84	495.9	0.43	7.32	-120.9	21.23	10.68	" "
242	250	5680	18.78	512.6	0.51	7.33	-121.0	25.69	10.68	" "
244	240	6160	18.79	505.2	0.45	7.32	-120.8	18.77	10.68	" "
246	250	6660	18.92	509.9	0.43	7.32	-121.0	19.64	10.68	" "
248	240	7140	18.92	511.5	0.44	7.32	-120.7	18.50	10.68	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 4

.npling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.68

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-13-18 1248	240	18.92	511.5	0.44	7.32	-120.7	18.50

nstrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight breeze

Sample Characteristics: orange flake, odorless

Sample Collection Order: Per SAP

Comments and Observations:

certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 6-13-18 By: Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 5
Name (Field Staff): April D Dillingham
Date: 6-13-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Brad Rudel (Signed) Lab Tech (Title) 6-13-18 (Date)

Field Sampling Log

Monitoring Well ID: MW5 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

itial Water Level (feet btoc): 10.31 Date: 6-13-18

itial Groundwater Elevation (NAVD88): Air Pressure in Well? Y / (N)

URGE INFORMATION

ate: 6-13-18

ame (Sample Collector): D Dillingham

ethod of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

me Purging Initiated: 0949 One (1) Well Volume (mL): NA

eginning Water Level (feet btoc): 10.31 Total Volume Purged (mL): 4240

eginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / N

/ell Total Depth (feet btoc): 37.14 Water Level after Sampling (feet btoc): 10.31 (i.e., pump is off)

asing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1012

URGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1451		400	20.84	709.2	1.13	6.71	-45.3	21.65	10.31	Orange Flake
1953	260	920	18.97	755.2	0.97	6.73	-52.1	8.90	10.31	clear, no odor
1955	250	1420	18.44	765.0	1.03	6.74	-53.3	6.96	10.31	clear, no odor
1957	315	2050	18.37	772.0	0.92	6.76	-53.5	3.41	10.31	" "
1959	315	2680	18.34	766.3	0.89	6.76	-53.9	3.49	10.31	" "
2001	270	3220	18.30	764.1	0.83	6.76	-54.5	1.86	10.31	" "
2003	270	3760	18.27	757.5	0.83	6.77	-55.2	2.06	10.31	" "
2005	240	4240	18.28	756.4	0.84	6.77	-55.6	1.91	10.31	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 5

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.31

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-13-18 1005	240	18.28	756.4	0.84	6.77	-55.6	1.91

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight Breeze

Sample Characteristics: Odorless, Clear, Colorless

Sample Collection Order: Per SAP

Comments and Observations:

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 6-13-18 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 6
Name (Field Staff): A Patel D Dillingham
Date: 6-13-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification [signature] [signature] Lab Tech 6-13-18
Signed Title Date

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW 6 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

itial Water Level (feet btoc): 11.25 Date: 6-13-18

itial Groundwater Elevation (NAVD88): Air Pressure in Well? Y / (N)

URGE INFORMATION

ate: 6-13-18

ame (Sample Collector): D Pillingham

ethod of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

me Purging Initiated: 0858 One (1) Well Volume (mL): NA

eginning Water Level (feet btoc): 11.25 Total Volume Purged (mL): 3120

eginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / (N)

/ell Total Depth (feet btoc): 37.71 Water Level after Sampling (feet btoc): 11.25 (i.e., pump is off)

asing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0920

URGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0900		420	14.57	411.7	0.78	6.65	-64.3	20.16	11.25	Red Flag
0902	280	980	18.17	408.1	0.55	6.73	-65.6	13.21	11.25	" "
0904	250	1480	17.83	391.1	0.51	6.73	-59.2	17.67	11.25	" "
0906	280	2040	17.68	348.0	0.46	6.72	-45.6	12.66	11.25	" "
0908	270	2580	17.59	344.9	0.44	6.69	-43.7	12.69	11.25	" "
0910	270	3120	17.59	345.4	0.43	6.67	-44.0	13.24	11.25	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 6

mpling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.25

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
06-13-18 0910	270	17.59	345.4	0.40	6.67	-44.0	13.24

nstrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, slight Breeze

mple Characteristics: Red Flake, Odorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Duplicate

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

e: 6-13-18 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 8
Name (Field Staff): A Patel D Dillingham
Date: 6-13-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification: A Patel (Signed) Lab Tech (Title) 6-13-18 (Date)

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

itial Water Level (feet btoc): 9.75 Date: 6-13-18

itial Groundwater Elevation (NAVD88): Air Pressure in Well? Y / (N)

URGE INFORMATION

ate: 6-13-18

ame (Sample Collector): D Dillingham

ethod of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

me Purging Initiated: 1041 One (1) Well Volume (mL): NA

eginning Water Level (feet btoc): 9.75 Total Volume Purged (mL): 7720

eginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / (N)

/ell Total Depth (feet btoc): 37.04 Water Level after Sampling (feet btoc): 9.75 (i.e., pump is off)

asing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1121

URGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1043		400	22.53	723.4	0.54	6.94	-106.1	53.79	9.75	orange flake
045	250	900	19.65	776.4	0.40	7.02	-106.1	148.9	9.75	" "
047	250	1400	18.79	788.1	0.38	7.06	-105.4	14.49	9.75	" "
049	250	1900	18.53	791.8	0.35	7.08	-103.9	12.80	9.75	" "
051	270	2440	18.44	793.2	0.32	7.09	-102.9	15.45	9.75	" "
1053	240	2920	18.36	794.2	0.35	7.10	-102.3	2.43	9.75	" "
1055	240	3400	18.34	792.9	0.29	7.10	-101.9	7.60	9.75	" "
1057	250	3900	18.35	793.8	0.26	7.10	-101.3	5.60	9.75	" "
1059	250	4400	18.34	794.0	0.26	7.11	-100.9	9.24	9.75	" "
1101	230	4860	18.37	792.8	0.25	7.11	-100.5	4.65	9.75	" "
1103	250	5360	18.36	792.6	0.25	7.11	-100.3	4.05	9.75	clear
1105	240	5840	18.35	792.3	0.25	7.11	-99.8	3.11	9.75	clear
1107	220	6280	18.29	792.2	0.23	7.11	-99.5	2.69	9.75	clear
1109	240	6760	18.30	791.0	0.24	7.11	-99.1	5.35	9.75	clear
1111	240	7240	18.34	792.3	0.22	7.11	-99.2	4.64	9.75	clear
1113	240	7720	18.34	788.6	0.23	7.11	-99.1	4.80	9.75	clear

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

mpling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 9.75

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-13-18 1113	240	18.54	788.6	0.23	7.11	-99.1	4.80

nstrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight Breeze

mple Characteristics: Yellow Flake, odorless

Sample Collection Order: Per SAP

Comments and Observations:

collect Field Blank

certify that sampling procedures were in accordance with applicable EPA and State protocols.

e: 6-13-18 By: Ashish Patel Title: Lab Tech

Field Instrumentation Calibration Log

Facility: SBMU SPS CCR Groundwater Sampling

Calibrated by: Abhish Patel

Field Instruments: In-Situ smarTROLL Field Meter

S/N #: 1174247

HF scientific, inc. Micro TPI Field Portable Turbidimeter

S/N #: 201607366

	Date	Time	pH Standards		pH Measurements	Specific Conductance Standard (µS/cm)		Specific Conductance Measurement (µS/cm)	Oxidation Reduction Potential Standard (mV)			Oxidation Reduction Potential Measurement (mV)	Dissolved Oxygen (%)			Turbidity Standards (NTU)		Turbidity Measurements (NTU)
Beginning of Day Calibration	6-13-18	0716	4.00	=	4.00	1413	=	1414.5	Temperature (°C)	=	23.17	229.2	Temperature (°C)	=	22.64	0.02	=	0.02
			7.00	=	7.00								Tap Water Source	=	Sikeston City	10.0	=	10.0
			10.00	=	10.00				Standard (mV)	=	224		Barometric Pressure (mm/Hg)	=	1003.6	1000	=	1000
													Measurement	=	99.9%			
End of Day Check	6-13-18	1320	4.00	=	4.09	1413	=	1378.1	Temperature (°C)	=	23.55	227.0	Temperature (°C)	=	24.39	0.02	=	0.01
			7.00	=	6.98								Tap Water Source	=	Sikeston City	10.0	=	9.93
			10.00	=	10.03				Standard (mV)	=	229		Barometric Pressure (mm/Hg)	=	1003.9	1000	=	1009
													Measurement	=	103.6			

Notes: The Multi-Probe Field Meter measures Temperature, Specific Conductance, Dissolved Oxygen, pH, and Oxidation Reduction Potential.

The HF scientific, inc. Micro TPI Field Portable Turbidimeter measures Turbidity.

Dissolved oxygen is calibrated via % saturation method; however, field measurements are recorded as mg/L.

I certify that the aforementioned meters were calibrated within the manufacturers specifications.

Date: 6-13-18 By: Abhish Patel

Field Sampling Notes – November 26, 2018

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 3
Name (Field Staff): A Patel D Dillingham
Date: 11-26-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼" ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Ashish Patel (Signed) Lab Tech (Title) 11-26-18 (Date)

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW 3 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 12.92 Date: 11-26-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 11-26-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0913 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 12.92 Total Volume Purged (mL): 5360

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 36.94 Water Level after Sampling (feet btoc): 12.92 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0950

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0915		320	16.56	197.7	1.07	6.46	120.1	29.61	12.92	Red Flakes, NO odor
0917	280	880	15.80	198.2	0.73	6.40	96.7	23.85	12.92	" "
0919	240	1360	15.53	198.0	0.64	6.39	86.0	20.39	12.92	" "
0921	250	1860	15.39	198.2	0.61	6.40	79.9	13.79	12.92	" "
0923	260	2380	15.30	196.8	0.53	6.42	74.1	14.03	12.92	" "
0925	240	2860	15.23	195.9	0.52	6.44	70.4	6.91	12.92	" "
0927	260	3380	15.16	195.1	0.48	6.45	64.5	4.80	12.92	" "
0929	250	3880	15.12	196.5	0.49	6.46	58.7	4.14	12.92	" "
0931	260	4400	15.08	195.4	0.45	6.48	55.1	2.46	12.92	" "
0933	250	4900	15.03	195.2	0.44	6.49	61.1	2.50	12.92	" "
0935	230	5360	15.05	194.9	0.47	6.50	49.8	2.23	12.92	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 3

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 12.92

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (Y

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
11-26-18 0935	230	15.05	194.9	0.47	6.50	49.8	2.23

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Cloudy, Windy 34°

Sample Characteristics: Red Flaks, No odor, Colorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Blank (Background sample) (App IV) - 3 bottle Field blank

0950 is start time (2 bottle sample) (App III)

0957 is end time

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 11-26-18 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 4
Name (Field Staff): A Patel D Dillingham
Date: 11-26-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Ashok Patel — Geo Tech — 11-26-18
Signed — Title — Date

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW 4 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.85 Date: 11-26-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 11-26-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1430 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.85 Total Volume Purged (mL): 3060

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.25 Water Level after Sampling (feet btoc): 11.85 (i.e., pump is off)

Casing Diameter (feet) 2" Sch 40 PVC Time Sampling Completed: 1512

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1432		300	11.85	513.7	1.40	7.36	-95.1	1.64	11.85	clear, no odor
1434	230	760	14.44	488.8	0.95	7.35	-99.8	0.81	11.85	" "
1436	220	1200	15.34	477.2	0.78	7.35	-103.7	1.96	11.85	" "
1438	230	1660	15.77	475.4	0.65	7.35	-101.9	1.02	11.85	" "
1440	220	2100	15.96	468.3	0.59	7.35	-102.0	1.72	11.85	" "
1442	230	2560	16.06	470.9	0.55	7.36	-102.5	1.16	11.85	" "
1444	250	3060	16.07	468.0	0.53	7.36	-101.8	1.01	11.85	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 4

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.85

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (✓)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
11-26-18 1444	250	16.57	468.0	0.53	7.36	-101.8	1.01

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Cloudy, Windy

Sample Characteristics: Clear, Odorless, Colorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Duplicate (3 bottle Duplicate) (App IV)

-1512 is time for 2 bottle sample (App III)

-1217 is end time for 2 bottle

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 11-26-18 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 5
Name (Field Staff): A Patel D Dillingham
Date: 11-26-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Ashish Patel (Signed) Lab Tech (Title) 11-26-18 (Date)

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW5 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.64 Date: 11-26-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 11-26-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1124 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.64 Total Volume Purged (mL): 3000

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.16 Water Level after Sampling (feet btoc): 11.64 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1153

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1126		300	11.52	887.8	1.35	6.63	-18.1	1.69	11.64	clear, NO odor
1128	240	780	13.57	850.4	0.93	6.68	-20.5	2.28	11.64	" "
1130	210	1200	14.29	840.0	0.76	6.70	-22.8	0.38	11.64	" "
1132	230	1660	14.58	837.8	0.67	6.71	-24.4	0.36	11.64	" "
1134	245	2150	14.72	834.5	0.59	6.72	-25.7	0.36	11.64	" "
1136	225	2500	14.72	836.6	0.54	6.73	-26.3	0.34	11.64	" "
1138	200	3000	14.90	836.4	0.51	6.74	-27.0	0.38	11.64	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 5

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.64

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (V)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
11-26-18 1138	200	14.90	836.4	0.51	6.74	-27.0	0.37

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Cloudy, windy 34°F

Sample Characteristics: Clear, odorless, colorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect 2 bottle Field blank (App III)

-1153 is start time on App III

-1159 is end time

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 11-26-18 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 6
Name (Field Staff): A Patel D Dillingham
Date: 11-26-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ___ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Rishi Patel (Signed) Lab Tech (Title) 11-26-18 (Date)

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW 6 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 12.81 Date: 11-26-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 11-26-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1015 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 12.81 Total Volume Purged (mL): 2840

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.75 Water Level after Sampling (feet btoc): 12.81 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1046

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1017		460	13.50	442.6	1.24	6.69	-53.0	3.68	12.81	CLEAR, SLIGHT ODOR
1019	250	960	14.49	422.6	1.07	6.74	-51.6	4.86	12.81	" "
1021	230	1420	14.87	400.1	1.09	6.74	-45.4	2.09	12.81	" "
1023	220	1860	14.98	385.3	1.06	6.73	-40.1	2.59	12.81	" "
1025	250	2360	15.03	379.8	0.98	6.72	-38.6	2.19	12.81	" "
1027	240	2840	15.04	375.3	1.07	6.72	-37.6	1.66	12.81	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 6

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 12.81

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other ✓

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
11-26-18 1027	240	15.04	375.3	1.07	6.72	-37.6	1.66

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Cloudy, windy 34°F

Sample Characteristics: Clear, Odorless, colorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Duplicate (Regular sample) (App III)
- 2 bottle Duplicate

- 1041 is Regular sample start collecting time (App III)
- 1052 is end time

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 11-26-18 By: Ashley Parker Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 8
Name (Field Staff): A Patel D Dillingham
Date: 11-26-18

Access:
Accessibility: Good ✓ Fair ___ Poor ___
Well clear of weeds and/or debris?: Yes ✓ No ___
Well identification clearly visible?: Yes ✓ No ___
Remarks:

Concrete Pad:
Condition of Concrete Pad: Good ✓ Inadequate ___
Depressions or standing water around well?: Yes ___ No ✓
Remarks:

Protective Outer Casing: Material = 4" x 4" Steel Hinged Casing with Hasp
Condition of Protective Casing: Good ✓ Damaged ___
Condition of Locking Cap: Good ✓ Damaged ___
Condition of Lock: Good ✓ Damaged ___
Condition of Weep Hole: Good ✓ Damaged ___
Remarks:

Well Riser: Material = 2" Diameter, Schedule 40 PVC, Flush Threaded
Condition of Riser: Good ✓ Damaged ___
Condition of Riser Cap: Good ✓ Damaged ___
Measurement Reference Point: Yes ✓ No ___
Remarks:

Dedicated Purging/Sampling Device: Type = ¼ " ID Semi-Rigid Polyethylene & 0.170" ID Flexible Silicone Tubing
Condition: Good ✓ Damaged ___ Missing ___
Remarks:

Monitoring Well Locked/Secured Post Sampling?: Yes ✓ No ___
Remarks:

Field Certification Ashish Patel (Signed) Lab Tech (Title) 11-26-18 (Date)

Field Sampling Log

Monitoring Well ID: MW 8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.89 Date: 11-26-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 11-26-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1251 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.89 Total Volume Purged (mL): 7460

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / N

Well Total Depth (feet btoc): 37.05 Water Level after Sampling (feet btoc): 10.89 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1338

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1253		340	11.24	731.9	1.18	7.07	-72.5	15.12	10.89	Yellow Flake
1255	220	780	13.57	683.6	0.68	7.09	-80.3	25.50	10.89	" "
1257	200	1180	14.27	674.6	0.62	7.12	-81.8	14.66	10.89	" "
1259	210	1600	14.49	666.9	0.62	7.13	-80.1	16.56	10.89	" "
1301	220	2040	14.72	669.5	0.58	7.15	-79.7	7.57	10.89	" "
1303	250	2540	14.79	667.5	0.56	7.15	-80.6	22.77	10.89	" "
1305	230	3000	14.82	667.7	0.53	7.16	-79.2	19.02	10.89	" "
1307	240	3480	14.95	666.1	0.49	7.16	-78.9	9.74	10.89	" "
1309	250	3980	14.96	666.8	0.43	7.17	-78.5	6.76	10.89	" "
1311	250	4480	15.03	665.7	0.47	7.17	-78.9	4.85	10.89	" "
1313	250	4980	14.95	665.2	0.45	7.17	-79.1	6.03	10.89	" "
1315	240	5460	14.99	664.4	0.43	7.18	-79.2	3.63	10.89	" "
1317	250	5960	15.02	663.7	0.41	7.18	-78.8	7.11	10.89	Clear, no odor
1319	250	6460	15.06	662.7	0.40	7.18	-78.4	3.74	10.89	" "
1321	260	6980	15.06	662.7	0.38	7.17	-77.7	3.69	10.89	" "
1323	240	7460	15.08	662.1	0.35	7.17	-77.6	2.88	10.89	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.89

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
11-26-18 1323	240	15.58	662.1	0.35	7.17	-77.6	2.88

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Cloudy, windy 34°F

Sample Characteristics: Yellow Fine, no odor, Colorless

Sample Collection Order: Per SAP

Comments and Observations:

-1338 is start time for 2 bottle (APP III)

-1343 is end time

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 11-26-18 By: Ashish Patel Title: Lab Tech

Field Instrumentation Calibration Log

Facility: SBMU SPS CCR Groundwater Sampling

Calibrated by: Ashish Patel

Field Instruments: In-Situ smarTROLL Field Meter

S/N #: 474247

HF scientific, inc. Micro TPI Field Portable Turbidimeter

S/N #: 20160766

	Date	Time	pH Standards		pH Measurements	Specific Conductance Standard (µS/cm)		Specific Conductance Measurement (µS/cm)	Oxidation Reduction Potential Standard (mV)			Oxidation Reduction Potential Measurement (mV)	Dissolved Oxygen (%)			Turbidity Standards (NTU)		Turbidity Measurements (NTU)
Beginning of Day Calibration	11-26-2018	0806	4.00	=	4.00	1413	=	1413.5	Temperature (°C)	=	22.4	229.3	Temperature (°C)	=	20.84	0.02	=	0.02
			7.00	=	7.00				Standard (mV)	=	229		Tap Water Source	=	Sinkesville City	10.0	=	10.0
			10.00	=	10.00								Barometric Pressure (mm/Hg)	=	1022.9	1000	=	1000.0
													Measurement	=	100.0			
End of Day Check	11-26-2018	1350	4.00	=	4.07	1413	=	1294.2	Temperature (°C)	=	19.62	231.0	Temperature (°C)	=	16.38	0.02	=	0.04
			7.00	=	7.06				Standard (mV)	=	229		Tap Water Source	=	Sinkesville City	10.0	=	10.05
			10.00	=	9.98								Barometric Pressure (mm/Hg)	=	1021.8	1000	=	989.8
													Measurement	=	101.6			

Notes: The Multi-Probe Field Meter measures Temperature, Specific Conductance, Dissolved Oxygen, pH, and Oxidation Reduction Potential.

The HF scientific, inc. Micro TPI Field Portable Turbidimeter measures Turbidity.

Dissolved oxygen is calibrated via % saturation method; however, field measurements are recorded as mg/L.

I certify that the aforementioned meters were calibrated within the manufacturers specifications.

Date: 11-26-18 By: Ashish Patel

Appendix 2

Laboratory Analytical Results

Laboratory Analytical Results – June 13, 2018

PDC Laboratories, Inc.
PROFESSIONAL • DEPENDABLE • COMMITTED

June 25, 2018

Mark E. McGill
Sikeston BMU, Sikeston Power Station
1551 W Wakefield
Sikeston, MO 63801

Dear Mark E. McGill:

Please find enclosed the analytical results for the sample(s) the laboratory received on **6/15/18 10:00 am** and logged in under work order **8062892**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Kurt Stepping
Senior Project Manager
(309) 692-9688 x1719
kstepping@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8062892-01
Name: MW-3
Matrix: Ground Water - Grab

Sampled: 06/13/18 08:34
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	1.3	mg/L		06/18/18 13:58	06/18/18 13:58	LAM	EPA 300.0
Fluoride	0.291	mg/L		06/18/18 13:58	06/18/18 13:58	LAM	EPA 300.0
Sulfate	17	mg/L		06/18/18 14:17	06/18/18 14:17	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	130	mg/L		06/20/18 12:00	06/20/18 13:34	SAH	SM 2540C
Total Metals - PIA							
Boron	23	ug/L		06/20/18 14:05	06/21/18 07:35	JMW	SW 6020
Calcium	20000	ug/L		06/20/18 14:05	06/21/18 11:07	JMW	SW 6020

Sample: 8062892-02
Name: MW-4
Matrix: Ground Water - Grab

Sampled: 06/13/18 12:48
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	14	mg/L		06/18/18 14:54	06/18/18 14:54	LAM	EPA 300.0
Fluoride	< 0.250	mg/L		06/18/18 14:35	06/18/18 14:35	LAM	EPA 300.0
Sulfate	86	mg/L		06/18/18 14:54	06/18/18 14:54	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	290	mg/L		06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	1200	ug/L		06/20/18 14:05	06/21/18 07:46	JMW	SW 6020
Calcium	80000	ug/L		06/20/18 14:05	06/21/18 11:18	JMW	SW 6020

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Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8062892-03
Name: MW-5
Matrix: Ground Water - Grab

Sampled: 06/13/18 10:05
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	11	mg/L		06/18/18 15:30	06/18/18 15:30	LAM	EPA 300.0
Fluoride	< 0.250	mg/L		06/18/18 15:12	06/18/18 15:12	LAM	EPA 300.0
Sulfate	240	mg/L		06/19/18 23:06	06/19/18 23:06	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	480	mg/L		06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	370	ug/L		06/20/18 14:05	06/21/18 07:49	JMW	SW 6020
Calcium	130000	ug/L		06/20/18 14:05	06/21/18 11:22	JMW	SW 6020

Sample: 8062892-04
Name: MW-6
Matrix: Ground Water - Grab

Sampled: 06/13/18 09:10
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	2.3	mg/L		06/18/18 15:49	06/18/18 15:49	LAM	EPA 300.0
Fluoride	< 0.250	mg/L		06/18/18 15:49	06/18/18 15:49	LAM	EPA 300.0
Sulfate	32	mg/L		06/18/18 16:44	06/18/18 16:44	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	160	mg/L	M	06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	43	ug/L		06/20/18 14:05	06/21/18 07:53	JMW	SW 6020
Calcium	41000	ug/L		06/20/18 14:05	06/21/18 11:25	JMW	SW 6020

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ANALYTICAL RESULTS

Sample: 8062892-05
Name: MW-8
Matrix: Ground Water - Grab

Sampled: 06/13/18 11:13
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	65	mg/L		06/18/18 17:39	06/18/18 17:39	LAM	EPA 300.0
Fluoride	< 0.250	mg/L		06/18/18 17:21	06/18/18 17:21	LAM	EPA 300.0
Sulfate	150	mg/L		06/18/18 17:39	06/18/18 17:39	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	430	mg/L		06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	520	ug/L		06/20/18 14:05	06/21/18 07:57	JMW	SW 6020
Calcium	120000	ug/L		06/20/18 14:05	06/21/18 11:29	JMW	SW 6020

Sample: 8062892-06
Name: FIELD BLANK
Matrix: Ground Water - Field Blank

Sampled: 06/13/18 00:00
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	< 1.0	mg/L		06/18/18 09:04	06/18/18 09:04	LAM	EPA 300.0
Fluoride	< 0.250	mg/L		06/18/18 09:04	06/18/18 09:04	LAM	EPA 300.0
Sulfate	< 1.0	mg/L		06/18/18 09:04	06/18/18 09:04	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	< 17	mg/L		06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	< 10	ug/L		06/20/18 14:05	06/21/18 08:01	JMW	SW 6020
Calcium	310	ug/L		06/20/18 14:05	06/21/18 11:33	JMW	SW 6020

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8062892-07
Name: FIELD DUPLICATE
Matrix: Ground Water - Field Duplicate

Sampled: 06/13/18 00:00
Received: 06/15/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	2.5	mg/L		06/18/18 17:58	06/18/18 17:58	LAM	EPA 300.0
Fluoride	0.253	mg/L		06/18/18 17:58	06/18/18 17:58	LAM	EPA 300.0
Sulfate	33	mg/L		06/18/18 18:16	06/18/18 18:16	LAM	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	180	mg/L	M	06/19/18 13:22	06/19/18 14:07	SAH	SM 2540C
Total Metals - PIA							
Boron	42	ug/L		06/20/18 14:05	06/21/18 08:14	JMW	SW 6020
Calcium	44000	ug/L		06/20/18 14:05	06/21/18 11:44	JMW	SW 6020

Laboratory Analytical Results – November 26, 2018

PDC Laboratories, Inc.

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December 07, 2018

Luke St Mary
Sikeston BMU, Sikeston Power Station
1551 W Wakefield
Sikeston, MO 63801

Dear Luke St Mary:

Please find enclosed the analytical results for the sample(s) the laboratory received on **11/28/18 9:45 am** and logged in under work order **8114353.** All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Kurt Stepping
Senior Project Manager
(309) 692-9688 x1719
kstepping@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8114353-01
Name: MW-3
Matrix: Ground Water - Grab

Sampled: 11/26/18 09:50
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	1.5	mg/L		11/29/18 18:19	11/29/18 18:19	arl	EPA 300.0
Fluoride	0.301	mg/L		11/29/18 18:19	11/29/18 18:19	arl	EPA 300.0
Sulfate	18	mg/L		11/29/18 18:38	11/29/18 18:38	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	100	mg/L		12/03/18 14:15	12/03/18 15:21	BAH	SM 2540C
Total Metals - PIA							
Boron	23	ug/L		12/04/18 08:41	12/05/18 12:26	JMW	SW 6020
Calcium	17000	ug/L		12/04/18 08:41	12/05/18 12:26	JMW	SW 6020

Sample: 8114353-02
Name: MW-4
Matrix: Ground Water - Grab

Sampled: 11/26/18 15:12
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	8.8	mg/L		11/29/18 19:33	11/29/18 19:33	arl	EPA 300.0
Fluoride	< 0.250	mg/L		11/29/18 19:33	11/29/18 19:33	arl	EPA 300.0
Sulfate	54	mg/L		11/29/18 20:10	11/29/18 20:10	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	260	mg/L		11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	1100	ug/L		12/04/18 08:41	12/05/18 12:30	JMW	SW 6020
Calcium	64000	ug/L		12/04/18 08:41	12/05/18 12:30	JMW	SW 6020

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ANALYTICAL RESULTS

Sample: 8114353-03
Name: MW-5
Matrix: Ground Water - Grab

Sampled: 11/26/18 11:53
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	17	mg/L		11/29/18 20:46	11/29/18 20:46	arl	EPA 300.0
Fluoride	< 0.250	mg/L		11/29/18 20:28	11/29/18 20:28	arl	EPA 300.0
Sulfate	230	mg/L		11/29/18 21:05	11/29/18 21:05	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	520	mg/L		11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	420	ug/L		12/04/18 08:41	12/05/18 12:34	JMW	SW 6020
Calcium	120000	ug/L		12/04/18 08:41	12/05/18 12:34	JMW	SW 6020

Sample: 8114353-04
Name: MW-6
Matrix: Ground Water - Grab

Sampled: 11/26/18 10:47
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	1.5	mg/L		11/29/18 21:23	11/29/18 21:23	arl	EPA 300.0
Fluoride	0.313	mg/L		11/29/18 21:23	11/29/18 21:23	arl	EPA 300.0
Sulfate	29	mg/L	Q4	11/29/18 22:18	11/29/18 22:18	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	180	mg/L		11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	46	ug/L		12/04/18 08:44	12/06/18 10:35	JMW	SW 6020
Calcium	36000	ug/L	Q4	12/04/18 08:44	12/06/18 17:13	TLH	SW 6020

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8114353-05
Name: MW-8
Matrix: Ground Water - Grab

Sampled: 11/26/18 13:38
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	45	mg/L		11/29/18 23:32	11/29/18 23:32	arl	EPA 300.0
Fluoride	< 0.250	mg/L		11/29/18 23:14	11/29/18 23:14	arl	EPA 300.0
Sulfate	100	mg/L		11/29/18 23:32	11/29/18 23:32	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	320	mg/L		11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	500	ug/L		12/04/18 08:44	12/06/18 10:46	JMW	SW 6020
Calcium	94000	ug/L		12/04/18 08:44	12/06/18 17:21	TLH	SW 6020

Sample: 8114353-06
Name: FIELD DUPLICATE
Matrix: Ground Water - Field Duplicate

Sampled: 11/26/18 00:00
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	1.4	mg/L		11/29/18 23:50	11/29/18 23:50	arl	EPA 300.0
Fluoride	0.284	mg/L		11/29/18 23:50	11/29/18 23:50	arl	EPA 300.0
Sulfate	26	mg/L	Q4	11/30/18 00:46	11/30/18 00:46	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	210	mg/L	M	11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	46	ug/L		12/04/18 08:44	12/06/18 10:50	JMW	SW 6020
Calcium	43000	ug/L		12/04/18 08:44	12/06/18 17:23	TLH	SW 6020

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 8114353-07
Name: FIELD BLANK
Matrix: Ground Water - Grab

Sampled: 11/26/18 00:00
Received: 11/28/18 09:45

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	< 1.0	mg/L		11/30/18 01:04	11/30/18 01:04	arl	EPA 300.0
Fluoride	< 0.250	mg/L		11/30/18 01:04	11/30/18 01:04	arl	EPA 300.0
Sulfate	< 1.0	mg/L		11/30/18 01:04	11/30/18 01:04	arl	EPA 300.0
General Chemistry - PIA							
Solids - total dissolved solids (TDS)	< 17	mg/L		11/28/18 14:12	11/28/18 14:57	BAH	SM 2540C
Total Metals - PIA							
Boron	< 10	ug/L		12/04/18 08:44	12/06/18 10:54	JMW	SW 6020
Calcium	< 100	ug/L		12/04/18 08:44	12/06/18 17:25	TLH	SW 6020

Appendix 3

Laboratory Quality Assurance/Quality Control Data

Laboratory Quality Assurance/Quality Control Data – June 13, 2018

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B812192 - IC No Prep - EPA 300.0									
Calibration Blank (B812192-CCB1)				Prepared & Analyzed: 06/18/18					
Fluoride	0.00	mg/L							
Chloride	0.00	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B812192-CCV1)				Prepared & Analyzed: 06/18/18					
Chloride	4.94	mg/L		5.000		99	90-110		
Sulfate	5.06	mg/L		5.000		101	90-110		
Fluoride	4.88	mg/L		5.000		98	90-110		
Matrix Spike (B812192-MS1)	**Sample: 8062892-06**			Prepared & Analyzed: 06/18/18					
Chloride	1.7	mg/L		1.500	ND	112	80-120		
Fluoride	1.54	mg/L		1.500	ND	103	80-120		
Sulfate	1.65	mg/L		1.500	ND	110	80-120		
Matrix Spike (B812192-MS2)	**Sample: 8062939-09**			Prepared & Analyzed: 06/18/18					
Chloride	1.5	mg/L		1.500	ND	101	80-120		
Sulfate	1.56	mg/L		1.500	ND	104	80-120		
Matrix Spike (B812192-MS3)	**Sample: 8062939-10**			Prepared & Analyzed: 06/18/18					
Chloride	1.5	mg/L		1.500	ND	98	80-120		
Sulfate	1.50	mg/L		1.500	ND	100	80-120		
Matrix Spike Dup (B812192-MSD1)	**Sample: 8062892-06**			Prepared & Analyzed: 06/18/18					
Fluoride	1.60	mg/L		1.500	ND	107	80-120	4	20
Sulfate	1.66	mg/L		1.500	ND	111	80-120	0.5	20
Chloride	1.7	mg/L		1.500	ND	112	80-120	0.3	20
Matrix Spike Dup (B812192-MSD2)	**Sample: 8062939-09**			Prepared & Analyzed: 06/18/18					
Chloride	1.5	mg/L		1.500	ND	100	80-120	0.7	20
Sulfate	1.55	mg/L		1.500	ND	104	80-120	0.09	20
Matrix Spike Dup (B812192-MSD3)	**Sample: 8062939-10**			Prepared & Analyzed: 06/18/18					
Chloride	1.5	mg/L		1.500	ND	99	80-120	1	20
Sulfate	1.50	mg/L		1.500	ND	100	80-120	0.1	20
Batch B812221 - No Prep - SM 2540C									
Blank (B812221-BLK1)				Prepared & Analyzed: 06/19/18					
Solids - total dissolved solids (TDS)	< 17	mg/L							
Duplicate (B812221-DUP1)	**Sample: 8062892-04**			Prepared & Analyzed: 06/19/18					
Solids - total dissolved solids (TDS)	165	mg/L	M		155			6	5
Duplicate (B812221-DUP2)	**Sample: 8062892-07**			Prepared & Analyzed: 06/19/18					
Solids - total dissolved solids (TDS)	193	mg/L	M		183			5	5
Batch B812274 - IC No Prep - EPA 300.0									
Calibration Blank (B812274-CCB1)				Prepared & Analyzed: 06/19/18					
Sulfate	0.00	mg/L							
Calibration Check (B812274-CCV1)				Prepared & Analyzed: 06/19/18					
Sulfate	4.97	mg/L		5.000		99	90-110		
Matrix Spike (B812274-MS1)	**Sample: 8063154-01**			Prepared & Analyzed: 06/19/18					
Sulfate	1.00E9	mg/L	Q4	1.500	15.1	NR	80-120		
Matrix Spike (B812274-MS2)	**Sample: 8063154-02**			Prepared & Analyzed: 06/19/18					
Sulfate	5.59	mg/L		1.500	4.11	99	80-120		

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B812274 - IC No Prep - EPA 300.0									
Matrix Spike (B812274-MS3)	**Sample: 8063154-03**			Prepared & Analyzed: 06/19/18					
Sulfate	1.00E9	mg/L	Q4	1.500	13.8	NR	80-120		
Matrix Spike Dup (B812274-MSD1)	**Sample: 8063154-01**			Prepared & Analyzed: 06/19/18					
Sulfate	1.00E9	mg/L	Q4	1.500	15.1	NR	80-120	0	20
Matrix Spike Dup (B812274-MSD2)	**Sample: 8063154-02**			Prepared & Analyzed: 06/19/18					
Sulfate	5.56	mg/L		1.500	4.11	97	80-120	0.4	20
Matrix Spike Dup (B812274-MSD3)	**Sample: 8063154-03**			Prepared & Analyzed: 06/19/18					
Sulfate	1.00E9	mg/L	Q4	1.500	13.8	NR	80-120	0	20
Batch B812324 - No Prep - SM 2540C									
Blank (B812324-BLK1)				Prepared & Analyzed: 06/20/18					
Solids - total dissolved solids (TDS)	< 17	mg/L							
Duplicate (B812324-DUP1)	**Sample: 8062892-01**			Prepared & Analyzed: 06/20/18					
Solids - total dissolved solids (TDS)	127	mg/L			130			3	5
Duplicate (B812324-DUP2)	**Sample: 8063154-01**			Prepared & Analyzed: 06/20/18					
Solids - total dissolved solids (TDS)	445	mg/L	M		410			8	5
Batch B812336 - SW 3015 - SW 6020									
Blank (B812336-BLK1)				Prepared: 06/20/18 Analyzed: 06/21/18					
Boron	< 10	ug/L							
Calcium	< 100	ug/L							
LCS (B812336-BS1)				Prepared: 06/20/18 Analyzed: 06/21/18					
Boron	553	ug/L		555.6		100	80-120		
Calcium	6230	ug/L		5556		112	80-120		
Matrix Spike (B812336-MS1)	**Sample: 8062892-01**			Prepared: 06/20/18 Analyzed: 06/21/18					
Boron	548	ug/L		555.6	23.4	94	75-125		
Calcium	24400	ug/L		5556	19900	83	75-125		
Matrix Spike Dup (B812336-MSD1)	**Sample: 8062892-01**			Prepared: 06/20/18 Analyzed: 06/21/18					
Boron	568	ug/L		555.6	23.4	98	75-125	4	20
Calcium	24800	ug/L		5556	19900	89	75-125	1	20

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

NOTES

Specific method revisions used for analysis are available upon request.

Certifications

CHI - McHenry, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

M Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.

Certified by: Kurt Stepping, Senior Project Manager

PDC Laboratories, Inc.
P.O. Box 9071 • Peoria, IL 61612-9071
(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689

DATA PACKAGE

CLIENT; Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 8062892

DATE ISSUED: June 25, 2018

CASE NARRATIVE –

PDC Work Order 8062892

PDC Laboratories, Inc. received 7 water samples on June 15, 2018 in good condition at our Peoria, IL facility. This sample set was designated as work order 8062892.

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-3	8062892-01	6/13/18	6/15/18
MW-4	8062892-02	6/13/18	6/15/18
MW-5	8062892-03	6/13/18	6/15/18
MW-6	8062892-04	6/13/18	6/15/18
MW-8	8062892-05	6/13/18	6/15/18
Field Blank	8062892-06	6/13/18	6/15/18
Duplicate	8062892-07	6/13/18	6/15/18

QC Summary:

All items met acceptance criteria with the following noted exceptions:

Batch QC sample for TDS flagged M. RPD outside acceptance criteria.

Batch QC sample for SO4 flagged Q4. Sample value is greater than 4 times the spiked value.

Certification

Signature:  Name: Kurt Stepping

Date: June 25, 2018 Title: Senior Project Manager

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

State where samples collected MD

CHAIN OF CUSTODY RECORD

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

1 CLIENT: Sikestom BMV
ADDRESS: 1551 West Wakefield
CITY, STATE, ZIP: Sikeston MO 63801
CONTACT PERSON: Kevin Evans & Heath McGill
PROJECT NUMBER:
P.O. NUMBER:
MEANS SHIPPED:
PHONE NUMBER:
FAX NUMBER:
DATE SHIPPED:
SAMPLER (PLEASE PRINT): Daniel Dillingham
SAMPLER SIGNATURE:

MATRIX TYPES:
WW-WASTEWATER
DW-DRINKING WATER
GW-GROUND WATER
WWSL-SLUDGE
NAS-SOLID
LCHT-LEACHATE
OTHER:

3 ANALYSIS REQUESTED: Cl, SO4, F, TDS, As, Ba, Ca, B

4 (FOR LAB USE ONLY)
LOGIN # 8062892-7
LOGGED BY:
LAB PROJ. #
TEMPLATE:
PROJ. MGR.:

2

SAMPLE DESCRIPTION / IDENTIFICATION	DATE	TIME	# OF CONTAINERS		MATRIX	# OF CONTAINERS	Cl	CA, B						REMARKS
MW 3	6-13-18	0834	X		GW	2	X	X						
MW 4	6-13-18	1248	X		GW	2	X	X						
MW 5	6-13-18	1005	X		GW	2	X	X						
MW 6	6-13-18	0910	X		GW	2	X	X						
MW 8	6-13-18	1113	X		GW	2	X	X						
Field Blank	6-13-18		X		DI	2	X	X						
Duplicate	6-13-18		X		GW	2	X	X						

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE
FAX # PHONE # EMAIL ADDRESS
DATE RESULTS NEEDED
E-MAIL

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.*

7 RELINQUISHED BY: (SIGNATURE) Daniel Dillingham DATE 6-13-18 TIME 0830 RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME RECEIVED AT LAB BY: (SIGNATURE) DATE 6/13/18 TIME 1000

8 COMMENTS: (FOR LAB USE ONLY)
4

SAMPLE TEMPERATURE UPON RECEIPT	°C
CHILL PROCESS STARTED PRIOR TO RECEIPT	Y OR N
SAMPLE(S) RECEIVED ON ICE	Y OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION	Y OR N
BOTTLES FILLED WITH ADEQUATE VOLUME	Y OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS)	Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE	

PAGE ____ OF ____

Copies: white should accompany samples to PDC Labs. **Yellow copy to be retained by the client.**

Laboratory Quality Assurance/Quality Control Data – November 26, 2018

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B824564 - No Prep - SM 2540C									
Blank (B824564-BLK1)				Prepared & Analyzed: 11/28/18					
Solids - total dissolved solids (TDS)	< 17	mg/L							
Duplicate (B824564-DUP1)	**Sample: 8114353-06**			Prepared & Analyzed: 11/28/18					
Solids - total dissolved solids (TDS)	235	mg/L	M		210			11	5
Batch B824729 - No Prep - EPA 300.0									
Calibration Blank (B824729-CCB1)				Prepared & Analyzed: 11/29/18					
Chloride	0.00	mg/L							
Fluoride	0.00	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B824729-CCV1)				Prepared & Analyzed: 11/29/18					
Sulfate	5.07	mg/L		5.000		101	90-110		
Chloride	4.91	mg/L		5.000		98	90-110		
Fluoride	5.06	mg/L		5.000		101	90-110		
Matrix Spike (B824729-MS1)	**Sample: 8114353-04**			Prepared & Analyzed: 11/29/18					
Fluoride	1.68	mg/L		1.500	0.313	91	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	28.6	NR	80-120		
Chloride	3.0	mg/L		1.500	1.5	100	80-120		
Matrix Spike (B824729-MS2)	**Sample: 8114353-06**			Prepared & Analyzed: 11/30/18					
Chloride	2.9	mg/L		1.500	1.4	99	80-120		
Fluoride	1.70	mg/L		1.500	0.284	94	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	26.5	NR	80-120		
Matrix Spike (B824729-MS3)	**Sample: 8114353-07**			Prepared & Analyzed: 11/30/18					
Fluoride	1.59	mg/L		1.500	ND	106	80-120		
Sulfate	1.60	mg/L		1.500	ND	107	80-120		
Chloride	1.6	mg/L		1.500	ND	108	80-120		
Matrix Spike Dup (B824729-MSD1)	**Sample: 8114353-04**			Prepared & Analyzed: 11/29/18					
Sulfate	1.00E9	mg/L	Q4	1.500	28.6	NR	80-120	0	20
Chloride	3.0	mg/L		1.500	1.5	99	80-120	0.6	20
Fluoride	1.71	mg/L		1.500	0.313	93	80-120	1	20
Matrix Spike Dup (B824729-MSD2)	**Sample: 8114353-06**			Prepared & Analyzed: 11/30/18					
Chloride	2.9	mg/L		1.500	1.4	100	80-120	0.6	20
Fluoride	1.68	mg/L		1.500	0.284	93	80-120	1	20
Sulfate	1.00E9	mg/L	Q4	1.500	26.5	NR	80-120	0	20
Matrix Spike Dup (B824729-MSD3)	**Sample: 8114353-07**			Prepared & Analyzed: 11/30/18					
Sulfate	1.59	mg/L		1.500	ND	106	80-120	1	20
Chloride	1.6	mg/L		1.500	ND	108	80-120	0.2	20
Fluoride	1.55	mg/L		1.500	ND	103	80-120	3	20
Batch B824853 - No Prep - SM 2540C									
Blank (B824853-BLK1)				Prepared & Analyzed: 12/03/18					
Solids - total dissolved solids (TDS)	< 17	mg/L							
Duplicate (B824853-DUP1)	**Sample: 8114886-11**			Prepared & Analyzed: 12/03/18					
Solids - total dissolved solids (TDS)	205	mg/L	M		190			8	5
Duplicate (B824853-DUP2)	**Sample: 8114886-14**			Prepared & Analyzed: 12/03/18					
Solids - total dissolved solids (TDS)	565	mg/L	M		520			8	5

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Peoria, IL 61615
(800) 752-6651

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B824903 - SW 3015 - SW 6020									
Blank (B824903-BLK1)				Prepared: 12/04/18 Analyzed: 12/05/18					
Boron	< 10	ug/L							
Calcium	< 100	ug/L							
LCS (B824903-BS1)				Prepared: 12/04/18 Analyzed: 12/05/18					
Boron	524	ug/L		555.6		94	80-120		
Calcium	5770	ug/L		5556		104	80-120		
Matrix Spike (B824903-MS1)	**Sample: 8113931-21**			Prepared: 12/04/18 Analyzed: 12/05/18					
Boron	517	ug/L		555.6	13.8	91	75-125		
Calcium	68900	ug/L	Q4	5556	65300	64	75-125		
Matrix Spike Dup (B824903-MSD1)	**Sample: 8113931-21**			Prepared: 12/04/18 Analyzed: 12/05/18					
Boron	534	ug/L		555.6	13.8	94	75-125	3	20
Calcium	69800	ug/L	Q4	5556	65300	80	75-125	1	20
Batch B824905 - SW 3015 - SW 6020									
Blank (B824905-BLK1)				Prepared: 12/04/18 Analyzed: 12/06/18					
Boron	< 10	ug/L							
Calcium	< 100	ug/L							
LCS (B824905-BS1)				Prepared: 12/04/18 Analyzed: 12/06/18					
Boron	536	ug/L		555.6		96	80-120		
Calcium	4460	ug/L		5556		80	80-120		
Matrix Spike (B824905-MS1)	**Sample: 8114353-04**			Prepared: 12/04/18 Analyzed: 12/06/18					
Boron	578	ug/L		555.6	46.3	96	75-125		
Calcium	45000	ug/L	Q4	5556	36400	156	75-125		
Matrix Spike Dup (B824905-MSD1)	**Sample: 8114353-04**			Prepared: 12/04/18 Analyzed: 12/06/18					
Boron	583	ug/L		555.6	46.3	97	75-125	0.9	20
Calcium	36400	ug/L	Q4	5556	36400	0.9	75-125	21	20

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

NOTES

Specific method revisions used for analysis are available upon request.

Certifications

CHI - McHenry, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPIL - Springfield, IL
NELAP/NELAC accredidation through the Illinois EPA, PAS IL 100323

SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Accreditation of Laboratories for Wastewater, Hazardous, and Solid Waste Analysis through IL EPA No. 200080
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

M Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.

Certified by: Kurt Stepping, Senior Project Manager

PDC Laboratories, Inc.
P.O. Box 9071 • Peoria, IL 61612-9071
(309) 692-9688 • (800) 752-8651 • FAX (309) 692-9689

DATA PACKAGE

CLIENT; Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 8114353

DATE ISSUED: December 7, 2018

CASE NARRATIVE –

PDC Work Order 8114353

PDC Laboratories, Inc. received 7 water samples on November 28, 2018 in good condition at our Peoria, IL facility. This sample set was designated as work order 8114353.

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-3	8114353-01	11/26/18	11/28/18
MW-4	8114353-02	11/26/18	11/28/18
MW-5	8114353-03	11/26/18	11/28/18
MW-6	8114353-04	11/26/18	11/28/18
MW-8	8114353-05	11/26/18	11/28/18
Field Duplicate	8114353-06	11/26/18	11/28/18
Field Blank	8114353-07	11/26/18	11/28/18

QC Summary:

All items met acceptance criteria with the following noted exceptions:

Batch QC sample for TDS flagged M. RPD outside acceptance criteria (>5%).

Batch QC samples for SO4 and Ca flagged Q4. Sample value is greater than 4 times the spiked value.

Certification

Signature:  Name: Kurt Stepping

Date: December 7, 2018 Title: Senior Project Manager

PDC Laboratories, Inc.
2231 W. Altorfer Dr
Peoria, IL 61615

CHAIN OF CUSTODY RECORD

State where samples were collected MO

Phone: (800) 752-6651
Fax: (309) 692-9689
www.pdclab.com

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

1	P.O. NUMBER	PROJECT NAME	DATE SHIPPED	3 ANALYSIS REQUESTED	4 WORK ORDER (FOR LAB USE ONLY)
		CCR APP III ONLY			LOGIN #: 8114537
	PHONE	EMAIL	MEANS SHIPPED		LOGGED BY:
	(573) 475-3131	MARK@SBMU.NET			PROJECT:
	SAMPLER'S (PLEASE PRINT)		MATRIX TYPES:		PROJ MGR: KURT
	SAMPLER'S SIGNATURE		WW - WASTE WATER DW - DRINKING WATER GW - GROUND WATER WWSL - SLUDGE NAS - SOLID LCHT - LEACHATE OTHER:		

2 SAMPLE DESCRIPTION AS YOU WANT TO REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	CL, F, SO4	B, CA	TDS	REMARKS
MW-3	11-26-18	0950	X		GW	2	X	X	X	
MW-4	11-26-18	1512	X		GW	2	X	X	X	
MW-5	11-26-18	1153	X		GW	2	X	X	X	
MW-6	11-26-18	1047	X		GW	2	X	X	X	
MW-8	11-26-18	1338	X		GW	2	X	X	X	
FIELD DUPLICATE	11-26-18		X		GW	2	X	X	X	
FLIED BLANK	11-26-18		X		GW	2	X	X	X	

5 TURNAROUND TIME REQUESTED (RUSH TAT IS SUBJECT TO APPROVAL AND SURCHARGE) ☑ NORMAL ☐ RUSH

DATE RESULTS NEEDED

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area, you request that we notify you before proceeding with analysis if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area, you allow the lab to proceed with analytical testing regardless of the sample temperature.*

7	DATE	TIME
RELINQUISHED BY (SIGNATURE)		1005
RELINQUISHED BY (SIGNATURE)	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME

RECEIVED BY (SIGNATURE)	DATE	TIME
RECEIVED BY (SIGNATURE)	DATE	TIME
RECEIVED BY (SIGNATURE)	11/28/18	09:45

8 COMMENTS (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 1 °C

CHILL PROCESS STARTED PRIOR TO RECEIPT	Y OR N
SAMPLE(S) RECEIVED ON ICE	Y OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION	Y OR N
BOTTLES FILLED WITH ADEQUATE VOLUME	Y OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS)	Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE	

Appendix 4

Groundwater Quality Data Base

Sikeston Board of Municipal Utilities
Sikeston Power Station
Bottom Ash Pond Scott County, Missouri

Groundwater Quality Data Base

			Field Parameters					Appendix III Monitoring Constituents (Detection)							Appendix IV Monitoring Constituents (Assessment)												
Well ID	Date	Monitoring Purpose	Spec. Cond. µmhos/cm	Temp. °C	ORP mV	D.O. mg/L	Turbidity NTU	pH S.U.	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	TDS mg/L	Boron ug/L	Calcium mg/L	Antimony ug/L	Arsenic ug/L	Barium ug/L	Beryllium ug/L	Cadmium ug/L	Chromium III ug/L	Cobalt ug/L	Lead ug/L	Lithium ug/L	Mercury ug/L	Molybdenum ug/L	Selenium ug/L	Thallium ug/L	Radium 226 and 228 (Combined) pCi/L
MW-3 (UG)	11/30/2016	Background	254.0	15.75	-27.1	0.41	37.28	7.08	2.3	0.438	26	160	18	24	<3.0	1.5	96	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.668
	1/24/2017	Background	226.4	16.52	-8.4	0.39	4.46	6.88	2.0	0.261	30	130	12	21	<3.0	1.2	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.677(ND)
	2/22/2017	Background	226.6	16.47	9.7	0.36	3.56	6.93	1.9	0.290	26	120	33	22	<3.0	1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.460(ND)
	3/20/2017	Background	212.1	17.07	33.7	0.43	6.61	6.68	1.8	0.286	21	170	22	19	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.277(ND)
	4/27/2017	Background	223.2	15.35	9.2	0.57	2.69	6.68	2.0	0.257	28 "Q4"	140	54	20	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	9.9	<1.0	<1.0	-0.030(ND)
	5/17/2017	Background	224.9	17.68	26.8	0.45	12.59	6.59	1.5	<0.250	21	130	19	17	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	0.40	<1.0	<1.0	<1.0	0.844(ND)
	6/8/2017	Background	217.9	16.73	18.2	0.49	2.61	6.66	1.7	0.276	22	160	20	19	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	-0.469(ND)
	7/13/2017	Background	243.8	19.02	5.5	0.39	4.79	6.71	2.2	0.256	19	160	18	20	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.715(ND)
	10/31/2017	Detection	246.2	16.74	12.4	0.65	7.47	6.64	2.0	0.331	20	140	27	19	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	194.2	17.19	42.3	0.42	7.57	6.59	1.3	0.291	17	130	23	20	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	11/26/2018	Detection	194.9	15.05	49.8	0.47	2.23	6.50	1.5	0.301	18	100	23	17	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-4 (DG)	11/30/2016	Background	575.6	17.51	-108.3	0.48	0.61	7.46	18	0.259	140	390	1400	89	<3.0	<1.0	41	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.572(ND)
	1/24/2017	Background	543.7	17.00	-105.2	0.50	0.48	7.45	15	<0.250	120	290	880	79	<3.0	<1.0	46	<2.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.7031(ND)
	2/22/2017	Background	554.0	17.95	-115.3	0.51	1.19	7.49	13	<0.250	97	320	1500	78	<3.0	<1.0	51	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.550(ND)
	3/20/2017	Background	562.8	18.58	-108.8	0.69	1.70	7.37	12	<0.250	94	350	1400	72	<3.0	<1.0	53	<1.0	<1.0	<4.0	<2.0	<1.0	<10	1.3	<1.0	<1.0	<1.0	1.036
	4/27/2017	Background	536.9	17.25	-129.6	0.91	2.38	7.38	14	<0.250	99	300	1300	74	<3.0	<1.0	50	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.210(ND)
	5/17/2017	Background	554.9	17.90	-115.5	0.63	3.02	7.38	14	<0.250	96	320	1200	71	<3.0	<1.0	66	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.774(ND)
	6/8/2017	Background	509.7	18.24	-122.9	0.86	0.84	7.38	12	<0.250	86	340	1100	61	<3.0	<1.0	45	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.464(ND)
	7/13/2017	Background	575.5	19.46	-115.2	0.52	1.43	7.37	13	<0.250	88	300	1200	79	<3.0	<1.0	52	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.086(ND)
	10/31/2017	Detection	525.8	18.35	-118.1	0.63	1.07	7.31	17	<0.250	83	290	1400	67	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	511.5	18.92	-120.7	0.44	18.50	7.32	14	<0.250	86	290	1200	80	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	11/26/2018	Detection	468.0	16.07	-101.8	0.53	1.01	7.36	8.8	<0.250	54	260	1100	64	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-5 (DG)	11/30/2016	Background	808.3	16.20	-48.7	0.50	1.24	6.97	16	0.255	230	560	470	96	<3.0	<1.0	84	<1.0	<1.0	<4.0	4.3	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.844
	1/24/2017	Background	745.3	16.24	-37.6	0.58	0.72	6.90	15	<0.250	270	470	480	120	<3.0	<1.0	91	<1.0	<1.0	<4.0	5.2	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.827(ND)
	2/22/2017	Background	717.8	17.75	-50.5	0.36	3.43	6.97	11	<0.250	170	420	470	100	<3.0	<1.0	83	<1.0	<1.0	<4.0	3.6	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.130(ND)
	3/20/2017	Background	737.9	17.78	-36.5	0.72	2.16	6.85	11	<0.250	170	480	320	99	<3.0	<1.0	76	<1.0	<1.0	<4.0	4.4	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.538(ND)
	4/27/2017	Background	777.3	16.07	-58.8	0.69	5.20	6.80	12	<0.250	460	480	490	120	<3.0	<1.0	87	<1.0	<1.0	<4.0	4.8	<1.0	<10	<0.20	3.0	<1.0	<1.0	1.676
	5/17/2017	Background	760.1	17.81	-56.0	0.46	5.35	6.81	11	<0.250	200	440	5700	240	<3.0	1.8	180	<1.0	<1.0	16	5.3	6.3	<10	0.24	<1.0	<1.0	<1.0	1.739
	6/8/2017	Background	678.3	17.72	-58.6	0.69	1.89	6.82	11	<0.250	180	480	360	97	<3.0	<1.0	77	<1.0	<1.0	<4.0	3.9	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.869(ND)
	7/13/2017	Background	799.0	19.19	-82.0	1.08	17.49	6.98	10	<0.250	190	430	320	110	<3.0	<1.0	81	<1.0	<1.0	<4.0	3.8	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.767(ND)
	10/31/2017	Detection	591.8	17.45	-77.6	0.85	3.17	6.89	18	<0.250	88	310	280	72	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	756.4	18.28	-55.6	0.84	1.91	6.77	11	<0.250	240	480	370	130	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	11/26/2018	Detection	836.4	14.90	-27.0	0.51	0.38	6.74	17	<0.250	230	520	420	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)

Prepared by: KAE
Checked by: MCC

Sikeston Board of Municipal Utilities
Sikeston Power Station
Bottom Ash Pond Scott County, Missouri

Groundwater Quality Data Base

			Field Parameters					Appendix III Monitoring Constituents (Detection)							Appendix IV Monitoring Constituents (Assessment)												
Well ID	Date	Monitoring Purpose	Spec. Cond. µmhos/cm	Temp. °C	ORP mV	D.O. mg/L	Turbidity NTU	pH S.U.	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	TDS mg/L	Boron ug/L	Calcium mg/L	Antimony ug/L	Arsenic ug/L	Barium ug/L	Beryllium ug/L	Cadmium ug/L	Chromium III ug/L	Cobalt ug/L	Lead ug/L	Lithium ug/L	Mercury ug/L	Molybdenum ug/L	Selenium ug/L	Thallium ug/L	Radium 226 and 228 (Combined) pCi/L
MW-6 (UG)	11/30/2016	Background	369.0	16.39	-49.4	0.85	0.84	6.92	2.8	0.331	36	200	36	45	<3.0	4.3	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.532
	1/24/2017	Background	358.9	16.29	-44.8	0.66	0.26	6.87	2.4	<0.250	43	200	27	41	<3.0	5.7	220	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.948(ND)
	2/22/2017	Background	352.5	17.20	-42.2	0.81	15.27	6.89	2.1	0.269	32	160	59	40	<3.0	6.4	210	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.685(ND)
	3/20/2017	Background	360.8	16.90	24.9	0.36	9.70	6.73	2.1	<0.250	31	240	37	39	<3.0	5	160	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.577(ND)
	4/27/2017	Background	331.5	15.71	-50.9	0.39	8.35	6.72	2.3	<0.250	34	170	36	38	<3.0	3.2	180	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.243(ND)
	5/17/2017	Background	323.2	17.65	-71.5	0.45	7.13	6.76	1.8	<0.250	30	170	35	30	<3.0	4.9	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.173(ND)
	6/8/2017	Background	326.7	17.50	-53.0	0.33	3.86	6.73	1.7	<0.250	29	180	38	36	<3.0	4.6	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.893(ND)
	7/13/2017	Background	396.8	19.68	-84.0	0.72	2.17	6.98	1.6	<0.250	28	180	31	40	<3.0	5.8	200	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.575(ND)
	10/31/2017	Detection	359.6	17.57	-57.9	0.71	1.48	6.72	1.7	0.303	29	170	41	38	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	345.4	17.59	-44.0	0.40	13.24	6.67	2.3	<0.250	32	160	43	41	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	11/26/2018	Detection	375.3	15.04	-37.6	1.07	1.66	6.72	1.5	0.313	29	180	46	36	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-8 (DG)	5/18/2017	Background	662.5	17.58	-89.4	0.29	2.39	7.16	46	<0.250	100	340	400	74	<3.0	<1.0	86	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.067
	6/9/2017	Background	678.2	17.90	-108.5	0.31	0.47	7.16	43	<0.250	110	380	520	92	<3.0	<1.0	86	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.839(ND)
	7/13/2017	Background	661.5	18.57	-107.1	0.23	1.20	7.25	36	<0.250	89	320	430	87	<3.0	<1.0	74	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.034(ND)
	8/3/2017	Background	665.7	19.06	-108.4	0.24	0.98	7.15	37	<0.250	89	330	490	80	<3.0	<1.0	74	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.681(ND)
	8/15/2017	Background	594.9	18.56	-88.7	0.38	0.99	7.16	36	<0.250	83	320	530	75	<3.0	<1.0	68	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.906(ND)
	8/30/2017	Background	644.2	18.62	-91.3	0.29	1.18	7.15	41	<0.250	96	290	510	88	<3.0	<1.0	75	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.805(ND)
	9/14/2017	Background	707.9	18.52	-90.1	0.48	0.67	7.13	53	<0.250 H	110	370	510	86	<3.0	<1.0	77	<1.0	<1.0	<4.0	<2.0	<1.0	12	<0.20	<1.0	<1.0	<1.0	0.314(ND)
	9/27/2017	Background	764.0	19.11	-89.6	0.30	0.58	7.05	50	<0.250	120	420	480	92	<3.0	<1.0	80	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.594(ND)
	10/31/2017	Detection	698.1	17.99	-96.3	0.38	0.94	7.09	45	<0.250	110	380	540	86	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	788.8	18.34	-99.1	0.23	4.80	7.11	65	<0.250	150	430	520	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	7/10/2018	Re-sample	899.4	18.52	-94.2	0.35	2.69	7.09	68	(NA)	140	(NA)	(NA)	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	7/10/2018	Re-sample/DUP	899.4	18.52	-94.2	0.35	2.69	7.09	71	(NA)	150	(NA)	(NA)	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	11/26/2018	Detection	662.1	15.08	-77.6	0.35	2.88	7.17	45	<0.250	100	320	500	94	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)

Notes:

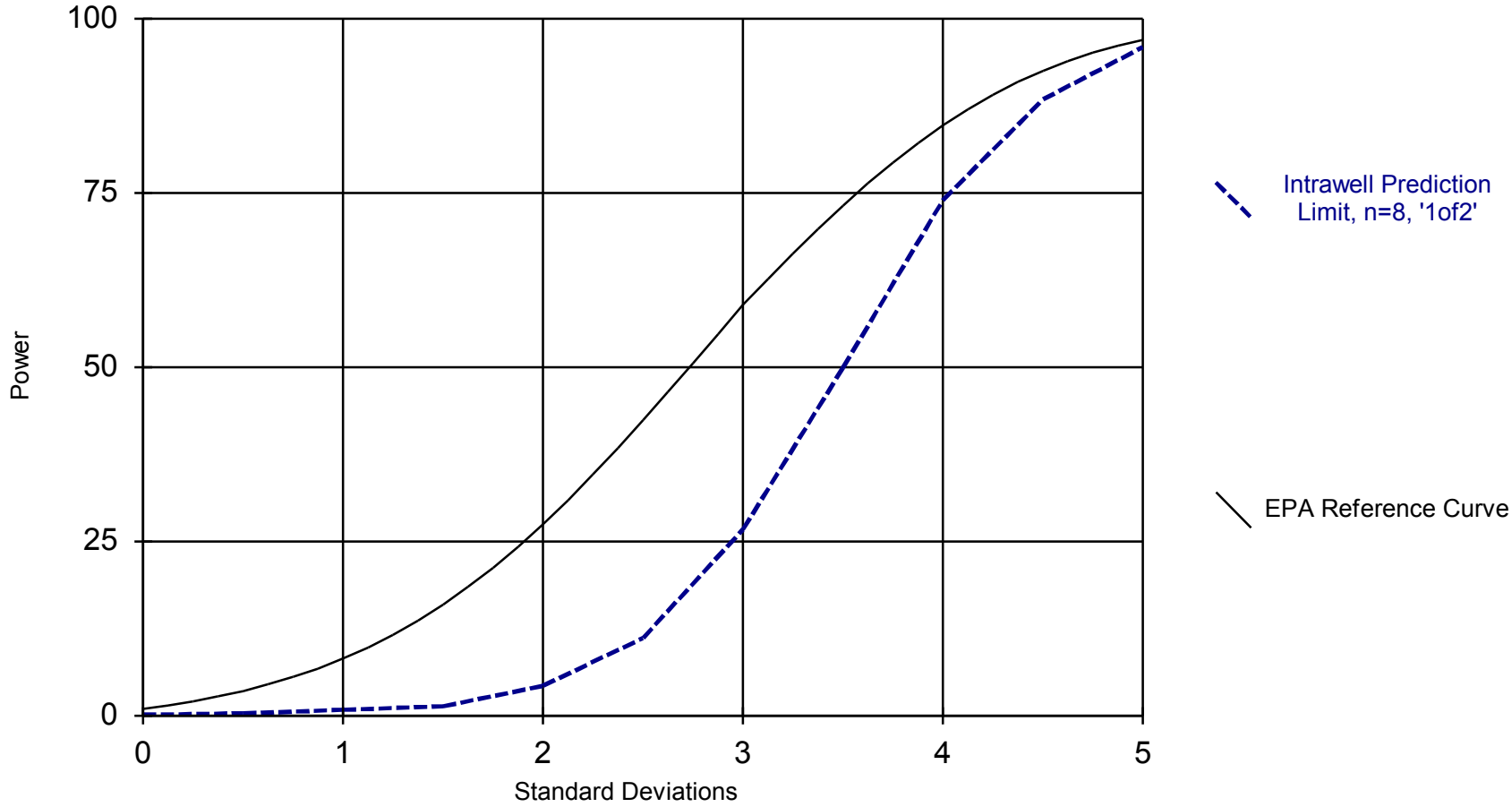
1. All data transcribed from analytical lab data sheets or field notes.
2. Less than (<) symbol denotes concentration not detected at or above reportable limits.
3. (ND) denotes Radium 226 and 228 (combined) concentration not detected above minimum detectable concentration.
4. (NA) denotes analysis not conducted, or not available at time of report.
5. Background monitoring per USEPA 40 CFR 257.93.
6. Detection monitoring per USEPA 40 CFR 257.94.
7. Assessment monitoring per USEPA 40 CFR 257.95.
8. Federal MCL = Maximum Contaminant Level per CFR 40 Subchapter D Part 141 subpart G Section 141.62 & 141.66.
9. Additional background sampling currently being conducted based on recommendations in Alternate Source Demonstration dated September 26, 2018 (see Appendix 9).

Prepared by: KAE
Checked by: MCC

Appendix 5

Statistical Power Curve

Power Curve MW-3 through MW-8



Kappa = 3.403, based on 3 compliance wells and 35 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 11/28/2017 4:57 PM View: SBMU-SPS Appendix III

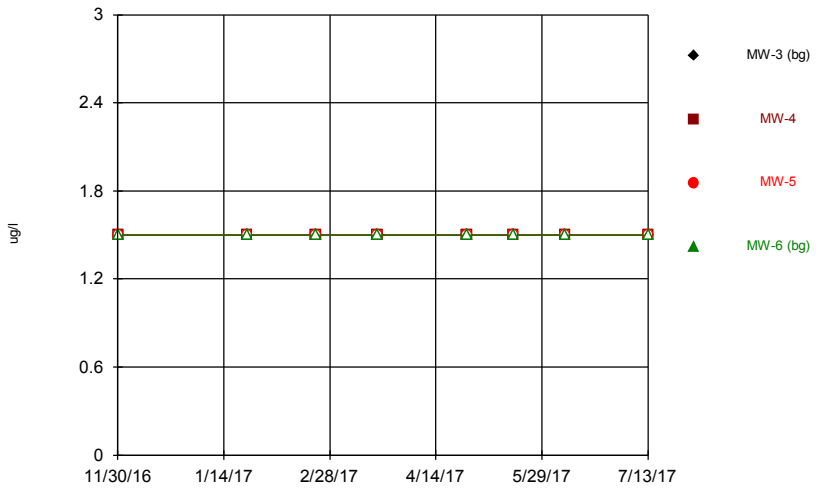
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Appendix 6

Time Series Plots

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Antimony



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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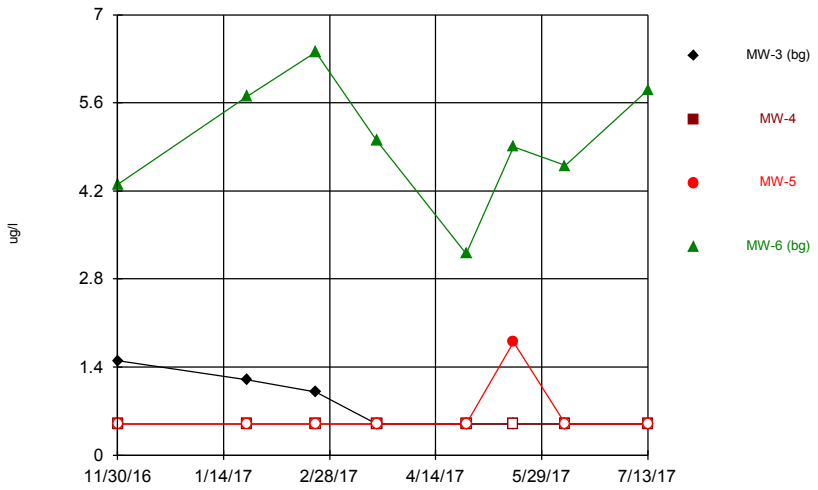
Hollow symbols indicate censored values.

Arsenic



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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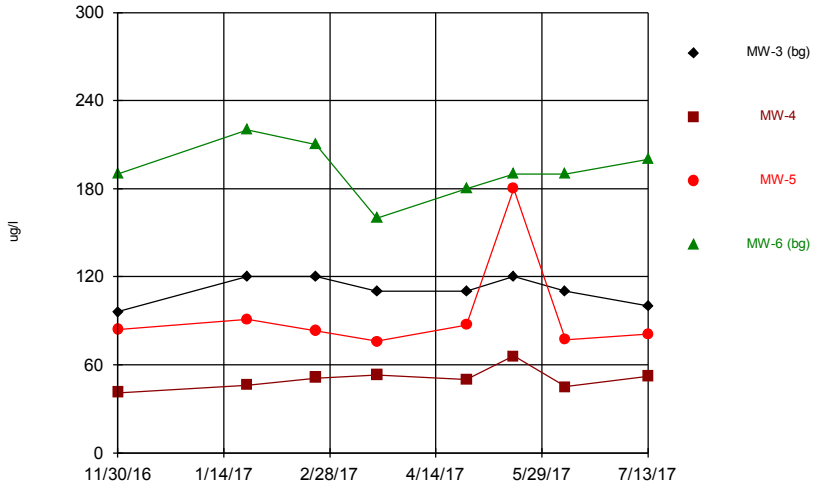
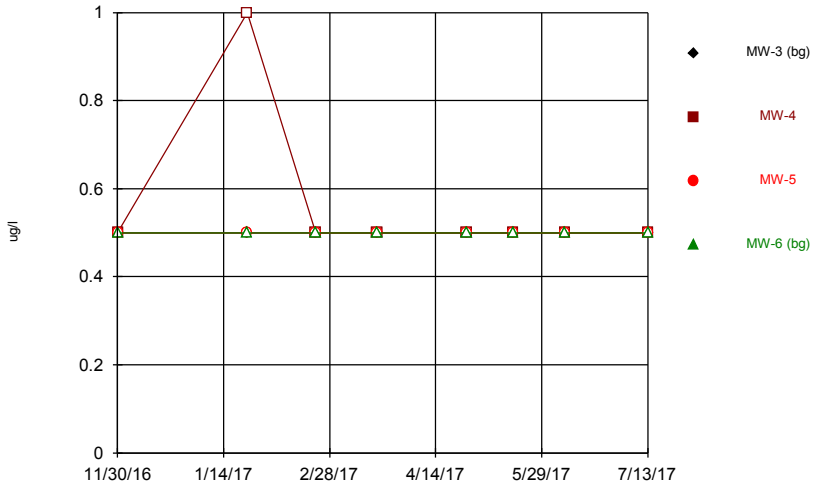
Barium



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

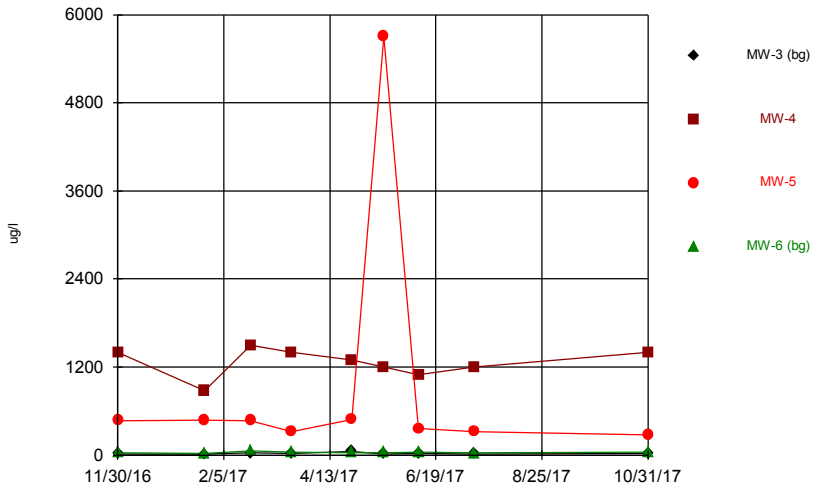
Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Beryllium



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Boron

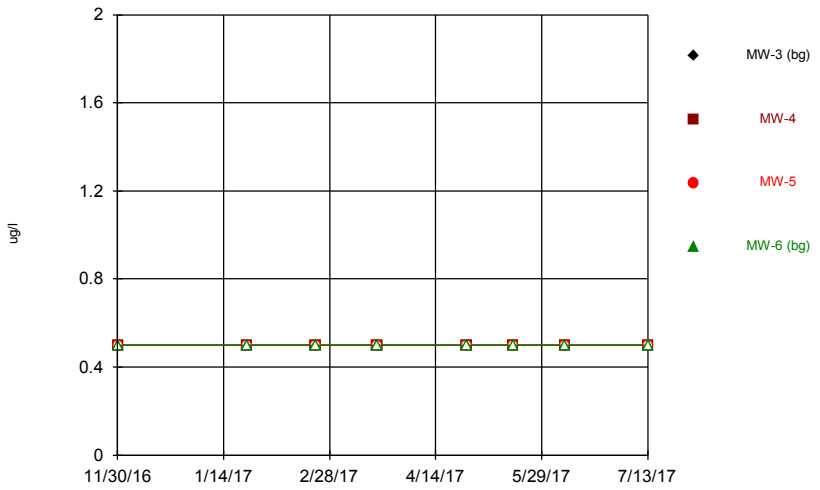


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Hollow symbols indicate censored values.

Cadmium



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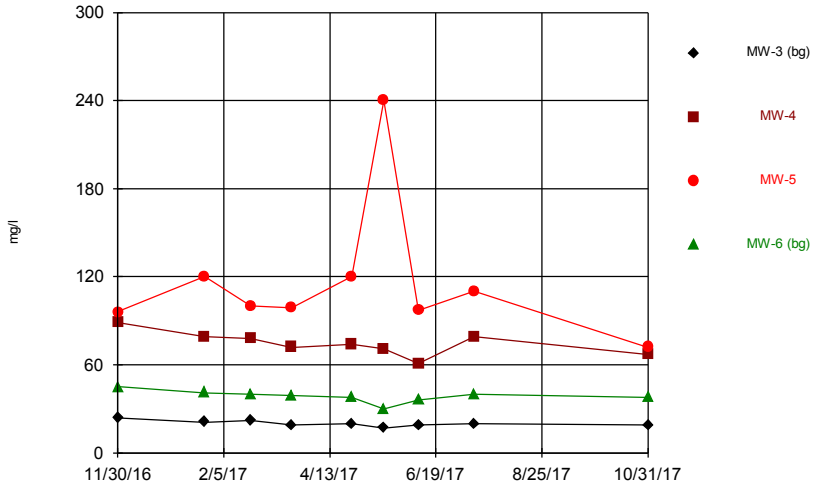
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Calcium



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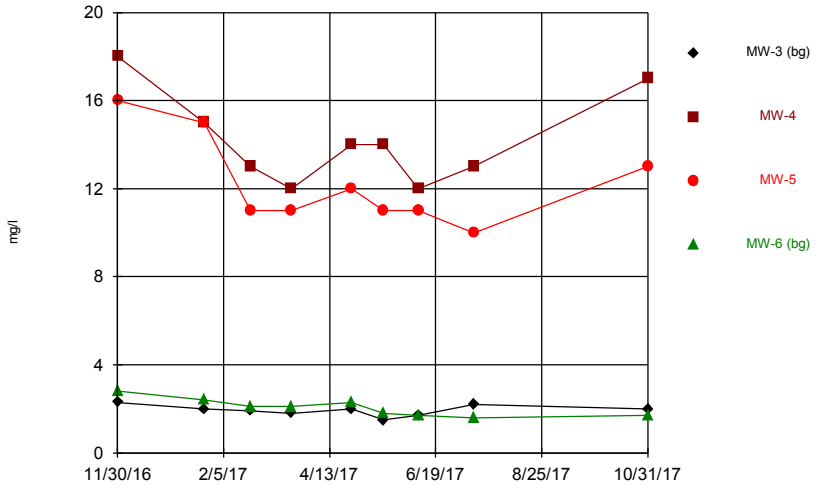
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Chloride



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SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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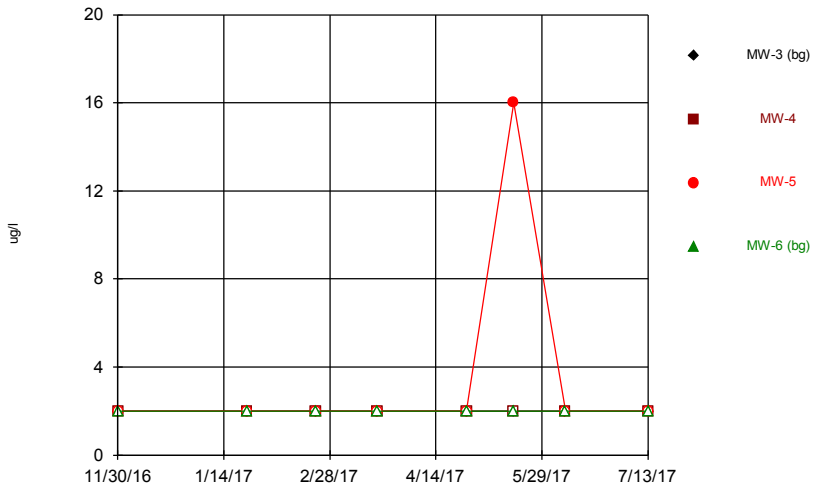
Chromium

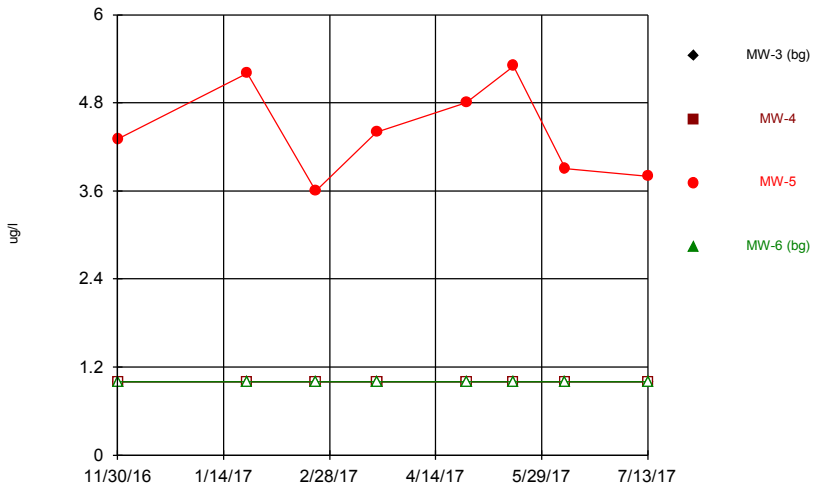


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Cobalt

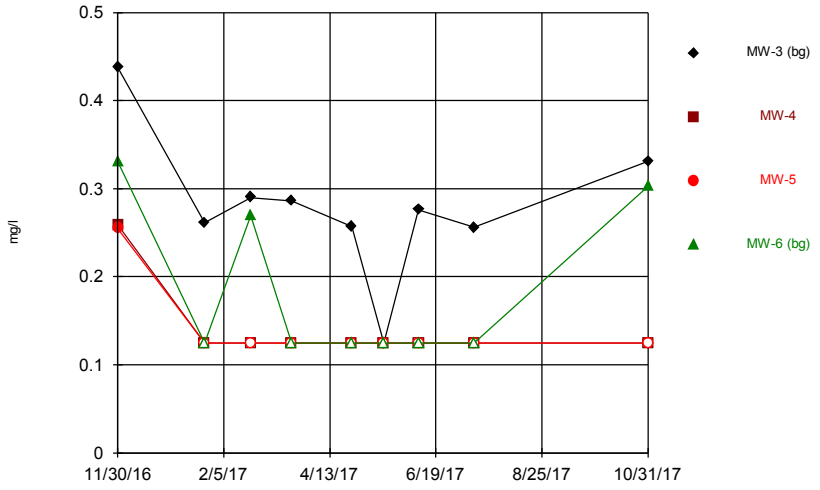


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Fluoride

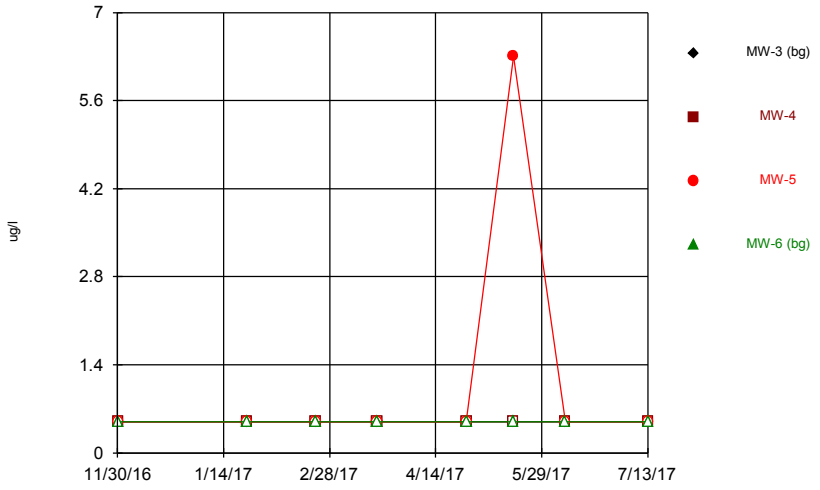


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Lead

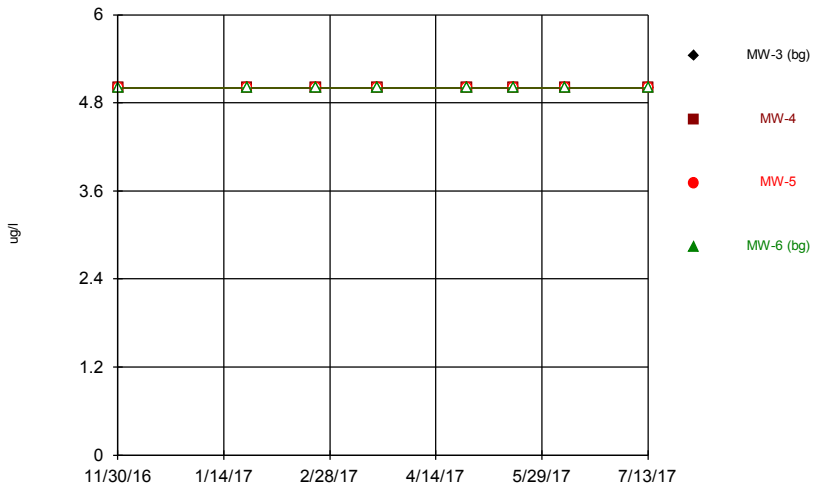


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

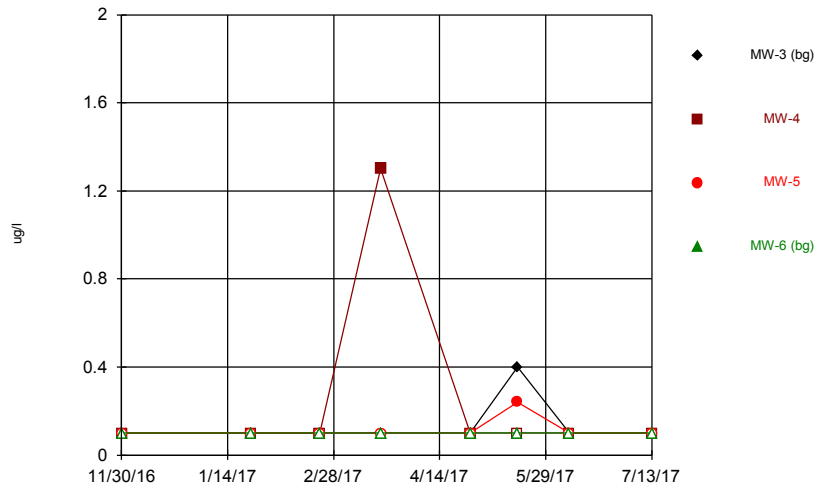
Lithium



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

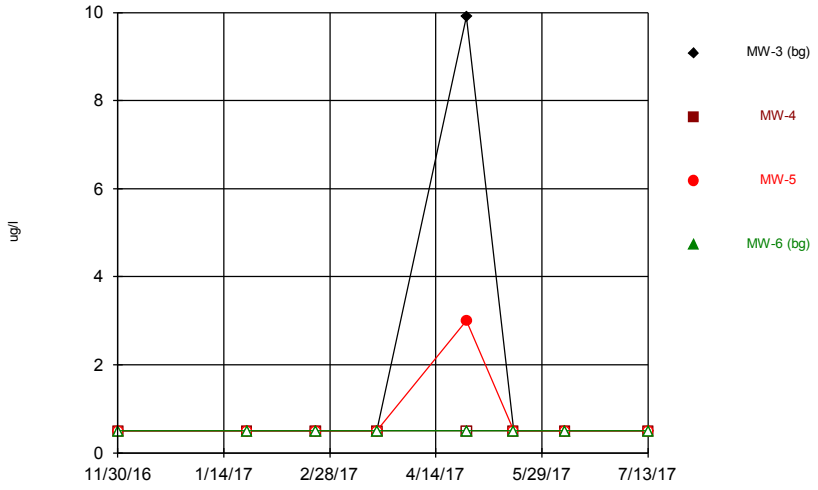
Mercury



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

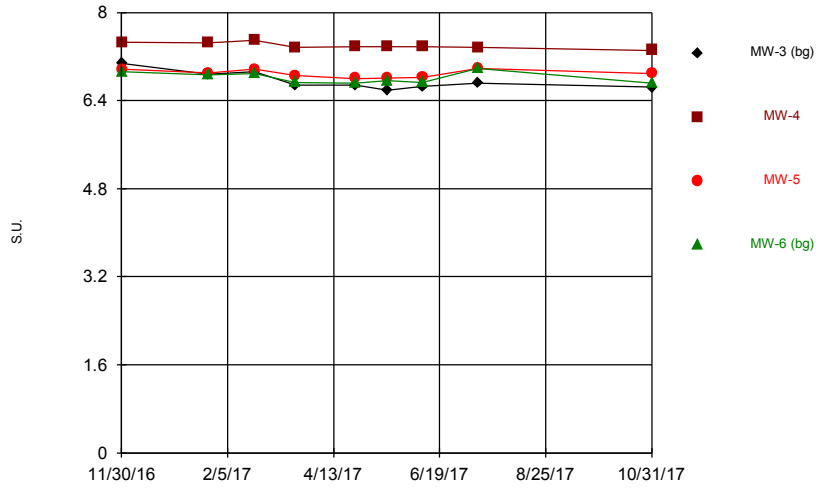
Molybdenum



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

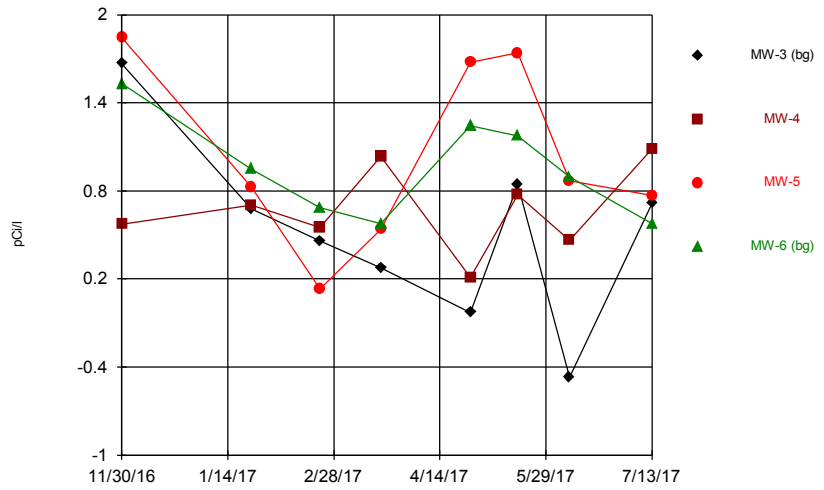
Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG

pH



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Radium

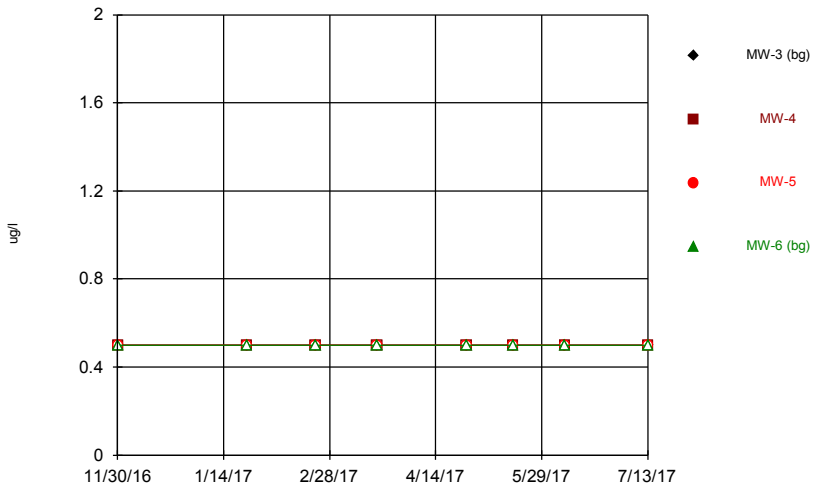


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Hollow symbols indicate censored values.

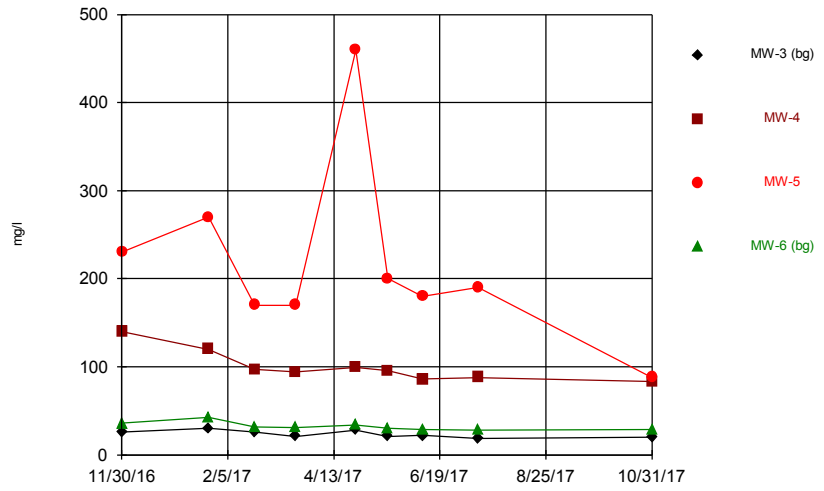
Selenium



Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sulfate



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SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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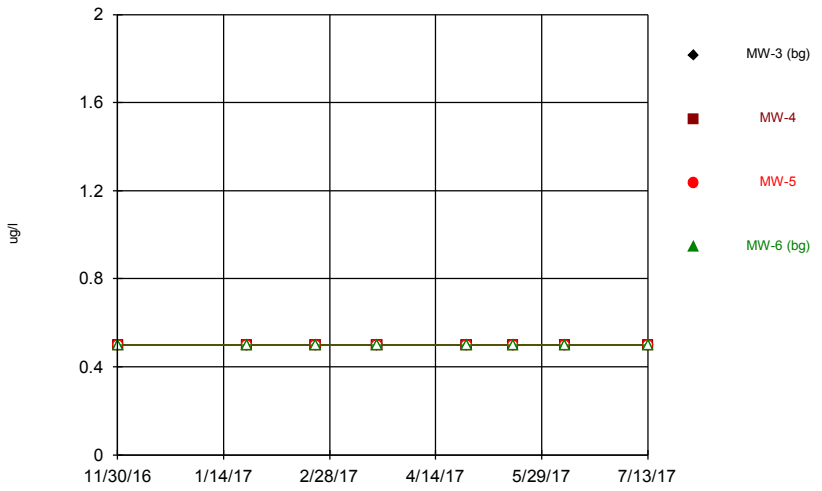
Thallium



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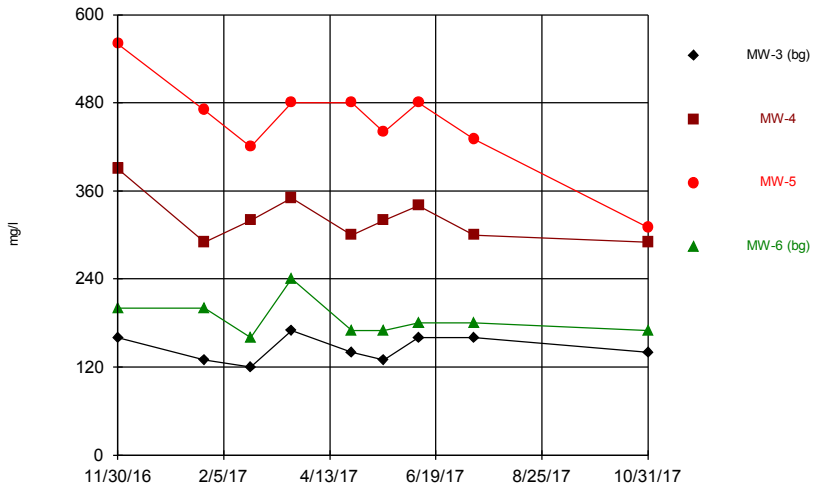
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Total Dissolved Solids

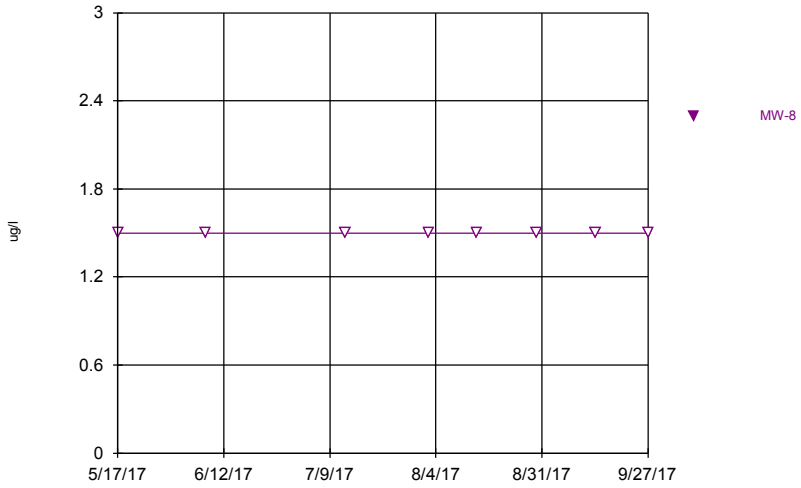


Time Series Analysis Run 11/29/2017 3:15 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Hollow symbols indicate censored values.

Antimony



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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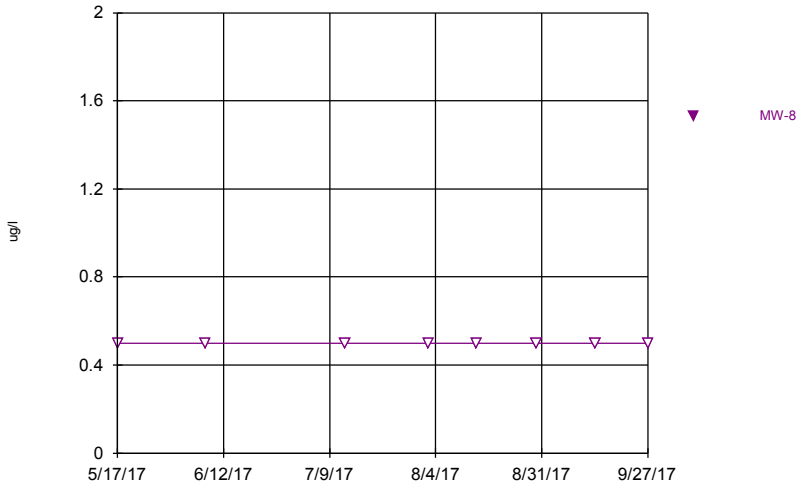
Hollow symbols indicate censored values.

Arsenic

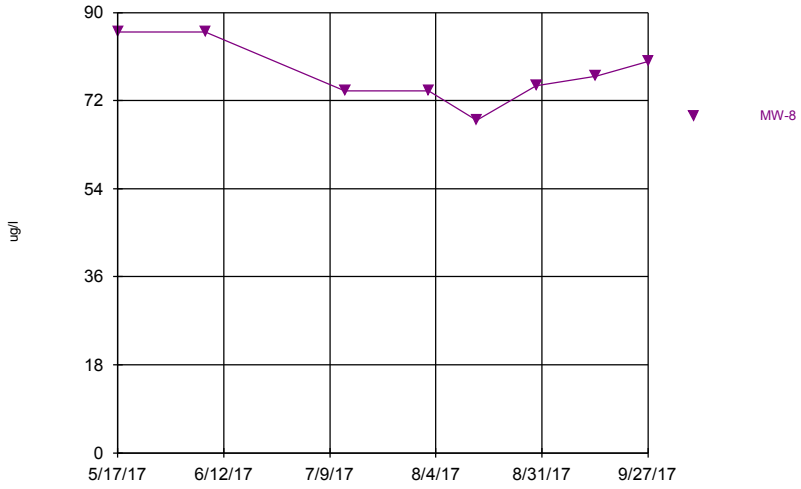


Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG

Barium

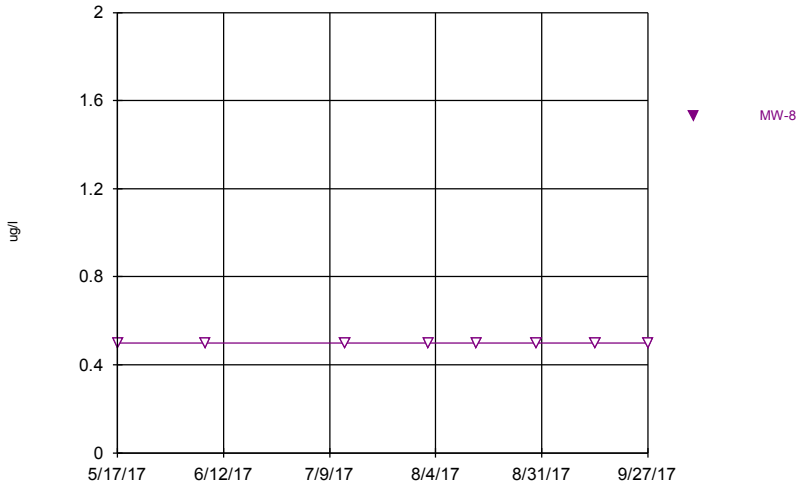


Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

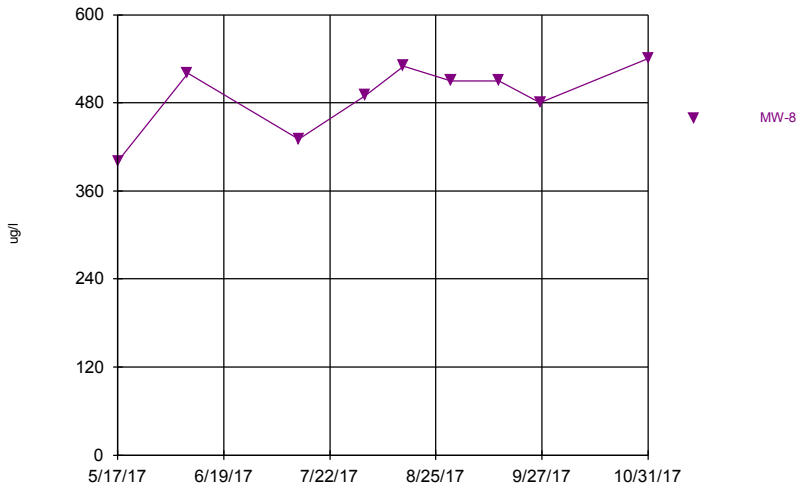
Beryllium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Boron

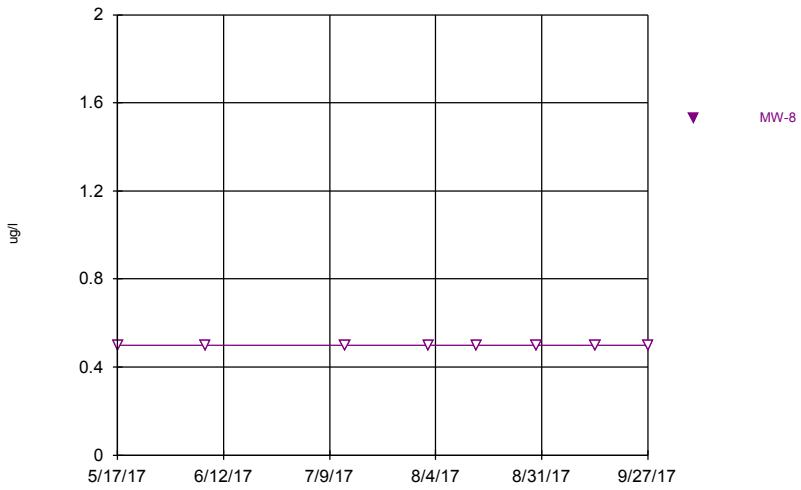


Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Hollow symbols indicate censored values.

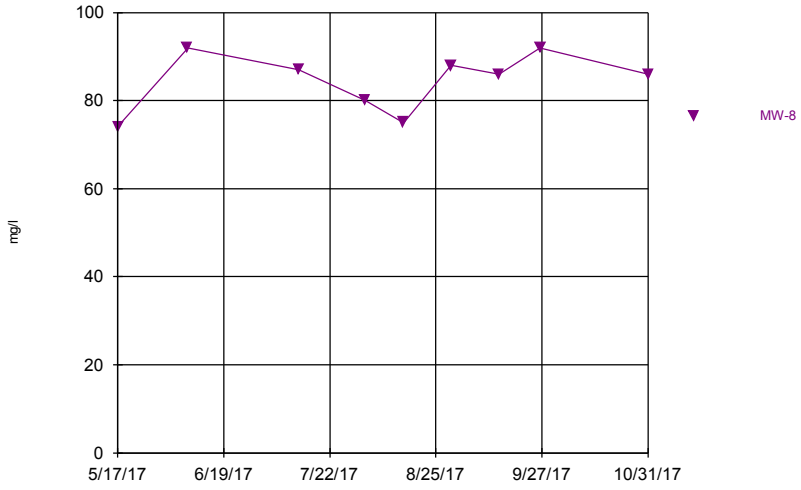
Cadmium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Calcium



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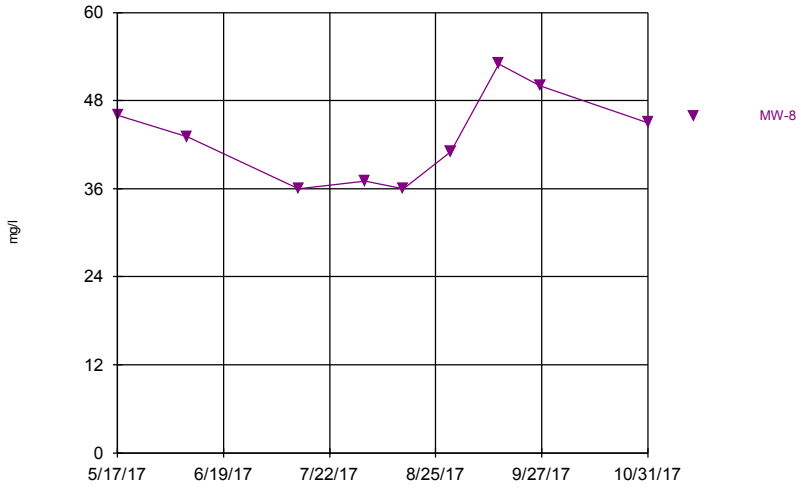
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Chloride

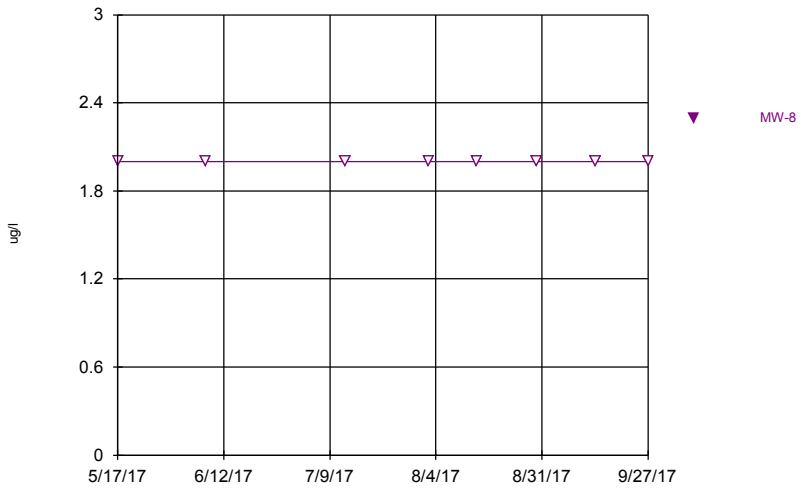


Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

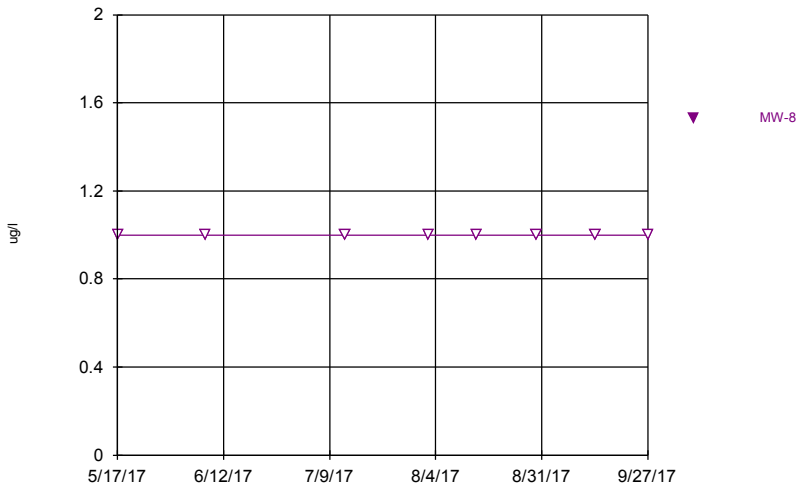
Chromium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

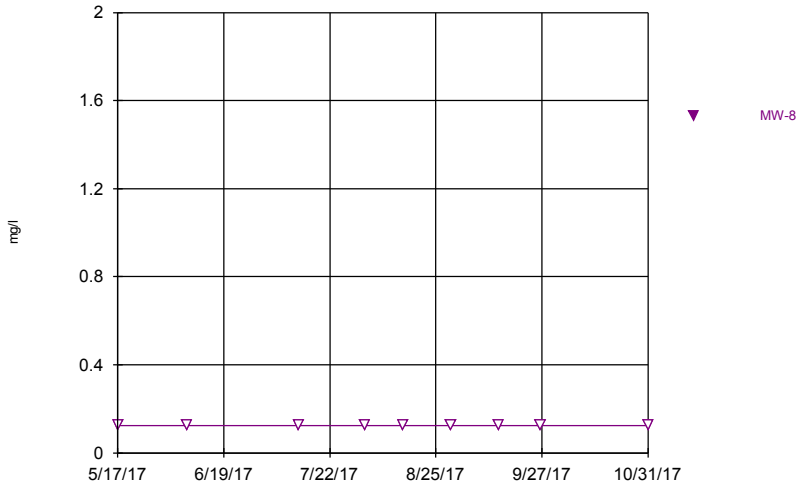
Cobalt



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

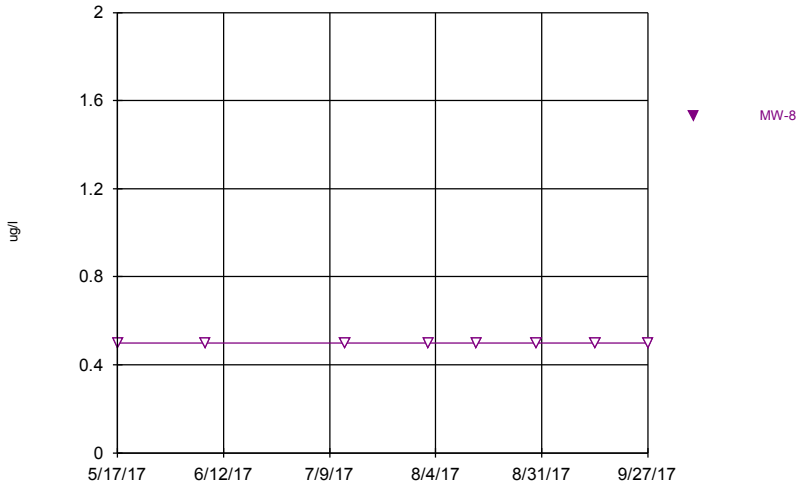
Fluoride



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Sanitas™ v.9.5.32 Sanitas software licensed to GREDELL Engineering only. UG
Hollow symbols indicate censored values.

Lead



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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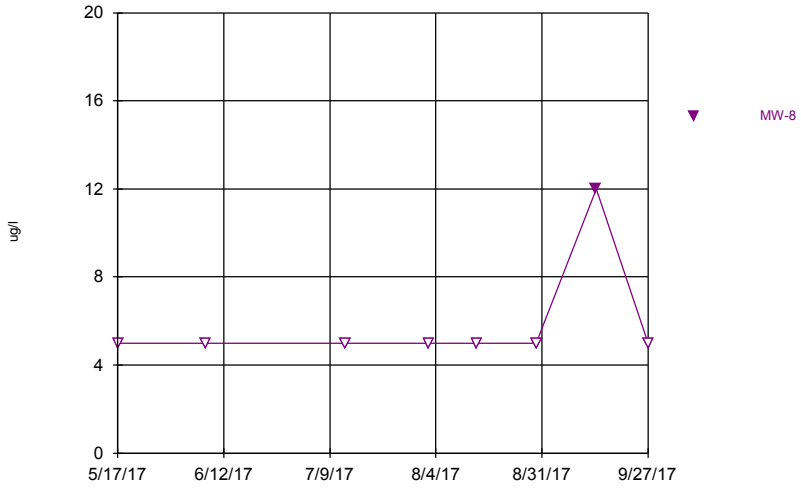
Lithium

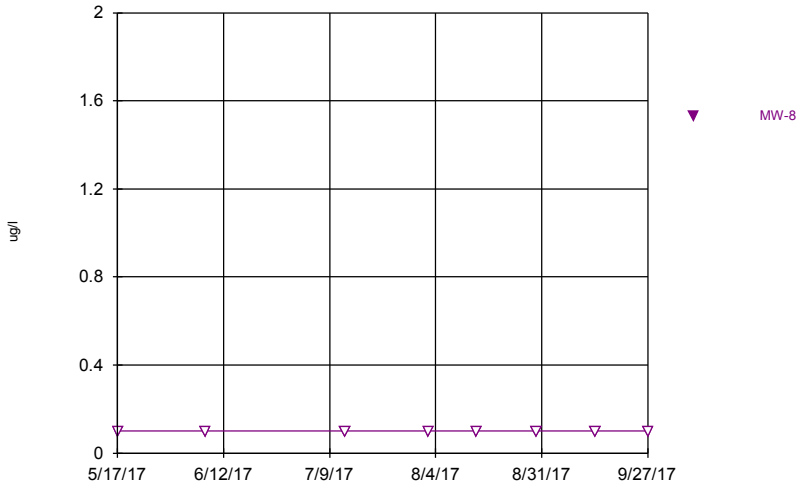


Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Hollow symbols indicate censored values.

Mercury



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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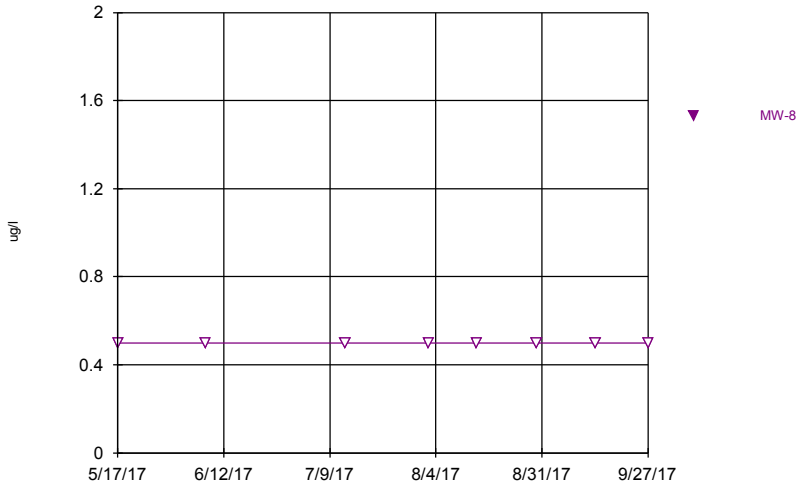
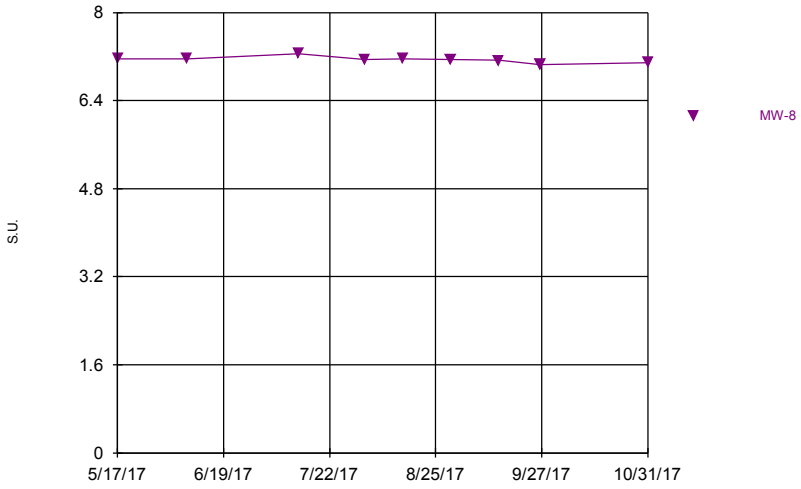
Molybdenum



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

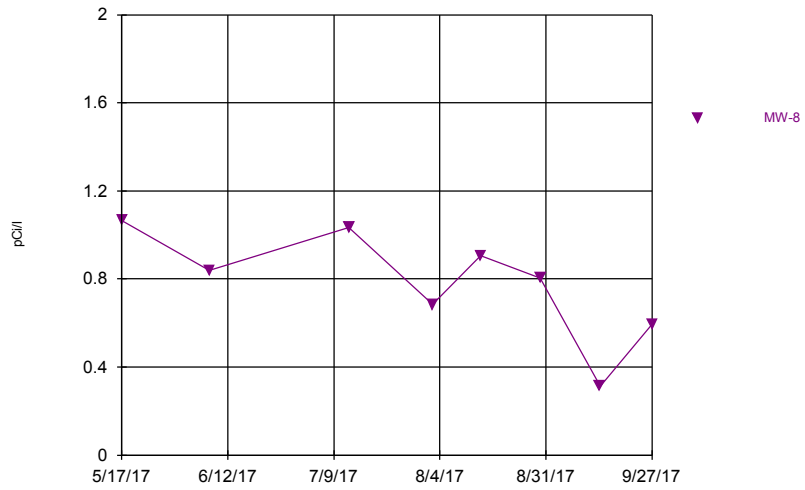
pH



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

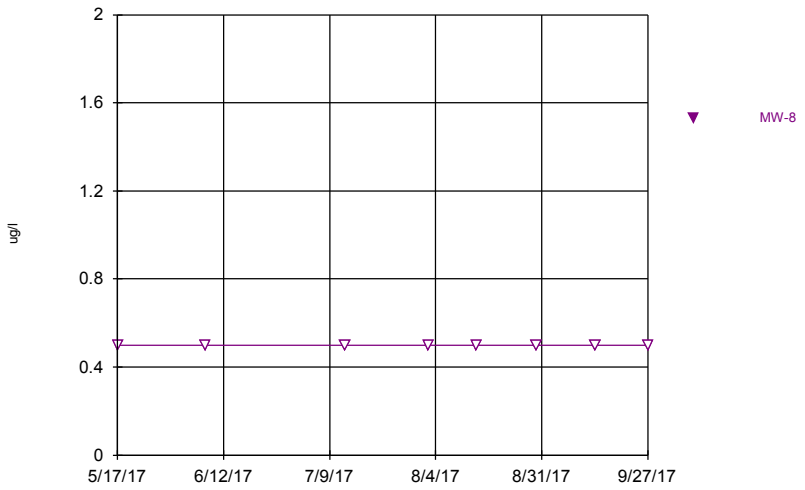
Radium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

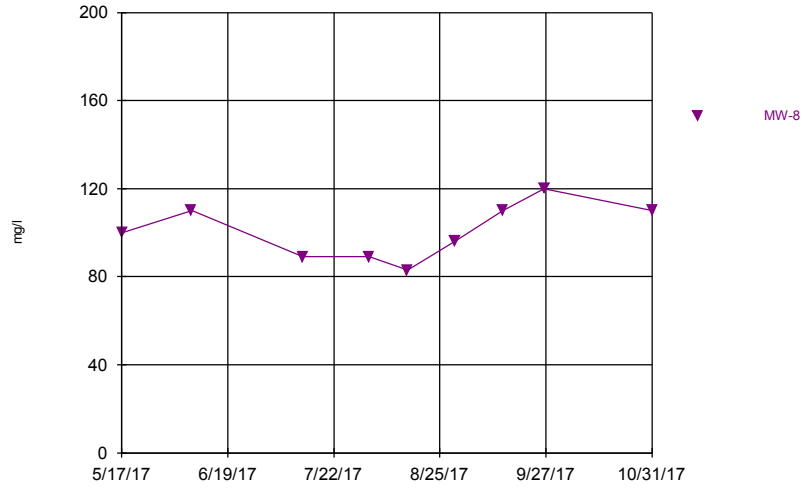
Hollow symbols indicate censored values.

Selenium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

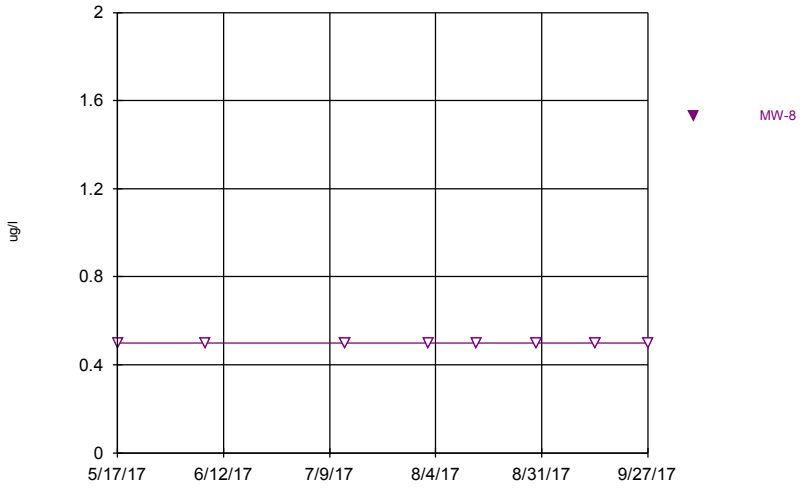
Sulfate



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

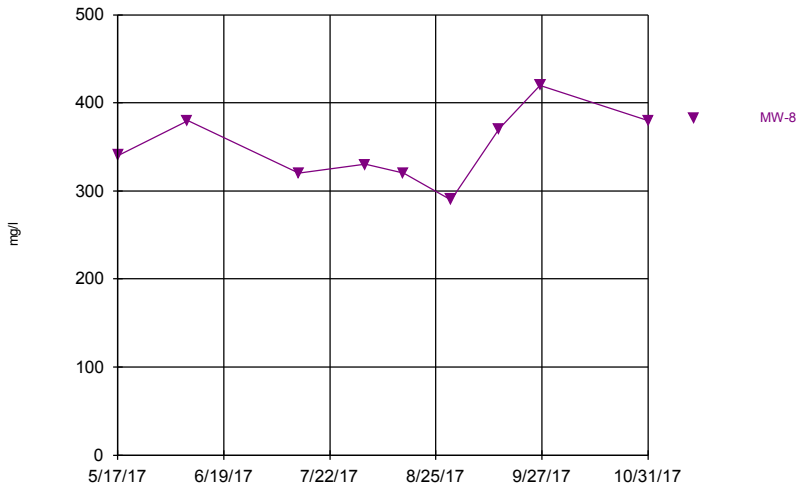
Hollow symbols indicate censored values.

Thallium



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Total Dissolved Solids



Time Series Analysis Run 11/29/2017 9:30 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Appendix 7

Box and Whiskers Plots

Box & Whiskers Plot MW-3 through MW-6

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17 Printed 11/29/2017, 3:18 PM

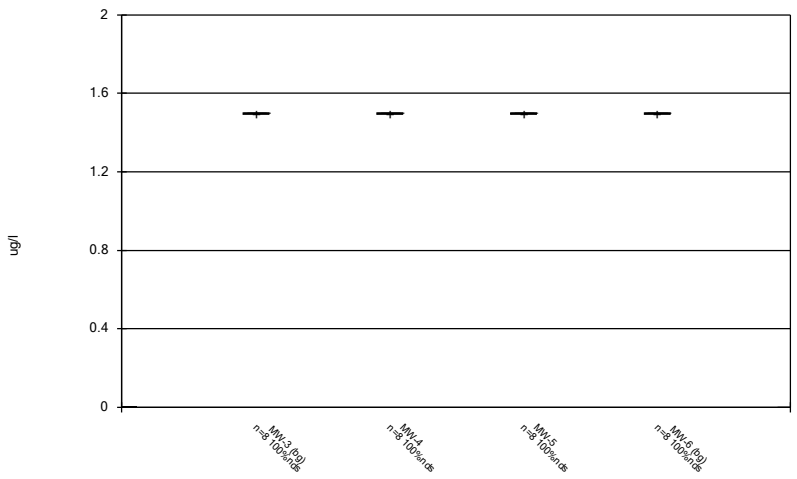
Constituent	Well	N	Mean	Median	Lower Q.	Upper Q.	Min.	Max.	%NDs
Antimony (ug/l)	MW-3 (bg)	8	1.5	1.5	1.5	1.5	1.5	1.5	100
Antimony (ug/l)	MW-4	8	1.5	1.5	1.5	1.5	1.5	1.5	100
Antimony (ug/l)	MW-5	8	1.5	1.5	1.5	1.5	1.5	1.5	100
Antimony (ug/l)	MW-6 (bg)	8	1.5	1.5	1.5	1.5	1.5	1.5	100
Arsenic (ug/l)	MW-3 (bg)	8	0.775	0.5	0.5	1.1	0.5	1.5	62.5
Arsenic (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Arsenic (ug/l)	MW-5	8	0.6625	0.5	0.5	0.5	0.5	1.8	87.5
Arsenic (ug/l)	MW-6 (bg)	8	4.988	4.95	4.45	5.75	3.2	6.4	0
Barium (ug/l)	MW-3 (bg)	8	110.8	110	105	120	96	120	0
Barium (ug/l)	MW-4	8	50.5	50.5	45.5	52.5	41	66	0
Barium (ug/l)	MW-5	8	94.88	83.5	79	89	76	180	0
Barium (ug/l)	MW-6 (bg)	8	192.5	190	185	205	160	220	0
Beryllium (ug/l)	MW-3 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Beryllium (ug/l)	MW-4	8	0.5625	0.5	0.5	0.5	0.5	1	100
Beryllium (ug/l)	MW-5	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Beryllium (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Boron (ug/l)	MW-3 (bg)	9	24.78	20	18	30	12	54	0
Boron (ug/l)	MW-4	9	1264	1300	1150	1400	880	1500	0
Boron (ug/l)	MW-5	9	987.8	470	320	485	280	5700	0
Boron (ug/l)	MW-6 (bg)	9	37.78	36	33	39.5	27	59	0
Cadmium (ug/l)	MW-3 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Cadmium (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Cadmium (ug/l)	MW-5	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Cadmium (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Calcium (mg/l)	MW-3 (bg)	9	20.11	20	19	21.5	17	24	0
Calcium (mg/l)	MW-4	9	74.44	74	69	79	61	89	0
Calcium (mg/l)	MW-5	9	117.1	100	96.5	120	72	240	0
Calcium (mg/l)	MW-6 (bg)	9	38.56	39	37	40.5	30	45	0
Chloride (mg/l)	MW-3 (bg)	9	1.933	2	1.75	2.1	1.5	2.3	0
Chloride (mg/l)	MW-4	9	14.22	14	12.5	16	12	18	0
Chloride (mg/l)	MW-5	9	12.22	11	11	14	10	16	0
Chloride (mg/l)	MW-6 (bg)	9	2.056	2.1	1.7	2.35	1.6	2.8	0
Chromium (ug/l)	MW-3 (bg)	8	2	2	2	2	2	2	100
Chromium (ug/l)	MW-4	8	2	2	2	2	2	2	100
Chromium (ug/l)	MW-5	8	3.75	2	2	2	2	16	87.5
Chromium (ug/l)	MW-6 (bg)	8	2	2	2	2	2	2	100
Cobalt (ug/l)	MW-3 (bg)	8	1	1	1	1	1	1	100
Cobalt (ug/l)	MW-4	8	1	1	1	1	1	1	100
Cobalt (ug/l)	MW-5	8	4.413	4.35	3.85	5	3.6	5.3	0
Cobalt (ug/l)	MW-6 (bg)	8	1	1	1	1	1	1	100
Fluoride (mg/l)	MW-3 (bg)	9	0.28	0.276	0.2565	0.3105	0.125	0.438	11.11
Fluoride (mg/l)	MW-4	9	0.1399	0.125	0.125	0.125	0.125	0.259	88.89
Fluoride (mg/l)	MW-5	9	0.1394	0.125	0.125	0.125	0.125	0.255	88.89
Fluoride (mg/l)	MW-6 (bg)	9	0.1837	0.125	0.125	0.286	0.125	0.331	66.67
Lead (ug/l)	MW-3 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Lead (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Lead (ug/l)	MW-5	8	1.225	0.5	0.5	0.5	0.5	6.3	87.5
Lead (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Lithium (ug/l)	MW-3 (bg)	8	5	5	5	5	5	5	100
Lithium (ug/l)	MW-4	8	5	5	5	5	5	5	100

Box & Whiskers Plot MW-3 through MW-6

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17 Printed 11/29/2017, 3:18 PM

Constituent	Well	N	Mean	Median	Lower Q.	Upper Q.	Min.	Max.	%NDs
Lithium (ug/l)	MW-5	8	5	5	5	5	5	5	100
Lithium (ug/l)	MW-6 (bg)	8	5	5	5	5	5	5	100
Mercury (ug/l)	MW-3 (bg)	8	0.1375	0.1	0.1	0.1	0.1	0.4	87.5
Mercury (ug/l)	MW-4	8	0.25	0.1	0.1	0.1	0.1	1.3	87.5
Mercury (ug/l)	MW-5	8	0.1175	0.1	0.1	0.1	0.1	0.24	87.5
Mercury (ug/l)	MW-6 (bg)	8	0.1	0.1	0.1	0.1	0.1	0.1	100
Molybdenum (ug/l)	MW-3 (bg)	8	1.675	0.5	0.5	0.5	0.5	9.9	87.5
Molybdenum (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Molybdenum (ug/l)	MW-5	8	0.8125	0.5	0.5	0.5	0.5	3	87.5
Molybdenum (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
pH (S.U.)	MW-3 (bg)	9	6.761	6.68	6.65	6.905	6.59	7.08	0
pH (S.U.)	MW-4	9	7.399	7.38	7.37	7.455	7.31	7.49	0
pH (S.U.)	MW-5	9	6.888	6.89	6.815	6.97	6.8	6.98	0
pH (S.U.)	MW-6 (bg)	9	6.813	6.76	6.725	6.905	6.72	6.98	0
Radium (pCi/l)	MW-3 (bg)	8	0.5178	0.5685	0.1235	0.7795	-0.469	1.668	0
Radium (pCi/l)	MW-4	8	0.6744	0.6375	0.507	0.905	0.21	1.086	0
Radium (pCi/l)	MW-5	8	1.049	0.848	0.6525	1.708	0.13	1.844	0
Radium (pCi/l)	MW-6 (bg)	8	0.9533	0.9205	0.631	1.208	0.575	1.532	0
Selenium (ug/l)	MW-3 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Selenium (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Selenium (ug/l)	MW-5	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Selenium (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Sulfate (mg/l)	MW-3 (bg)	9	23.67	22	20.5	27	19	30	0
Sulfate (mg/l)	MW-4	9	100.3	96	87	109.5	83	140	0
Sulfate (mg/l)	MW-5	9	217.6	190	170	250	88	460	0
Sulfate (mg/l)	MW-6 (bg)	9	32.44	31	29	35	28	43	0
Thallium (ug/l)	MW-3 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Thallium (ug/l)	MW-4	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Thallium (ug/l)	MW-5	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Thallium (ug/l)	MW-6 (bg)	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Total Dissolved Solids (mg/l)	MW-3 (bg)	9	145.6	140	130	160	120	170	0
Total Dissolved Solids (mg/l)	MW-4	9	322.2	320	295	345	290	390	0
Total Dissolved Solids (mg/l)	MW-5	9	452.2	470	425	480	310	560	0
Total Dissolved Solids (mg/l)	MW-6 (bg)	9	185.6	180	170	200	160	240	0

Antimony



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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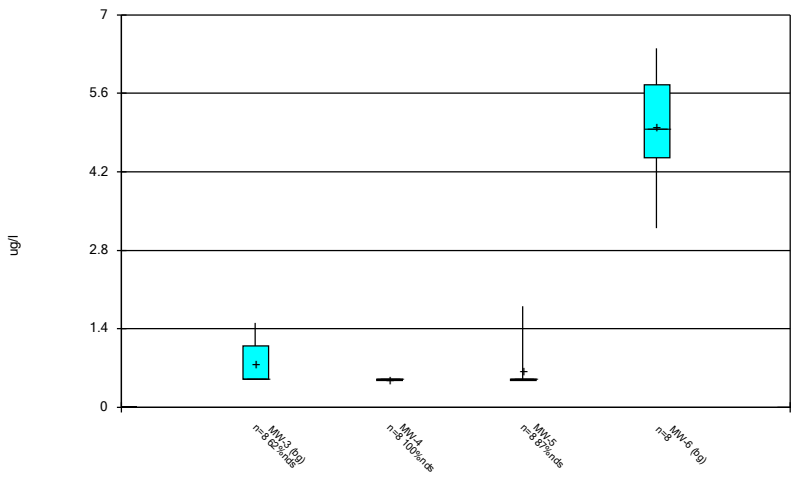
Arsenic



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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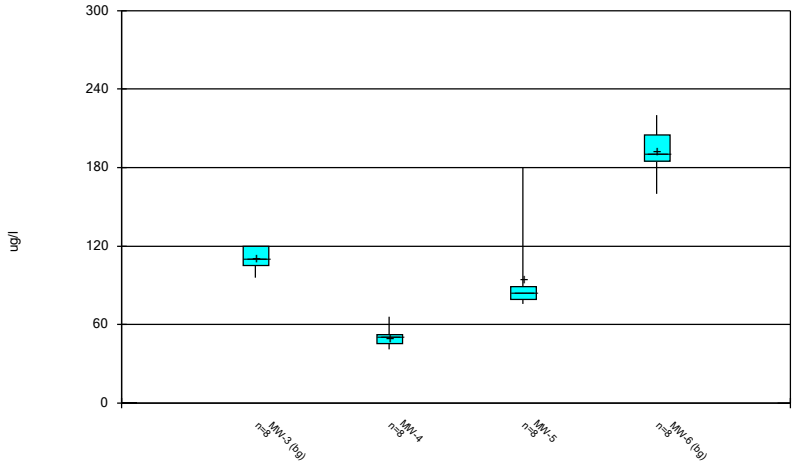
Barium



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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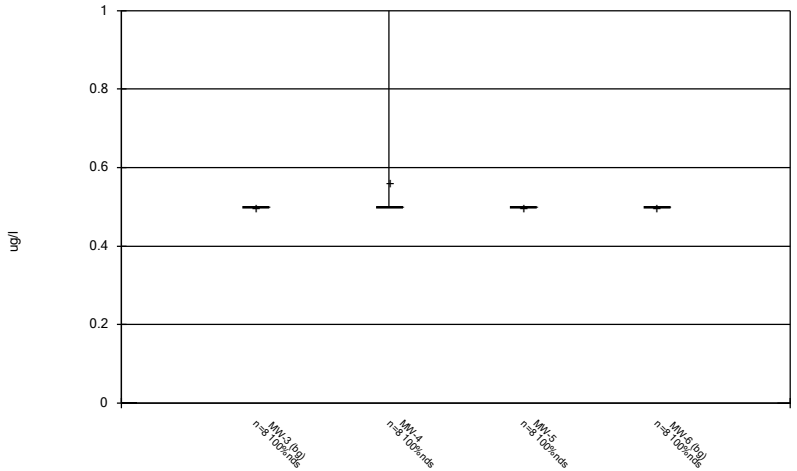
Beryllium



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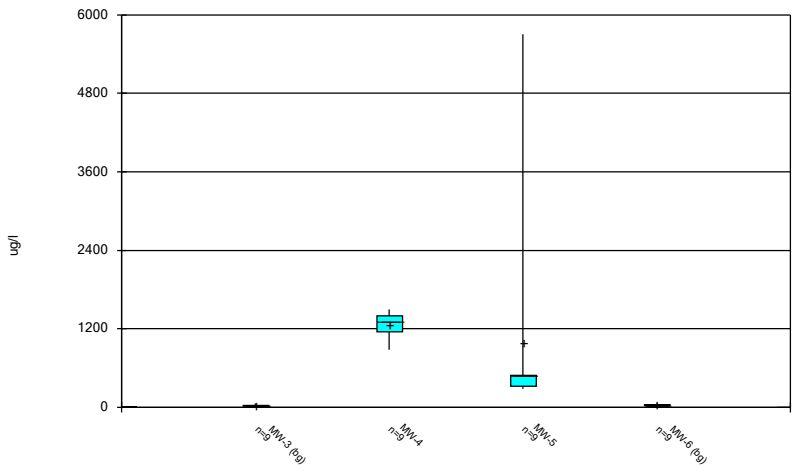
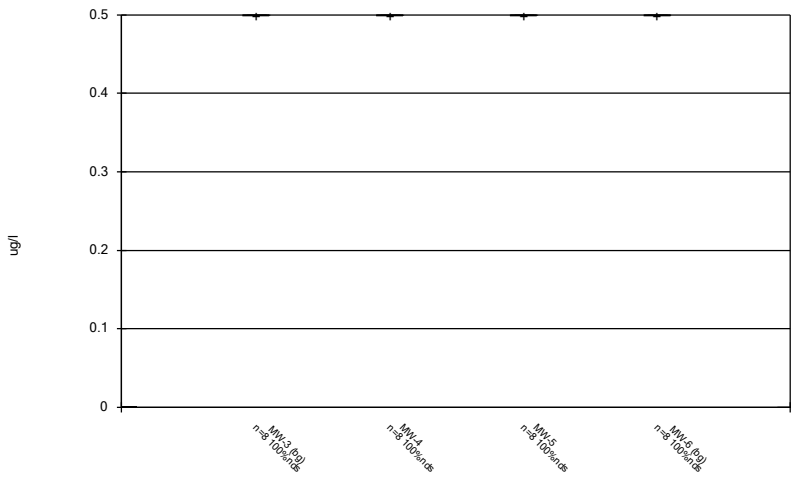
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Boron



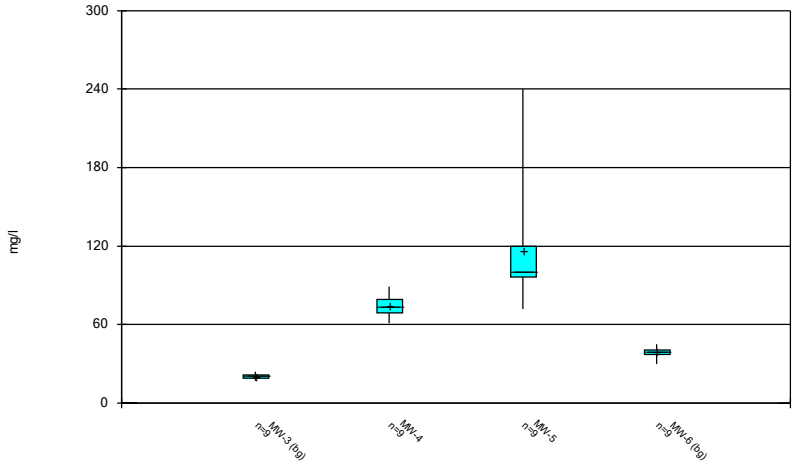
Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Cadmium



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Calcium



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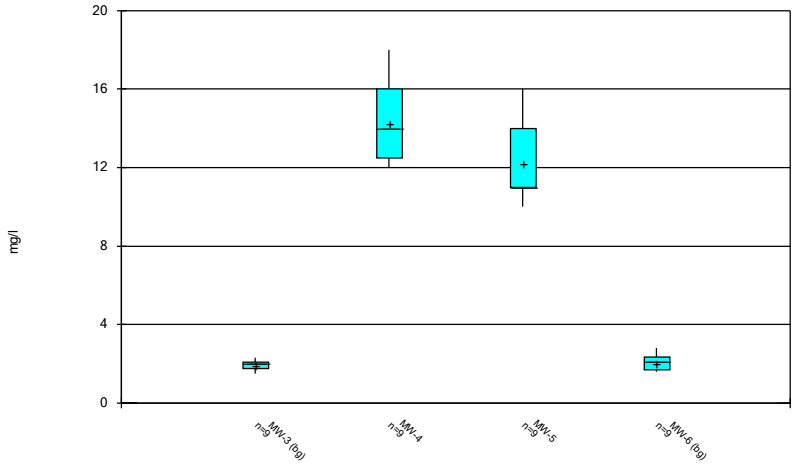
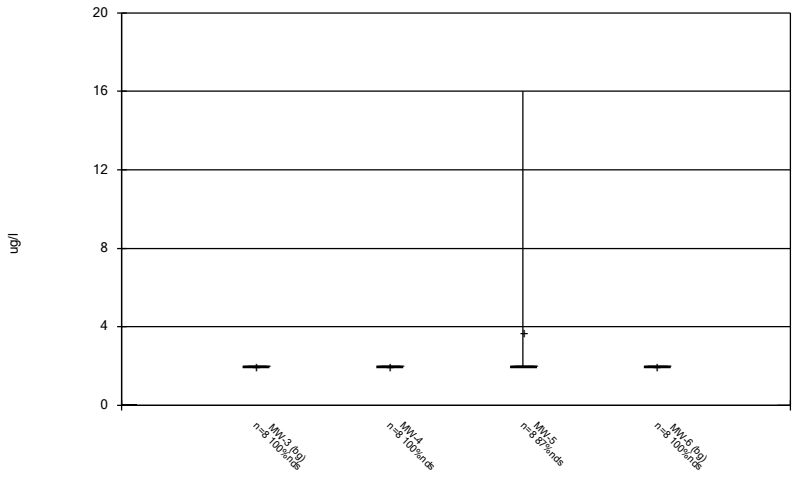
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Chloride



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Chromium



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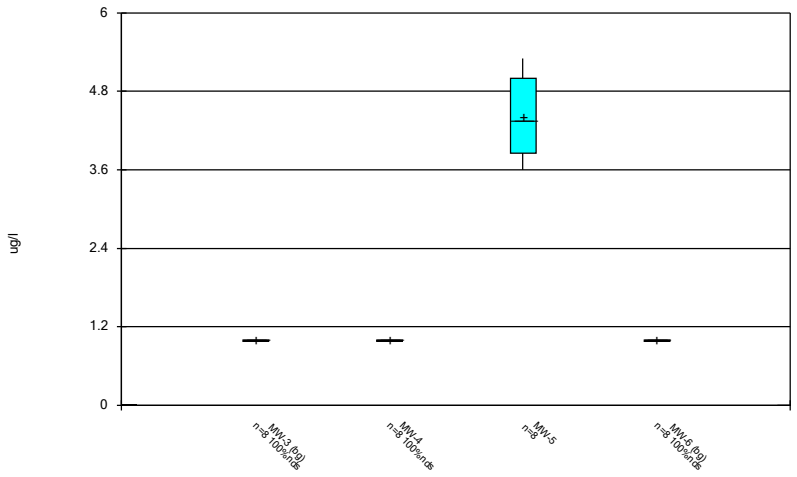
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Cobalt



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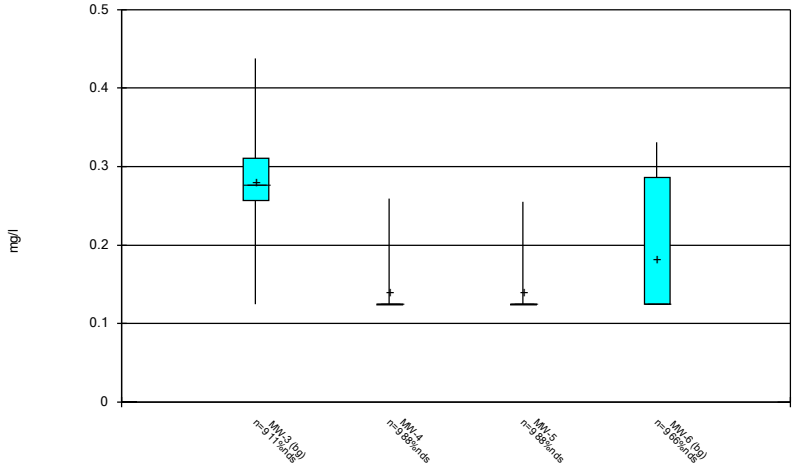
Fluoride



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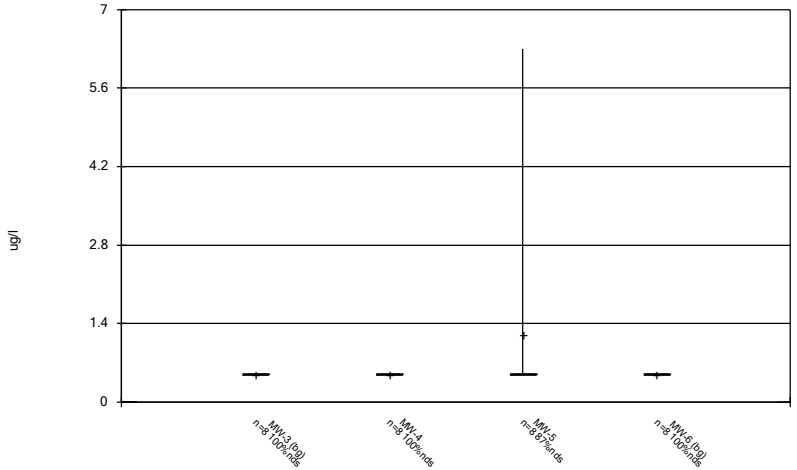
Lead



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
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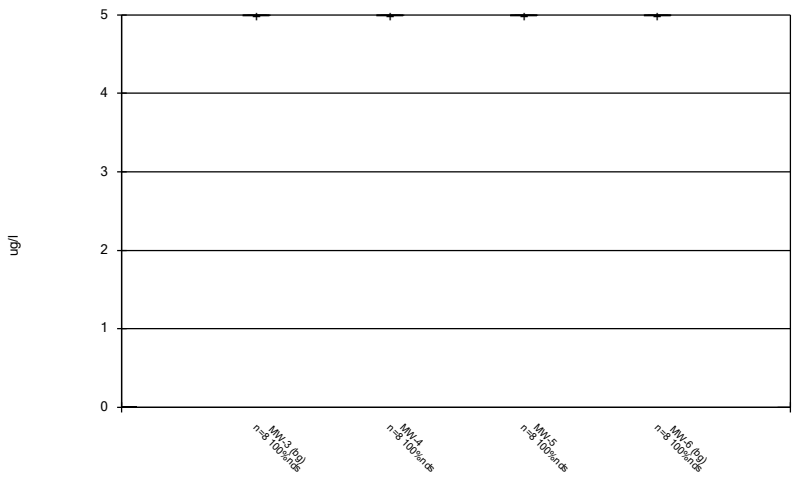
Lithium



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
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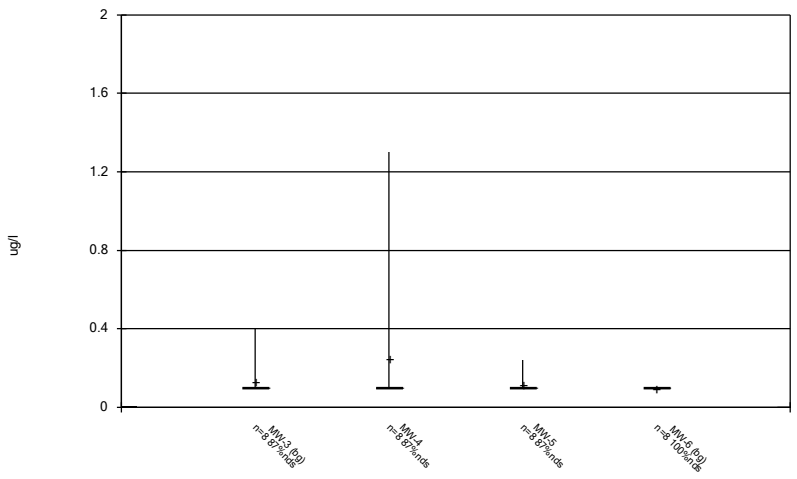
Mercury



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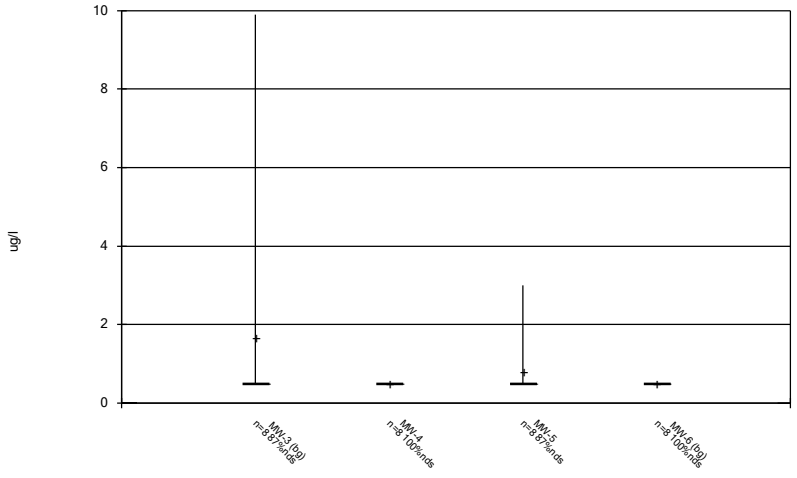
Molybdenum



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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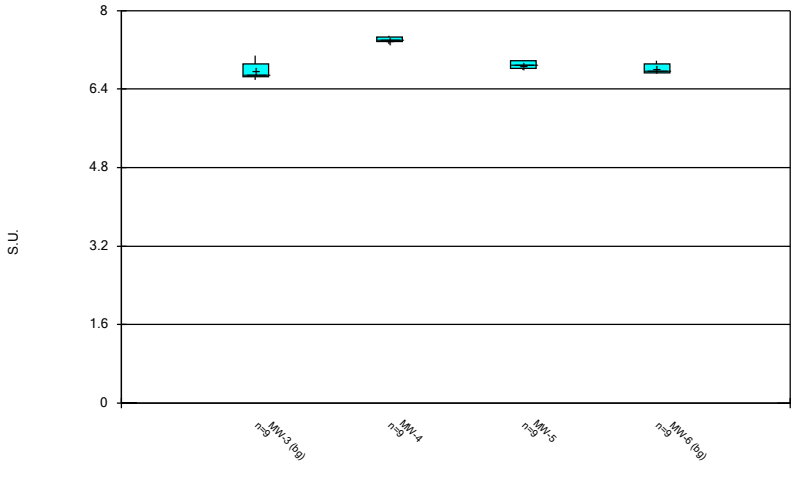
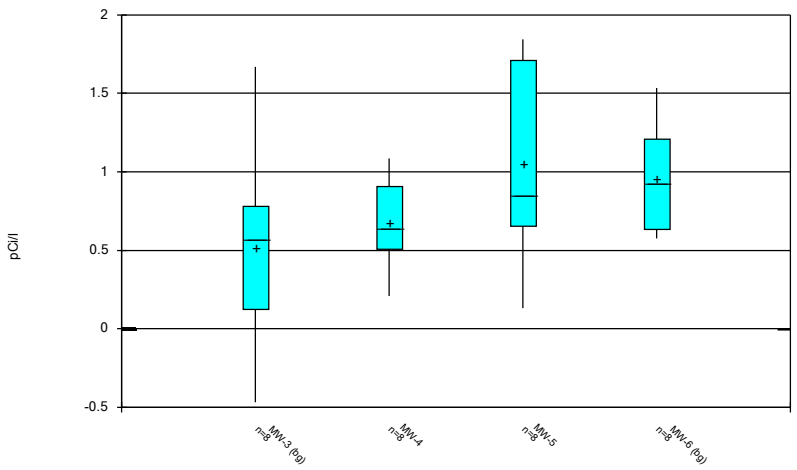
pH



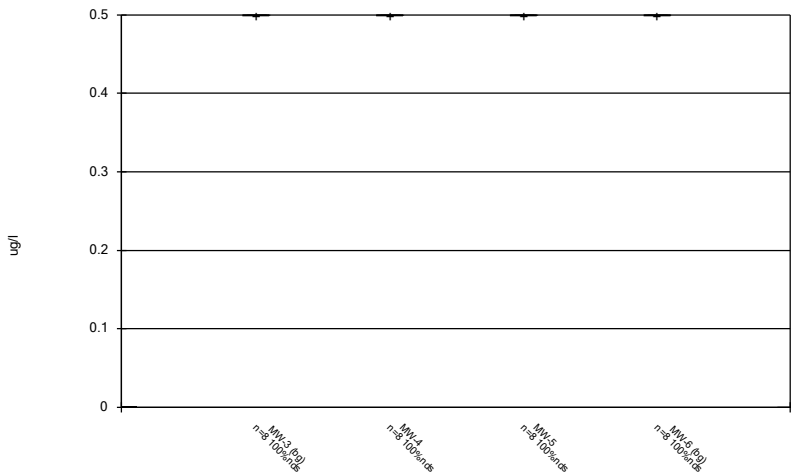
Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Radium



Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Selenium



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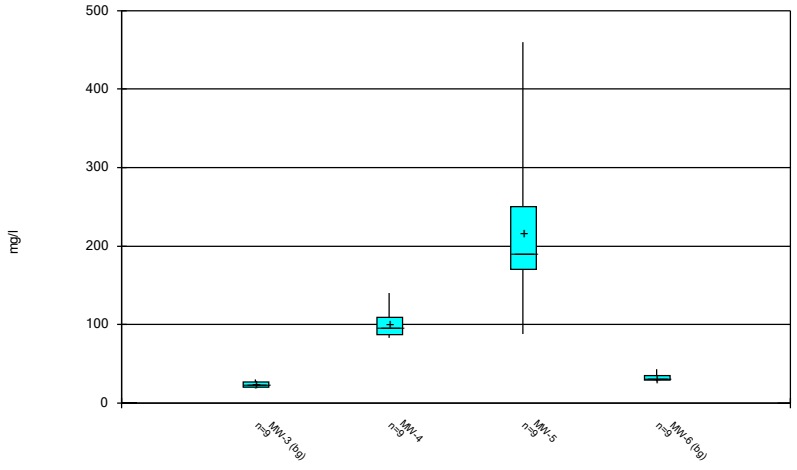
Sulfate



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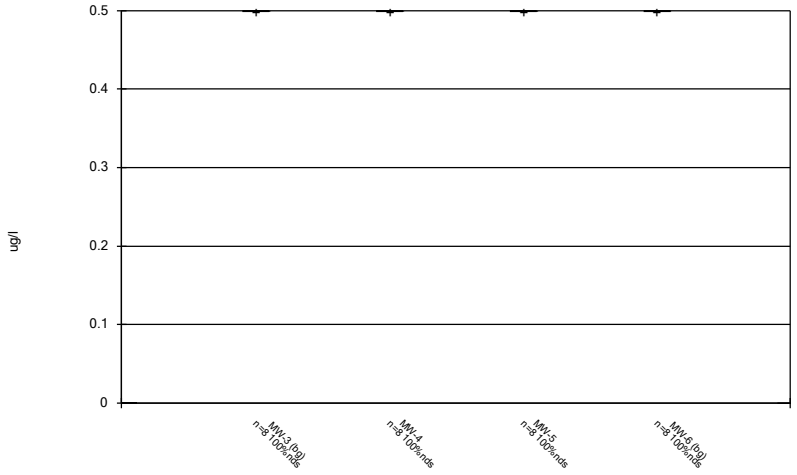
Thallium



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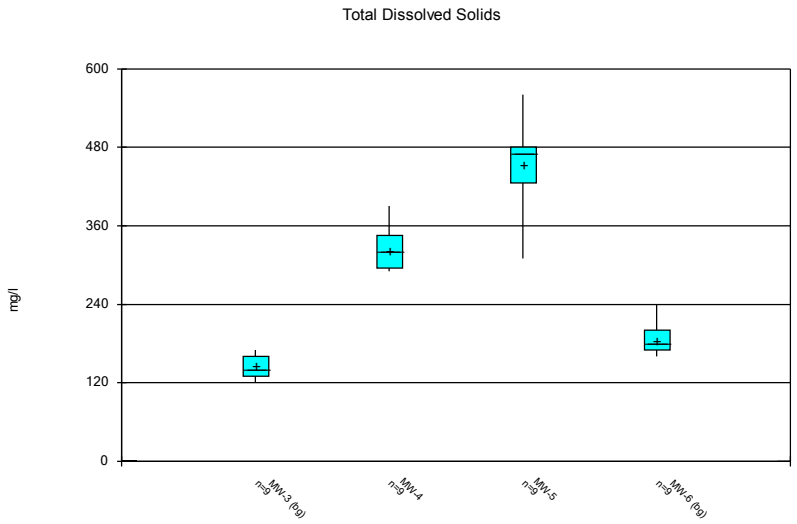

Box & Whiskers Plot Analysis Run 11/29/2017 3:17 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Box & Whiskers Plot MW-8

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17 Printed 11/29/2017, 9:37 AM

Constituent	Well	N	Mean	Median	Lower Q.	Upper Q.	Min.	Max.	%NDs
Antimony (ug/l)	MW-8	8	1.5	1.5	1.5	1.5	1.5	1.5	100
Arsenic (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Barium (ug/l)	MW-8	8	77.5	76	74	83	68	86	0
Beryllium (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Boron (ug/l)	MW-8	9	490	510	455	525	400	540	0
Cadmium (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Calcium (mg/l)	MW-8	9	84.44	86	77.5	90	74	92	0
Chloride (mg/l)	MW-8	9	43	43	36.5	48	36	53	0
Chromium (ug/l)	MW-8	8	2	2	2	2	2	2	100
Cobalt (ug/l)	MW-8	8	1	1	1	1	1	1	100
Fluoride (mg/l)	MW-8	9	0.125	0.125	0.125	0.125	0.125	0.125	100
Lead (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Lithium (ug/l)	MW-8	8	5.875	5	5	5	5	12	87.5
Mercury (ug/l)	MW-8	8	0.1	0.1	0.1	0.1	0.1	0.1	100
Molybdenum (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
pH (S.U.)	MW-8	9	7.144	7.15	7.11	7.16	7.05	7.25	0
Radium (pCi/l)	MW-8	8	0.7804	0.822	0.639	0.97	0.314	1.067	0
Selenium (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Sulfate (mg/l)	MW-8	9	100.8	100	89	110	83	120	0
Thallium (ug/l)	MW-8	8	0.5	0.5	0.5	0.5	0.5	0.5	100
Total Dissolved Solids (mg/l)	MW-8	9	350	340	320	380	290	420	0

Antimony

Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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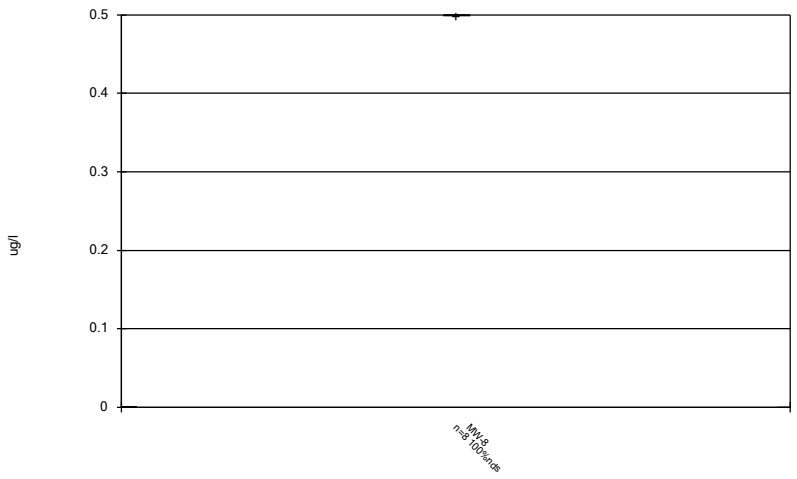
Arsenic



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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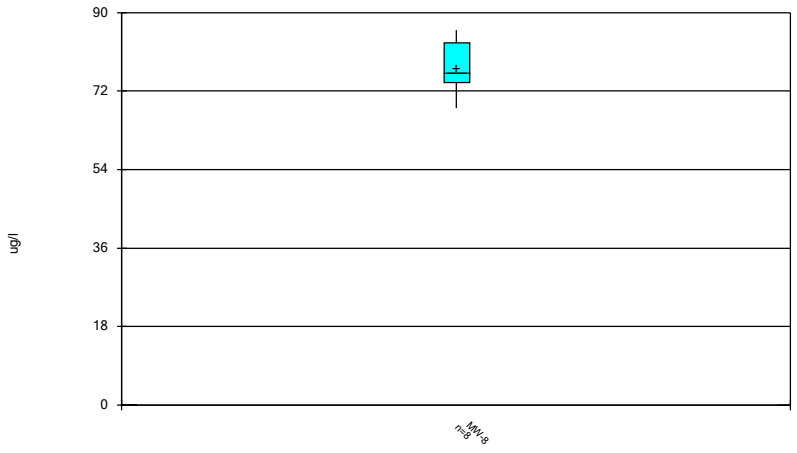
Barium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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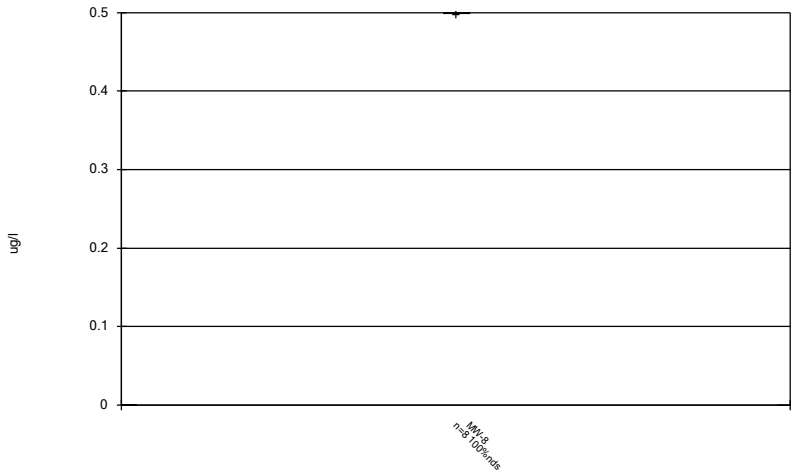
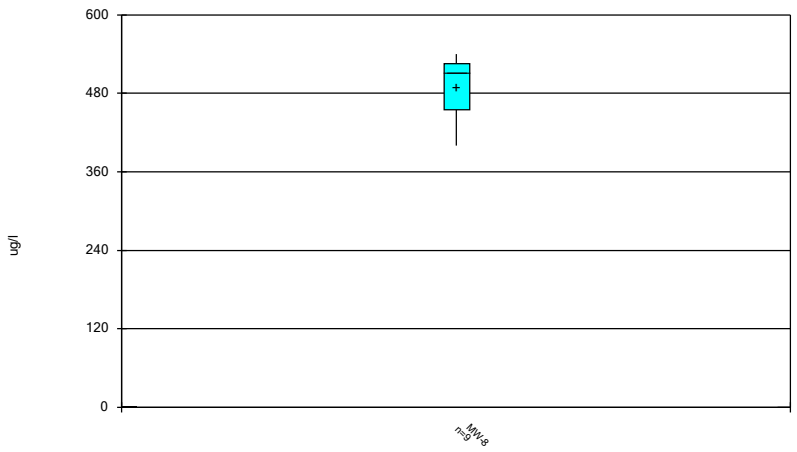
Beryllium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Boron



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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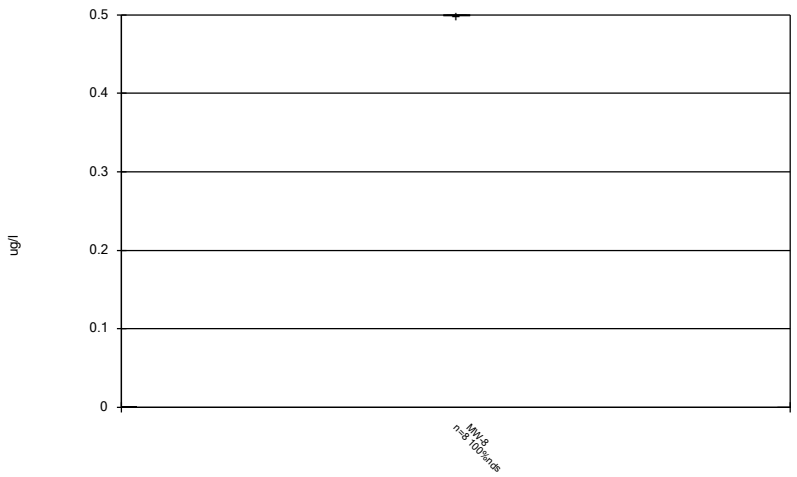
Cadmium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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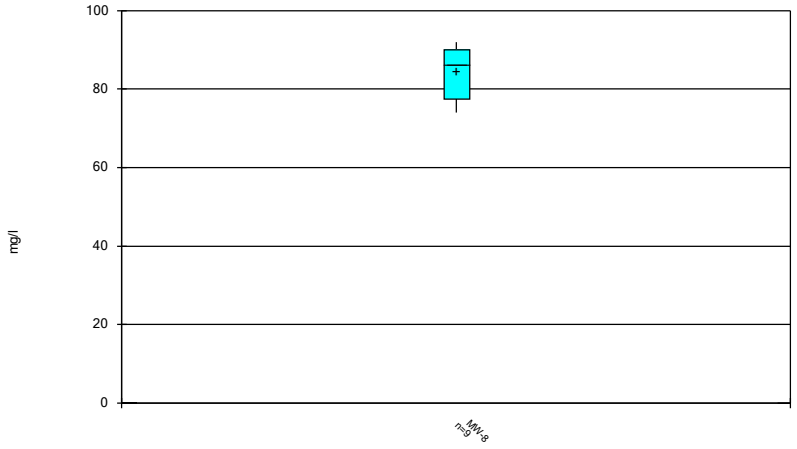
Calcium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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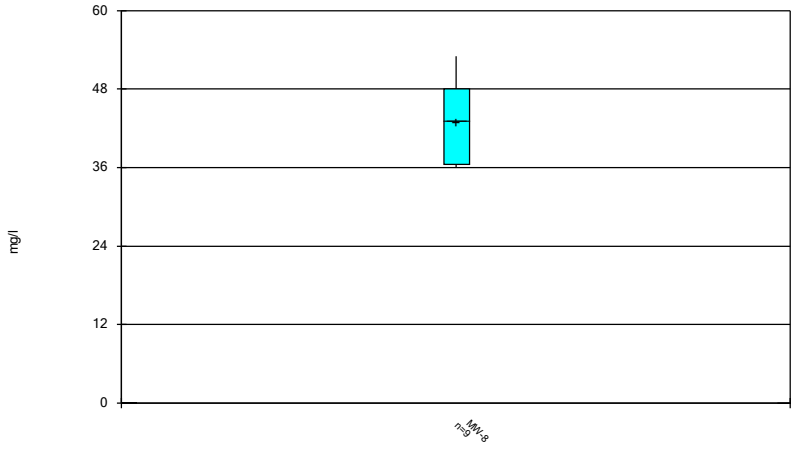
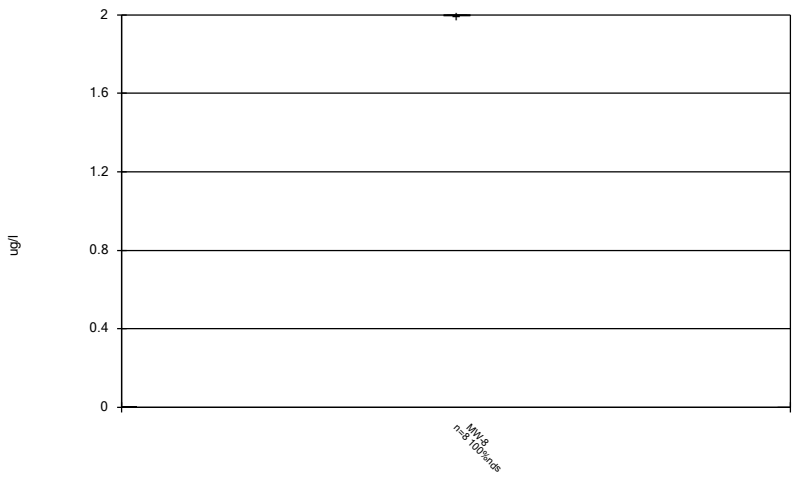
Chloride



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Chromium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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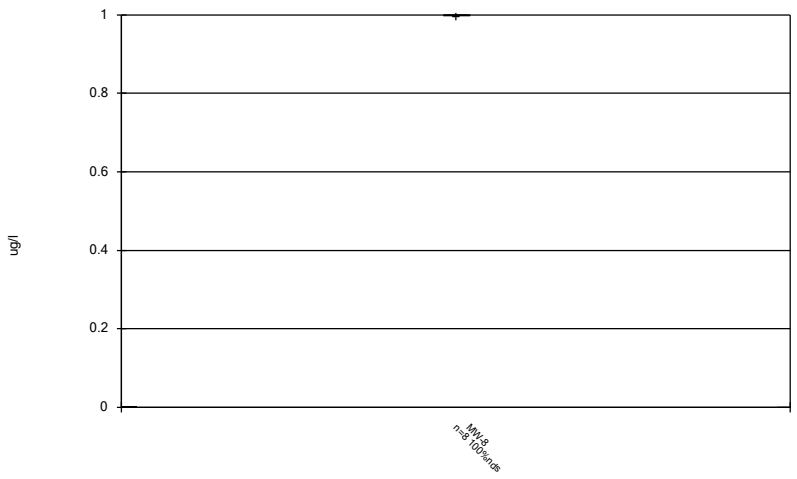
Cobalt



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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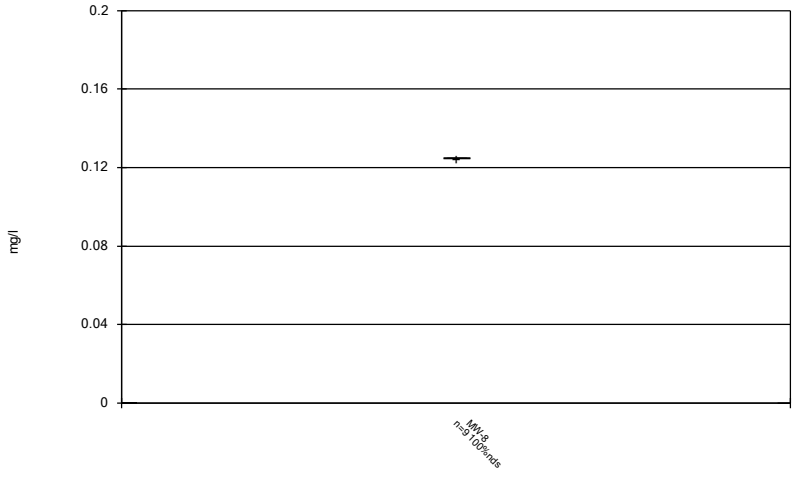
Fluoride



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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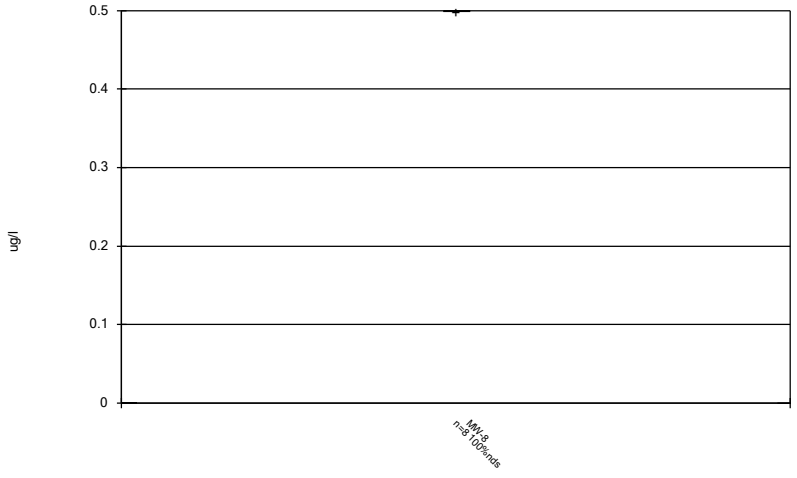
Lead



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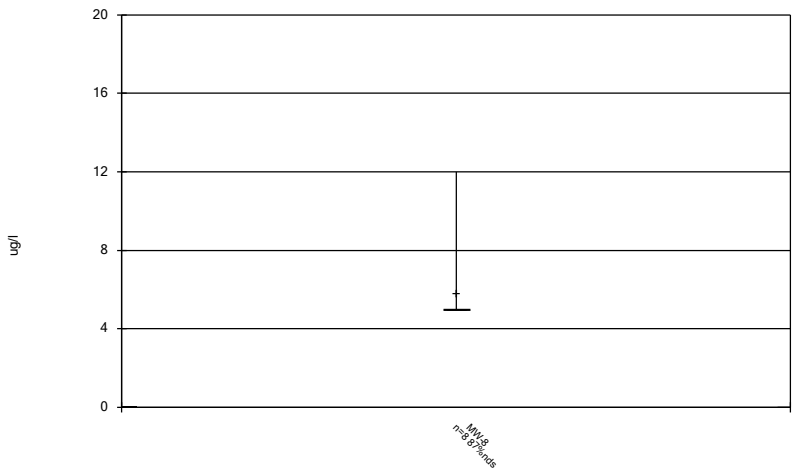
Lithium



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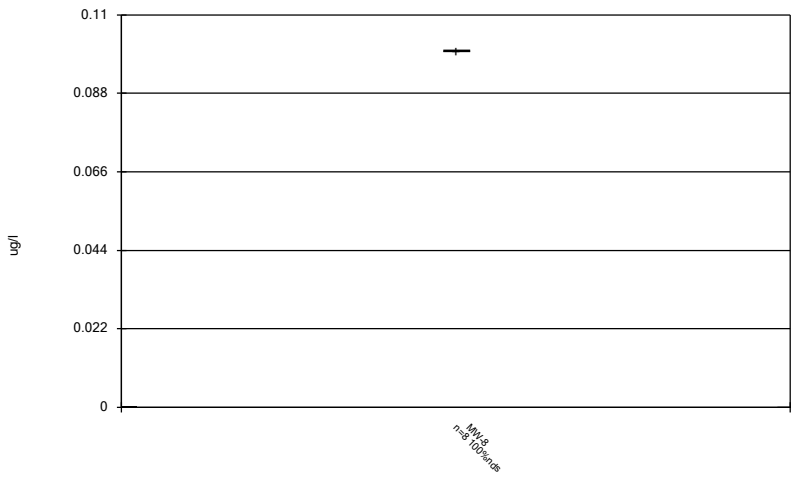
Mercury



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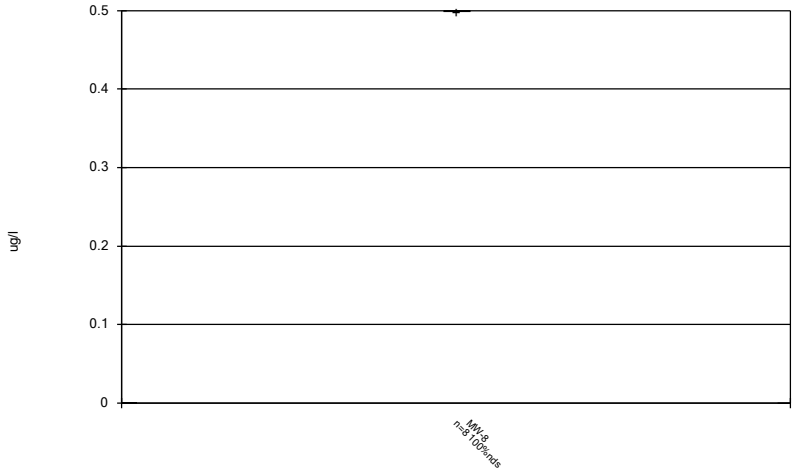
Molybdenum



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pH

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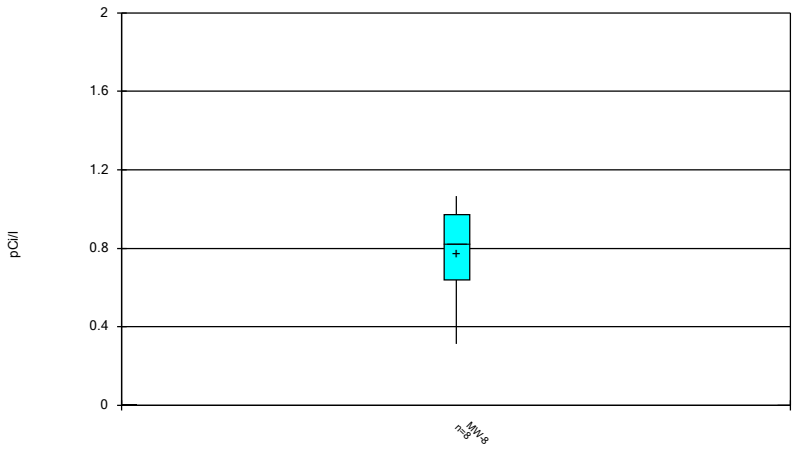
Radium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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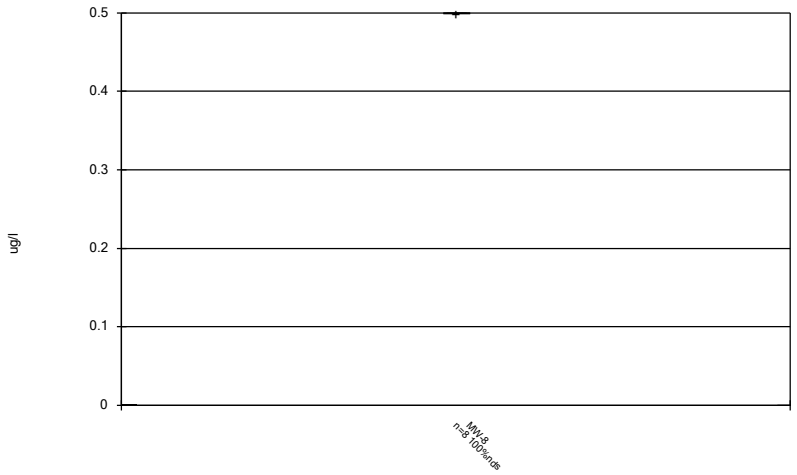
Selenium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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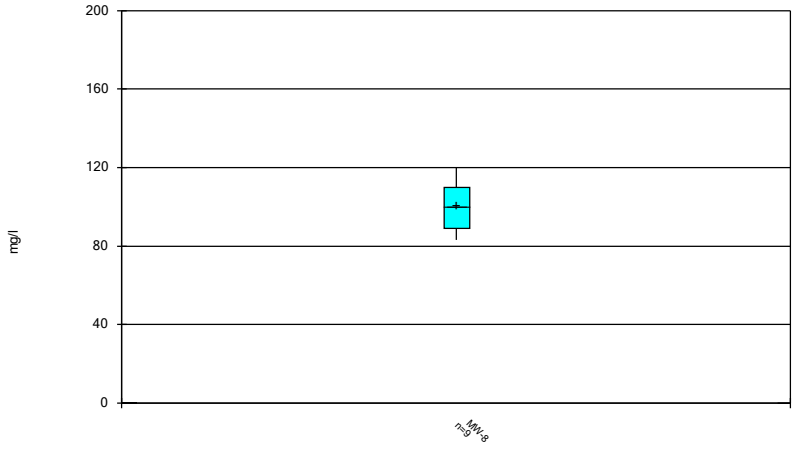
Sulfate



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
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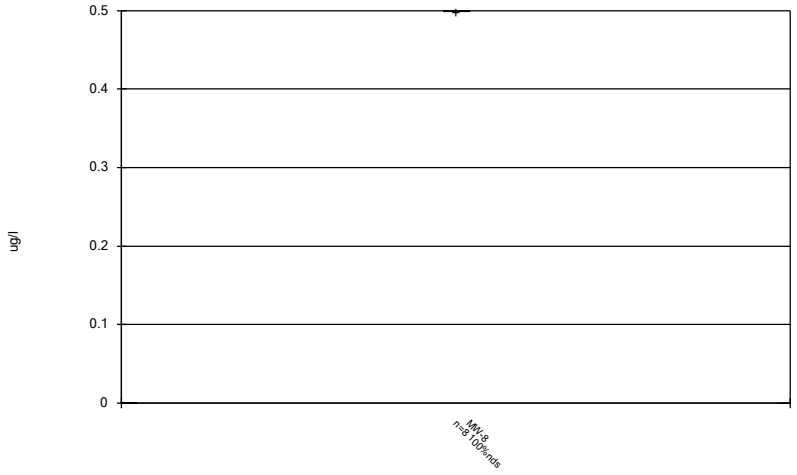
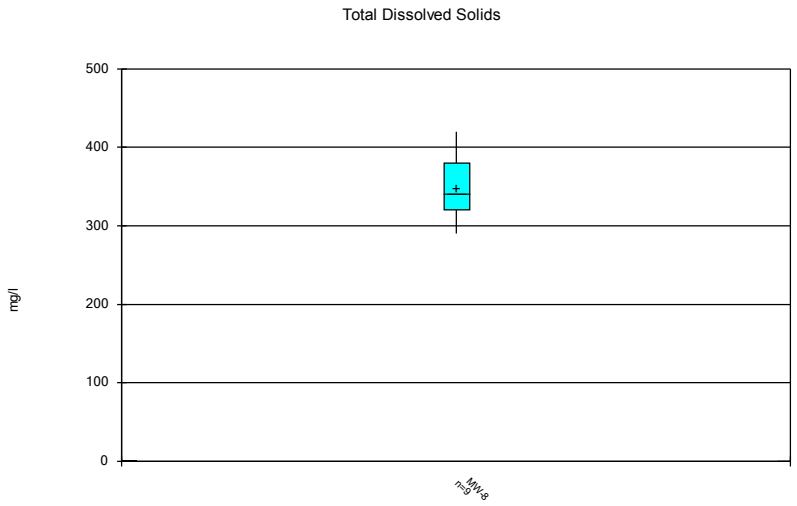
Thallium



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17



Box & Whiskers Plot Analysis Run 11/29/2017 9:36 AM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Appendix 8

Prediction Limit Charts

Prediction Limits - MW-3, 4, 5, 6, & 8

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17 Printed 1/10/2019, 4:03 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (ug/l)	MW-3	57.21	n/a	6/13/2018	23	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-4	1734	n/a	6/13/2018	1200	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-5	5700	n/a	6/13/2018	370	No	8	0	n/a	0.02144	NP Intra (normality) ...
Boron (ug/l)	MW-6	60.62	n/a	6/13/2018	43	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-8	596.7	n/a	6/13/2018	520	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-3	25.46	n/a	6/13/2018	20	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-4	95.25	n/a	6/13/2018	80	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-5	240	n/a	6/13/2018	130	No	8	0	n/a	0.02144	NP Intra (normality) ...
Calcium (mg/l)	MW-6	49.29	n/a	6/13/2018	41	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	**MW-8**	**101.7**	**n/a**	**6/13/2018**	**120**	**Yes**	**8**	**0**	**No**	**0.002505**	**Param Intra 1 of 2**
Chloride (mg/l)	MW-3	2.565	n/a	6/13/2018	1.3	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-4	18.69	n/a	6/13/2018	14	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-5	17.45	n/a	6/13/2018	11	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-6	3.083	n/a	6/13/2018	2.3	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	**MW-8**	**58.72**	**n/a**	**6/13/2018**	**65**	**Yes**	**8**	**0**	**No**	**0.002505**	**Param Intra 1 of 2**
Fluoride (mg/l)	MW-3	0.4819	n/a	6/13/2018	0.291	No	8	12.5	No	0.002505	Param Intra 1 of 2
Fluoride (mg/l)	MW-4	0.259	n/a	6/13/2018	0.125ND	No	8	87.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-5	0.255	n/a	6/13/2018	0.125ND	No	8	87.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-6	0.331	n/a	6/13/2018	0.125ND	No	8	75	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-8	0.25	n/a	6/13/2018	0.125ND	No	8	100	n/a	0.02144	NP Intra (NDs) 1 of 2
pH (S.U.)	MW-3	7.189	6.363	6/13/2018	6.59	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-4	7.529	7.291	6/13/2018	7.32	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-5	7.078	6.697	6/13/2018	6.77	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-6	7.075	6.575	6/13/2018	6.67	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-8	7.285	7.018	6/13/2018	7.11	No	8	0	No	0.001253	Param Intra 1 of 2
Sulfate (mg/l)	MW-3	33.73	n/a	6/13/2018	17	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-4	147.6	n/a	6/13/2018	86	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-5	484.6	n/a	6/13/2018	240	No	8	0	sqrt(x)	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-6	44.8	n/a	6/13/2018	32	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	**MW-8**	**131.1**	**n/a**	**6/13/2018**	**150**	**Yes**	**8**	**0**	**No**	**0.002505**	**Param Intra 1 of 2**
Total Dissolved Solids (mg/l)	MW-3	191.6	n/a	6/13/2018	130	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-4	407.2	n/a	6/13/2018	290	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-5	577.5	n/a	6/13/2018	480	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-6	250.2	n/a	6/13/2018	160	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-8	448	n/a	6/13/2018	430	No	8	0	No	0.002505	Param Intra 1 of 2

Prediction Limits - MW-3, 4, 5, 6, & 8

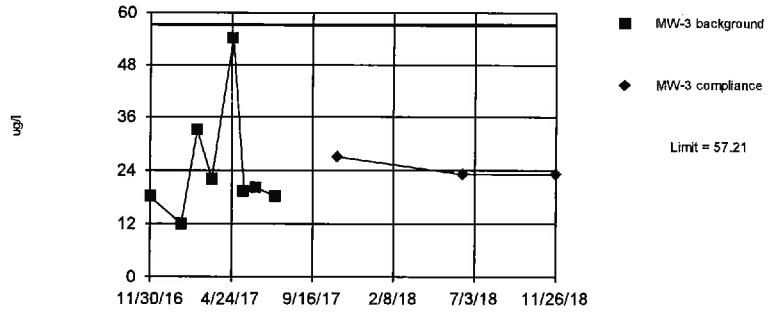
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17 Printed 1/10/2019, 4:13 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (ug/l)	MW-3	57.21	n/a	11/26/2018	23	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-4	1734	n/a	11/26/2018	1100	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-5	5700	n/a	11/26/2018	420	No	8	0	n/a	0.02144	NP Intra (normality) ...
Boron (ug/l)	MW-6	60.62	n/a	11/26/2018	46	No	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/l)	MW-8	596.7	n/a	11/26/2018	500	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-3	25.46	n/a	11/26/2018	17	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-4	95.25	n/a	11/26/2018	64	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-5	240	n/a	11/26/2018	120	No	8	0	n/a	0.02144	NP Intra (normality) ...
Calcium (mg/l)	MW-6	49.29	n/a	11/26/2018	36	No	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/l)	MW-8	101.7	n/a	11/26/2018	94	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-3	2.565	n/a	11/26/2018	1.5	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-4	18.69	n/a	11/26/2018	8.8	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-5	17.45	n/a	11/26/2018	17	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-6	3.083	n/a	11/26/2018	1.5	No	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/l)	MW-8	58.72	n/a	11/26/2018	45	No	8	0	No	0.002505	Param Intra 1 of 2
Fluoride (mg/l)	MW-3	0.4819	n/a	11/26/2018	0.301	No	8	12.5	No	0.002505	Param Intra 1 of 2
Fluoride (mg/l)	MW-4	0.259	n/a	11/26/2018	0.125ND	No	8	87.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-5	0.255	n/a	11/26/2018	0.125ND	No	8	87.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-6	0.331	n/a	11/26/2018	0.313	No	8	75	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/l)	MW-8	0.25	n/a	11/26/2018	0.125ND	No	8	100	n/a	0.02144	NP Intra (NDs) 1 of 2
pH (S.U.)	MW-3	7.189	6.363	11/26/2018	6.5	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-4	7.529	7.291	11/26/2018	7.36	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-5	7.078	6.697	11/26/2018	6.74	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-6	7.075	6.575	11/26/2018	6.72	No	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-8	7.285	7.018	11/26/2018	7.17	No	8	0	No	0.001253	Param Intra 1 of 2
Sulfate (mg/l)	MW-3	33.73	n/a	11/26/2018	18	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-4	147.6	n/a	11/26/2018	54	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-5	484.6	n/a	11/26/2018	230	No	8	0	sqrt(x)	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-6	44.8	n/a	11/26/2018	29	No	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/l)	MW-8	131.1	n/a	11/26/2018	100	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-3	191.6	n/a	11/26/2018	100	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-4	407.2	n/a	11/26/2018	260	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-5	577.5	n/a	11/26/2018	520	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-6	250.2	n/a	11/26/2018	180	No	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/l)	MW-8	448	n/a	11/26/2018	320	No	8	0	No	0.002505	Param Intra 1 of 2

Within Limit

Boron

Intrawell Parametric



Background Data Summary: Mean=24.5, Std. Dev.=13.31, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7709, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Prediction Limit Analysis Run 1/10/2019 4:12 PM View: SBMU-SPS Appendix III

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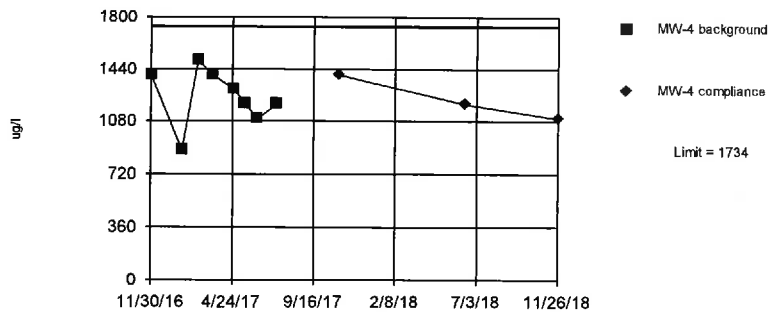
Within Limit

Boron

Intrawell Parametric



Background Data Summary: Mean=1248, Std. Dev.=198, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9503, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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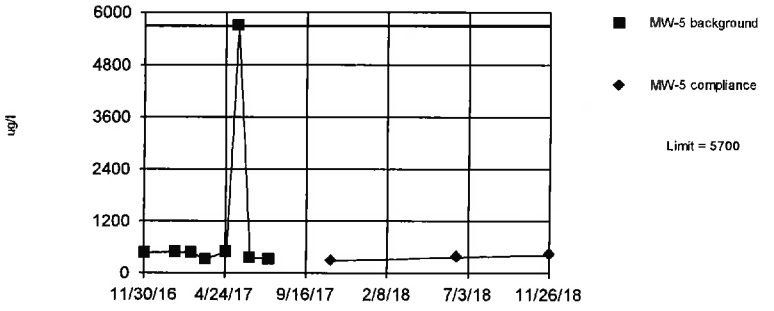
Within Limit

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. 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.

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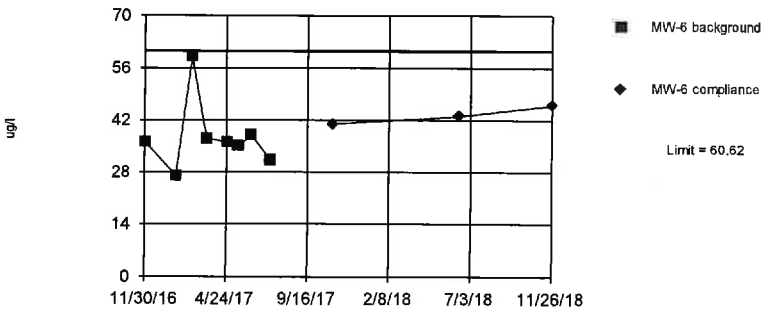
Within Limit

Boron

Intrawell Parametric



Background Data Summary: Mean=37.38, Std. Dev.=9.456, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7684, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

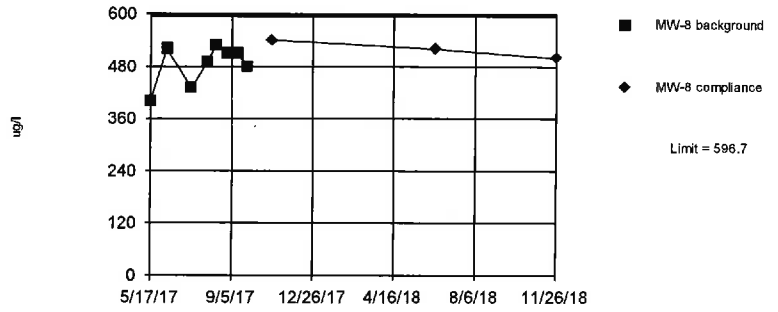
Prediction Limit Analysis Run 1/10/2019 4:12 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Boron

Intrawell Parametric



Background Data Summary: Mean=483.8, Std. Dev.=45.96, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8712, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

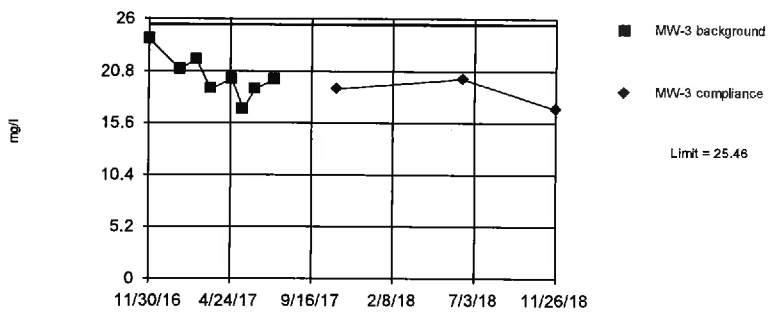
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Calcium

Intrawell Parametric



Background Data Summary: Mean=20.25, Std. Dev.=2.121, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9723, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

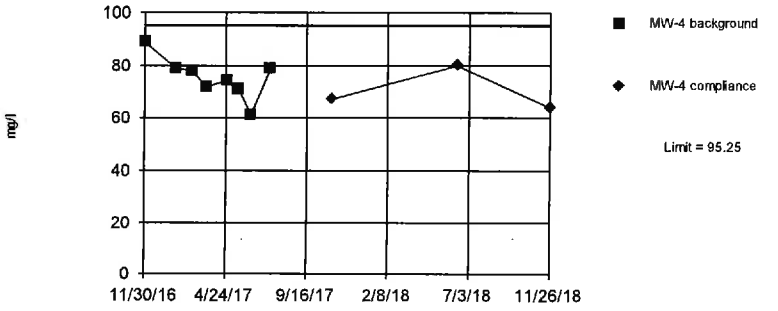
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Calcium

Intrawell Parametric



Background Data Summary: Mean=75.38, Std. Dev.=8.088, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9559, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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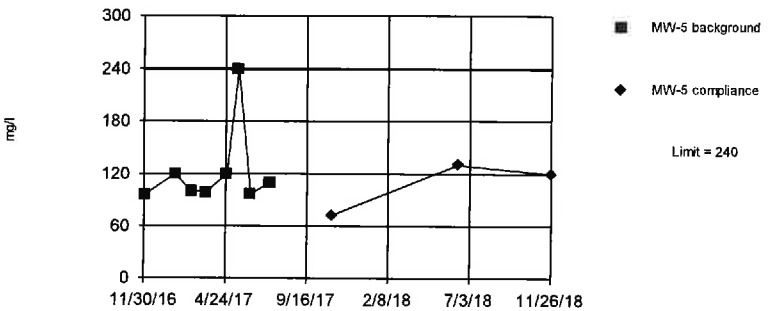
Within Limit

Calcium

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.

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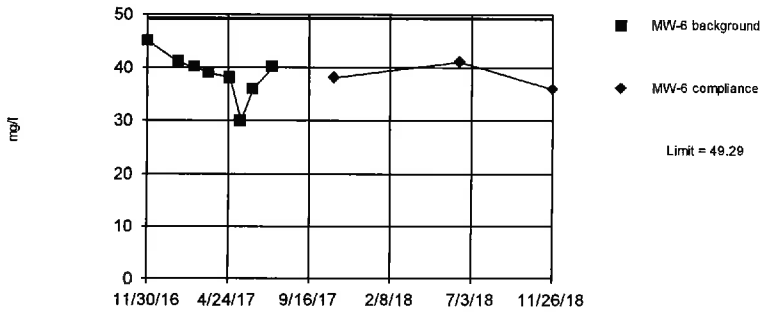
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Calcium

Intrawell Parametric



Background Data Summary: Mean=38.63, Std. Dev.=4.34, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9284, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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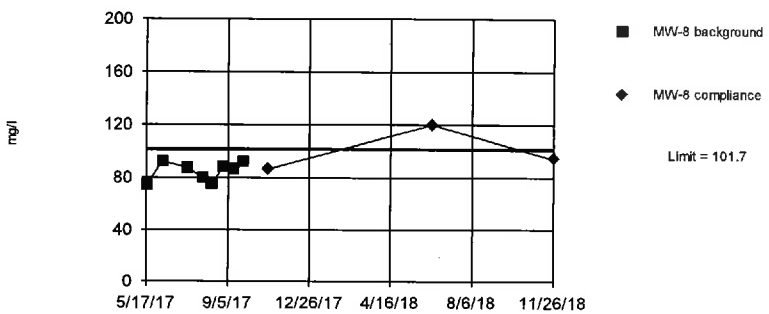
Within Limit

Calcium

Intrawell Parametric



Background Data Summary: Mean=84.25, Std. Dev.=7.106, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8885, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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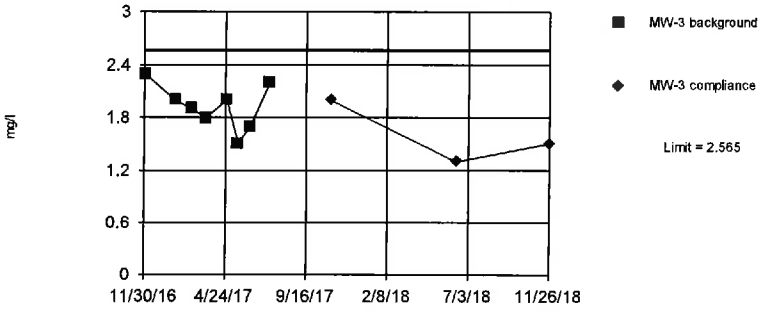
Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=1.925, Std. Dev.=0.2605, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9816, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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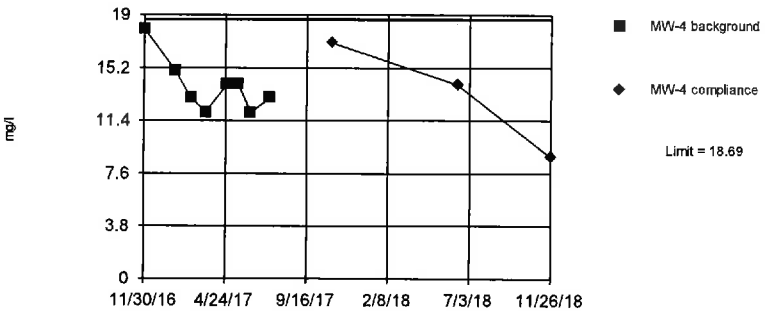
Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=13.88, Std. Dev.=1.959, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8612, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

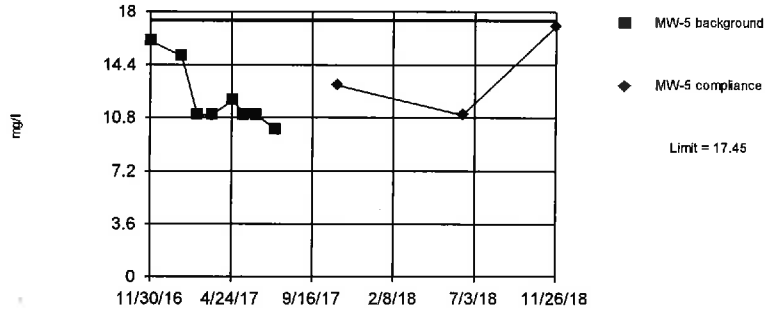
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=12.13, Std. Dev.=2.167, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7822, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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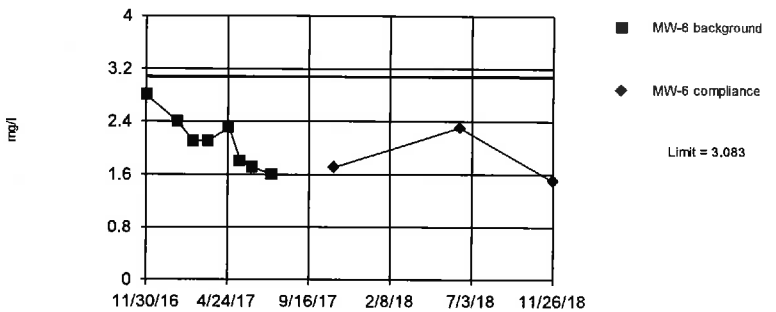
Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=2.1, Std. Dev.=0.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9562, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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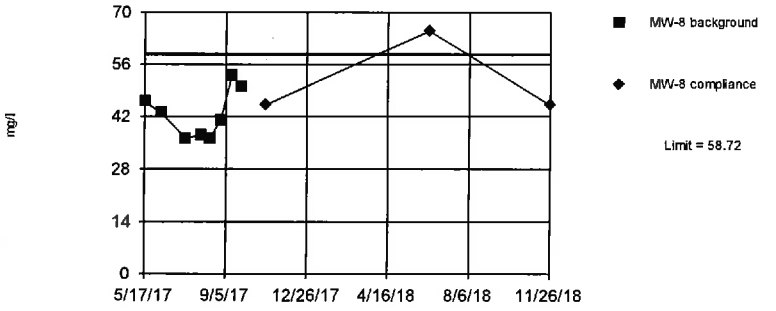
Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=42.75, Std. Dev.=6.497, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9101, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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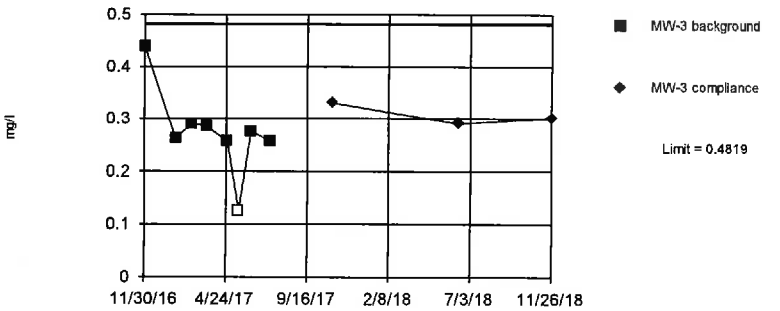
Hollow symbols indicate censored values.

Within Limit

Fluoride

Intrawell Parametric



Background Data Summary: Mean=0.2736, Std. Dev.=0.08475, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8446, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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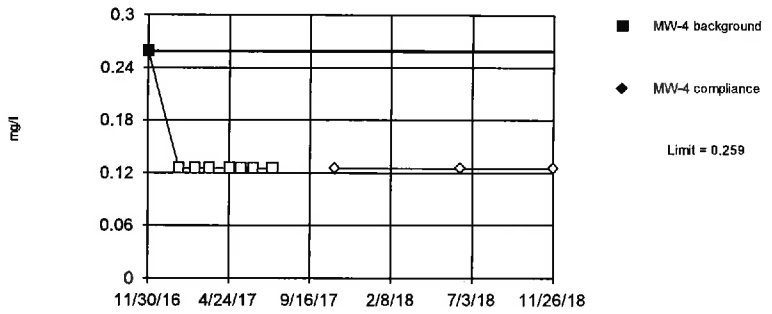
Hollow symbols indicate censored values.

Within Limit

Fluoride

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. 87.5% 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.

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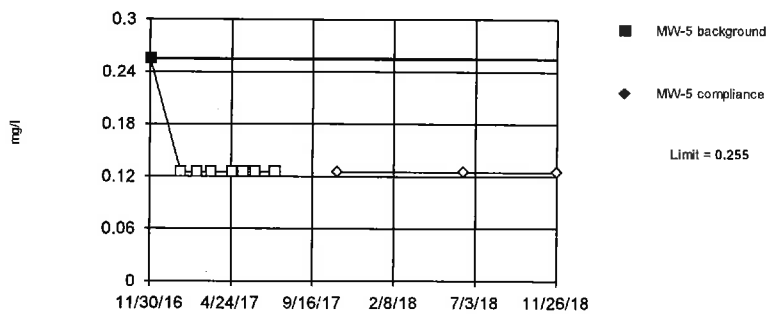
Hollow symbols indicate censored values.

Within Limit

Fluoride

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. 87.5% 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 4:13 PM View: SBMU-SPS Appendix III
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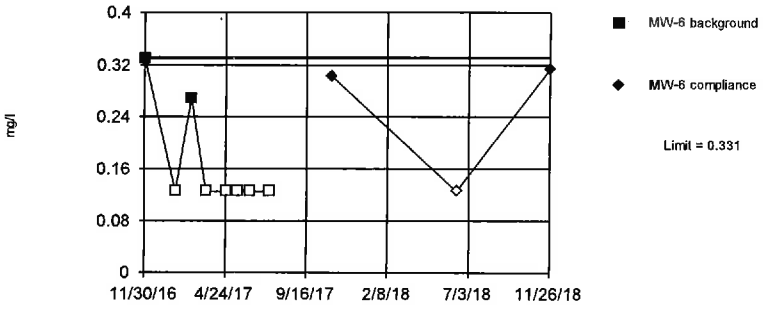
Hollow symbols indicate censored values.

Within Limit

Fluoride

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. 75% 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 4:13 PM View: SBMU-SPS Appendix III
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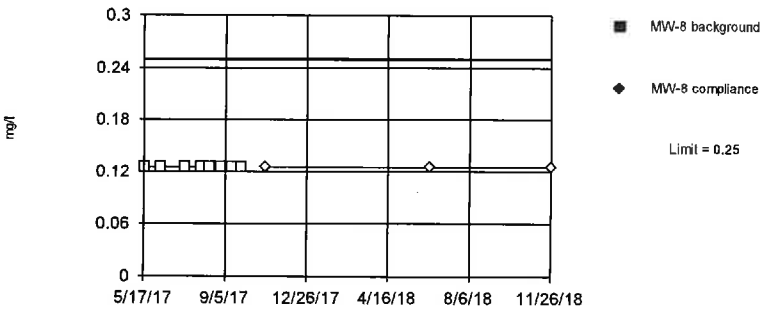
Hollow symbols indicate censored values.

Within Limit

Fluoride

Intrawell Non-parametric



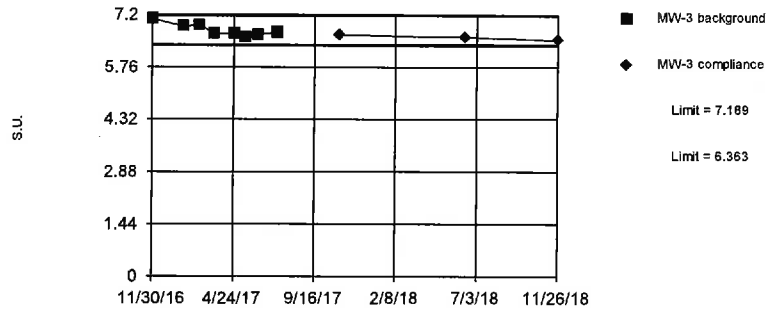
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test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

Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limits

pH

Intrawell Parametric



Background Data Summary: Mean=6.776, Std. Dev.=0.1681, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8856, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

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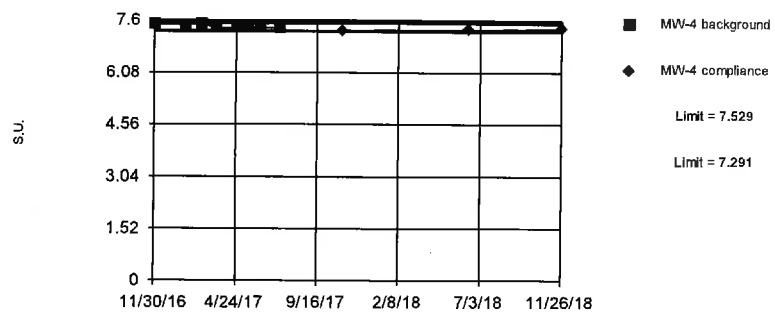
Within Limits

pH

Intrawell Parametric



Background Data Summary: Mean=7.41, Std. Dev.=0.0484, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7828, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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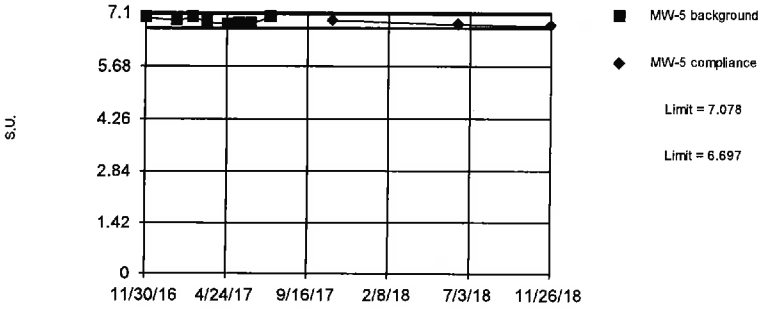
Within Limits

pH

Intrawell Parametric



Background Data Summary: Mean=6.888, Std. Dev.=0.07741, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8471, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

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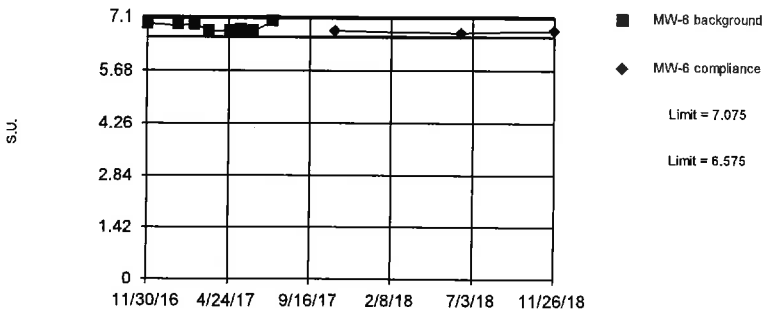
Within Limits

pH

Intrawell Parametric



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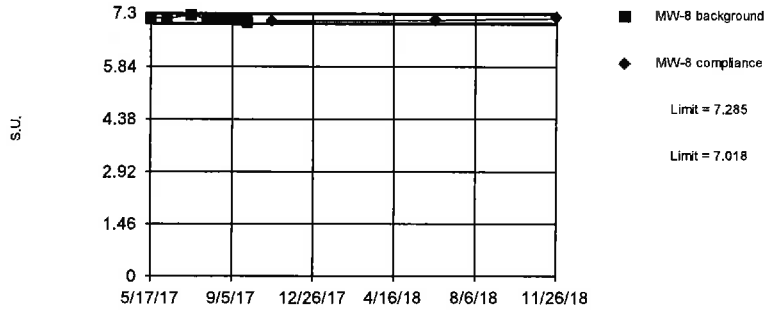
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limits

pH

Intrawell Parametric



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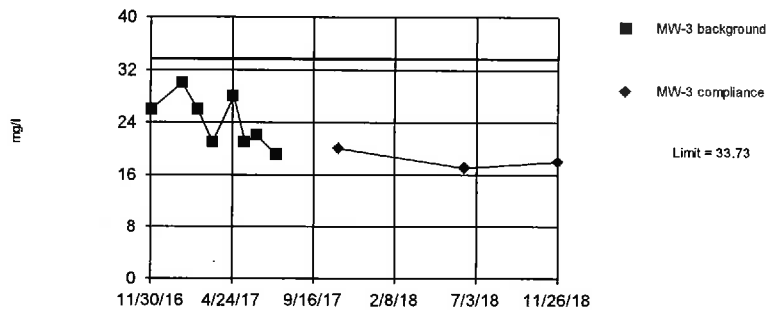
Within Limit

Sulfate

Intrawell Parametric



Background Data Summary: Mean=24.13, Std. Dev.=3.907, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9297, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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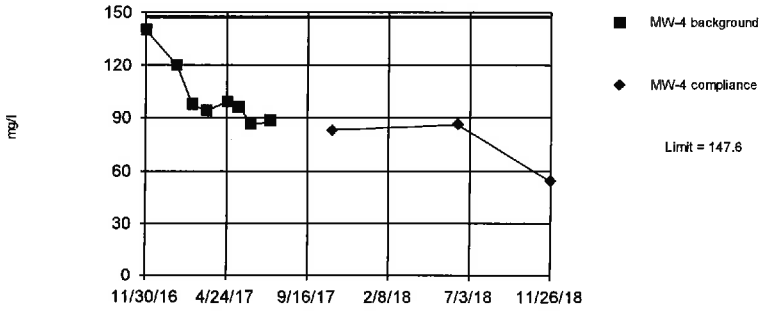
Within Limit

Sulfate

Intrawell Parametric



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SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

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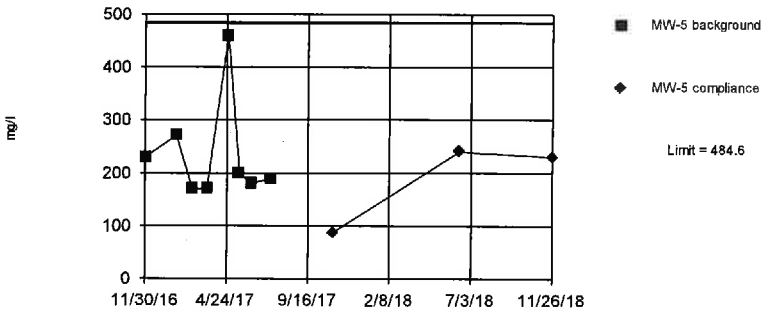
Within Limit

Sulfate

Intrawell Parametric



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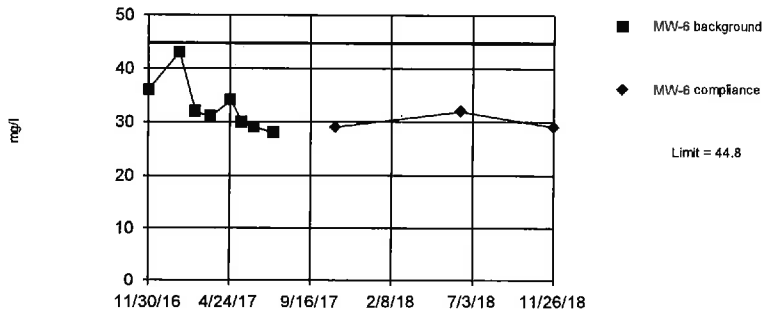
Within Limit

Sulfate

Intrawell Parametric



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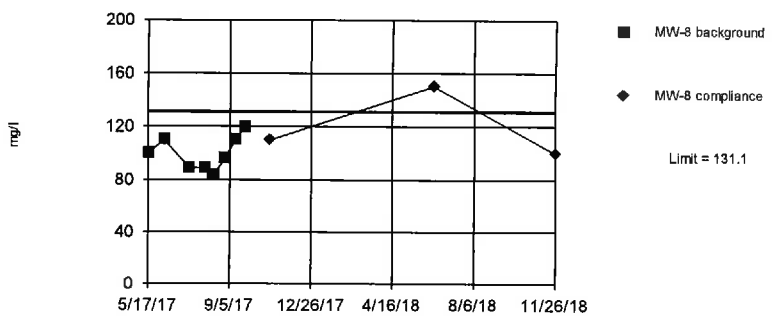
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Sulfate

Intrawell Parametric



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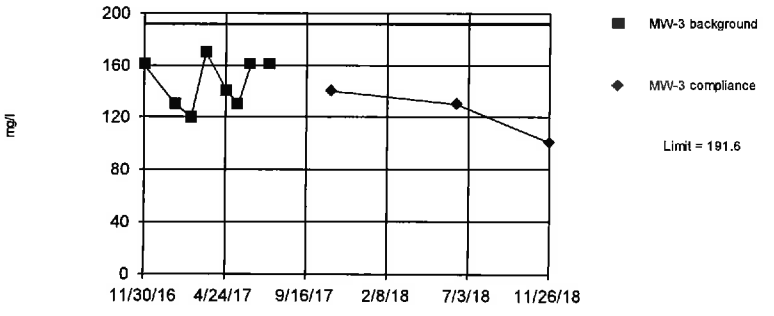
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Total Dissolved Solids

Intrawell Parametric



Background Data Summary: Mean=146.3, Std. Dev.=18.47, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8903, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

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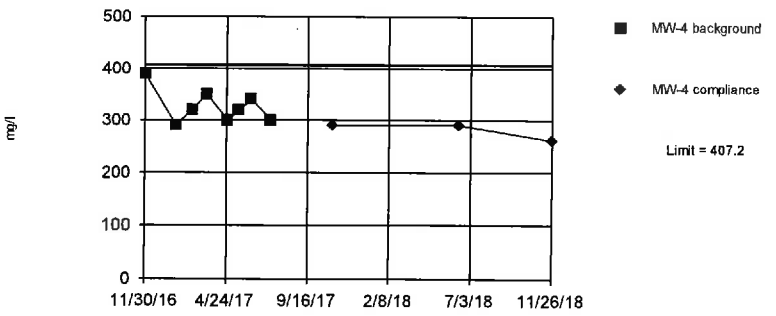
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Total Dissolved Solids

Intrawell Parametric



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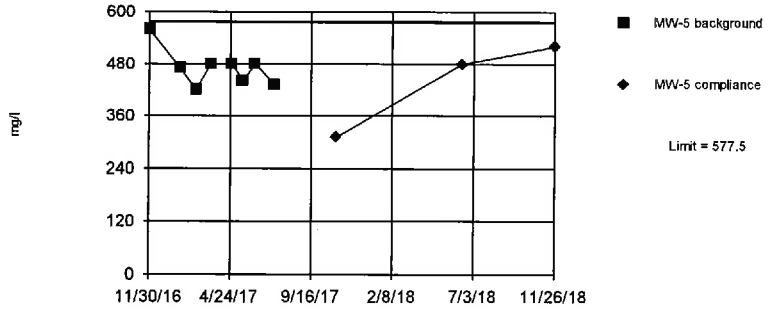
Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Within Limit

Total Dissolved Solids

Intrawell Parametric



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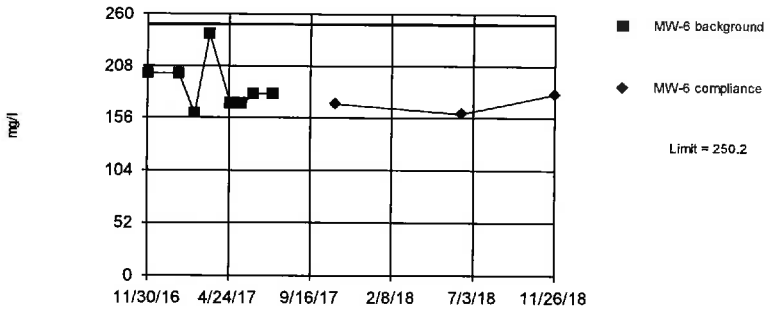
Within Limit

Total Dissolved Solids

Intrawell Parametric



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Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

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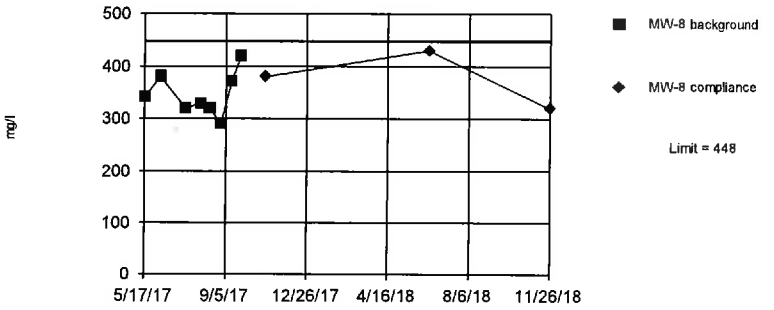
Within Limit

Total Dissolved Solids

Intrawell Parametric



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Prediction Limit Analysis Run 1/10/2019 4:13 PM View: SBMU-SPS Appendix III

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SBMU-SPS EDD File 09-28-17

Appendix 9

Alternate Source Demonstration

1505 East High Street
Jefferson City, Missouri 65101
Telephone (573) 659-9078
Facsimile (573) 659-9079

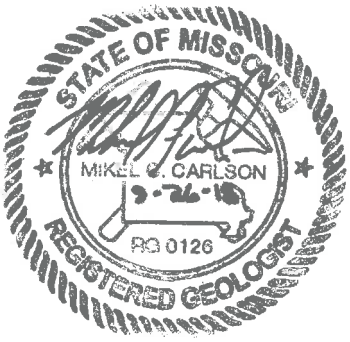
GREDELL Engineering Resources, Inc.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Bottom Ash Pond
Alternate Source Demonstration

Prepared for:

BMU Sikeston
Board of Municipal Utilities

Sikeston Power Station
1551 West Wakefield Avenue
Sikeston, MO 63801



September 2018

PROFESSIONAL ENGINEER'S CERTIFICATION

40 CFR 257.94(e)(2) Alternate Source Demonstration

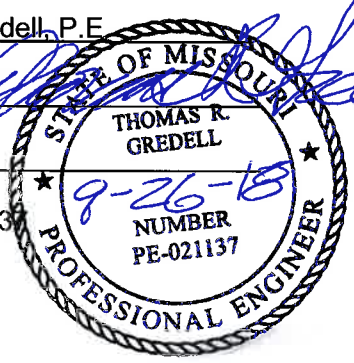
I, Thomas R. Gredell, P.E., a professional engineer licensed in the State of Missouri, hereby certify in accordance with 40 CFR 257.94(e)(2) to the accuracy of the alternate source demonstration described in the following report for the Sikeston Board of Municipal Utilities, Sikeston Power Station, Bottom Ash Pond CCR unit. The report demonstrates that the statistically significant increase of chloride, sulfate, and calcium in MW-8 resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. This demonstration successfully meets the requirements of 40 CFR 257.94(e) as found in federal regulation 40 CFR 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments. In addition, the demonstration was made using EPA Unified Guidance (Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance: EPA 530/R-09-007) and generally accepted methods.

Name: Thomas R. Gredell, P.E.

Signature: _____

Date: 9-26-18

Registration Number: PE-021137
State of Registration: Missouri



Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Bottom Ash Pond
Alternate Source Demonstration

September 2018

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1.0 INTRODUCTION

This Alternate Source Demonstration Report has been prepared to address the results of the semi-annual sampling event conducted on June 13, 2018 at the Sikeston Board of Municipal Utilities (SBMU) Sikeston Power Station's (SPS) Bottom Ash Pond, a coal combustion residual (CCR) surface impoundment. Following receipt of final analytical data, statistical analysis was performed by GREDELL Engineering Resources, Inc. (Gredell Engineering) on June 29, 2018 in accordance with the approved plan for the parameters listed in Appendix III to Part 257 – Constituents for Detection Monitoring. The results of the statistical evaluation suggested the apparent presence of three statistically significant increases (SSIs) in one of five wells constituting the groundwater monitoring well system for the Bottom Ash Pond. These initial results were confirmed by subsequent analytical data received on July 24, 2018, following resampling and re-analysis of the well in question, designated MW-8.

As stated in §257.94(e)(2), an owner or operator may demonstrate that a source other than the CCR unit caused the apparent SSI over background levels for a constituent or that the apparent SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting an apparent SSI over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner of the CCR unit may continue with a detection monitoring program. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e), in addition to the certification by a qualified professional engineer.

Gredell Engineering has completed a review of the groundwater sampling and analytical data for the SBMU SPS Bottom Ash Pond groundwater monitoring well system to determine if an alternate source is the cause of the apparent SSIs in monitoring well MW-8. This report presents the results of that evaluation and includes supporting documentation.

2.0 OBSERVATIONS AND DATA COLLECTION

The Bottom Ash Pond groundwater monitoring well system consists of five wells, designated MW-3, MW-4, MW-5, MW-6, and MW-8 (Figure 1). Monitoring wells MW-3, MW-4, MW-5, and MW-6 were installed in April 2016, and sampled on an approximate monthly basis beginning in November 2016 and ending in July 2017 to establish a background data base. Monitoring well MW-8 was installed in April 2017, and was sampled at an increased frequency beginning in May 2017 and ending in September 2017. The increased background sampling frequency of MW-8 was necessary to comply with §257.94(b), which states, "…*a minimum of eight independent samples from each background and downgradient well must be collected and analyzed for the constituents listed in appendix III and IV to this part no later than October 17, 2017"*. Table 1 summarizes the sampling dates and water quality data for each sampling event pertaining to this monitoring well system. Additional information regarding these wells is available in the Bottom Ash Pond monitoring well design, installation, and development report (Gredell Engineering, 2017).

The results of the eight independent background sampling events were evaluated in accordance with §257.93, and intra-well analysis using prediction limits was selected as the statistical analysis approach for detection monitoring (Gredell Engineering, 2018). Following receipt of final analytical data reports from the contract laboratory, the reported concentration for each detection monitoring constituent (Table 1) from each well is compared to its respective prediction limit. If a concentration exceeds the respective prediction limit for a particular constituent well pair, or is outside the predicted range (in the case of pH), a SSI over background is suspected.

The five monitoring wells were sampled October 31, 2017 and June 13, 2018 in accordance with §257.94 Detection Monitoring Program. The results of the October 31, 2017 Detection Monitoring event, including the determination that no SSIs were noted following statistical analysis, are detailed in the 2017 Annual Groundwater Monitoring and Corrective Action Report posted in SBMU's Operating Record on January 31, 2018 (Gredell Engineering, 2018). The results of the June 13, 2018 event are described below.

Following receipt of the analytical data from the June 13, 2018 sampling event, data were compared with their respective prediction limits. Three suspected SSIs were noted for the samples analyzed from MW-8, including Calcium, Chloride, and Sulfate. The prediction limits for Calcium, Chloride, and Sulfate in MW-8 are 101.7 mg/L, 58.72 mg/L, and 131.1 mg/L, respectively, whereas the reported concentrations were 120 mg/L, 65 mg/L, and 150 mg/L, respectively. MW-8 was resampled on July 10, 2018 and the initial results for Chloride, Sulfate, and Calcium data were confirmed on July 24, 2018. These subsequent results for Calcium, Chloride, and Sulfate were 120 mg/L, 68 mg/L, and 140 mg/L, respectively (Table 1). A replicate sample also taken from MW-8 during the July 10, 2018 resampling event showed that reported concentrations of Calcium, Chloride, and Sulfate were 120 mg/L, 71, mg/L, and 150 mg/L, respectively.

3.0 DISCUSSION OF ALTERNATVE SOURCE

The U.S. Environmental Protection Agency (USEPA) provides Unified Guidance for statistical analysis of groundwater monitoring data (USEPA, 2009). This Unified Guidance was reviewed to assess the validity of the apparent SSIs detected in MW-8 following the July 10, 2018 confirmatory resampling event. Chapter 4 of the Unified Guidance discusses groundwater monitoring programs and statistical analysis of the associated data. Within this discussion are a number of items to consider when attempting "*to determine whether or not the increase is actually due to a contaminant release*". Several of these considerations are pertinent to the data associated with the Bottom Ash Pond groundwater monitoring well system and for that reason are listed below.

1. Chapter 4, page 4-8: *Could observed SSIs for naturally occurring analytes be due to longer-term (i.e., seasonal or multi-year) variation? Seasonal or other cyclical patterns should be observable in upgradient wells. Is this change occurring in both upgradient and downgradient wells? Depending on the statistical test and frequency of sampling involved, an observed SSI may be entirely due to temporal variation not accounted for in the sampling scheme.*
2. Chapter 4, page 4-8: *Were early sample data following well installation utilized in statistical testing? Initial well measurements are sometimes highly variable during a 'break in' sampling and analysis period and potentially less trustworthy.*
3. Chapter 4, page 4-9: *Have there been changes in well performance over time?*
4. Chapter 4, page 4-9: *Have there been 'mid-stream' changes in sampling procedures, e.g., increased or decreased well purging? Have sampling or purging techniques been consistently applied from well to well or from sampling event to sampling event?*
5. Chapter 4, page 4-9: *Have there been increases in well turbidity and sedimentation, which could affect observed contaminant levels?*

Each of these considerations were used to evaluate the background data and the validity of the apparent SSIs for Calcium, Chloride, and Sulfate in MW-8. The results of this evaluation are discussed below.

Unified Guidance Consideration 1

The background sampling period for well MW-8 spans a timeframe of less than five months. This short sampling period is considered unrepresentative of possible longer-term (seasonal or multi-year) variations in groundwater quality. Furthermore, the background sampling period for the remaining wells spans a timeframe of approximately eight months. Because none of the wells have a background sampling period of at least a year or more, seasonal variation or multi-year trends in background concentrations of Detection Monitoring Constituents (Table 1) cannot be fully assessed. However, the available data set for each well suggests natural seasonal variation may exist within the groundwater monitoring well system.

Figure 2 displays time series plots developed using Excel® for Calcium, Chloride, and Sulfate for each well in the Bottom Ash Pond groundwater monitoring well system. The first column of plots displays Chloride, the second column displays Sulfate, and the third column displays Calcium. Each well is represented by a single row of time series plots, with MW-3 data displayed on the first row and wells MW-4, MW-5, MW-6, and MW-8 displayed in successive rows. Note the horizontal (time) axis is identical on all plots.

Time series plots for wells MW-3, MW-4, MW-5 and MW-6 display background data spanning an eight month period (November 2016 to July 2017). Linear regression models, also developed using Excel®, of the plotted data are displayed to assess potential data trends. Ten of the twelve plots suggest a decreasing trend in the data during the background monitoring period.

Time series plots for MW-8 are displayed on the bottom row of Figure 2. MW-8 background data spans a five month period (May 2017 to September 2017). Data collected during the first three months (May 2017 to July 2017) show a decreasing trend similar to the other wells. However, these three plots also suggest an increasing trend in Chloride, Sulfate, and Calcium during late summer (July 2017 to September 2017), a period of time during which background sampling was not conducted for the remainder of the monitoring well system.

This evaluation strongly suggests that a longer background sampling interval that spans at least one year or more is better suited to assess seasonal or cyclical variation in groundwater quality from the Bottom Ash Pond groundwater monitoring system.

Unified Guidance Consideration 2

Unified Guidance indicates that chemical data from sampling during a well's 'break-in' period can be highly variable and potentially less trustworthy than data collected later relative to the construction of a well. While Unified Guidance does not specify a 'break-in' period for a well, it does suggest that data trends may indicate sampling was conducted during the 'break-in' period following new well installation. Well construction records were reviewed to assess the time lapse between construction and background sampling. Background sampling of wells MW-3, MW-4, MW-5, and MW-6 began seven months after construction, whereas background sampling of MW-8 began one month after well construction to ensure compliance with §257.94(b). The time series plots for MW-8, discussed above, suggest multiple data trends that suggest sampling was conducted prior to 'break-in'.

This review strongly suggests that allowance of a longer 'break-in' period for monitoring well MW-8 and the incorporation of additional background data collected later relative to the date of well construction may result in more representative background data.

Unified Guidance Considerations 3, 4, and 5

Based on field records, changes are apparent in well MW-8 with regard to well performance. The field sampling logs for MW-8 during both the June 13, 2018 sampling event and the July 10, 2018

resampling event (Appendix 1) indicate yellow or orange flakes were present in the purged water and in the sample, but field logs from previous sampling events for this well do not document similar observations. The presence of these flakes are believed indicative of changes in biologic activity in the water column screened by the well, which apparently affected both well performance and the recorded turbidity in purge water removed prior to sampling.

The total purge volume recorded in MW-8 during each of the background sampling events, in milliliters (mL), was; 2,180, 2,180, 2,840, 2,700, 2,600, 2,280, 1,720, and 2,640, respectively (Appendix 1). However, the total purge volume during the June 13, 2018 semi-annual sampling event was 7,720 mL, or approximately three times the average background purge volume for this well. During a post-sampling debriefing, field personnel indicated that the increased purge time and volume was necessary to achieve field parameter (turbidity) stabilization. Review of the Field Sampling Log for this event (Appendix 1) confirms that turbidity values were elevated and required increased purge time and volume relative to previous sampling event observations in order to stabilize.

Based on field sampling logs, the maximum turbidity value recorded from purging of MW-8 during each of the eight background sampling events was, in Nephelometric Turbidity Units (NTU); 3.57, 2.02, 1.66, 0.98, 2.98, 1.79, 0.67, and 0.86, respectively, but the maximum turbidity reading recorded during the June 13, 2018 semi-annual sampling event was 148.9 NTU (Appendix 1). The final (sampled) MW-8 turbidity reading during the June 13, 2018 semi-annual sampling event was 4.80 NTU, which is at least twice the final turbidity value recorded in MW-8 during previous sampling events (Table 1). The field sampling log for the July 10, 2018 resampling event similarly reflects elevated turbidity values (Appendix 1).

These data collectively suggest that well performance, sampling procedures, and turbidity levels changed between the background sampling period and the June 13, 2018 semi-annual sampling event. All of these factors are described by Unified Guidance as potential causes of false positives (and alternate sources) for apparent SSI detections during statistical evaluation.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Gredell Engineering concludes that the apparent SSIs of Chloride, Sulfate, and Calcium in MW-8 detected during the June 13, 2018 sampling event are attributable to alternate sources that have created false positives in the analytical data results. The range in concentrations of these three constituents potentially vary seasonally or cyclically over a duration longer than the span of the background sampling period for each of the Bottom Ash Pond groundwater monitoring system wells, as is suggested by time series plots (Figure 2). Additionally, the background sampling period for MW-8 was largely coincident with the 'break-in' period of the well following construction, which likely resulted in the collection of unrepresentative background data. Finally, the performance of MW-8 changed during the June 13, 2018 sampling event relative to previous sampling events. This performance change was manifested by the appearance of orange and yellow flakes potentially attributable to biologic activity and resulting in increased turbidity as observed during well purging. The increased turbidity resulted in significantly increased purge time and volume to achieve the stabilization criteria necessary for collection of a representative groundwater sample. Based on these conclusions, Gredell Engineering recommends the following:

1. Continue with semi-annual detection monitoring in accordance with §257.94;
2. Re-develop MW-8 to reduce or eliminate turbidity;
3. Conduct quarterly sampling of all Bottom Ash Pond wells for the constituents listed in Appendix III and IV to Part 257, and continue data acquisition for a minimum of eight quarters. Data resulting from these sampling events can also be used to fulfil §257.94 requirements for semi-annual detection monitoring of the Bottom Ash Pond groundwater monitoring system, and;
4. Update background data sets for the Bottom Ash Pond groundwater monitoring system wells at a frequency in accordance with Unified Guidance.

5.0 REFERENCES

GREDELL Engineering Resources, Inc., 2017, Sikeston Power Station Documentation of Monitoring Well Design, Installation & Development for Compliance with 40 CFR 257.91. Prepared for Sikeston Board of Municipal Utilities, October 17, 2017.

GREDELL Engineering Resources, Inc., 2018, Sikeston Power Station 2017 Annual Groundwater Monitoring and Corrective Action Report for Bottom Ash Pond for Compliance with USEPA 40 CFR 257.90(e). Prepared for Sikeston Board of Municipal Utilities, January 26, 2018.

USEPA, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance: EPA 530/R-09-007, Office of Resource Conservation and Recovery, Program Implementation and Information Division, Washington, D.C.

FIGURES

N

SCALE: 1" = 500'

0 250 500

LEGEND

PROPERTY LINE (APPROXIMATE)	PL
MONITORING WELL	MW
UP GRADIENT MONITORING LOCATION	UG
DOWN GRADIENT MONITORING LOCATION	DG

NOTES:
1. IMAGE PROVIDED BY BING MAPS.
2. MONITORING WELL LOCATIONS/ELEVATIONS SURVEYED BY BOWEN ENGINEERING & SURVEYING.

FIGURE 1
SIKESTON POWER STATION

BOTTOM ASH POND GROUNDWATER MONITORING WELL SYSTEM

GREDELL Engineering Resources, Inc.
ENVIRONMENTAL ENGINEERING LAND - AIR - WATER
1505 East High Street Telephone: (573) 659-9078
Jefferson City, Missouri Facsimile: (573) 659-9079
MO CORP. ENGINEERING LICENSE NO. E-2001001669-D

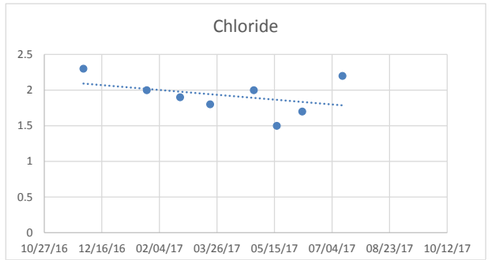
DATE	SCALE	PROJECT NAME	REVISION
10/2018	AS NOTED	SIKESTON	
DRAWN	APPROVED	FILE NAME	SHEET #
CP	MCC	LOCATION RESTRICTION	1 OF 1

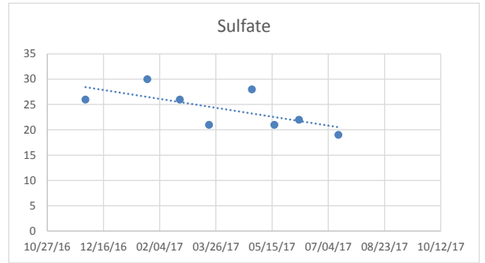
M:\Share\CADDFiles\SIKESTON\ALTERNATE SOURCE DEMO\BOTTOM ASH POND MAP.dwg, BOTTOM ASH POND GROUNDWATER MONITORING WELL SYSTEM, 9/17/2018 9:16:39 AM

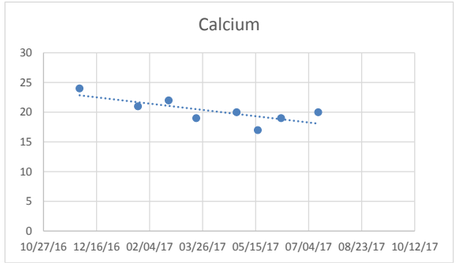
Sikeston Board of Municipal Utilities
Sikeston Power Station Bottom Ash Pond
Scott County, Missouri

Figure 2
Time Series Plots for Selected Data

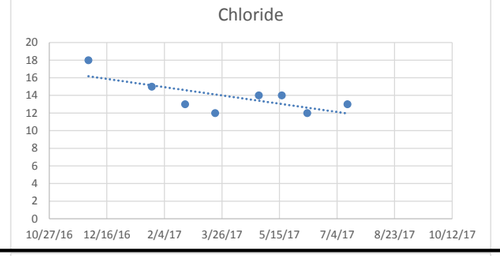
Well ID	Date	Chloride mg/L	Sulfate mg/L	Calcium mg/L
MW-3 (UG)	11/30/2016	2.3	26	24
	1/24/2017	2.0	30	21
	2/22/2017	1.9	26	22
	3/20/2017	1.8	21	19
	4/27/2017	2.0	28	20
	5/17/2017	1.5	21	17
	6/8/2017	1.7	22	19
	7/13/2017	2.2	19	20
	10/31/2017	2.0	20	19
	6/13/2018	1.3	17	20

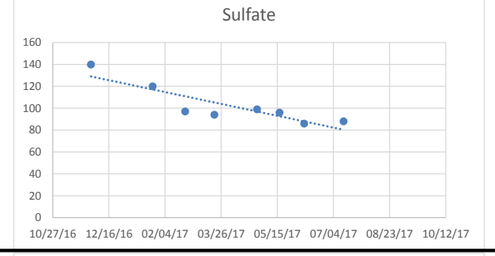


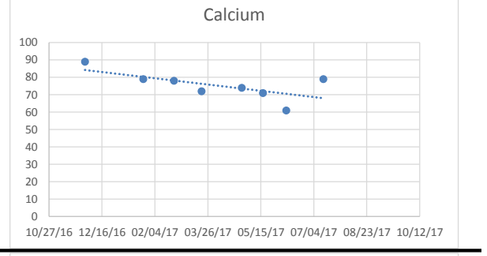




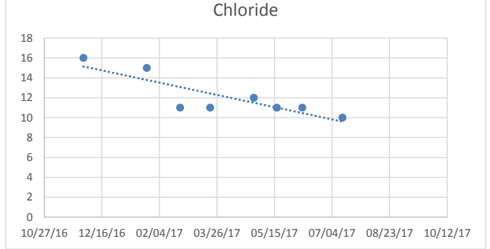
Well ID	Date	Chloride mg/L	Sulfate mg/L	Calcium mg/L
MW-4 (DG)	11/30/2016	18	140	89
	1/24/2017	15	120	79
	2/22/2017	13	97	78
	3/20/2017	12	94	72
	4/27/2017	14	99	74
	5/17/2017	14	96	71
	6/8/2017	12	86	61
	7/13/2017	13	88	79
	10/31/2017	17	83	67
	6/13/2018	14	86	80

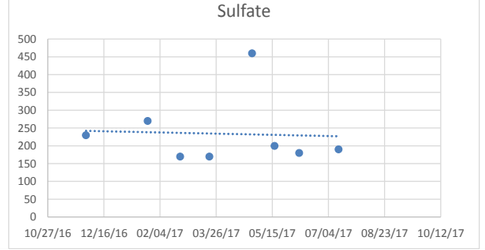


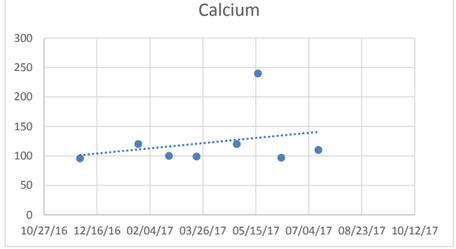




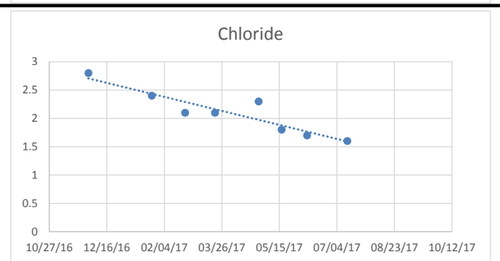
Well ID	Date	Chloride mg/L	Sulfate mg/L	Calcium mg/L
MW-5 (DG)	11/30/2016	16	230	96
	1/24/2017	15	270	120
	2/22/2017	11	170	100
	3/20/2017	11	170	99
	4/27/2017	12	460	120
	5/17/2017	11	200	240
	6/8/2017	11	180	97
	7/13/2017	10	190	110
	10/31/2017	18	88	72
	6/13/2018	11	240	130

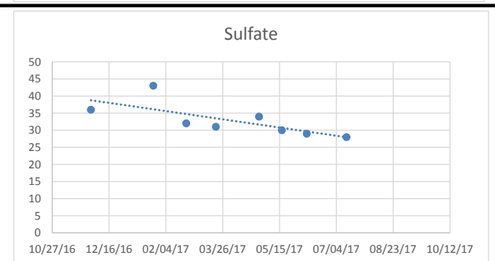


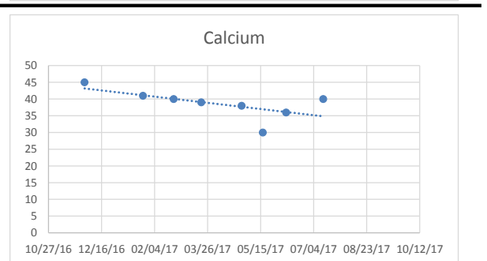




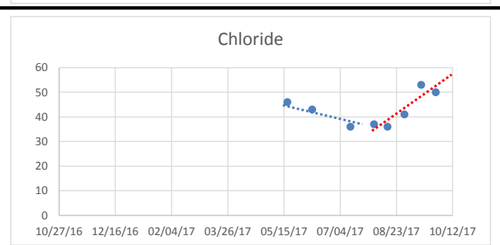
Well ID	Date	Chloride mg/L	Sulfate mg/L	Calcium mg/L
MW-6 (UG)	11/30/2016	2.8	36	45
	1/24/2017	2.4	43	41
	2/22/2017	2.1	32	40
	3/20/2017	2.1	31	39
	4/27/2017	2.3	34	38
	5/17/2017	1.8	30	30
	6/8/2017	1.7	29	36
	7/13/2017	1.6	28	40
	10/31/2017	1.7	29	38
	6/13/2018	2.3	32	41

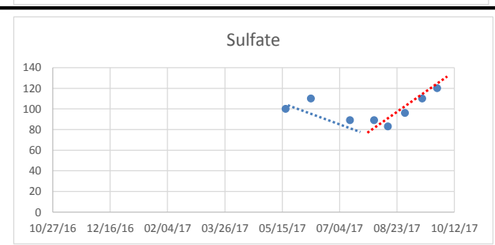


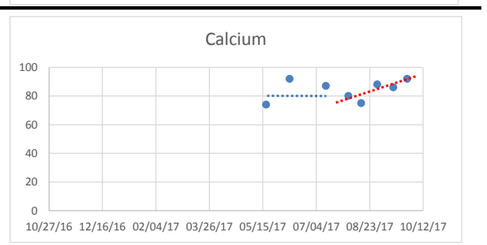




Well ID	Date	Chloride mg/L	Sulfate mg/L	Calcium mg/L
MW-8 (DG)	5/18/2017	46	100	74
	6/9/2017	43	110	92
	7/13/2017	36	89	87
	8/3/2017	37	89	80
	8/15/2017	36	83	75
	8/30/2017	41	96	88
	9/14/2017	53	110	86
	9/27/2017	50	120	92
	10/31/2017	45	110	86
	6/13/2018	65	150	120
	7/10/2018	68	140	120
	7/10/2018	71	150	120







TABLES

Sikeston Board of Municipal Utilities
Sikeston Power Station Bottom Ash Pond
Scott County, Missouri

Table 1
Water Quality Data Summary

									Detection Monitoring Constituents (Appendix III)						Assessment Monitoring Constituents (Appendix IV)											
Well ID	Date	Monitoring Purpose	Spec. Cond.	Temp.	ORP	D.O.	Turbidity	pH	Chloride	Fluoride	Sulfate	TDS	Boron	Calcium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium III	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (Combined)
			µmhos/cm	°C	mV	mg/L	NTU	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
Federal MCL									None	4.0	None	None	None	None	6	10	2000	4	5	100	6	15	40	2	100	50	2	
MW-3 (UG)	11/30/2016	Background	254.0	15.75	-27.1	0.41	37.28	7.08	2.3	0.438	26	160	18	24	<3.0	1.5	96	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.668
	1/24/2017	Background	226.4	16.52	-8.4	0.39	4.46	6.88	2.0	0.261	30	130	12	21	<3.0	1.2	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.677(ND)
	2/22/2017	Background	226.6	16.47	9.7	0.36	3.56	6.93	1.9	0.290	26	120	33	22	<3.0	1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.460(ND)
	3/20/2017	Background	212.1	17.07	33.7	0.43	6.61	6.68	1.8	0.286	21	170	22	19	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.277(ND)
	4/27/2017	Background	223.2	15.35	9.2	0.57	2.69	6.68	2.0	0.257	28 "Q4"	140	54	20	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	9.9	<1.0	<1.0	-0.030(ND)
	5/17/2017	Background	224.9	17.68	26.8	0.45	12.59	6.59	1.5	<0.250	21	130	19	17	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	0.40	<1.0	<1.0	<1.0	0.844(ND)
	6/8/2017	Background	217.9	16.73	18.2	0.49	2.61	6.66	1.7	0.276	22	160	20	19	<3.0	<1.0	110	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	-0.469(ND)
	7/13/2017	Background	243.8	19.02	5.5	0.39	4.79	6.71	2.2	0.256	19	160	18	20	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.715(ND)
	10/31/2017	Detection	246.2	16.74	12.4	0.65	7.47	6.64	2.0	0.331	20	140	27	19	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	194.2	17.19	42.3	0.42	7.57	6.59	1.3	0.291	17	130	23	20	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-4 (DG)	11/30/2016	Background	575.6	17.51	-108.3	0.48	0.61	7.46	18	0.259	140	390	1400	89	<3.0	<1.0	41	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.572(ND)
	1/24/2017	Background	543.7	17.00	-105.2	0.50	0.48	7.45	15	<0.250	120	290	880	79	<3.0	<1.0	46	<2.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.7031(ND)
	2/22/2017	Background	554.0	17.95	-115.3	0.51	1.19	7.49	13	<0.250	97	320	1500	78	<3.0	<1.0	51	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.550(ND)
	3/20/2017	Background	562.8	18.58	-108.8	0.69	1.70	7.37	12	<0.250	94	350	1400	72	<3.0	<1.0	53	<1.0	<1.0	<4.0	<2.0	<1.0	<10	1.3	<1.0	<1.0	<1.0	1.036
	4/27/2017	Background	536.9	17.25	-129.6	0.91	2.38	7.38	14	<0.250	99	300	1300	74	<3.0	<1.0	50	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.210(ND)
	5/17/2017	Background	554.9	17.90	-115.5	0.63	3.02	7.38	14	<0.250	96	320	1200	71	<3.0	<1.0	66	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.774(ND)
	6/8/2017	Background	509.7	18.24	-122.9	0.86	0.84	7.38	12	<0.250	86	340	1100	61	<3.0	<1.0	45	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.464(ND)
	7/13/2017	Background	575.5	19.46	-115.2	0.52	1.43	7.37	13	<0.250	88	300	1200	79	<3.0	<1.0	52	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.086(ND)
	10/31/2017	Detection	525.8	18.35	-118.1	0.63	1.07	7.31	17	<0.250	83	290	1400	67	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	511.5	18.92	-120.7	0.44	18.50	7.32	14	<0.250	86	290	1200	80	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-5 (DG)	11/30/2016	Background	808.3	16.20	-48.7	0.50	1.24	6.97	16	0.255	230	560	470	96	<3.0	<1.0	84	<1.0	<1.0	<4.0	4.3	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.844
	1/24/2017	Background	745.3	16.24	-37.6	0.58	0.72	6.90	15	<0.250	270	470	480	120	<3.0	<1.0	91	<1.0	<1.0	<4.0	5.2	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.827(ND)
	2/22/2017	Background	717.8	17.75	-50.5	0.36	3.43	6.97	11	<0.250	170	420	470	100	<3.0	<1.0	83	<1.0	<1.0	<4.0	3.6	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.130(ND)
	3/20/2017	Background	737.9	17.78	-36.5	0.72	2.16	6.85	11	<0.250	170	480	320	99	<3.0	<1.0	76	<1.0	<1.0	<4.0	4.4	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.538(ND)
	4/27/2017	Background	777.3	16.07	-58.8	0.69	5.20	6.80	12	<0.250	460	480	490	120	<3.0	<1.0	87	<1.0	<1.0	<4.0	4.8	<1.0	<10	<0.20	3.0	<1.0	<1.0	1.676
	5/17/2017	Background	760.1	17.81	-56.0	0.46	5.35	6.81	11	<0.250	200	440	5700	240	<3.0	1.8	180	<1.0	<1.0	16	5.3	6.3	<10	0.24	<1.0	<1.0	<1.0	1.739
	6/8/2017	Background	678.3	17.72	-58.6	0.69	1.89	6.82	11	<0.250	180	480	360	97	<3.0	<1.0	77	<1.0	<1.0	<4.0	3.9	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.869(ND)
	7/13/2017	Background	799.0	19.19	-82.0	1.08	17.49	6.98	10	<0.250	190	430	320	110	<3.0	<1.0	81	<1.0	<1.0	<4.0	3.8	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.767(ND)
	10/31/2017	Detection	591.8	17.45	-77.6	0.85	3.17	6.89	18	<0.250	88	310	280	72	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	756.4	18.28	-55.6	0.84	1.91	6.77	11	<0.250	240	480	370	130	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-6 (UG)	11/30/2016	Background	369.0	16.39	-49.4	0.85	0.84	6.92	2.8	0.331	36	200	36	45	<3.0	4.3	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.532
	1/24/2017	Background	358.9	16.29	-44.8	0.66	0.26	6.87	2.4	<0.250	43	200	27	41	<3.0	5.7	220	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.948(ND)
	2/22/2017	Background	352.5	17.20	-42.2	0.81	15.27	6.89	2.1	0.269	32	160	59	40	<3.0	6.4	210	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.685(ND)
	3/20/2017	Background	360.8	16.90	24.9	0.36	9.70	6.73	2.1	<0.250	31	240	37	39	<3.0	5	160	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.577(ND)
	4/27/2017	Background	331.5	15.71	-50.9	0.39	8.35	6.72	2.3	<0.250	34	170	36	38	<3.0	3.2	180	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.243(ND)
	5/17/2017	Background	323.2	17.65	-71.5	0.45	7.13	6.76	1.8	<0.250	30	170	35	30	<3.0	4.9	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.173(ND)
	6/8/2017	Background	326.7	17.50	-53.0	0.33	3.86	6.73	1.7	<0.250	29	180	38	36	<3.0	4.6	190	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.893(ND)
	7/13/2017	Background	396.8	19.68	-84.0	0.72	2.17	6.98	1.6	<0.250	28	180	31	40	<3.0	5.8	200	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.575(ND)
	10/31/2017	Detection	359.6	17.57	-57.9	0.71	1.48	6.72	1.7	0.303	29	170	41	38	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	345.4	17.59	-44.0	0.40	13.24	6.67	2.3	<0.250	32	160	43	41	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
MW-8 (DG)	5/18/2017	Background	662.5	17.58	-89.4	0.29	2.39	7.16	46	<0.250	100	340	400	74	<3.0	<1.0	86	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.067
	6/9/2017	Background	678.2	17.90	-108.5	0.31	0.47	7.16	43	<0.250	110	380	520	92	<3.0	<1.0	86	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.839(ND)
	7/13/2017	Background	661.5	18.57	-107.1	0.23	1.20	7.25	36	<0.250	89	320	430	87	<3.0	<1.0	74	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.034(ND)
	8/3/2017	Background	665.7	19.06	-108.4	0.24	0.98	7.15	37	<0.250	89	330	490	80	<3.0	<1.0	74	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.681(ND)
	8/15/2017	Background	594.9	18.56	-88.7	0.38	0.99	7.16	36	<0.250	83	320	530	75	<3.0	<1.0	68	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.906(ND)
	8/30/2017	Background	644.2	18.62	-91.3	0.29	1.18	7.15	41	<0.250	96	290	510	88	<3.0	<1.0	75	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.805(ND)
	9/14/2017	Background	707.9	18.52	-90.1	0.48	0.67	7.13	53	<0.250 H	110	370	510	86	<3.0	<1.0	77	<1.0	<1.0	<4.0	<2.0	<1.0	12	<0.20	<1.0	<1.0	<1.0	0.314(ND)
	9/27/2017	Background	764.0	19.11	-89.6	0.30	0.58	7.05	50	<0.250	120	420	480	92	<3.0	<1.0	80	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.594(ND)
	10/31/2017	Detection	698.1	17.99	-96.3	0.38	0.94	7.09	45	<0.250	110	380	540	86	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	6/13/2018	Detection	788.8	18.34	-99.1	0.23	4.80	7.11	65	<0.250	150	430	520	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	7/10/2018	Re-sample	899.4	18.52	-94.2	0.35	2.69	7.09	68	(NA)	140	(NA)	(NA)	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	7/10/2018	Re-sample/DUP	899.4	18.52	-94.2	0.35	2.69	7.09	71	(NA)	150	(NA)	(NA)	120	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)

Notes:
1. All data transcribed from analytical lab data sheets or field notes.
2. Less than (<) symbol denotes concentration not detected at or above reportable limits.
3. (ND) denotes Radium 226 and 228 (combined) concentration not detected above minimum detectable concentration.
4. (NA) denotes analysis not conducted.
5. Background monitoring per USEPA 40 CFR 257.93.
6. Detection monitoring per USEPA 40 CFR 257.94.
7. Assessment monitoring per USEPA 40 CFR 257.95.
8. Federal MCL = Maximum Contaminant Level per CFR 40 Subchapter D Part 141 subpart G Section 141.62 & 141.66.

Prepared by: KAE
Checked by: MCC

APPENDICES

Appendix 1

Field Sampling Logs

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc) 9.10' Date: 5-18-17

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 5-18-17

Name (Sample Collector) A. Patel

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1057 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 9.10 Total Volume Purged (mL): 2180

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): _____ Water Level after Sampling (feet btoc): 9.10' (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1135

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1059		220	22.04	612.6	0.92	7.14	-84.6	2.25	9.10	—
1101	240	700	18.70	646.2	0.42	7.17	-92.2	3.57	"	—
1103	250	1200	17.85	661.7	0.36	"	-90.7	2.46	"	—
1105	250	1700	17.53	667.1	0.32	"	-89.8	1.56	"	—
1107	240	2180	17.58	662.5	0.29	7.16	-89.4	2.39	"	—

btoc - below top of casing

Prepared by: GREDELL Engineering Resources, Inc

January 2017

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 9.10'

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (X)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
5-18-17 1107	240	17.58	662.5	0.29	7.16	-89.4	2.39

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: cloudy, very windy, 75°F

Sample Characteristics: clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 5-18-17 By: [signature] Title: Lab tech

Field Sampling Log

Monitoring Well ID: MW 8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 9.20 Date: 6-9-2017

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 6-9-2017

Name (Sample Collector): H McGill

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0910 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 9.20 Total Volume Purged (mL): 2180

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y (N)

Well Total Depth (feet btoc): 37.04 Water Level after Sampling (feet btoc): 9.20 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0931

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0912		460	20.10	651	0.52	7.15	-113.1	2.02	9.20	—
0914	320	1100	18.52	672.8	0.38	7.15	-112.4	0.73	9.20	—
0916	250	1600	18.08	680.3	0.34	7.16	-110.4	1.21	9.20	—
0918	240	2180	17.90	678.2	0.31	7.16	-108.5	0.47	9.20	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated (Y) / N

Water Level @ Sampling (feet btoc): 9.20

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other ✓

Final Purge Stabilization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-9-2017 0918	290	17.90	678.2	0.31	7.16	-128.5	0.47

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, windy, 70°F

Sample Characteristics: Clear, Colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Railroad crew working 30 yards from us. They are digging up railroad ties.

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 6-9-2017 By: Ashley Patton Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.07 Date: 7-13-2017

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y (N)

PURGE INFORMATION

Date: 7-13-2017

Name (Sample Collector): H McGill

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0905 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.07 Total Volume Purged (mL): 2840

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / N

Well Total Depth (feet btoc): 37.05 Water Level after Sampling (feet btoc): 10.07 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0930

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0907		460	21.21	6325	0.36	7.24	-111.4	1.41	10.07	—
0909	340	1140	19.33	658.2	0.31	7.24	-108.8	1.66	10.07	—
0911	280	1700	18.78	658.2	0.26	7.25	-108.2	1.24	10.07	—
0913	270	2240	18.62	667.2	0.25	7.25	-108.1	1.27	10.07	—
0915	300	2840	18.57	661.5	0.23	7.25	-107.1	1.20	10.07	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.07

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (X)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
7-13-17 0917	300	18.57	661.5	0.23	7.25	-107.1	1.20

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight breeze, Warm, humid

Sample Characteristics: Colorless, odorless, clear

Sample Collection Order: Per SAP

Comments and Observations:

Collect Duplicate

I certify that sampling procedures were in accordance with applicable EPA and State protocols

Date: 7-13-17 By: Ashish Patel Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW 8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.65 Date: 8-3-2017

Initial Groundwater Elevation (NAVD88): . Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 8-3-2017

Name (Sample Collector): H McGill

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1025 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.65 Total Volume Purged (mL): 2700

Beginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / N

Well Total Depth (feet btoc): 37.05 Water Level after Sampling (feet btoc): 10.65 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1055

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1027		400	23.39	6230	0.47	7.15	-127.2	0.53	10.65	—
1029	290	980	20.21	657.1	0.41	7.16	-116.9	0.42	10.65	—
1031	310	1600	19.50	656.9	0.29	7.16	-113.4	0.93	10.65	—
1033	250	2100	19.23	663.0	0.26	7.16	-112.1	0.72	10.65	—
1035	300	2700	19.06	665.7	0.24	7.15	-108.6	0.94	10.65	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.65

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other X

Final Purge Stabilization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
8-3-2017 1035	300	19.06	665.7	0.24	7.15	-108.4	0.98

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight breeze

Sample Characteristics: Colorless, odorless, clear

Sample Collection Order: Per SAP

Comments and Observations:

There is gravel around well.

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 8-3-2017 By: [signature] Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.79' Date: 8-15-17

Initial Groundwater Elevation (NAVD88): Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 8-15-17

Name (Sample Collector): A. Patel

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0755 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.79' Total Volume Purged (mL): 2600

Beginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / (N) 8-15-17

Well Total Depth (feet btoc): ~~29.~~ 37.05 Water Level after Sampling (feet btoc): ~~37.05~~ 10.79 8-15-17 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0837

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0757		300	21.46	582.8	0.68	7.08	-84.1	1.43	10.79'	—
0759	220	740	19.59	590.9	0.52	7.11	-84.2	1.72	"	—
0801	230	1200	18.97	593.4	0.46	7.12	-84.6	2.98	"	—
0803	230	1660	18.72	600.4	0.40	7.14	-87.1	0.89	"	—
0805	245	2150	18.61	603.3	0.35	7.15	-88.1	1.34	"	—
0807	225	2600	18.56	594.9	0.38	7.16	-88.7	0.99	"	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.79'

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (X)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
8-15-17 0809	225	18.56	594.9	0.38	7.16	-88.7	0.99

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Partly to Mostly Cloudy, humid

Sample Characteristics: ~~Clear~~ 8-15-17 Clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Duplicate Taken

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 8-15-17 By: [signature] Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.05' Date: 8-30-17

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 8-30-17

Name (Sample Collector): H. McGill

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0915 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.05' Total Volume Purged (mL): 2280

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.05' Water Level after Sampling (feet btoc) (i.e., pump is off): ~~37.05~~ Max 11.05'

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0957

PURGE STABILIZATION DATA 1

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0917		300	22.04	610.2	1.03	7.19	-85.9	0.19	11.05'	-
0919	240	780	19.92	632.3	0.54	7.18	-90.6	4.66	"	-
0921	250	1280	19.08	642.6	0.37	7.13	-89.9	1.79	"	-
0923	250	1780	18.79	647.0	0.33	7.14	-90.6	1.59	"	-
0925	250	2280	19.62	644.2	0.29	7.15	-91.3	1.18	"	-

btoc - below top of casing

Prepared by: GREDELL Engineering Resources, Inc.

January 2017

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW25

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.05'

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (✓)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
8-30-2017 0925	250	18.62	644.2	0.29	7.15	-91.3	1.18

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Mostly Sunny, 0 wind, 82° F

Sample Characteristics: Clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

duplicate taken

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 8-30-2017 By: [signature] Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.20' Date: 9-14-2017

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 9-14-2017

Name (Sample Collector): _____

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0914 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.20' Total Volume Purged (mL): 1720

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / N

Well Total Depth (feet btoc): 37.05 Water Level after Sampling (feet btoc): NM 37.05 11.20' (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0952

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0916		300	20.44	674.4	0.93	7.15	-87.2	0.49	11.22'	—
0918	240	780	18.97	636.0	0.74	7.13	-87.5	0.58	"	—
0920	240	1260	18.79	704.9	0.57	7.13	-89.3	0.44	"	—
0922	230	1720	18.82	707.9	0.48	7.13	-90.1	0.67	"	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): _____

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (✓)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
9-14-2017 0922	230	18.52	707.9	0.48	7.13	-90.1	0.67

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Ø wind

Sample Characteristics: clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Duplicate taken

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 9-14-2017 By: _____ Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.51' Date: 9-27-17

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 9-27-17

Name (Sample Collector): _____

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1103 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.51' Total Volume Purged (mL): 2640

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.05' Water Level after Sampling (feet btoc): 11.51' (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1146

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1105		300	22.26	684.6	0.67	7.04	-90.2	0.86	11.51'	—
1107	220	740	20.25	706.9	0.53	7.03	-88.0	0.76	"	—
1109	230	1200	19.81	730.3	0.38	7.04	-88.8	0.77	"	—
1111	250	1700	19.31	754.0	0.33	7.04	-85.0	0.79	"	—
1113	230	2140	19.18	764.0	0.31	7.05	-89.1	0.76	"	—
1115	240	2640	19.11	764.0	0.30	7.05	-89.6	0.58	"	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.51'

Monitoring Event: Annual ( ) Semi-Annual ( ) Quarterly ( ) Monthly ( ) Other (✓)

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
9-27-17 1115	240	19.11	764.0	0.30	7.05	-89.6	0.58

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Mostly cloudy, slight breeze

Sample Characteristics: Clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Duplicate taken

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 9-27-17 By: [signature] Title: Lab Tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc) 11.57' Date 10-31-17

Initial Groundwater Elevation (NAVD88): Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 10-31-17

Name (Sample Collector): A. Patel

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated 1256 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.57' Total Volume Purged (mL): 1700

Beginning Groundwater Elevation (NAVD88): Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.05' Water Level after Sampling (feet btoc): 11.57' (i.e., pump is off)

Casing Diameter (feet) 2" Sch 40 PVC Time Sampling Completed: 1309

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1258		300	20.25	673.3	1.23	7.06	-104.9	1.43	11.57'	—
1300	230	760	18.46	687.9	0.56	7.07	-96.8	1.47	"	—
1302	220	1200	18.08	702.6	0.45	7.07	-95.8	0.83	"	—
1304	250	1700	17.99	698.1	0.38	7.09	-96.3	0.94	"	—

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 11.57'

Monitoring Event: Annual ( ) Semi-Annual (X) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
10-31-17 1304	250	17.99	698.1	0.38	7.09	-96.3	0.94

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, pleasant, Slight breeze

Sample Characteristics: clear, colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Field blank taken

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 10-31-17 By: [signature] Title: Lab tech

Field Sampling Log

Monitoring Well ID: MW8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 9.75 Date: 6-13-18

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y / (N)

PURGE INFORMATION

Date: 6-13-18

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 1041 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 9.75 Total Volume Purged (mL): 7720

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / (N)

Well Total Depth (feet btoc): 37.04 Water Level after Sampling (feet btoc): 9.75 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1121

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
1043		400	22.53	723.4	0.54	6.94	-126.1	53.79	9.75	orange flake
1045	250	900	19.65	776.4	0.40	7.02	-106.1	148.9	9.75	" "
1047	250	1400	18.79	788.1	0.38	7.06	-105.4	14.49	9.75	" "
1049	250	1900	18.55	791.8	0.35	7.08	-103.9	12.80	9.75	" "
1051	270	2440	18.44	793.2	0.32	7.09	-102.9	15.45	9.75	" "
1053	240	2920	18.36	794.2	0.35	7.10	-102.3	2.45	9.75	" "
1055	240	3400	18.34	742.9	0.29	7.10	-101.9	7.60	9.75	" "
1057	250	3900	18.35	793.8	0.26	7.10	-101.3	5.60	9.75	" "
1059	250	4400	18.34	794.0	0.26	7.11	-100.9	9.24	9.75	" "
1101	230	4860	18.37	792.8	0.25	7.11	-100.5	4.65	9.75	" "
1103	250	5360	18.36	792.6	0.25	7.11	-100.3	4.05	9.75	clear
1105	240	5840	18.35	792.3	0.25	7.11	-99.8	3.11	9.75	clear
1107	220	6280	18.29	792.2	0.23	7.11	-99.5	2.69	9.75	clear
1109	240	6760	18.30	791.0	0.24	7.11	-99.1	5.36	9.75	clear
1111	240	7240	18.34	792.3	0.22	7.11	-99.2	4.69	9.75	clear
1113	240	7720	18.34	788.6	0.23	7.11	-99.1	4.80	9.75	clear

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Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

mpling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc). 9.75

Monitoring Event: Annual ( ) Semi-Annual (✓) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
6-13-18 1113	240	18.54	788.6	0.23	7.11	-99.1	4.80

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, Slight Breeze

nple Characteristics: Yellow Flake, odorless

Sample Collection Order: Per SAP

Comments and Observations:

collect Field blank

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

e: 6-13-18 By: Ashish Patel Title: Lab Tech

Prepared by: GREDELL Engineering Resources, Inc.

January 2017

Field Sampling Log

Monitoring Well ID: MW 8 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.40 Date: 7-10-2018

Initial Groundwater Elevation (NAVD88): _____ Air Pressure in Well? Y (N)

PURGE INFORMATION

Date: 7-10-2018

Name (Sample Collector): D Dillingham

Method of Well Purge: Low Flow Perstaltic Pump Dedicated Tubing? (Y) / N

Time Purging Initiated: 0854 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.40 Total Volume Purged (mL): 6960

Beginning Groundwater Elevation (NAVD88): _____ Well Purged To Dryness? Y / N

Well Total Depth (feet btoc): 37.30 Water Level after Sampling (feet btoc): 10.40 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0932

PURGE STABILIZATION DATA

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)	Water Level (feet btoc)	Notes (e.g., opacity, color, odor)
0856		300	21.32	863.8	0.95	7.10	-78.1	19.88	10.40	yellow Flake
0858	240	780	19.41	884.4	0.55	7.06	-83.4	6.98	10.40	yellow Flake
0900	240	1260	18.81	893.7	0.47	7.06	-86.4	5.19	10.40	yellow Flake
0902	240	1740	18.65	896.9	0.46	7.06	-88.1	8.95	10.40	" "
0904	210	2160	18.55	897.4	0.70	7.07	-89.0	10.97	10.40	" "
0906	220	2600	18.52	898.9	0.65	7.07	-90.0	4.02	10.40	" "
0908	250	3100	18.52	899.0	0.63	7.07	-90.5	3.75	10.40	" "
0910	240	3580	18.52	898.2	0.57	7.07	-91.3	4.90	10.40	" "
0912	235	4050	18.50	898.5	0.56	7.08	-92.5	3.34	10.40	" "
0914	235	4520	18.49	899.3	0.54	7.08	-92.2	2.08	10.40	" "
0916	250	5020	18.52	898.3	0.42	7.08	-92.6	4.50	10.40	" "
0918	240	5500	18.50	897.6	0.40	7.08	-92.9	6.73	10.40	" "
0920	250	6000	18.52	897.4	0.38	7.08	-93.4	2.95	10.40	" "
0922	240	6480	18.52	901.2	0.36	7.09	-94.1	2.83	10.40	" "
0924	240	6960	18.52	899.4	0.35	7.09	-94.2	2.69	10.40	" "

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Prepared by: GREDELL Engineering Resources, Inc.

January 2017

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW8

Sampling Information:

Method of Sampling: Low Flow - Perstaltic Pump & Tubing Dedicated: (Y) / N

Water Level @ Sampling (feet btoc): 10.40

Monitoring Event: Annual ( ) Semi-Annual (X) Quarterly ( ) Monthly ( ) Other ( )

Final Purge Stablization Sampling Data:

Date Sample Time	Sample Rate (mL/min)	Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (S.U.)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
7-10-18 0924	240	18.52	899.4	0.35	7.09	-94.2	2.69

Instrument Calibration Data:

See instrument calibration log of daily calibration data for the following instruments:

1 - In-Situ SmarTroll Multi-Probe Field Meter (Temperature, Specific Conductance, Dissolved Oxygen, pH, Oxidation Reduction Potentia

2 - HF scientific, inc. Micro TPI Field Portable Turbidimeter

General Information:

Weather Conditions @ time of sampling: Sunny, warm

Sample Characteristics: yellow flake, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Blank and Duplicate

I certify that sampling procedures were in accordance with applicable EPA and State protocols.

Date: 7-10-18 By: [signature] Title: Lab Tech

Prepared by: GREDELL Engineering Resources, Inc.

January 2017