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GREDELL Engineering Resources, Inc.

Sikeston Power Station

2021 Annual Groundwater Monitoring Report for Fly Ash Pond Compliance with USEPA 40 CFR 257.90(e)

Prepared for:

BMU Sikeston
Board of Municipal Utilities

Sikeston Power Station
1551 West Wakefield Avenue
Sikeston, Missouri 63801

August 2021

Sikeston Power Station
2021 Annual Groundwater Monitoring Report for Fly Ash Pond
Compliance with USEPA 40 CFR 257.90(e)

Prepared for:

Sikeston Board of Municipal Utilities
1551 West Wakefield Avenue
Sikeston, Missouri 63801

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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 of electricity. 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). This report pertains specifically to the Fly 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 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). Analytical data also are subjected to statistical analysis in accordance with §257.93(f), with the results included in an Annual Groundwater Monitoring 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 alternate 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 third and fourth semi-annual detection groundwater sampling events conducted at the SPS Fly Ash Pond on April 6, 2020, and September 22, 2020. Included is a description of the sampling events, groundwater elevations, water table surfaces, field activities summaries, analytical results, and statistical analysis results. Field sampling and reporting activities were conducted in accordance with the site-specific GMSAP (Gredell Engineering, 2018). Statistical analysis was performed in accordance with §257.93(f) using the statistical analysis method as filed in the SBMU-SPS operating record on April 15, 2019. The fifth semi-annual groundwater sampling field activities were completed on April 17, 2021, but data analysis was not complete at the time of this report and will therefore be included in the next Annual Groundwater Monitoring Report.

2.0 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system for the Fly Ash Pond consists of five wells. Well locations are depicted on Figures 1 and 2. The wells are identified as MW-1, MW-2, MW-3, MW-7, and MW-9. MW-2 and MW-3 are located hydraulically upgradient of the Fly Ash Pond, whereas MW-1, MW-7, and MW-9 are hydraulically downgradient of the Fly Ash Pond. Monitoring wells MW-1, MW-2, and MW-3 were installed on April 26 and 27, 2016 by Smith & Company of Poplar Bluff, Missouri during characterization of the site (Gredell Engineering, 2017). Monitoring wells MW-7 and MW-9 were installed on April 18, 2017 and November 13, 2017, respectively, by Bulldog Drilling, Inc. of Dupo, Illinois to serve as additional downgradient monitoring wells. Well construction activities were performed under the direction of a Registered Geologist in the State of Missouri. Well design and installation techniques were completed in accordance with 10 CSR 23-4, which is consistent with the standards summarized in 40 CFR 257.91(e). Well depths are between 30 and 35.5 feet below ground surface. All five wells monitor uppermost groundwater, which is within the alluvial aquifer at the Fly Ash Pond site. Each well yields sufficient quantities of water for the purposes of sampling and analysis.

Table 1 presents a construction summary of the wells comprising the Fly Ash Pond groundwater monitoring system. Figures 1 and 2 depict well locations and groundwater contour maps of the uppermost aquifer for the April 6, 2020, and September 22, 2020 semi-annual sampling events. 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 for the Fly Ash Pond. The Fly Ash Pond groundwater monitoring system is described in more detail in the site-specific GMSAP for this facility (Gredell Engineering, 2018).

3.0 FIELD SAMPLING SUMMARY

SPS environmental staff performed groundwater sampling on April 6, 2020, and September 22, 2020. These sampling events were the third and fourth semi-annual detection groundwater sampling events conducted at the SPS Fly Ash Pond.

Following the April 6, 2020 sampling event, monitoring wells MW-1, MW-2, MW-3 and MW-9 were resampled on May 21, 2020. Groundwater at MW-1 was resampled for Sulfate, Calcium and Total Dissolved Solids (TDS). Groundwater at MW-2 was resampled for Fluoride and Boron. Groundwater at MW-3 was resampled for Chloride and TDS. Groundwater at MW-9 was resampled for TDS.

Following the September 22, 2020 sampling event, monitoring wells MW-1 and MW-2 were resampled on December 8, 2020, and MW-7 and MW-9 were resampled on January 26, 2021. Groundwater at MW-1 was resampled for Sulfate, Calcium, Boron, and TDS. Groundwater at MW-2 was resampled for Boron. Groundwater at MW-7 and MW-9 was resampled for pH.

The fifth semi-annual groundwater sampling field activities were initially conducted on April 17, 2021, but data analysis was not complete at the time of this annual report. Therefore, final analytical data (and evaluation) for the fifth event will be included in the next Annual Groundwater Monitoring Report.

Field procedures for the April 6, 2020 and September 22, 2020 sampling events (and subsequent resampling events) were conducted in the manner described in the following paragraphs and the GMSAP for this facility (Gredell Engineering, 2018).

Groundwater samples were collected using low-flow sampling techniques and dedicated sampling equipment. Field tests of indicator parameters were performed using an In-Situ, Inc. SmarTROLL TM 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 monitoring wells produced sufficient volume of groundwater for full analysis.

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, while 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 stability prior to groundwater sample collection. Following stabilization of all indicator parameters, final pH was recorded and groundwater samples were then collected.

Field notes documenting the third and fourth detection sampling events and the respective resampling events are presented in Appendix 1. Field sampling notes are summarized in Table 3, including initial and final water level measurements, purge volumes, and pH. Laboratory analytical reports for each sampling event, including the field blanks and sample duplicates, are included in Appendix 2. Quality Assurance/Quality Control (QA/QC) documentation is presented in Appendix 3. A summary of background and detection monitoring analytical data, including field parameters, is presented in Appendix 4.

3.1 Field Quality Assurance/Quality Control

Field QA/QC during each sampling event included the collection of one field blank and one field duplicate sample. The duplicate during the April 6, 2020 event was collected at MW-2, and the duplicate during the September 22, 2020 event was collected at MW-1 (duplicate results are summarized in Table 5). Rinsate blanks were not collected because dedicated sampling equipment was used. Samples were shipped to PDC Laboratories' primary facility located in Peoria, Illinois using standard chain-of-custody documentation/procedures.

Samples collected during the April 6, 2020 event were received by the primary facility on April 8, 2020 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 were received from PDC Laboratories on April 16, 2020.

Samples collected during the May 21, 2020 resample event were received by the primary facility on May 26, 2020 and subsequently analyzed for the requested analytes. Final hard copy analytical results were received from PDC Laboratories on June 15, 2020.

Samples collected during the September 22, 2020 event were received by the primary facility on September 24, 2020 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 were received from PDC Laboratories on October 16, 2020.

Samples collected during the December 8, 2020 resample event were received by the primary facility on December 10, 2020 and subsequently analyzed for the requested analytes. Final hard copy analytical results were received from PDC Laboratories on December 23, 2020. The January 26, 2021 resample event was conducted for field parameters (pH) only.

4.0 ANALYTICAL SUMMARY

Hard copy analytical data for each monitoring well sampled during the April 2020 and September 2020 detection monitoring events and the respective May 2020 and December 2020 resample events are provided in Appendix 2. Resampling data (field-measured pH) resulting from the January 2021 resampling event for the September 2020 detection monitoring event are provided in Appendix 1. The data pertain to water quality results from the uppermost aquifer in the area bordering the Fly Ash Pond, along with sample duplicate and field blank results.

4.1 Laboratory Quality Control

Laboratory analyses of all groundwater samples collected in 2020 was completed by PDC Laboratories, Inc., of Peoria, Illinois. The results 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 for detection monitoring samples and resamples 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 narratives for the 2020 groundwater sampling events indicate that all quality controls met acceptance criteria except as follows:

Detection sampling event April 6, 2020

- The batch Quality Control sample for TDS is flagged “M” because the RPD is outside acceptance criteria.
- The batch Quality Control samples for Chloride and Sulfate are flagged “Q4” because the associated sample concentrations exceed four times the spiked values.
- The batch Quality Control sample for Fluoride is flagged “Q3”, “Q2”, and “Q1” because the Matrix Spike (MS) and Matrix Spike Duplicate are outside acceptance criteria.

Resample event May 21, 2020

- The batch Quality Control sample for Calcium is flagged “Q4” because the associated sample concentrations exceed four times the spiked values.
- The batch Quality Control sample for Chloride is flagged “Q1” because the MS is outside acceptance criteria.

Detection sampling event September 22, 2021

- Lower level Boron sample results are flagged “B” due to trace Boron detected in the Method Blank.

Resample event December 8, 2020

- Batch sample duplicates for TDS are flagged “M” because the RPD is outside acceptance criteria.

Additional QA/QC comments include the following:

- *Field Duplicates:* Analyses of duplicate samples are used to define the total variability of the sampling/analytical system as a whole. One field duplicate from MW-2 was collected during the April 6, 2020 detection monitoring event and one field duplicate was collected from MW-1 during the September 22, 2020 detection monitoring event. The RPD was calculated for all detected chemical parameters. 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 with the exception of Boron from the April 2020 sampling event.
- *Field Blank:* One field blank was incorporated into the data set for the both the April and September detection sampling events and one field blank was incorporated into the data set for the May resample event. Results for the field blanks showed that they contained no reportable concentrations except for Boron in the April and September 2020 detection events and Calcium during the May 2020 resample event.
- *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 duplicate samples and reviewing the results of field blanks.

Approved sampling procedures are described in the GMSAP (Gredell Engineering, 2018). Procedures specified in that plan have been followed. Approved sampling procedures should be reviewed annually. Groundwater monitoring data are 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 method used to evaluate groundwater within the uppermost aquifer for the Fly Ash Pond groundwater monitoring system 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 Fly Ash Pond at the SPS. The background data used to evaluate current groundwater quality is based on eight rounds of groundwater sampling of the five wells spanning March 2018 to December 2018. The background data set may be updated every two years but 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 9.6.14; 2019). Intra-well prediction intervals were compared at the 99 percent confidence level for each Appendix III constituent. The groundwater analytical results from the April and September 2020 detection monitoring events were compared to the prediction limits (Table 6) to determine if SSIs over background exist in the data sets.

If the number of reportable concentrations of a given constituent in a background data set for 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 Fly Ash Pond groundwater monitoring system data. Prediction intervals are based on the background monitoring data sets (Appendix 4), including results reported as less than 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 April 2020 sampling event and the September 2020 sampling event are described below. 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. 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. Box and whiskers plots of background data are presented in Appendix 7. Prediction limit charts are provided in Appendix 8.

5.1 Statistical Results

The statistical analysis for the Fly Ash Pond groundwater monitoring system suggest eight suspected SSIs in the April 2020 data set. Three are associated with MW-1 and include Sulfate, Calcium and TDS, two are associated with MW-2 and include Boron and Fluoride, two are associated with MW-3 and include Chloride and TDS, and the final suspected SSI is Boron in MW-9. The associated prediction limits for these well constituent pairs are summarized on Table 6. Each of these well constituent pairs was resampled on May 21, 2020 and the initial results for Sulfate, Calcium and TDS in MW-1, and Fluoride in MW-2 were confirmed with the laboratory data report received on June 15, 2020. In accordance with §257.94, Alternate Source Demonstrations (ASDs) have been prepared to address these SSIs and are included as Appendix 9 to this report. The ASDs were completed successfully and certified in accordance with §257.94(e)(2) on September 11, 2020.

The statistical analysis for the September 2020 Fly Ash Pond groundwater monitoring results suggest seven suspected SSIs. Four are associated with MW-1 and include Boron, Sulfate, Calcium and TDS, one is associated with Boron in MW-2, and the remaining two are associated with pH in MW-7 and MW-9. The associated prediction limits for these well constituent pairs are summarized on Table 6. Monitoring wells MW-1 and MW-2 were resampled on December 8, 2020 and the initial results for Sulfate, Calcium and TDS in MW-1 were confirmed with the laboratory data report received on December 23, 2020. Monitoring wells MW-7 and MW-9 were resampled for pH on January 26, 2021, and the initial results for pH in MW-9 were confirmed. In accordance with §257.94, ASDs have been prepared to address these SSIs and are included as Appendix 9 to this report. The ASDs were completed successfully and certified in accordance with §257.94(e)(2) on March 10, 2021.

As a result of the successful ASDs, detection monitoring in accordance with §257.94 has continued on a semi-annual basis as specified in §257.94(b).

6.0 SUMMARY

The third semi-annual sampling event was conducted by SPS environmental staff on April 6, 2020. Resampling was conducted on May 21, 2020, and suspected SSIs of Sulfate, Calcium and TDS in MW-1, and Fluoride in MW-2 were confirmed on June 15, 2020. In response, ASDs were prepared and successfully completed (Appendix 9). Consequently, GREDELL Engineering Resources, Inc. concluded the statistical analysis results for samples obtained during the third semi-annual groundwater detection monitoring event do not indicate SSIs associated with the Fly Ash Pond.

The fourth semi-annual sampling event was conducted by SPS environmental staff on September 22, 2020. Resampling was conducted on December 8, 2020 (MW-1 and MW-2) and January 26, 2021 (MW-7 and MW-9). Three suspected SSIs in MW-1 for Sulfate, Calcium, and TDS were confirmed following receipt of the laboratory data on December 23, 2020, and the suspected SSI for pH in MW-9 was confirmed following receipt of the field data on February 2, 2021. In response, ASDs were prepared and successfully completed (Appendix 9). Consequently, GREDELL Engineering Resources, Inc. concluded the statistical analysis results for samples obtained during the fourth semi-annual groundwater detection monitoring event do not indicate SSIs associated with the Fly Ash Pond.

The fifth semi-annual groundwater sampling field activities was initially conducted on April 17, 2021, but data analysis was not complete at the time of this report. Therefore, analytical data (and evaluation) for the May event will be included in the next Annual Groundwater Monitoring Report.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of the client and GREDELL Engineering Resources, Inc. for the specific project discussed in accordance with generally accepted environmental practices common to this locale at this time. No other warranties, expressed or implied, are provided.

Interpretations of data and recommendations made in this report are based on observations of data that were available and referred to in this report unless otherwise noted. The report is applicable only to this specific project and known site conditions as they existed at the time of report preparation.

This report is not a guarantee of subsurface conditions. Variations in subsurface conditions may be present that were not identified during this or previous investigations. The use of this report and interpretations of data or conclusions developed by others are the sole responsibility of those firms or individuals.

8.0 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., 2018, *Sikeston Power Station Groundwater Monitoring and Sampling Plan for Compliance with Missouri State Operating Permit #MO-0095575*, dated September 2018.

GREDELL Engineering Resources, Inc., 2020a, *Sikeston Board of Municipal Utilities Sikeston Power Station Detection Monitoring Program for Fly Ash Pond – Calcium, Sulfate, and Total Dissolved Solids in MW-1 Alternate Source Demonstration*, dated September 9, 2020.

GREDELL Engineering Resources, Inc., 2020b, *Sikeston Board of Municipal Utilities Sikeston Power Station Detection Monitoring Program for Fly Ash Pond – Fluoride in MW-2 Alternate Source Demonstration*, dated September 9, 2020.

GREDELL Engineering Resources, Inc., 2021a, *Sikeston Board of Municipal Utilities Sikeston Power Station Detection Monitoring Program for Fly Ash Pond – Calcium, Sulfate, and Total Dissolved Solids in MW-1 Alternate Source Demonstration*, dated March 10, 2021.

GREDELL Engineering Resources, Inc., 2021b, *Sikeston Board of Municipal Utilities Sikeston Power Station Detection Monitoring Program for Fly Ash Pond – pH in MW-9 Alternate Source Demonstration*, dated March 10, 2021.

Sanitas Statistical Software, © 1992-2019 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.

FIGURES

LEGEND

PROPERTY LINE — PL

GROUNDWATER CONTOUR (DASHED WHERE INFERRED)

MONITORING WELL

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 GREDELL ENGINEERING RESOURCES, INC.
3. GROUNDWATER ELEVATIONS MEASURED BY SIKESTON POWER STATION STAFF ON APRIL 6, 2020.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER® SOFTWARE.
5. RANGE OF GROUNDWATER FLOW GRADIENT AS DETERMINED BY SURFER® SOFTWARE 0.0001 FT./FT. TO 0.001 FT./FT.

MONITORING WELL ID	GROUNDWATER ELEVATION (FEET)	CASING ELEVATION (FEET)	NORTHING	EASTING
MW-1	299.16	312.77	383119.51	1078467.90
MW-2	300.40	308.01	383207.42	1079751.30
MW-3	300.00	308.55	381130.00	1079946.62
MW-7	298.99	315.03	381584.50	1078847.00
MW-9	299.41	314.68	382429.94	1078825.60

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SIKESTON POWER STATION
FLY ASH POND
2021 ANNUAL GROUNDWATER MONITORING & REPORT

FIGURE 1
GROUNDWATER CONTOUR MAP
APRIL 6, 2020

SURVEYED	DESIGNED	DRAWN	CHECKED	APPROVED	DATE	SCALE	PROJECT NAME	FILE NAME	SHEET #
NA	NA	CM	KE	MCC	7/2021	AS NOTED	SIKESTON/GWMAP/FAP	GWCONT FAP 2021	1 OF 2

N

SCALE: 1" = 400'

0 200 400

LEGEND

PROPERTY LINE	—PL—
GROUNDWATER CONTOUR (DASHED WHERE INFERRED)	——
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 SEPTEMBER 22, 2020.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER® SOFTWARE.
5. RANGE OF GROUNDWATER FLOW GRADIENT AS DETERMINED BY SURFER® SOFTWARE 0.0001 FT./FT. TO 0.001 FT./FT.

MONITORING WELL ID	GROUNDWATER ELEVATION (FEET)	CASING ELEVATION (FEET)	NORTHING	EASTING
MW-1	296.53	312.77	383119.51	1078467.90
MW-2	297.97	308.01	383207.42	1079751.30
MW-3	297.47	308.55	381130.00	1079946.62
MW-7	296.33	315.03	381584.50	1078847.00
MW-9	296.78	314.68	382429.94	1078825.60

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FIGURE 2
GROUNDWATER CONTOUR MAP
SEPTEMBER 22, 2020

SIKESTON POWER STATION
FLY ASH POND
2021 ANNUAL GROUNDWATER
MONITORING & REPORT

SURVEYED	DESIGNED	DRAWN	CHECKED	APPROVED	DATE	SCALE	PROJECT NAME	FILE NAME	SHEET #
NA	NA	CM	KE	MCC	7/2021	AS NOTED	SIKESTON/GWMAP/FAP	GWCONT FAP 2021	2 OF 2

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TABLES

Annual Groundwater Monitoring Report for Fly Ash Pond
USEPA 40 CFR 257.90(e)
SBMU - Sikeston Power Station
Scott County, Missouri

Table 1
Groundwater Monitoring Well Summary - Fly 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-1	383119.51	1078467.90	310.41	312.77	37.84	274.93	10	285.1
MW-2	383207.42	1079751.30	305.53	308.01	37.42	270.59	10	280.8
MW-3	381130.00	1079946.62	306.11	308.55	37.21	271.34	10	281.5
MW-7	381584.50	1078847.00	312.70	315.03	37.37	277.66	10	287.9
MW-9	382429.94	1078825.60	311.85	314.68	37.28	277.40	10	287.6

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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Prepared by: KAE
Checked by: MCC

Annual Groundwater Monitoring Report for Fly Ash Pond
USEPA 40 CFR 257.90(e)
SBMU - Sikeston Power Station
Scott County, Missouri

Table 2
Historical Groundwater Level Summary

Well ID	MW-1	MW-2	MW-3	MW-7	MW-9
Date	Groundwater Elevation (feet MSL)				
05/12/16	297.50	298.66	298.13	NM	NM
06/28/16	296.60	298.01	297.58	NM	NM
07/15/16	296.57	297.86	297.37	NM	NM
08/08/16	295.62	297.06	297.05	NM	NM
09/08/16	296.06	297.27	296.76	NM	NM
10/05/16	295.86	296.96	296.40	NM	NM
11/01/16	295.47	296.66	296.10	NM	NM
11/30/16	295.45	296.60	296.03	NM	NM
01/24/17	NM	NM	296.35	NM	NM
01/26/17	295.77	296.76	296.35	NM	NM
02/22/17	NM	NM	296.00	NM	NM
02/24/17	295.47	296.40	296.00	NM	NM
03/20/17	296.11	296.96	296.45	NM	NM
04/19/17	296.04	296.86	296.35	NM	NM
04/27/17	NM	NM	296.72	NM	NM
05/17/17	NM	NM	297.81	NM	NM
06/08/17	NM	NM	297.81	NM	NM
07/13/17	NM	NM	296.98	NM	NM
10/31/17	NM	NM	295.22	NM	NM
03/21/18	295.92	296.96	296.65	295.83	296.13
04/15/18	297.07	297.86	297.60	296.95	297.18
05/23/18	296.78	298.01	297.62	296.66	296.98
06/13/18	NM	NM	297.33	NM	NM
06/27/18	296.37	297.61	297.21	296.26	296.56
08/01/18	295.22	296.60	296.15	295.08	295.48
09/05/18	294.79	296.11	295.68	294.71	295.01
11/06/18	295.01	296.21	295.74	294.85	295.17
11/26/18	NM	NM	295.63	NM	NM
12/12/18	295.12	296.21	295.79	295.06	295.36
01/08/19	295.66	296.72	296.38	295.53	295.80
02/05/19	NM	NM	296.73	NM	NM
02/22/19	297.70	298.67	298.35	297.59	297.84
03/27/19	297.69	298.93	298.51	297.58	297.93
04/16/19	298.15	299.29	298.93	298.01	298.38
05/14/19	298.27	299.66	299.25	298.15	298.52
05/28/19	NM	NM	298.95	NM	NM
06/12/19	297.82	299.24	298.82	297.76	298.10
07/17/19	297.32	298.77	298.38	297.25	297.55
07/24/19	297.40	298.80	298.41	297.33	297.65
08/14/19	296.61	298.15	297.80	296.65	296.96
08/28/19	NM	NM	297.55	NM	NM
09/16/19	296.24	297.70	297.22	296.14	296.50
09/24/19	296.09	297.53	297.05	295.98	296.33
10/10/19	295.92	297.29	296.84	295.80	296.13
10/22/19	295.92	297.24	296.80	295.74	296.12
11/04/19	NM	NM	297.34	NM	NM
01/28/20	297.61	298.73	298.34	297.42	297.80
02/18/20	NM	NM	299.00	NM	NM
03/30/20	NM	NM	300.09	NM	NM
04/06/20	299.16	300.40	300.00	298.99	299.41
05/21/20	298.50	300.02	299.55	NM	298.71
09/22/20	296.53	297.97	297.47	296.33	296.78
12/08/20	296.63	298.00	NM	NM	NM
01/26/21	NM	NM	NM	296.51	296.82

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
April 6, 2020

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-1	Downgradient	13.61	13.61	300	8,800	7.1
MW-2	Upgradient	7.61	7.61	300	2,440	6.3
MW-3	Upgradient	8.55	8.55	300	5,460	6.4
MW-7	Downgradient	16.04	16.04	300	3,460	7.2
MW-9	Downgradient	15.27	15.27	300	2,440	7.3

NOTES:

1. Sequence of sampling is MW-3, MW-2, MW-1, MW-7, then MW-9. Note MW-1, MW-3, and MW-9 resampled May 21, 2020.
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.

Water Levels and Field Parameter Summary
September 22, 2020

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-1	Downgradient	16.24	16.24	300	2,260	7.2
MW-2	Upgradient	10.04	10.04	300	3,200	6.2
MW-3	Upgradient	11.08	11.08	300	3,880	6.5
MW-7	Downgradient	18.70	18.70	300	2,780	7.5/7.4
MW-9	Downgradient	17.90	17.90	300	2,180	7.5

NOTES:

1. Sequence of sampling is MW-3, MW-2, MW-1, MW-7, then MW-9.
   Note MW-1 and MW-2 resampled December 8, 2020 and MW-9 and MW-7 resampled January 26, 2021.
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.

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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 -
April 6, 2020

Chemical Parameter	Units	MW-2	DUP	Relative Percent Difference
pH	S.U.	6.3	6.3	0.00
Chloride	µg/L	2.1	2	4.88
Fluoride	mg/L	0.336	0.287	15.73
Sulfate	mg/L	16	16	0.00
Total Dissolved Solids	mg/L	140	160	13.33
Boron	mg/L	34	80	80.70
Calcium	mg/L	15	15	0.00

NOTES:
1. S.U. = Standard Unit.
2. µg/L = micrograms per liter.
3. mg/L = milligrams per liter.
4. Relative Percent Difference tolerance = 20%.

Relative Percent Differences Summary -
September 22, 2020

Chemical Parameter	Units	MW-1	DUP	Relative Percent Difference
pH	S.U.	7.2	7.2	0.00
Chloride	µg/L	5.9	5.9	0.00
Fluoride	mg/L	<0.250	<0.250	N/A
Sulfate	mg/L	67	70	4.38
Total Dissolved Solids	mg/L	310	340	9.23
Boron	µg/L	620	700	12.12
Calcium	mg/L	67	66	1.50

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-1	MW-2	MW-3	MW-7	MW-9
40 CFR 257 Appendix III Constituents for Detection Monitoring						
pH Upper	S.U.	7.5	6.5	6.6	7.4	7.4
pH Lower	S.U.	6.9	5.9	6.4	7.2	7.3
Boron	µg/L	544.6	60.53	32.7	2385	6236
Calcium	mg/L	45.18	25.29	19.49	152.9	95.09
Chloride	mg/L	12.2	8.15	1.598	15.22	23.28
Fluoride	mg/L	0.313	0.335	0.4083	0.8677	1.14
Sulfate	mg/L	31.57	22.33	21.97	259.2	301.1
Total Dissolved Solids	mg/L	223.2	169.4	177.8	617.2	630.8

NOTES:

1. Prediction limits based on eight rounds of background data spanning March 2018 to December 2018.
2. Prediction limits summarized from Sanitas outputs provided in Appendix 8.

APPENDICES

Appendix 1

Field Sampling Notes

Appendix 1

Field Sampling Notes
April 6, 2020

Field Instrumentation Calibration Log

Facility: SBMU SPS CCR Groundwater Sampling

Calibrated by: Ashley Razer

Field Instruments: In-Situ smarTROLL Field Meter

S/N #: 474247

HF scientific, inc. Micro TPI Field Portable Turbidimeter

S/N #: 20160736G

	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	04/06/2020	0630	4.00	=	4.0	1413	=	1412.0	Temperature (°C)	=	21.73	= 229.2	Temperature (°C)	=	21.06	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0		Tap Water Source	=	Sikeston City	10.0	=	10.0
			10.00	=	10.0								Barometric Pressure (mm/Hg)	=	1006.6	1000	=	1000.0
													Measurement	=	99.98			
End of Day Check	04/06/2020	1438	4.00	=	4.1	1413	=	1443.2	Temperature (°C)	=	22.41	= 227.3	Temperature (°C)	=	24.93	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0		Tap Water Source	=	Sikeston City	10.0	=	9.77
			10.00	=	9.9								Barometric Pressure (mm/Hg)	=	1004.2	1000	=	1001.0
													Measurement	=	97.97			

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: 4/6/2020 By: Ashley Razer

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 3
Name (Field Staff): A Patel D Dillingham
Date: 4-6-2020

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) 4-6-2020 (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): 8.55 Date: 4-6-2020

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

PURGE INFORMATION

Date: 4-6-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 0800 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 8.55 Total Volume Purged (mL): 5460

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

Well Total Depth (feet btoc): 36.99 Water Level after Sampling (feet btoc): 8.55 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0828

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)
0802		340	16.33	194.23	2.31	8.1	90.9	20.54	8.55	Yellow tinge, no odor
0804	250	840	15.24	197.53	2.12	7.5	85.6	30.81	8.55	Red tinge, no odor
0806	260	1360	14.99	198.35	2.02	7.0	82.0	25.17	8.55	" "
0808	260	1880	14.86	198.49	1.93	6.8	78.5	20.00	8.55	" "
0810	250	2380	14.86	198.07	1.69	6.6	74.3	18.07	8.55	" "
0812	250	2880	14.94	198.11	1.55	6.5	70.9	13.13	8.55	Clear, no odor
0814	260	3400	14.99	196.06	1.47	6.5	68.3	10.90	8.55	" "
0816	260	3920	15.03	197.84	1.45	6.4	67.6	9.40	8.55	" "
0818	260	4440	14.99	196.02	1.31	6.4	64.8	7.49	8.55	" "
0820	250	4940	14.97	197.50	1.29	6.4	64.4	7.27	8.55	" "
0822	260	5460	14.94	197.38	1.17	6.4	61.3	7.37	8.55	" "

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 3

Sampling Information:

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

Water Level @ Sampling (feet btoc): 8.55

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)
04-06-2022 0822	260	14.94	198.38	1.17	6.4	61.3	7.37

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: Sunny 50 °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 04-06-2022 By: Mishi Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 2
Name (Field Staff): A Patel D Dillingham
Date: 04-06-2020

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) 04-06-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW 2 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 7.61 Date: 04-06-2020

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

PURGE INFORMATION

Date: 04-06-2020

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): 7.61 Total Volume Purged (mL): 2440

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

Well Total Depth (feet btoc): 37.18 Water Level after Sampling (feet btoc): 7.61 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0915

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		380	16.87	146.61	1.70	6.5	66.2	13.71	7.61	Clear, no odor
0858	250	880	16.20	148.49	1.50	6.4	62.5	5.45	7.61	" "
0900	260	1400	15.96	148.90	1.66	6.4	60.2	4.35	7.61	" "
0902	270	1940	15.99	148.95	1.47	6.3	59.7	4.63	7.61	" "
0904	250	2440	16.04	148.70	1.36	6.3	58.2	4.70	7.61	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 2

Sampling Information:

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

Water Level @ Sampling (feet btoc): 7.61

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)
04-06-2020 AP ~~25~~ 0904	250	16.04	148.70	1.36	6.3	58.2	4.70

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 57 °F

Sample Characteristics: Clear, Colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Duplicate (Flyash APP III)

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

Date: 04-06-2020 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 1
Name (Field Staff): A Patel D Dillingham
Date: 04-06-2020

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) 04-06-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW 1 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 13.61 Date: 04-06-2023

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

PURGE INFORMATION

Date: 04-06-2023

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1039 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 13.61 Total Volume Purged (mL): 8800

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

Well Total Depth (feet btoc): 37.64 Water Level after Sampling (feet btoc): 13.61 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1118

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)
1041		380	19.75	390.39	0.77	6.8	-113.1	163.9	13.61	Yellow tint Flame, odor
1043	260	900	18.04	383.28	0.73	6.9	-117.2	112.9	13.61	" "
1045	270	1440	17.43	385.11	0.50	7.0	-119.4	179.1	13.61	" "
1047	260	1960	17.32	386.47	0.46	7.1	-120.6	48.68	13.61	" "
1049	270	2500	17.28	398.04	0.45	7.1	-119.5	23.66	13.61	" "
1051	260	3020	17.23	396.60	0.39	7.1	-118.7	25.65	13.61	" "
1053	260	3540	17.28	394.76	0.37	7.1	-118.3	17.46	13.61	Clear, no odor
1055	270	4080	17.23	403.33	0.37	7.1	-117.5	10.71	13.61	" "
1057	260	4600	17.27	411.71	0.35	7.1	-115.0	13.36	13.61	" "
1059	260	5120	17.27	409.38	0.35	7.1	-115.3	11.96	13.61	" "
1101	260	5640	17.29	403.60	0.34	7.1	-115.0	9.98	13.61	" "
1103	270	6180	17.27	409.98	0.32	7.1	-114.5	8.52	13.61	" "
1105	260	6700	17.27	417.74	0.32	7.1	-114.0	9.56	13.61	" "
1107	260	7220	17.30	410.68	0.32	7.1	-115.8	8.12	13.61	" "
1109	310	7840	17.33	412.32	0.34	7.1	-114.2	4.31	13.61	" "
1111	220	8280	17.28	416.40	0.33	7.1	-118.4	3.70	13.61	" "
1113	260	8800	17.32	416.50	0.31	7.1	-117.7	4.38	13.61	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 1

Sampling Information:

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

Water Level @ Sampling (feet btoc): 13.61

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)
04-06-2020 1113	260	17.32	416.50	0.31	7.1	-117.7	4.38

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 66°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: 04-06-2020 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 7
Name (Field Staff): A Patel D Dillingham
Date: 04-06-2020

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) 04-06-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW 7 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 16.04 Date: 04-06-2020

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

PURGE INFORMATION

Date: 04-06-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1146 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 16.04 Total Volume Purged (mL): 3460

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

Well Total Depth (feet btoc): 37.20 Water Level after Sampling (feet btoc): 16.04 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1203

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)
1148		620	18.11	834.79	0.60	7.1	66.9	3.25	16.04	Red Flake, no odor
1150	290	1200	16.83	855.02	0.43	7.2	76.4	5.11	16.04	Black Flake, no odor
1152	290	1780	16.56	859.69	0.37	7.2	80.3	2.52	16.04	" "
1154	300	2380	16.42	863.61	0.27	7.2	69.7	2.44	16.04	" "
1156	280	2940	16.37	865.48	0.25	7.2	71.2	2.32	16.04	" "
1158	260	3460	16.34	865.56	0.24	7.2	68.3	1.62	16.04	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 7

Sampling Information:

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

Water Level @ Sampling (feet btoc): 16.04

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)
04-06-2020 1158	260	16.34	865.56	0.24	7.2	68.3	1.62

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 70°F

Sample Characteristics: Black Flakes, 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: 04-06-2020 By: Rajesh Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 9
Name (Field Staff): A Patel D Dillingham
Date: 04-06-2020

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.J. Patel (Signed) Lab Tech (Title) 04-06-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW9 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 15.27 Date: 04-06-2020

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

PURGE INFORMATION

Date: 04-06-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1309 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 15.27 Total Volume Purged (mL): 2440

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

Well Total Depth (feet btoc): 37.11 Water Level after Sampling (feet btoc): 15.27 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1324

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)
1311		380	21.22	913.45	0.71	7.3	28.3	7.24	15.27	Clear, no odor
1313	250	880	18.56	962.49	0.55	7.3	40.5	3.01	15.27	" "
1315	250	1380	17.81	973.55	0.41	7.3	50.1	0.70	15.27	" "
1317	260	1900	17.65	973.75	0.40	7.3	59.0	0.59	15.27	" "
1319	270	2440	17.60	967.52	0.34	7.3	61.6	0.92	15.27	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 9

Sampling Information:

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

Water Level @ Sampling (feet btoc): 15.27

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)
04-06-2020 1319	270	17.60	967.52	0.34	7.3	61.6	0.92

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 73 °F

Sample Characteristics: Clear, Colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Blank (Flyash App IV)

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

Date: 04-06-2020 By: Ashish Patel Title: Lab Tech

Appendix 1

Field Sampling Notes
May 21, 2020 Resample

Field Instrumentation Calibration Log

Facility: SBMU SPS CCR Groundwater Sampling

Calibrated by: ASH, SH Patel

Field Instruments: In-Situ smarTROLL Field Meter

S/N #: 474247

HF scientific, inc. Micro TPI Field Portable Turbidimeter

S/N #: 20160366

	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	5-21-2020	0620	4.00	=	4.0	1413	=	1408.9	Temperature (°C)	=	21.68	=	229.2	Temperature (°C)	=	20.52	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Sikeston City	10.0	=	10.0
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	1003.0	1000	=	1000.0
														Measurement	=	99.93			
End of Day Check	05-21-2020	1535	4.00	=	4.1	1413	=	1441.8	Temperature (°C)	=	22.14	=	227.7	Temperature (°C)	=	21.86	0.02	=	0.03
			7.00	=	6.9				Standard (mV)	=	229.0			Tap Water Source	=	Sikeston City	10.0	=	10.25
			10.00	=	9.9									Barometric Pressure (mm/Hg)	=	1002.3	1000	=	100000
														Measurement	=	99.47			

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: 5-21-2020 By: ASH, SH Patel

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 3
Name (Field Staff): A Patel D Dillingham
Date: 5-21-2020

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) 5-21-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW3 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 9.00 Date: 5-21-2020

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

PURGE INFORMATION

Date: 5-21-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 0712 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 9.00 Total Volume Purged (mL): 4380

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

Well Total Depth (feet btoc): 36.99 Water Level after Sampling (feet btoc): 9.00 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0767

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)
0714		340	17.19	202.65	23.53	8.4	40.4	21.71	9.00	Red Flake, No Odor
0716	250	840	15.85	206.99	20.48	7.7	33.6	17.11	9.00	Red Flake, No Odor
0718	250	1340	15.44	207.20	19.17	7.3	29.6	15.11	9.00	" "
0720	250	1840	15.31	207.22	18.51	7.0	27.0	14.11	9.00	" "
0722	260	2360	15.30	207.20	16.42	6.8	24.0	12.25	9.00	Clear, No Odor
0724	240	2840	15.26	207.12	16.17	6.64	21.4	11.49	9.00	" "
0726	250	3340	15.27	203.47	14.67	6.5	19.6	7.14	9.00	" "
0728	270	3880	15.25	203.07	14.57	6.5	16.5	7.02	9.00	" "
0730	250	4380	15.25	205.51	13.48	6.4	14.9	7.29	9.00	" "

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Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW3

Sampling Information:

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

Water Level @ Sampling (feet btoc): 9.00

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)
5-21-2020 0730	250	15.25	205.51	13.48	6.4	14.9	7.29

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 61°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: 5-21-2020 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 1
Name (Field Staff): A Patel D Dillingham
Date: 05-21-2020

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) 05-21-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW 1 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 14.27 Date: 05-21-2020

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

PURGE INFORMATION

Date: 05-21-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1157 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 14.27 Total Volume Purged (mL): 5220

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

Well Total Depth (feet btoc): 37.67 Water Level after Sampling (feet btoc): 14.27 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1255

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)
1159		400	18.49	488.12	9.77	7.18	-130.6	10.46	14.27	Yellow NS Flake, odor
1201	270	940	17.11	498.75	7.09	7.2	-130.9	12.56	14.27	" "
1203	260	1460	16.74	503.52	5.81	7.2	-131.2	12.63	14.27	" "
1205	270	2020	16.61	508.15	4.37	7.2	-130.8	6.66	14.27	Clear, no odor
1207	270	2540	16.61	507.15	4.18	7.2	-131.3	7.74	14.27	" "
1208	260	3060	16.64	513.41	3.56	7.2	-129.2	7.47	14.27	" "
1210	270	3600	16.61	515.98	3.69	7.2	-128.4	5.75	14.27	" "
1212	280	4160	16.58	518.70	3.30	7.2	-125.5	3.79	14.27	" "
1214	260	4680	16.51	521.87	3.40	7.2	-124.9	4.29	14.27	" "
1216	270	5220	16.56	524.71	3.25	7.2	-125.2	3.32	14.27	" "

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 1

Sampling Information:

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

Water Level @ Sampling (feet btoc): 14.27

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)
05-21-2020 1216	270	16.56	524.71	3.25	7.2	-125.2	3.32

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 64°F

Sample Characteristics: Clear, Colorless, 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.

Date: 5-21-2020 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 9
Name (Field Staff): A Patel D Dillingham
Date: 5-21-2020

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 5-21-2020
Signed Title Date

Field Sampling Log

Monitoring Well ID: MW 9 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 15.97 Date: 5-21-2020

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

PURGE INFORMATION

Date: 5-21-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1414 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 15.97 Total Volume Purged (mL): 2520

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

Well Total Depth (feet btoc): 37.11 Water Level after Sampling (feet btoc): 15.97 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1501

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)
1416		360	20.04	979.66	10.07	7.3	-57.1	4.63	15.97	Clear, no odor
1418	270	900	17.82	1018.2	8.51	7.3	-52.0	1.75	15.97	" "
1420	270	1440	17.19	1028.2	5.46	7.3	-50.7	0.75	15.97	" "
1422	270	1980	17.02	1028.1	4.84	7.3	-50.9	0.79	15.97	" "
1424	270	2520	17.09	1024.4	4.95	7.4	-51.1	0.59	15.97	" "

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 9

Sampling Information:

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

Water Level @ Sampling (feet btoc): 15.97

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)
05-21-2020 1424	270	17.09	1024.4	4.95	7.4	-51.1	0.59

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 72°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: 5-21-2020 By: Ashish Patel Title: Log Tech

Prepared by: GREDELL Engineering Resources, Inc.

January 2017

Appendix 1

Field Sampling Notes
September 22, 2020

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 #: 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	09-22-2020	0615	4.00	=	4.0	1413	=	1410.3	Temperature (°C)	=	21.58	=	229.5	Temperature (°C)	=	20.84	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Siloam Springs City	10.0	=	10.0
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	1011.4	1000	=	1000.0
														Measurement	=	100.0%			
End of Day Check	09-22-2020	1729	4.00	=	4.0	1413	=	1422.7	Temperature (°C)	=	21.65	=	227.6	Temperature (°C)	=	22.97	0.02	=	0.01
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Siloam Springs City	10.0	=	10.37
			10.00	=	10.1									Barometric Pressure (mm/Hg)	=	1009.1	1000	=	991.4
														Measurement	=	100.38			

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: 09-22-2020 By: Ashish Patel

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 3
Name (Field Staff): A Patel O Dillingham
Date: 09-22-2020

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) 09-22-2020 (Date)

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW3 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 11.08 Date: 09-22-2020

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

PURGE INFORMATION

Date: 09-22-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 0734 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 11.08 Total Volume Purged (mL): 3880

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

Well Total Depth (feet btoc): 36.99 Water Level after Sampling (feet btoc): 11.08 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0826

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)
0736		320	18.19	203.72	15.66	6.4	54.9	7.92	11.08	Clear, no odor
0738	260	840	17.26	203.58	13.70	6.4	54.8	7.34	11.08	Red Flow, no odor
0740	240	1320	16.90	201.05	12.32	6.4	52.2	7.19	11.08	" "
0742	260	1840	16.77	199.44	11.34	6.4	49.2	3.92	11.08	" "
0744	260	2360	16.73	197.78	10.33	6.5	46.0	3.65	11.08	" "
0746	260	2880	16.67	196.82	9.72	6.5	43.9	2.05	11.08	Clear, no odor
0748	250	3380	16.65	193.57	8.81	6.5	40.3	2.70	11.08	Clear, no odor
0750	250	3880	16.65	194.11	8.29	6.5	36.7	2.13	11.08	" "

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): 11.08

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)
09-22-2020 0750	250	16.65	194.11	8.29	6.5	36.7	2.13

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 55°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 09-22-2020 By: Ashish Patel Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 2
Name (Field Staff): A Patel D Dillingham
Date: 09-22-2020

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) 09-22-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW2 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.04 Date: 09-22-2020

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

PURGE INFORMATION

Date: 09-22-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 0849 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.04 Total Volume Purged (mL): 3200

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

Well Total Depth (feet btoc): 37.18 Water Level after Sampling (feet btoc): 10.04 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 0940

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)
0851		340	18.75	187.19	10.47	6.2	-12.7	1.53	10.04	Clear, no odor
0853	230	800	18.52	188.32	9.04	6.2	-11.1	1.83	10.04	" "
0855	240	1280	18.48	186.69	10.14	6.2	-10.3	1.80	10.04	" "
0857	230	1740	18.43	188.21	9.82	6.2	-9.5	1.31	10.04	" "
0859	260	2260	18.39	188.73	7.22	6.2	-10.0	0.63	10.04	" "
0901	230	2720	18.35	189.52	5.75	6.2	-9.8	0.82	10.04	" "
0903	240	3200	18.34	189.84	6.52	6.2	-9.6	0.62	10.04	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 2

Sampling Information:

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

Water Level @ Sampling (feet btoc): 10.04

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)
09-22-2020 0903	240	18.34	189.84	6.52	6.2	-9.6	0.62

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 61°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: 09-22-2020 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 1
Name (Field Staff): A Patel D Dillingham
Date: 09-22-2020

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 Abhishek Patel (Signed) Lab Tech (Title) 09-22-2020 (Date)

Field Sampling Log

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

Initial Water Level (feet btoc): 16.24 Date: 09-22-2020

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

PURGE INFORMATION

Date: 09-22-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1045 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 16.24 Total Volume Purged (mL): 2260

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

Well Total Depth (feet btoc): 37.62 Water Level after Sampling (feet btoc): 16.24 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1137

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)
1047		320	19.72	529.33	9.35	7.3	-85.1	0.98	16.24	Clear, No odor
1049	240	800	18.30	541.23	6.41	7.3	-89.7	1.43	16.24	" "
1051	240	1280	17.90	546.11	5.51	7.3	-93.2	0.74	16.24	" "
1053	240	1760	17.72	554.01	4.93	7.2	-95.3	0.46	16.24	" "
1055	250	2260	17.67	556.93	4.23	7.2	-95.2	0.51	16.24	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 1

Sampling Information:

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

Water Level @ Sampling (feet btoc): 16.24

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)
09-22-2020 1095	250	17.67	556.93	4.23	7.2	-95.2	0.51

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 66°F

Sample Characteristics: Clear, Colorless, odorless

Sample Collection Order: Per SAP

Comments and Observations:

Collect Field Duplicate

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

Date 09-22-2020 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 7
Name (Field Staff): A Patel D Dillingham
Date: 09-22-2020

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) 09-22-2020 (Date)

Field Sampling Log

Monitoring Well ID: MW 7 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 18.70 Date: 09-22-2020

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

PURGE INFORMATION

Date: 09-22-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1210 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 18.70 Total Volume Purged (mL): 2780

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

Well Total Depth (feet btoc): 37.25 Water Level after Sampling (feet btoc): 18.70 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1258

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)
1212		320	19.24	715.24	7.47	7.6	-81.0	1.61	18.70	Black Flake, No odor
1214	250	820	18.17	723.21	5.03	7.5	-82.2	1.14	18.70	" "
1216	240	1300	17.72	727.92	3.64	7.5	-81.3	0.68	18.70	" "
1218	240	1780	17.50	729.37	3.85	7.5	-80.3	0.34	18.70	" "
1220	250	2280	17.45	727.24	3.58	7.5	-80.8	0.65	18.70	" "
1222	250	2780	17.40	720.45	3.63	7.5	-80.8	0.50	18.70	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 7

Sampling Information:

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

Water Level @ Sampling (feet btoc): 18.70

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)
09-22-2020 1222	250	17.40	720.45	3.63	7.5	-80.8	0.50

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 68°F

Sample Characteristics: Black Flake; 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: 09-22-2020 By: [signature] Title: Cert Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 9
Name (Field Staff): A Paki D Dillingham
Date: 09-22-2020

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 Paki Lab Tech 09-22-2020
Signed Title Date

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW9 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 17.90 Date: 09-22-2020

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

PURGE INFORMATION

Date: 09-22-2020

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1346 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 17.90 Total Volume Purged (mL): 2180

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

Well Total Depth (feet btoc): 37.14 Water Level after Sampling (feet btoc): 17.90 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1431

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)
1348		360	20.68	892.74	4.72	7.5	-76.6	0.28	17.90	Clear, no odor
1350	170	700	17.72	883.77	4.20	7.5	-71.9	1.07	17.90	" "
1352	240	1180	17.63	886.97	4.15	7.5	-71.5	0.26	17.90	" "
1354	230	1640	17.65	894.35	4.03	7.5	-70.7	0.21	17.90	" "
1356	270	2180	17.59	891.91	4.18	7.5	-70.4	0.64	17.90	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 9

Sampling Information:

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

Water Level @ Sampling (feet btoc): 17.90

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)
09-22-2023 1356	270	17.59	891.91	4.18	7.5	-70.4	0.64

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 66 °F

Sample Characteristics: Clear, Colorless, 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.

Date: 09-22-2023 By: Abigail Paser Title: Lab Tech

Appendix 1

Field Sampling Notes
December 8, 2020 Resample

Field Instrumentation Calibration Log

Facility: SBMU SPS CCR Groundwater Sampling

Calibrated by: AS 2.32 Patel

Field Instruments: In-Situ smarTROLL Field Meter

S/N #: 474247

HF scientific, inc. Micro TPI Field Portable Turbidimeter

S/N #: 20160736

	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	12-8-2020	1005	4.00	=	4.0	1413	=	1412.5	Temperature (°C)	=	21.96	=	229.3	Temperature (°C)	=	21.52	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Sikeston City	10.0	=	10.0
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	1008.1	1000	=	1000.0
														Measurement	=	99.92			
End of Day Check	12-8-2020		4.00	=	4.0	1413	=	1427.7	Temperature (°C)	=	21.92	=	228.4	Temperature (°C)	=	21.28	0.02	=	0.03
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Sikeston City	10.0	=	9.90
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	1005.5	1000	=	988.2
														Measurement	=	99.80			

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: 12-8-20 By: AS Patel

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 2
Name (Field Staff): A Patel D Dillingham
Date: 12-08-20

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) L4S Tech (Title) 12-8-20 (Date)

Field Sampling Log

Monitoring Well ID: MW 2 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 10.01 Date: 12-08-20

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

PURGE INFORMATION

Date: 12-08-20

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1107 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 10.01 Total Volume Purged (mL): 2240

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

Well Total Depth (feet btoc): 37.19 Water Level after Sampling (feet btoc): 10.01 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1140

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)
1109		320	18.14	180.62	10.14	6.6	209.1	6.93	10.01	clear, no odor
1111	240	800	17.41	181.02	6.93	6.3	223.1	1.69	10.01	" "
1113	230	1260	17.14	181.99	6.13	6.2	218.8	1.15	10.01	" "
1115	240	1740	16.96	186.98	5.54	6.2	222.2	1.28	10.01	" "
1117	250	2240	16.90	186.51	5.56	6.2	223.4	0.79	10.01	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW2

Sampling Information:

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

Water Level @ Sampling (feet btoc): 10.01

Monitoring Event: Annual ( ) Semi-Annual (Y) 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)
12-08-20 1117	250	16.90	186.51	5.56	6.2	223.4	0.79

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 45°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: 12-8-20 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 1
Name (Field Staff): A Patel D Dillingham
Date: 12-08-20

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 12-08-20
Signed Title Date

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW1 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 16.14 Date: 12-08-20

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

PURGE INFORMATION

Date: 12-08-20

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1234 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 16.14 Total Volume Purged (mL): 2300

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

Well Total Depth (feet btoc): 37.64 Water Level after Sampling (feet btoc): 16.14 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1310

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)
1236		380	15.79	457.84	9.51	7.3	133.8	3.10	16.14	Clear, no odor
1238	250	880	15.92	453.96	6.45	7.3	128.1	2.44	16.14	" "
1240	250	1380	15.93	455.45	5.25	7.3	107.5	2.15	16.14	" "
1242	250	1780	15.92	460.52	4.85	7.3	88.9	2.32	16.14	" "
1244	260	2300	15.90	462.07	4.19	7.3	80.1	2.44	16.14	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 1

Sampling Information:

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

Water Level @ Sampling (feet btoc): 16.14

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)
12-08-20 1244	260	15.90	462.07	4.19	7.3	80.1	2.44

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 48°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: 12-08-20 By: Ashish Patel Title: Lab Tech

Appendix 1

Field Sampling Notes
January 26, 2021 Resample

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 #: 20160736

	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	01/26/2021	1005	4.00	=	4.0	1413	=	1412.4	Temperature (°C)	=	21.91	=	229.2	Temperature (°C)	=	21.5	0.02	=	0.02
			7.00	=	7.0				Standard (mV)	=	229.0			Tap Water Source	=	Silverton City	10.0	=	10.0
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	999.57	1000	=	1000.0
														Measurement	=	102.13			
End of Day Check	01/26/2021	1245	4.00	=	4.0	1413	=	1416.5	Temperature (°C)	=	20.71	=	227.4	Temperature (°C)	=	16.30	0.02	=	0.03
			7.00	=	7.1				Standard (mV)	=	229.0			Tap Water Source	=	Silverton City	10.0	=	9.88
			10.00	=	10.0									Barometric Pressure (mm/Hg)	=	1000.9	1000	=	992.7
														Measurement	=	99.80			

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: 01/26/2021 By: Ashish Patel

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW7
Name (Field Staff): A Patel D Dillingham
Date: 1-26-2021

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) 1/26/2021 (Date)

Prepared by: GREDELL Engineering Resources, Inc. January 2017

Field Sampling Log

Monitoring Well ID: MW7 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 18.52 Date: 11/26/2021

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

PURGE INFORMATION

Date: 11/26/2021

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1052 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 18.52 Total Volume Purged (mL): 8260

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

Well Total Depth (feet btoc): 37.21 Water Level after Sampling (feet btoc): 18.52 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1127

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)
1054		320	17.71	811.39	1.00	7.5	27.1	1.35	18.52	clear, no odor
1056	240	800	16.87	825.74	0.50	7.5	19.5	1.00	18.52	" "
1058	240	1280	16.62	823.36	0.38	7.5	13.1	0.68	18.52	" "
1100	250	1780	16.70	816.05	0.33	7.4	5.9	0.64	18.52	" "
1102	260	2300	16.51	820.75	0.30	7.4	0.5	0.47	18.52	" "
1104	250	2800	16.51	796.72	0.31	7.4	-11.8	0.52	18.52	" "
1106	250	3300	16.48	826.73	0.31	7.4	-18.3	0.43	18.52	" "
1108	250	3800	16.37	826.37	0.32	7.4	-22.7	0.52	18.52	" "
1110	270	4340	16.40	824.22	0.32	7.4	-27.6	0.51	18.52	" "
1112	240	4820	16.26	837.04	0.29	7.4	-30.9	0.44	18.52	" "
1114	240	5300	16.11	837.56	0.31	7.4	-36.2	0.51	18.52	" "
1116	250	5800	16.07	837.08	0.31	7.4	-38.4	0.54	18.52	" "
1118	250	6300	15.94	842.16	0.29	7.4	-42.0	0.36	18.52	" "
1120	240	6780	16.22	841.53	0.29	7.4	-44.0	0.58	18.52	" "
1122	240	7260	16.42	834.33	0.27	7.4	-46.1	0.49	18.52	" "
1124	240	7740	16.38	827.89	0.26	7.4	-47.9	0.52	18.52	" "
1126	260	8260	16.40	823.94	0.27	7.4	-49.2	0.41	18.52	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 7

Sampling Information:

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

Water Level @ Sampling (feet btoc): 18.52

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)
01/26/2021 1126	260	16.40	823.44	0.27	7.4	-49.2	0.41

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 48°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: 1/26/2021 By: [signature] Title: Lab Tech

Monitoring Well Field Inspection

Facility: SBMU SPS – CCR Groundwater Monitoring
Monitoring Well ID: MW 9
Name (Field Staff): A Patel D Dillingham
Date: 01-26-2021

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) 1/26/2021 (Date)

Field Sampling Log

Monitoring Well ID: MW 9 Facility: SBMU Sikeston Power Station - Groundwater Monitoring

Initial Water Level (feet btoc): 17.86 Date: 01/26/2021

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

PURGE INFORMATION

Date: 01/21/2021

Name (Sample Collector): D Dillingham

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

Time Purging Initiated: 1144 One (1) Well Volume (mL): NA

Beginning Water Level (feet btoc): 17.86 Total Volume Purged (mL): 8800

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

Well Total Depth (feet btoc): 37.12 Water Level after Sampling (feet btoc): 17.86 (i.e., pump is off)

Casing Diameter (feet): 2" Sch 40 PVC Time Sampling Completed: 1223

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)
1146		300	16.51	957.59	1.38	7.6	-58.9	0.73	17.86	Clear, no odor
1148	220	740	16.43	970.73	0.86	7.5	-60.0	0.51	17.86	" "
1150	220	1180	16.30	977.57	0.67	7.5	-61.2	0.56	17.86	" "
1152	200	1580	16.49	966.46	0.58	7.5	-59.6	0.54	17.86	" "
1154	210	2000	16.44	976.11	0.53	7.5	-64.6	0.45	17.86	" "
1156	230	2460	16.50	968.43	0.49	7.5	-65.6	0.54	17.86	" "
1158	250	2960	16.44	971.81	0.46	7.5	-66.1	0.43	17.86	" "
AP 1200	230	3420	16.37	973.45	0.45	7.5	-66.3	0.47	17.86	" "
1202	250	3920	16.26	970.45	0.42	7.5	-67.4	0.43	17.86	" "
1204	230	4380	15.84	980.26	0.41	7.5	-67.8	0.43	17.86	" "
1206	220	4820	15.96	977.99	0.39	7.5	-66.1	0.53	17.86	" "
1208	230	5280	16.39	965.74	0.37	7.5	-66.6	0.46	17.86	" "
1210	240	5760	16.34	966.13	0.36	7.5	-67.2	0.44	17.86	" "
1212	270	6300	16.12	974.67	0.36	7.5	-67.0	0.53	17.86	" "
1214	250	6800	15.84	979.97	0.35	7.5	-65.2	0.42	17.86	" "
1216	240	7280	16.01	976.70	0.34	7.5	-65.6	0.52	17.86	" "
1218	240	7760	15.92	970.53	0.35	7.5	-70.3	0.36	17.86	" "
1220	280	8320	16.19	975.47	0.34	7.5	-69.2	0.57	17.86	" "
1222	240	8800	16.07	971.71	0.34	7.5	-69.1	0.47	17.86	" "

btoc - below top of casing

Field Sampling Log

Facility: SBMU Sikeston Power Station - CCR Groundwater Monitoring Monitoring Well ID: MW 9

Sampling Information:

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

Water Level @ Sampling (feet btoc): 17.86

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)
01/26/2021 1222	240	16.07	971.71	0.34	7.5	-69.1	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 50°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: 1/26/2021 By: [signature] Title: Lab Tech

Appendix 2

Laboratory Analytical Results

Appendix 2

Laboratory Analytical Results
April 6, 2020

April 16, 2020

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

RE: Sikeston BMU-CCR Fly Ash Wells

Dear Luke St Mary:

Please find enclosed the analytical results for the **7** sample(s) the laboratory received on **4/8/20 10:00 am** and logged in under work order **0041811**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

NELAP ACCREDITED TNI LABORATORY

ANALYTICAL RESULTS

ANALYTICAL RESULTS

Sample: 0041811-01
Name: MW-1
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 11:13
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	5.4	mg/L		04/14/20 10:34	1	1.0	04/14/20 10:34	LAM	EPA 300.0 REV 2.1
Fluoride	0.255	mg/L		04/14/20 10:34	1	0.250	04/14/20 10:34	LAM	EPA 300.0 REV 2.1
Sulfate	39	mg/L	Q4	04/14/20 11:29	5	5.0	04/14/20 11:29	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	230	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	520	ug/L		04/14/20 08:45	5	10	04/16/20 08:49	JMW	EPA 6020A
Calcium	48000	ug/L		04/14/20 08:45	5	100	04/15/20 08:03	JMW	EPA 6020A

Sample: 0041811-02
Name: MW-2
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 09:04
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	2.1	mg/L		04/14/20 11:47	1	1.0	04/14/20 11:47	LAM	EPA 300.0 REV 2.1
Fluoride	0.336	mg/L		04/14/20 11:47	1	0.250	04/14/20 11:47	LAM	EPA 300.0 REV 2.1
Sulfate	16	mg/L	Q4	04/14/20 12:41	5	5.0	04/14/20 12:41	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	140	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	34	ug/L		04/14/20 08:45	5	10	04/16/20 08:52	JMW	EPA 6020A
Calcium	15000	ug/L		04/14/20 08:45	5	100	04/15/20 08:07	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-03
Name: MW-3
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 08:22
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	1.8	mg/L		04/13/20 19:38	1	1.0	04/13/20 19:38	KCC	EPA 300.0 REV 2.1
Fluoride	0.371	mg/L		04/13/20 19:38	1	0.250	04/13/20 19:38	KCC	EPA 300.0 REV 2.1
Sulfate	20	mg/L		04/13/20 20:33	10	10	04/13/20 20:33	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	380	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	29	ug/L		04/14/20 08:45	5	10	04/16/20 09:12	JMW	EPA 6020A
Calcium	16000	ug/L		04/14/20 08:45	5	100	04/15/20 08:10	JMW	EPA 6020A

Sample: 0041811-04
Name: MW-7
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 11:58
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	4.0	mg/L		04/13/20 20:51	1	1.0	04/13/20 20:51	KCC	EPA 300.0 REV 2.1
Fluoride	0.737	mg/L		04/13/20 20:51	1	0.250	04/13/20 20:51	KCC	EPA 300.0 REV 2.1
Sulfate	200	mg/L		04/13/20 21:09	25	25	04/13/20 21:09	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	540	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	2200	ug/L		04/14/20 08:45	5	10	04/16/20 09:20	JMW	EPA 6020A
Calcium	120000	ug/L		04/14/20 08:45	5	100	04/15/20 08:14	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-05
Name: MW-9
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 13:19
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	18	mg/L	Q4	04/14/20 14:30	5	5.0	04/14/20 14:30	LAM	EPA 300.0 REV 2.1
Fluoride	0.816	mg/L	Q3	04/14/20 12:59	1	0.250	04/14/20 12:59	LAM	EPA 300.0 REV 2.1
Sulfate	250	mg/L	Q4	04/14/20 14:48	25	25	04/14/20 14:48	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	840	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	4900	ug/L		04/14/20 08:45	5	10	04/16/20 09:23	JMW	EPA 6020A
Calcium	92000	ug/L		04/14/20 08:45	5	100	04/15/20 08:18	JMW	EPA 6020A

Sample: 0041811-06
Name: DUPLICATE WELL
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 00:00
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	2.0	mg/L		04/14/20 15:06	1	1.0	04/14/20 15:06	LAM	EPA 300.0 REV 2.1
Fluoride	0.287	mg/L		04/14/20 15:06	1	0.250	04/14/20 15:06	LAM	EPA 300.0 REV 2.1
Sulfate	16	mg/L		04/14/20 15:24	5	5.0	04/14/20 15:24	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	160	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	80	ug/L		04/14/20 08:45	5	10	04/16/20 09:27	JMW	EPA 6020A
Calcium	15000	ug/L		04/14/20 08:45	5	100	04/15/20 08:30	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-07
Name: FIELD BLANK
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 00:00
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	< 1.0	mg/L		04/14/20 16:01	1	1.0	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		04/14/20 16:01	1	0.250	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
Sulfate	< 1.0	mg/L		04/14/20 16:01	1	1.0	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	< 17	mg/L		04/09/20 13:28	1	17	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	23	ug/L		04/14/20 08:45	5	10	04/16/20 09:31	JMW	EPA 6020A
Calcium	< 100	ug/L		04/14/20 08:45	5	100	04/15/20 08:33	JMW	EPA 6020A

Appendix 2

Laboratory Analytical Results
May 21, 2020 Resample

June 15, 2020

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

RE: Sikeston Bottom Ash App III and App IV 2019

Dear Luke St Mary:

Please find enclosed the analytical results for the **6** sample(s) the laboratory received on **5/26/20 8:00 am** and logged in under work order **0054242**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

ANALYTICAL RESULTS

Sample: 0054242-01
Name: MW-1
Alias: RESAMPLE

Sampled: 05/21/20 12:16
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Sulfate	63	mg/L		06/02/20 00:17	10	10	06/02/20 00:17	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	260	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Calcium	60000	ug/L		06/09/20 13:19	5	200	06/11/20 08:51	JMW	EPA 6020A

Sample: 0054242-02
Name: DUPLICATE
Alias: RESAMPLE

Sampled: 05/21/20 00:00
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Sulfate	16	mg/L		06/04/20 14:35	5	5.0	06/04/20 14:35	MGU	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	100	mg/L	H	05/29/20 12:45	1	17	05/29/20 13:05	BMS	SM 2540C
Solids - total dissolved solids (TDS)	90	mg/L	M, X	05/28/20 07:45	1	17	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Calcium	18000	ug/L		06/09/20 13:19	5	200	06/11/20 08:54	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0054242-03
Name: MW-2
Alias: RESAMPLE

Sampled: 05/21/20 08:33
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Fluoride	0.374	mg/L		06/02/20 00:35	1	0.250	06/02/20 00:35	KCC	EPA 300.0 REV 2.1
Total Metals - PIA									
Boron	36	ug/L		06/09/20 13:19	5	10	06/11/20 08:58	JMW	EPA 6020A

Sample: 0054242-04
Name: MW-3
Alias: RESAMPLE

Sampled: 05/21/20 07:30
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	1.5	mg/L	Q1	06/02/20 02:06	1	1.0	06/02/20 02:06	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	130	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C

Sample: 0054242-05
Name: MW-9
Alias: RESAMPLE

Sampled: 05/21/20 14:24
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	560	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C

ANALYTICAL RESULTS

Sample: 0054242-06
Name: FIELD BLANK
Matrix: Ground Water - Regular Sample

Sampled: 05/21/20 00:00
Received: 05/26/20 08:00
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	< 1.0	mg/L		06/02/20 03:01	1	1.0	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		06/02/20 03:01	1	0.250	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
Sulfate	< 1.0	mg/L		06/02/20 03:01	1	1.0	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	< 17	mg/L		05/28/20 07:45	1	17	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Boron	< 10	ug/L		06/09/20 13:19	5	10	06/11/20 09:02	JMW	EPA 6020A
Calcium	220	ug/L		06/09/20 13:19	5	200	06/11/20 09:02	JMW	EPA 6020A

Appendix 2

Laboratory Analytical Results
September 22, 2020

October 16, 2020

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

RE: Sikeston BMU-CCR Fly Ash Wells

Dear Luke St Mary:

Please find enclosed the **revised** analytical results for the **7** sample(s) the laboratory received on **9/24/20 10:00 am** and logged in under work order **0095312**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

SAMPLE RECEIPT CHECK LIST

Work Order 0095312

YES	Samples received within temperature compliance
YES	COC present
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Samples are free from signs of damage & contamination
NO	No headspace >6 mm present in VOA vials or TOX bottles
NO	Sulfide bottle(s) completely filled if required
NO	Trip blank(s) received if required
NO	Custody seals used
NO	Custody seals intact
YES	All analyses received within holding times
NO	Short hold time analysis requested
NO	RUSH TAT requested
NO	Field parameters recorded on COC
YES	Current PDC COC submitted
NO	Sample receipt case narrative provided

ANALYTICAL RESULTS

Sample: 0095312-01
Name: MW-1
Matrix: Ground Water - Grab

Sampled: 09/22/20 10:55
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	5.9	mg/L		09/29/20 21:52	1	1.0	09/29/20 21:52	CRD	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		09/29/20 21:52	1	0.250	09/29/20 21:52	CRD	EPA 300.0 REV 2.1
Sulfate	67	mg/L		09/30/20 16:49	10	10	09/30/20 16:49	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	310	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	620	ug/L		10/08/20 09:47	5	10	10/15/20 12:13	JMW	EPA 6020A
Calcium	67000	ug/L		10/08/20 09:47	5	200	10/15/20 08:14	JMW	EPA 6020A

Sample: 0095312-02
Name: MW-2
Matrix: Ground Water - Grab

Sampled: 09/22/20 09:03
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	4.8	mg/L		09/29/20 22:28	1	1.0	09/29/20 22:28	CRD	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		09/29/20 22:28	1	0.250	09/29/20 22:28	CRD	EPA 300.0 REV 2.1
Sulfate	17	mg/L		09/29/20 23:22	5	5.0	09/29/20 23:22	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	150	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	68	ug/L	B	10/08/20 09:47	5	10	10/15/20 12:17	JMW	EPA 6020A
Calcium	21000	ug/L		10/08/20 09:47	5	200	10/15/20 08:18	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0095312-03
Name: MW-3
Matrix: Ground Water - Grab

Sampled: 09/22/20 07:50
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	1.1	mg/L		09/29/20 23:41	1	1.0	09/29/20 23:41	CRD	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		09/30/20 17:07	1	0.250	09/30/20 17:07	CRD	EPA 300.0 REV 2.1
Sulfate	17	mg/L		09/29/20 23:59	5	5.0	09/29/20 23:59	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	120	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	31	ug/L	B	10/08/20 09:47	5	10	10/15/20 12:21	JMW	EPA 6020A
Calcium	17000	ug/L		10/08/20 09:47	5	200	10/15/20 08:21	JMW	EPA 6020A

Sample: 0095312-04
Name: MW-7
Matrix: Ground Water - Grab

Sampled: 09/22/20 12:22
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	3.1	mg/L		09/30/20 00:17	1	1.0	09/30/20 00:17	CRD	EPA 300.0 REV 2.1
Fluoride	0.628	mg/L		09/30/20 17:25	1	0.250	09/30/20 17:25	CRD	EPA 300.0 REV 2.1
Sulfate	110	mg/L		09/30/20 00:35	50	50	09/30/20 00:35	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	460	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	1700	ug/L		10/08/20 09:47	5	10	10/15/20 12:24	JMW	EPA 6020A
Calcium	100000	ug/L		10/08/20 09:47	5	200	10/15/20 08:25	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0095312-05
Name: MW-9
Matrix: Ground Water - Grab

Sampled: 09/22/20 13:56
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	15	mg/L		09/30/20 01:11	5	5.0	09/30/20 01:11	CRD	EPA 300.0 REV 2.1
Fluoride	0.832	mg/L		09/30/20 17:43	1	0.250	09/30/20 17:43	CRD	EPA 300.0 REV 2.1
Sulfate	210	mg/L		09/30/20 01:29	25	25	09/30/20 01:29	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	550	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	5000	ug/L		10/08/20 09:47	5	10	10/15/20 12:28	JMW	EPA 6020A
Calcium	80000	ug/L		10/08/20 09:47	5	200	10/15/20 08:28	JMW	EPA 6020A

Sample: 0095312-06
Name: DUPLICATE WELL
Matrix: Ground Water - Field Duplicate

Sampled: 09/22/20 00:00
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	5.9	mg/L		09/30/20 01:48	1	1.0	09/30/20 01:48	CRD	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		09/30/20 18:01	1	0.250	09/30/20 18:01	CRD	EPA 300.0 REV 2.1
Sulfate	70	mg/L		09/30/20 03:04	50	50	09/30/20 03:04	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	340	mg/L		09/28/20 09:52	1	26	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	700	ug/L		10/08/20 09:47	5	10	10/15/20 12:32	JMW	EPA 6020A
Calcium	66000	ug/L		10/08/20 09:47	5	200	10/15/20 08:32	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0095312-07
Name: FIELD BLANK
Matrix: Water - Field Blank

Sampled: 09/22/20 13:56
Received: 09/24/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	< 1.0	mg/L		09/30/20 03:23	1	1.0	09/30/20 03:23	CRD	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		09/30/20 18:19	1	0.250	09/30/20 18:19	CRD	EPA 300.0 REV 2.1
Sulfate	< 1.0	mg/L		09/30/20 03:23	1	1.0	09/30/20 03:23	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	< 17	mg/L		09/28/20 09:52	1	17	09/28/20 11:16	BCR	SM 2540C
Total Metals - PIA									
Boron	33	ug/L	B	10/08/20 09:47	5	10	10/15/20 12:35	JMW	EPA 6020A
Calcium	< 200	ug/L		10/08/20 09:47	5	200	10/15/20 08:36	JMW	EPA 6020A

Appendix 2

Laboratory Analytical Results
December 8, 2020 Resample

December 23, 2020

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

RE: FLYASH RE-SAMPLES

Dear Luke St Mary:

Please find enclosed the analytical results for the **2** sample(s) the laboratory received on **12/10/20 10:00 am** and logged in under work order **0122324**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

SAMPLE RECEIPT CHECK LIST

Items not applicable will be marked as in compliance

Work Order 0122324

YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers recieved undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
NO	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided

ANALYTICAL RESULTS

Sample: 0122324-01
Name: MW-1
Matrix: Ground Water - Grab

Sampled: 12/08/20 12:44
Received: 12/10/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Sulfate	43	mg/L		12/11/20 13:30	10	10	12/11/20 13:30	CRD	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	250	mg/L		12/11/20 08:04	1	26	12/11/20 10:51	BCR	SM 2540C
Total Metals - PIA									
Boron	440	ug/L		12/17/20 10:53	5	10	12/22/20 07:13	JMW	EPA 6020A
Calcium	49000	ug/L		12/17/20 10:53	5	200	12/21/20 09:37	JMW	EPA 6020A

Sample: 0122324-02
Name: MW-2
Matrix: Ground Water - Grab

Sampled: 12/08/20 11:17
Received: 12/10/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Total Metals - PIA									
Boron	49	ug/L		12/17/20 10:53	5	10	12/22/20 07:16	JMW	EPA 6020A

Appendix 3

Laboratory Quality Assurance/Quality Control Data

Appendix 3

Laboratory Quality Assurance/Quality Control Data
April 6, 2020

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B008447 - No Prep - SM 2540C									
Blank (B008447-BLK1)				Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B008447-BS1)				Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	1000	mg/L		1000		100	67.9-132		
Duplicate (B008447-DUP1)	**Sample: 0041195-01**			Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	1310	mg/L	M		727			58	5
Duplicate (B008447-DUP2)	**Sample: 0041195-02**			Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	427	mg/L	M		360			17	5
Batch B008764 - SW 3015 - EPA 6020A									
Blank (B008764-BLK1)				Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	< 10	ug/L							
Calcium	< 100	ug/L							
LCS (B008764-BS1)				Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	574	ug/L		555.6		103	80-120		
Calcium	5060	ug/L		5556		91	80-120		
Matrix Spike (B008764-MS1)	**Sample: 0041811-07**			Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	591	ug/L		555.6	23.4	102	75-125		
Calcium	5170	ug/L		5556	86.3	92	75-125		
Matrix Spike Dup (B008764-MSD1)	**Sample: 0041811-07**			Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	594	ug/L		555.6	23.4	103	75-125	0.5	20
Calcium	5420	ug/L		5556	86.3	96	75-125	5	20
Batch B008794 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B008794-CCB1)				Prepared & Analyzed: 04/13/20					
Sulfate	0.0870	mg/L							
Fluoride	0.00	mg/L							
Chloride	0.297	mg/L							
Calibration Check (B008794-CCV1)				Prepared & Analyzed: 04/13/20					
Sulfate	5.03	mg/L		5.000		101	90-110		
Fluoride	5.13	mg/L		5.000		103	90-110		
Chloride	4.73	mg/L		5.000		95	90-110		
Batch B008886 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B008886-CCB1)				Prepared & Analyzed: 04/14/20					
Fluoride	0.00	mg/L							
Chloride	0.457	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B008886-CCV1)				Prepared & Analyzed: 04/14/20					
Sulfate	5.20	mg/L		5.000		104	90-110		
Fluoride	5.18	mg/L		5.000		104	90-110		
Chloride	4.99	mg/L		5.000		100	90-110		
Matrix Spike (B008886-MS1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Chloride	6.8	mg/L		1.500	5.4	90	80-120		

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B008886 - No Prep - EPA 300.0 REV 2.1									
Matrix Spike (B008886-MS1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Sulfate	1.00E9	mg/L	Q4	1.500	38.8	NR	80-120		
Fluoride	1.54	mg/L		1.500	0.255	86	80-120		
Matrix Spike (B008886-MS2)	**Sample: 0041811-02**			Prepared & Analyzed: 04/14/20					
Fluoride	1.58	mg/L		1.500	0.336	83	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	16.1	NR	80-120		
Chloride	3.4	mg/L		1.500	2.1	84	80-120		
Matrix Spike (B008886-MS3)	**Sample: 0041811-05**			Prepared & Analyzed: 04/14/20					
Chloride	1.0E9	mg/L	Q4	1.500	18	NR	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	246	NR	80-120		
Fluoride	1.68	mg/L	Q1	1.500	0.816	58	80-120		
Matrix Spike Dup (B008886-MSD1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Fluoride	1.51	mg/L		1.500	0.255	84	80-120	2	20
Chloride	6.7	mg/L		1.500	5.4	87	80-120	0.7	20
Sulfate	1.00E9	mg/L	Q4	1.500	38.8	NR	80-120	0	20
Matrix Spike Dup (B008886-MSD2)	**Sample: 0041811-02**			Prepared & Analyzed: 04/14/20					
Sulfate	1.00E9	mg/L	Q4	1.500	16.1	NR	80-120	0	20
Fluoride	1.61	mg/L		1.500	0.336	85	80-120	2	20
Chloride	3.4	mg/L		1.500	2.1	84	80-120	0.1	20
Matrix Spike Dup (B008886-MSD3)	**Sample: 0041811-05**			Prepared & Analyzed: 04/14/20					
Chloride	1.0E9	mg/L	Q4	1.500	18	NR	80-120	0	20
Sulfate	1.00E9	mg/L	Q4	1.500	246	NR	80-120	0	20
Fluoride	2.14	mg/L	Q2	1.500	0.816	88	80-120	24	20

NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPIL - Springfield, IL - 1210 Capitol Airport Drive, Springfield, IL 62707
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17592

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

M	Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q1	Matrix Spike failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
Q2	Matrix Spike Duplicate failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
Q3	Matrix Spike/Matrix Spike Duplicate both failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
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.
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DATA PACKAGE

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CLIENT; Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 0041811

DATE ISSUED: April 16, 2020

CASE NARRATIVE –

PDC Work Order 0041811

PDC Laboratories, Inc. received 7 water samples on April 8, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0041811

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0041811-01	4/6/20	4/8/20
MW-2	0041811-02	4/6/20	4/8/20
MW-3	0041811-03	4/6/20	4/8/20
MW-7	0041811-04	4/6/20	4/8/20
MW-9	0041811-05	4/6/20	4/8/20
DUPLICATE WELL	0041811-06	4/6/20	4/8/20
FIELD BLANK	0041811-07	4/6/20	4/8/20

QC Summary:

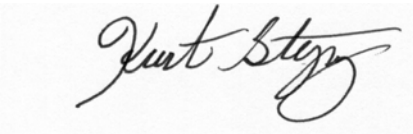
All items met acceptance criteria with the following noted exceptions:

TDS batch QC samples flagged with M, RPD outside acceptance criteria

SO4, CL, Batch QC samples flagged with Q4, sample exceeds 4x spiked values

F, batch QC sample flagged with Q3, Q2, Q1, matrix spike and spike dup outside acceptance criteria.

Certification

Signature: 

Name: Kurt Stepping

Date: April 16, 2020

Title: Senior Project Manager

PDC LABORATORIES, INC.
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REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA	☐	RCRA	☐
CCDD	☐	TACO: RES OR IND/COMM	☐

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED: MO

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

1 CLIENT	PROJECT NUMBER	PROJECT LOCATION	PURCHASE ORDER #
SIKESTON BMU POWER STATION		FLYASH APP III ONLY	23574
ADDRESS	**PHONE NUMBER**	**E-MAIL**	**DATE SHIPPED**
1551 W WAKEFIELD	573.475.3131	LSTMARY@SBMU.NET	4-7-2020
CITY STATE ZIP	**SAMPLER (PLEASE PRINT)**		**MATRIX TYPES:**
SIKESTON, MO 63801	Daniel Dillingham		WW- WASTEWATER DW- DRINKING WATER GW- GROUND WATER WWSL- SLUDGE NAS- NON AQUEOUS SOLID LCHT-LEACHATE OIL-OIL SO-SOIL SOL-SOLID
CONTACT PERSON	**SAMPLER'S SIGNATURE**		
LUKE ST MARY	Daniel a. Dillingham		

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	3 ANALYSIS REQUESTED: CL, F, SO4, TDS	3 ANALYSIS REQUESTED: B, CA	REMARKS
MW-1	4-6-2020	1113	X		GW	2		X	X	
MW-2	4-6-2020	0904	X		GW	2		X	X	
MW-3	4-6-2020	0822	X		GW	2		X	X	
MW-7	4-6-2020	1158	X		GW	2		X	X	
MW-9	4-6-2020	1319	X		GW	2		X	X	
DUPLICATE WELL	4-6-2020		X		GW	2		X	X	
FIELD BLANK	4-6-2020		X		GW	2		X	X	

4 (FOR LAB USE ONLY)
LOGIN # 004811
LOGGED BY: ZC
CLIENT: SIKESTON BMU
PROJECT: FLYASH APP III ONLY
PROJ. MGR.: KURT
CUSTODY SEAL #:

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) ☒ NORMAL ☐ RUSH
DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL ☐ PHONE ☐
EMAIL IF DIFFERENT FROM ABOVE:
PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) _____

7 RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
	4-7-2020	0730			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				4/7/20	1730

8 COMMENTS: (FOR LAB USE ONLY)
SAMPLE TEMPERATURE UPON RECEIPT 1.5 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Qualtrax ID #3219

Appendix 3

Laboratory Quality Assurance/Quality Control Data
May 21, 2020 Resample

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B012525 - No Prep - SM 2540C									
Blank (B012525-BLK1)				Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B012525-BS1)				Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	947	mg/L		1000		95	67.9-132		
Duplicate (B012525-DUP2)	**Sample: 0054242-02RE1**			Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	110	mg/L	M, X		90.0			20	
Batch B012718 - No Prep - SM 2540C									
Blank (B012718-BLK1)				Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B012718-BS1)				Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	947	mg/L		1000		95	67.9-132		
Duplicate (B012718-DUP1)	**Sample: 0054242-02**			Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	100	mg/L	H		100			0	5
Batch B013015 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B013015-CCB1)				Prepared & Analyzed: 06/01/20					
Fluoride	0.00	mg/L							
Chloride	0.552	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B013015-CCV1)				Prepared & Analyzed: 06/01/20					
Chloride	4.88	mg/L		5.000		98	90-110		
Fluoride	4.95	mg/L		5.000		99	90-110		
Sulfate	5.17	mg/L		5.000		103	90-110		
Matrix Spike (B013015-MS3)	**Sample: 0054242-03**			Prepared & Analyzed: 06/02/20					
Fluoride	1.76	mg/L		1.500	0.374	92	80-120		
Matrix Spike (B013015-MS4)	**Sample: 0054242-04**			Prepared & Analyzed: 06/02/20					
Chloride	2.6	mg/L	Q1	1.500	1.5	75	80-120		
Matrix Spike Dup (B013015-MSD3)	**Sample: 0054242-03**			Prepared & Analyzed: 06/02/20					
Fluoride	1.78	mg/L		1.500	0.374	94	80-120	2	20
Matrix Spike Dup (B013015-MSD4)	**Sample: 0054242-04**			Prepared & Analyzed: 06/02/20					
Chloride	3.1	mg/L		1.500	1.5	107	80-120	17	20
Batch B013404 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B013404-CCB1)				Prepared & Analyzed: 06/04/20					
Sulfate	0.00	mg/L							
Calibration Check (B013404-CCV1)				Prepared & Analyzed: 06/04/20					
Sulfate	5.07	mg/L		5.000		101	90-110		
Batch B013688 - SW 3015 - EPA 6020A									
Blank (B013688-BLK1)				Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	< 10	ug/L							
Calcium	< 200	ug/L							
LCS (B013688-BS1)				Prepared: 06/09/20 Analyzed: 06/11/20					

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B013688 - SW 3015 - EPA 6020A									
LCS (B013688-BS1)				Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	524	ug/L		555.6		94	80-120		
Calcium	5630	ug/L		5556		101	80-120		
Matrix Spike (B013688-MS1)	**Sample: 0054994-01**			Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	1900	ug/L		555.6	1340	101	75-125		
Calcium	186000	ug/L	Q4	5556	183000	63	75-125		
Matrix Spike Dup (B013688-MSD1)	**Sample: 0054994-01**			Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	1920	ug/L		555.6	1340	104	75-125	1	20
Calcium	185000	ug/L	Q4	5556	183000	42	75-125	0.6	20

NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

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Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

H	Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.
M	Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q1	Matrix Spike failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
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.
X	Sample did not meet weighback criteria established in the method. Reset out of hold for confirmation of result. Both sets of data to be reported. H flagged data is to confirm the validity of the initial data in spite of the weigh back criteria.

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

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CLIENT: Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 0054242

DATE ISSUED: June 15, 2020

CASE NARRATIVE –

PDC Work Order 0054242

PDC Laboratories, Inc. received 6 water samples on May 26, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0054242

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0054242-01	5/21/20	5/26/20
DUPLICATE	0054242-02	5/21/20	5/26/20
MW-2	0054242-03	5/21/20	5/26/20
MW-3	0054242-04	5/21/20	5/26/20
MW-9	0054242-05	5/21/20	5/26/20
FIELD BLANK	0054242-06	5/21/20	5/26/20

QC Summary:

All items met acceptance criteria with the following noted exceptions:

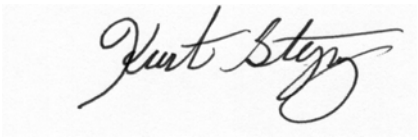
Ca, batch QC sample flagged with Q4, sample exceeds 4x spiked values

Cl, batch QC sample flagged with Q1, matrix spike outside acceptance criteria.

Initial analysis for TDS on sample 0054242-02 was below method criteria for weigh back and also was done in duplicate with an RPD greater than 5%. Flagged with X and M. See LIMS report for full X qualifier description.

TDS on sample 0054242-02 was repeated in duplicate out of hold time to confirm initial analysis. Re-analysis RPD was 0%, weigh back was acceptable. Re-analysis flagged with H for hold time.

Certification

Signature: 

Name: Kurt Stepping

Date: June 15, 2020

Title: Senior Project Manager

PDC LABORATORIES, INC.
WWW.PDCLAB.COM

REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA		RCRA	
CCDD		TACO: RES OR IND/COMM	

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED MO

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

1 CLIENT: SIKESTON BMU POWER STATION
ADDRESS: 1551 W WAKEFIELD
CITY STATE ZIP: SIKESTON, MO 63801
CONTACT PERSON: LUKE ST MARY
PROJECT NUMBER:
PROJECT LOCATION: RESAMPLES
PURCHASE ORDER #:
PHONE NUMBER: 573.475.3131
E-MAIL: LSTMARY@SBMU.NET
DATE SHIPPED:
SAMPLER (PLEASE PRINT): Daniel Dillingham
SAMPLER'S SIGNATURE: Daniel a. Dillingham

MATRIX TYPES:
WW- WASTEWATER
DW- DRINKING WATER
GW- GROUND WATER
WWSL- SLUDGE
NAS- NON AQUEOUS SOLID
LCHT-LEACHATE
OIL-OIL
SO-SOIL
SOL-SOLID

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN # 084242
LOGGED BY:
CLIENT: SIKESTON BMU
PROJECT: RESAMPLES MAY 2020
PROJ. MGR.: KURT
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	TDS	SULFATE	CALCIUM	FLUORIDE	BORON	CHLORIDE		REMARKS
MW-1	05-21-20	1216	X		GW	2		X	X	X					
DUPLICATE	05-21-20		X		GW	2		X	X	X					
MW-2	05-21-20	0833	X		GW	2					X	X			
MW-3	05-21-20	0730	X		GW	1		X					X		
MW-9	05-21-20	1424	X		GW	1		X							
FIELD BLANK	05-21-20		X		GW	2		X	X	X	X	X	X		

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) [X] NORMAL [ ] RUSH
DATE RESULTS NEEDED:
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL [ ] PHONE [ ]
EMAIL IF DIFFERENT FROM ABOVE:
PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) _____

7 RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Ashish Patel	5-22-2020	0700			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				5/26/20	8 00

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 19.0 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

Page 10 of 10

Qualtrax ID #3219

Appendix 3

Laboratory Quality Assurance/Quality Control Data
September 22, 2020

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B024220 - No Prep - SM 2540C									
Blank (B024220-BLK1)				Prepared & Analyzed: 09/28/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B024220-BS1)				Prepared & Analyzed: 09/28/20					
Solids - total dissolved solids (TDS)	1020	mg/L		1000		102	84.9-109		
Duplicate (B024220-DUP1)	**Sample: 0095312-02**			Prepared & Analyzed: 09/28/20					
Solids - total dissolved solids (TDS)	150	mg/L			150			0	5
Duplicate (B024220-DUP2)	**Sample: 0095312-03**			Prepared & Analyzed: 09/28/20					
Solids - total dissolved solids (TDS)	120	mg/L			120			0	5
Batch B024429 - SW 3015 - EPA 6020A									
Blank (B024429-BLK1)				Prepared: 09/30/20 Analyzed: 10/02/20					
Boron	< 10	ug/L							
Calcium	< 200	ug/L							
LCS (B024429-BS1)				Prepared: 09/30/20 Analyzed: 10/02/20					
Boron	555	ug/L		555.6		100	80-120		
Calcium	6040	ug/L		5556		109	80-120		
Matrix Spike (B024429-MS1)	**Sample: 0095287-05**			Prepared: 09/30/20 Analyzed: 10/02/20					
Boron	675	ug/L		555.6	164	92	75-125		
Calcium	82500	ug/L		5556	77600	87	75-125		
Matrix Spike Dup (B024429-MSD1)	**Sample: 0095287-05**			Prepared: 09/30/20 Analyzed: 10/02/20					
Boron	679	ug/L		555.6	164	93	75-125	0.6	20
Calcium	82500	ug/L		5556	77600	88	75-125	0.06	20
Batch B024486 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B024486-CCB1)				Prepared & Analyzed: 09/29/20					
Chloride	0.00	mg/L							
Fluoride	0.00	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B024486-CCV1)				Prepared & Analyzed: 09/29/20					
Fluoride	5.23	mg/L		5.000		105	90-110		
Sulfate	5.00	mg/L		5.000		100	90-110		
Chloride	4.87	mg/L		5.000		97	90-110		
Batch B024618 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B024618-CCB1)				Prepared & Analyzed: 09/30/20					
Fluoride	0.00	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B024618-CCV1)				Prepared & Analyzed: 09/30/20					
Fluoride	4.88	mg/L		5.000		98	90-110		
Sulfate	4.77	mg/L		5.000		95	90-110		
Batch B025298 - SW 3015 - EPA 6020A									
Blank (B025298-BLK1)				Prepared: 10/08/20 Analyzed: 10/15/20					
Boron	20.7	ug/L	B						

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B025298 - SW 3015 - EPA 6020A									
Blank (B025298-BLK1)				Prepared: 10/08/20 Analyzed: 10/15/20					
Calcium	314	ug/L	Ba						
LCS (B025298-BS1)				Prepared: 10/08/20 Analyzed: 10/15/20					
Boron	552	ug/L		555.6		99	80-120		
Calcium	6230	ug/L		5556		112	80-120		

NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

* Not a TNI accredited analyte

Memos

Revised Report, Ca and B repeated and reported.

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

B	Present in the method blank at 20.7 ug/L.
Ba	Present in the method blank at 314 ug/L.

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

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CLIENT: Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 0095312

DATE ISSUED: October 16, 2020

CASE NARRATIVE –

PDC Work Order 0095312

PDC Laboratories, Inc. received 7 water samples on September 24, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0095312.

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0095312-01	9/22/20	9/24/20
MW-2	0095312-02	9/22/20	9/24/20
MW-3	0095312-03	9/22/20	9/24/20
MW-7	0095312-04	9/22/20	9/24/20
MW-9	0095312-05	9/22/20	9/24/20
DUPLICATE WELL	0095312-06	9/22/20	9/24/20
FIELD BLANK	0095312-07	9/22/20	9/24/20

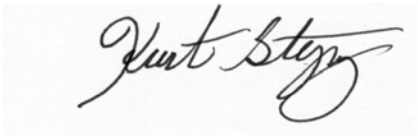
QC Summary:

All items met acceptance criteria with the following noted exceptions:

Calcium and Boron redigested and reanalyzed for all samples. Reanalysis consistent with historical data. Suspect a sample preparation error.

Lower level Boron samples flagged with B for trace of Boron in the method blank.

Certification

Signature: 

Name: Kurt Stepping

Date: October 16, 2020

Title: Senior Project Manager

PDC LABORATORIES, INC.
WWW.PDCLAB.COM

REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA		RCRA	
CCDD		TACO: RES OR IND/COMM	

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED: MO

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

1 CLIENT	PROJECT NUMBER	PROJECT LOCATION	PURCHASE ORDER #
SIKESTON BMU POWER STATION		FLYASH APP III ONLY	23574
ADDRESS	**PHONE NUMBER**	**E-MAIL**	**DATE SHIPPED**
1551 W WAKEFIELD	573.475.3131	LSTMARY@SBMU.NET	
CITY STATE ZIP	**SAMPLER (PLEASE PRINT)**		**MATRIX TYPES:**
SIKESTON, MO 63801	Daniel Dillingham		WW- WASTEWATER DW- DRINKING WATER GW- GROUND WATER WWSL- SLUDGE NAS- NON AQUEOUS SOLID LCHT-LEACHATE OIL-OIL SO-SOIL SOL-SOLID
CONTACT PERSON	**SAMPLER'S SIGNATURE**		
LUKE ST MARY	Daniel a. Dillingham		

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE (CLIENT PROVIDED)	3 ANALYSIS REQUESTED: CL, F, SO4, TDS	3 ANALYSIS REQUESTED: B, CA	REMARKS
MW-1	09-22-20	1055	X		GW	2		X	X	
MW-2	09-22-20	0903	X		GW	2		X	X	
MW-3	09-22-20	0750	X		GW	2		X	X	
MW-7	09-22-20	1222	X		GW	2		X	X	
MW-9	09-22-20	1356	X		GW	2		X	X	
DUPLICATE WELL	09-22-20		X		GW	2		X	X	
FIELD BLANK	09-22-20	1356	X		GW	2		X	X	

4 (FOR LAB USE ONLY)
LOGIN #: 0095312
LOGGED BY: GS
CLIENT: SIKESTON BMU
PROJECT: FLYASH APP III ONLY
PROJ. MGR.: KURT
CUSTODY SEAL #:

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) [X] NORMAL [ ] RUSH
DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL [ ] PHONE [ ]
EMAIL IF DIFFERENT FROM ABOVE:
PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) _____

7 RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Daniel a. Dillingham	9/23/20	0640			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			D. Edwards	9/24/20	1000

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT ____ °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT
REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Page 12 of 12

Appendix 3

Laboratory Quality Assurance/Quality Control Data
December 8, 2020 Resample

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B030991 - No Prep - SM 2540C									
Blank (B030991-BLK1)				Prepared & Analyzed: 12/11/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B030991-BS1)				Prepared & Analyzed: 12/11/20					
Solids - total dissolved solids (TDS)	960	mg/L		1000		96	84.9-109		
Duplicate (B030991-DUP1)	**Sample: 0121457-01**			Prepared & Analyzed: 12/11/20					
Solids - total dissolved solids (TDS)	500	mg/L	M		460			8	5
Duplicate (B030991-DUP2)	**Sample: 0121457-02**			Prepared & Analyzed: 12/11/20					
Solids - total dissolved solids (TDS)	530	mg/L	M		440			19	5
Batch B031149 - IC No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B031149-CCB1)				Prepared & Analyzed: 12/11/20					
Sulfate	0.0804	mg/L							
Calibration Check (B031149-CCV1)				Prepared & Analyzed: 12/11/20					
Sulfate	4.86	mg/L		5.000		97	90-110		
Batch B031544 - SW 3015 - EPA 6020A									
Blank (B031544-BLK1)				Prepared: 12/17/20 Analyzed: 12/21/20					
Boron	< 10	ug/L							
Calcium	< 200	ug/L							
LCS (B031544-BS1)				Prepared: 12/17/20 Analyzed: 12/21/20					
Boron	462	ug/L		555.6		83	80-120		
Calcium	5130	ug/L		5556		92	80-120		
Matrix Spike (B031544-MS1)	**Sample: 0122455-04**			Prepared: 12/17/20 Analyzed: 12/22/20					
Boron	536	ug/L		555.6	16.5	93	75-125		
Calcium	36500	ug/L		5556	30000	117	75-125		
Matrix Spike Dup (B031544-MSD1)	**Sample: 0122455-04**			Prepared: 12/17/20 Analyzed: 12/22/20					
Boron	530	ug/L		555.6	16.5	92	75-125	1	20
Calcium	35400	ug/L		5556	30000	98	75-125	3	20

NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

M Analyte failed to meet the required acceptance criteria for duplicate analysis.

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

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CLIENT: Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 0122324

DATE ISSUED: December 23, 2020

CASE NARRATIVE –

PDC Work Order 0122324

PDC Laboratories, Inc. received 2 water samples on December 10, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0122324.

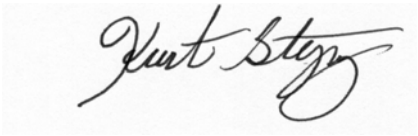
Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0122324-01	12/8/20	12/10/20
MW-2	0122324-02	12/8/20	12/10/20

QC Summary:

All items met acceptance criteria with the following noted exceptions:

Batch sample duplicates for TDS had high RPD.

Certification

Signature:  Name: Kurt Stepping

Date: December 23, 2020 Title: Senior Project Manager

PDC LABORATORIES, INC.
WWW.PDCLAB.COM

REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA	☐	RCRA	☐
CCDD	☐	TACO: RES OR IND/COMM	☐

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED MO

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

1 CLIENT: SIKESTON BMU POWER STATION
PROJECT NUMBER:
PROJECT LOCATION: FLYASH RESAMPLES
PURCHASE ORDER #: 23574
ADDRESS: 1551 W WAKEFIELD
PHONE NUMBER: 573.475.3131
E-MAIL: LSTMARY@SBMU.NET
DATE SHIPPED:
CITY STATE ZIP: SIKESTON, MO 63801
SAMPLER (PLEASE PRINT): Daniel Dillingham
CONTACT PERSON: LUKE ST MARY
SAMPLER'S SIGNATURE: Daniel D. Dillingham

MATRIX TYPES:
WW- WASTEWATER
DW- DRINKING WATER
GW- GROUND WATER
WWSL- SLUDGE
NAS- NON AQUEOUS SOLID
LCHT-LEACHATE
OIL-OIL
SO-SOIL
SOL-SOLID

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN # 0122324
LOGGED BY:
CLIENT: SIKESTON BMU
PROJECT: FLYASH APP RESAMPLES
PROJ. MGR.: KURT
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	+ SO4, TDS	+ B, CA	+ B	REMARKS
MW-1	12-8-20	1244	X		GW	2		X	X		
MW-2	12-8-20	1117	X		GW	1				X	

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) ☒ NORMAL ☐ RUSH
DATE RESULTS NEEDED:
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL ☐ PHONE ☐
EMAIL IF DIFFERENT FROM ABOVE:
PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS)

7			
RELINQUISHED BY: (SIGNATURE) Ashley Carter	DATE 12-09-20 TIME 0900	RECEIVED BY: (SIGNATURE)	DATE TIME
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE TIME
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE 12/10/20 TIME 1000

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 6.0 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

Appendix 4

Fly Ash Pond Groundwater Quality Data Base

Sikeston Board of Municipal Utilities
Sikeston Power Station
Fly Ash Pond Scott County, Missouri
CCR Groundwater Data Base

			Field Parameters						Appendix III Monitoring Constituents (Detection)						Appendix IV Monitoring Constituents (Assessment)											
Well ID	Date	Monitoring Purpose	Spec. Cond.	pH	Temp.	ORP	D.O.	Turbidity	Chloride	Fluoride	Sulfate	TDS	Boron	Calcium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226/228 (Combined)
			µmhos/cm	S.U.	°C	mV	mg/L	NTU	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
MW-1 (DG)	3/21/2018	Background	249.6	7.31	16.33	-108.8	0.32	28.35	3.0	<0.250	22	150	360	21	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.353 (ND)
	4/15/2018	Background	233.8	7.36	15.17	-122.7	0.60	14.46	2.8	0.316	22	120	450	29	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.478 (ND)
	5/23/2018	Background	220.0	7.35	18.42	-133.3	0.54	12.11	3.3	<0.250	20	140	420	25	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.378 (ND)
	6/27/2018	Background	227.4	7.27	18.59	-149.3	0.30	11.07	6.9	<0.250	20	120	470	28	<3.0	<1.0	140	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.065 (ND)
	8/1/2018	Background	264.3	7.16	18.26	-138.0	0.56	7.52	5.6	<0.250	23	190	440	30	<3.0	<1.0	140	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.893(ND)
	9/5/2018	Background	281.3	7.14	18.70	-132.1	0.41	3.20	7.0	0.252	24	140	490	34	<3.0	<1.0	150	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.100
	11/6/2018	Background	311.8	7.11	17.86	-128.8	1.00	1.30	9.0	0.262	26	200	480	38	<3.0	<1.0	170	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.282
	12/12/2018	Background	317.5	7.06	16.30	-96.3	0.45	2.27	9.1	0.256	30	140	440	38	<3.0	<1.0	180	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.423 (ND)
	3/27/2019	Detection 1	361.2	7.13	16.60	-101.9	0.36	53.91	7.9	<0.250	27	210	440	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/24/2019	Detection 2	372.9	7.0	18.22	-127.5	0.56	0.53	4.3	0.260	35	230	500	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2019	Det/RESAMPLE	418.0	7.1	17.10	-113.4	0.32	0.96	NA	NA	41	180	NA	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/6/2020	Detection 3	416.5	7.1	17.32	-117.7	0.31	4.38	5.4	0.255	39	230	520	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/21/2020	Det/RESAMPLE	524.7	7.2	16.56	-125.2	3.25	3.32	NA	NA	63	260	NA	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/22/2020	Detection 4	556.9	7.2	17.67	-95.2	4.23	0.51	5.9	<0.250	67	310	620	67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/8/2020	Det/RESAMPLE	462.1	7.3	15.90	80.1	4.19	2.44	NA	NA	43	250	440	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2 (UG)	3/21/2018	Background	157.8	6.35	15.86	65.3	2.72	3.41	3.4	<0.250	16	110	28	16	<3.0	<1.0	130	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.896 (ND)
	4/15/2018	Background	159.8	6.36	14.04	64.7	0.87	4.05	2.3	0.335	18	63	23	14	<3.0	<1.0	120	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.483 (ND)
	5/23/2018	Background	175.3	6.18	17.40	121.7	0.58	1.72	4.2	<0.250	20	100	36	18	<3.0	<1.0	170	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.199 (ND)
	6/27/2018	Background	172.1	6.16	18.38	243.8	0.27	5.30	4.7	<0.250	18	87	42	19	<3.0	<1.0	180	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	1.4	<1.0	1.006 (ND)
	8/1/2018	Background	184.2	6.11	18.48	80.7	0.75	2.61	5.9	<0.250	19	140	43	20	<3.0	<1.0	200	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	2.0	<1.0	0.751(ND)
	9/5/2018	Background	187.9	6.09	19.26	83.8	0.68	2.58	6.8	<0.250	18	110	46	22	<3.0	<1.0	220	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	2.2	<1.0	1.734
	11/6/2018	Background	174.3	6.19	17.77	79.7	0.60	1.19	4.2	0.272	19	100	43	20	<3.0	<1.0	170	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.583
	12/12/2018	Background	186.3	6.13	16.78	82.3	0.67	5.78	5.5	0.254	21	140	48	21	<3.0	<1.0	210	<1.0	<1.0	<4.0	2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.18 (ND)
	3/27/2019	Detection 1	165.9	6.25	15.87	70.4	0.72	2.60	3.3	<0.250	20	130	31	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/24/2019	Detection 2	189.4	6.1	18.75	71.3	0.61	1.16	6.6	<0.250	17	130	58	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/6/2020	Detection 3	148.7	6.3	16.04	58.2	1.36	4.70	2.1	0.336	16	140	34	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/21/2020	Det/RESAMPLE	168.1	6.2	16.47	-0.8	6.90	2.76	NA	0.374	NA	NA	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/22/2020	Detection 4	189.8	6.2	18.34	-9.6	6.52	0.62	4.8	<0.250	17	150	68	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/8/2020	Det/RESAMPLE	186.5	6.2	16.90	223.4	5.56	0.79	NA	NA	NA	NA	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix 4
Prepared by: KAE
Checked by: MCC

Sikeston Board of Municipal Utilities
Sikeston Power Station
Fly Ash Pond Scott County, Missouri
CCR Groundwater Data Base

			Field Parameters						Appendix III Monitoring Constituents (Detection)						Appendix IV Monitoring Constituents (Assessment)											
Well ID	Date	Monitoring Purpose	Spec. Cond.	pH	Temp.	ORP	D.O.	Turbidity	Chloride	Fluoride	Sulfate	TDS	Boron	Calcium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226/228 (Combined)
			µmhos/cm	S.U.	°C	mV	mg/L	NTU	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
MW-3 (UG)	3/21/2018	Background	220.7	6.57	15.22	40.7	0.38	14.88	1.4	0.274	18	120	17	19	<3.0	<1.0	96	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.240 (ND)
	4/15/2018	Background	224.7	6.48	14.05	39.2	0.45	10.81	1.5	0.386	20	120	25	18	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.475 (ND)
	5/23/2018	Background	221.3	6.49	17.77	43.2	0.39	13.39	1.4	<0.250	20	100	20	18	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.994 (ND)
	6/27/2018	Background	198.7	6.45	17.81	123.8	0.45	17.03	1.2	<0.250	17	110	27	18	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.214 (ND)
	8/1/2018	Background	209.2	6.55	16.74	41.4	0.43	10.96	1.3	<0.250	17	150	21	18	<3.0	<1.0	91	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.315(ND)
	9/5/2018	Background	196.8	6.51	17.62	56.8	0.46	6.21	1.2	0.308	15	100	22	17	<3.0	<1.0	98	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.860(ND)
	11/6/2018	Background	206.7	6.49	16.84	63.3	0.49	2.37	1.3	0.313	16	130	26	17	<3.0	<1.0	100	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	1.339
	12/12/2018	Background	195.6	6.50	15.39	48.7	0.40	3.10	1.4	0.334	18	160	28	17	<3.0	<1.0	99	<1.0	<1.0	<4.0	<2.0	<1.0	<10	<0.20	<1.0	<1.0	<1.0	0.8 (ND)
	3/27/2019	Detection 1	196.0	6.36	15.07	52.2	0.84	12.50	1.5	<0.250	19	140	22	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/24/2019	Detection 2	191.4	6.5	17.07	58.1	0.53	2.28	1.2	0.332	16	130	26	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/6/2020	Detection 3	198.4	6.4	14.94	61.3	1.17	7.37	1.8	0.371	20	380	29	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/21/2020	Det/RESAMPLE	205.5	6.4	15.25	14.9	13.48	7.29	1.5	NA	NA	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/22/2020	Detection 4	194.1	6.5	16.65	36.7	8.29	2.13	1.1	<0.250	17	120	31	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7 (DG)	3/21/2018	Background	901.8	7.30	14.85	41.8	0.58	1.61	12	0.752	190	440	1900	110	<3.0	<1.0	41	<1.0	<1.0	<4.0	<2.0	<1.0	25	<0.20	160	5.4	<1.0	0.883 (ND)
	4/15/2018	Background	936.4	7.24	14.04	40.0	0.51	0.96	12	0.794	210	420	1900	110	<3.0	<1.0	43	<1.0	<1.0	<4.0	2.0	<1.0	19	<0.20	170	2.3	<1.0	0.0619 (ND)
	5/23/2018	Background	899.1	7.25	18.05	46.5	0.38	0.25	11	0.650	220	480	1800	120	<3.0	<1.0	44	<1.0	<1.0	<4.0	<2.0	<1.0	22	<0.20	170	28	<1.0	0.896 (ND)
	6/27/2018	Background	891.4	7.22	17.91	66.4	0.22	5.84	11	0.592	220	500	2000	140	<3.0	<1.0	48	<1.0	<1.0	<4.0	2.1	<1.0	26	<0.20	160	53	<1.0	1.153 (ND)
	8/1/2018	Background	958.3	7.22	18.03	53.0	0.28	1.77	9.1	0.608	230	590	2300	140	<3.0	<1.0	47	<1.0	<1.0	<4.0	2.2	<1.0	30	<0.20	160	54	<1.0	0.884(ND)
	9/5/2018	Background	873.3	7.29	19.46	69.3	0.28	2.29	10	0.700	220	520	2100	130	<3.0	<1.0	47	<1.0	<1.0	<4.0	2.0	<1.0	27	<0.20	150	42	<1.0	0.652(ND)
	11/6/2018	Background	787.9	7.35	18.12	344.4	0.44	0.44	6.3	0.693	170	450	2000	120	<3.0	<1.0	43	<1.0	<1.0	<4.0	2.0	<1.0	26	<0.20	150	15	<1.0	1.478
	12/12/2018	Background	784.8	7.27	17.26	51.6	1.05	0.41	6.8	0.746	180	440	1800	120	<3.0	<1.0	44	<1.0	<1.0	<4.0	2.1	<1.0	26	<0.20	150	11	<1.0	0.975 (ND)
	3/27/2019	Detection 1	797.4	7.25	16.39	52.6	0.32	2.37	6.6	0.670	170	480	1800	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/24/2019	Detection 2	751.7	7.3	18.88	119.0	0.31	0.59	3.9	0.684	150	470	1900	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/6/2020	Detection 3	865.6	7.2	16.34	68.3	0.24	1.62	4.0	0.737	200	540	2200	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/22/2020	Detection 4	720.5	7.5	17.40	-80.8	3.63	0.50	3.1	0.628	110	460	1700	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1/26/2021	Det/RESAMPLE	823.6	7.4	16.40	-49.2	0.27	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix 4
Prepared by: KAE
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Sikeston Board of Municipal Utilities
Sikeston Power Station
Fly Ash Pond Scott County, Missouri
CCR Groundwater Data Base

			Field Parameters						Appendix III Monitoring Constituents (Detection)						Appendix IV Monitoring Constituents (Assessment)												
Well ID	Date	Monitoring Purpose	Spec. Cond. µmhos/cm	pH S.U.	Temp. °C	ORP mV	D.O. mg/L	Turbidity NTU	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 ug/L	Cobalt ug/L	Lead ug/L	Lithium ug/L	Mercury ug/L	Molybdenum ug/L	Selenium ug/L	Thallium ug/L	Radium 226/228 (Combined) pCi/L
MW-9 (DG)	3/21/2018	Background	979.8	7.35	14.98	25.1	0.52	1.60	17	0.929	230	480	4700	65	<3.0	<1.0	49	<1.0	<1.0	<4.0	<2.0	<1.0	19	<0.20	630	<1.0	<1.0	0.491 (ND)
	4/15/2018	Background	972.7	7.37	14.63	24.9	1.73	2.32	21	1.09	240	460	5100	57	<3.0	1.2	49	<1.0	<1.0	<4.0	<2.0	<1.0	11	<0.20	680	<1.0	<1.0	0.982 (ND)
	5/23/2018	Background	1020.5	7.34	18.70	25.9	0.48	0.64	17	1.05	240	520	5800	55	<3.0	<1.0	45	<1.0	<1.0	8.1	<2.0	<1.0	15	<0.20	840	<1.0	<1.0	0.359 (ND)
	6/27/2018	Background	902.9	7.32	19.33	25.2	0.42	4.97	15	0.910	220	520	4600	73	<3.0	<1.0	47	<1.0	<1.0	<4.0	<2.0	<1.0	15	<0.20	560	<1.0	<1.0	0.327 (ND)
	8/1/2018	Background	942.6	7.28	19.10	20.7	0.47	2.03	16	0.916	220	560	4500	76	<3.0	<1.0	47	<1.0	<1.0	<4.0	<2.0	<1.0	18	<0.20	500	<1.0	<1.0	0.418(ND)
	9/5/2018	Background	829.2	7.31	19.85	20.9	0.45	2.68	16	0.957	180	420	4400	80	<3.0	<1.0	48	<1.0	<1.0	<4.0	<2.0	<1.0	17	<0.20	460	<1.0	<1.0	0.707(ND)
	11/6/2018	Background	732.8	7.34	18.19	428.8	0.60	0.45	11	0.885	130	410	3800	79	<3.0	<1.0	47	<1.0	<1.0	<4.0	<2.0	<1.0	13	<0.20	420	<1.0	<1.0	1.473(ND)
	12/12/2018	Background	742.9	7.33	16.95	36.5	0.48	0.63	12	0.972	170	360	3700	78	<3.0	<1.0	53	<1.0	<1.0	<4.0	<2.0	<1.0	17	<0.20	420	<1.0	<1.0	1.232 (ND)
	3/27/2019	Detection 1	673.2	7.40	16.74	22.1	0.51	0.96	11	0.827	120	440	3100	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/24/2019	Detection 2	891.5	7.4	19.25	38.3	0.41	0.62	16	0.847	220	540	5000	87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/6/2020	Detection 3	967.5	7.3	17.60	61.6	0.34	0.92	18	0.816	250	840	4900	92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/21/2020	Det/RESAMPLE	1024.4	7.4	17.09	-51.1	4.95	0.59	NA	NA	NA	560	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/22/2020	Detection 4	891.9	7.5	17.59	-70.4	4.18	0.64	15	0.832	210	550	5000	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1/26/2021	Det/RESAMPLE	971.7	7.5	16.07	-69.1	0.34	0.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

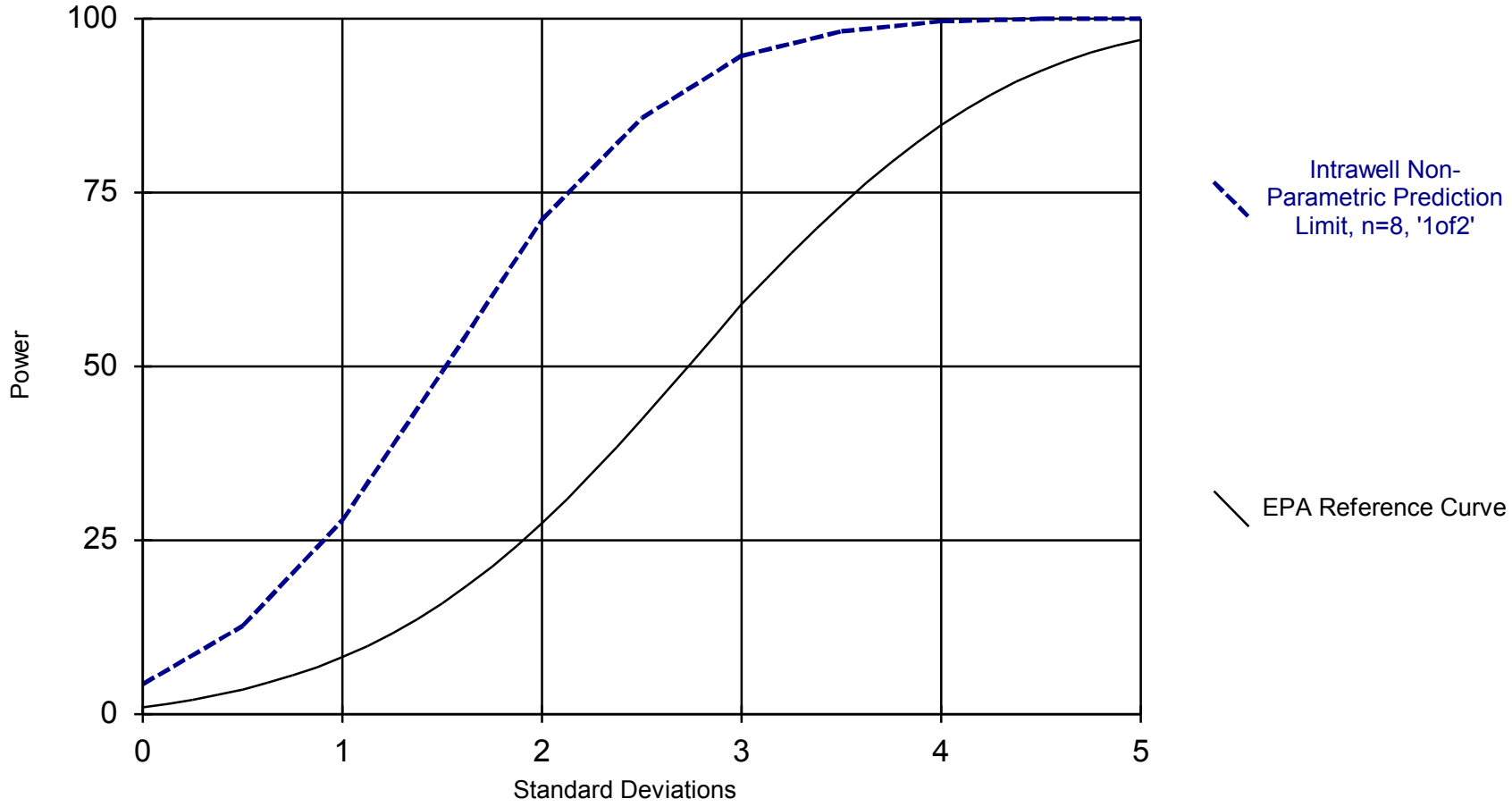
1. All data transcribed from analytical lab data sheets or field notes.
2. Less than (<) symbol denotes concentration below reportable limits.
3. (ND) denotes Radium 226 and 228 (combined) concentration not detected above Minimum Detectable Concentration.
4. (NA) denotes analysis not conducted, or not 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.

Appendix 4
Prepared by: KAE
Checked by: MCC

Appendix 5

Statistical Power Curve

Power Curve MW-1, 2, 3, 7 & 9



This report reflects annual total based on two evaluations per year.

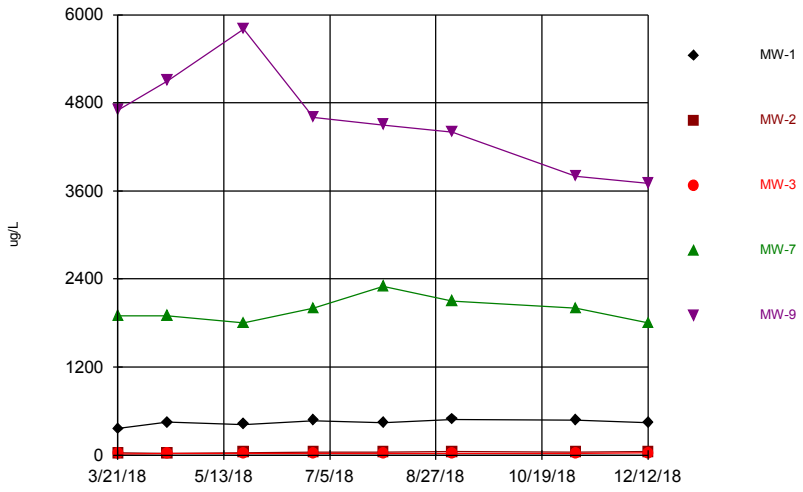
Analysis Run 5/31/2019 2:59 PM

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Appendix 6

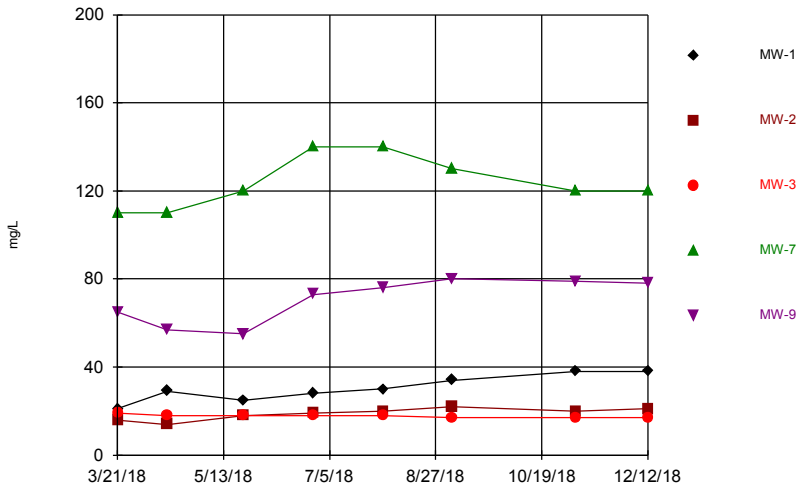
Time Series Plots

Boron



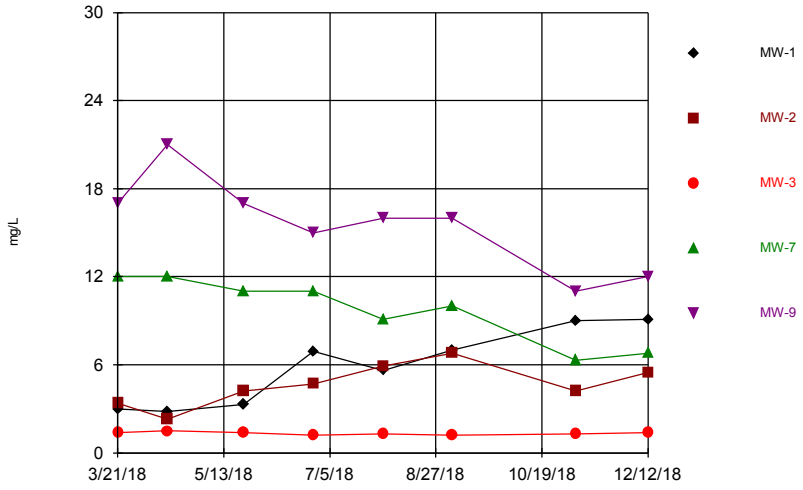
Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

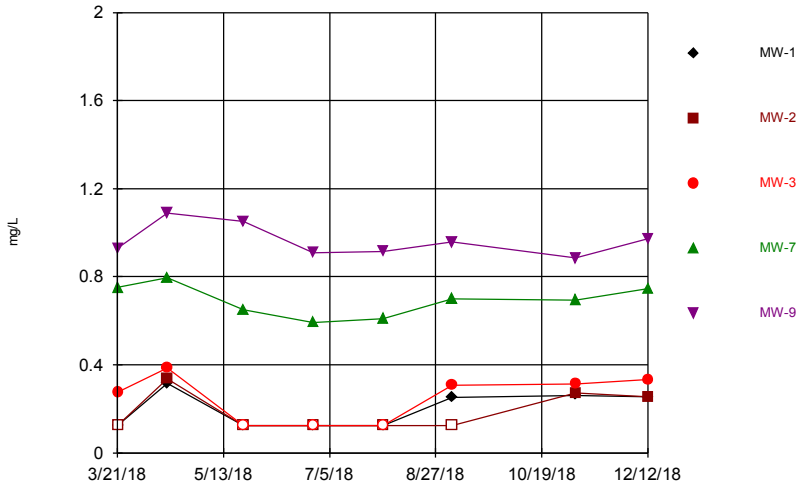
Chloride



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

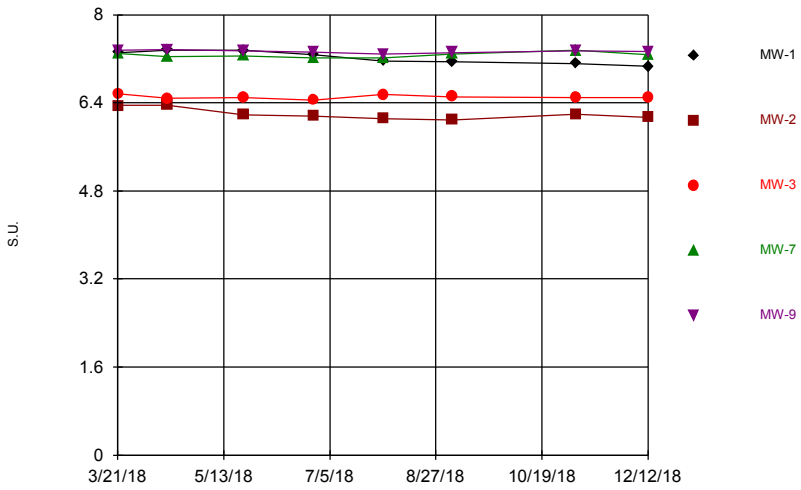
Hollow symbols indicate censored values.

Fluoride



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

pH



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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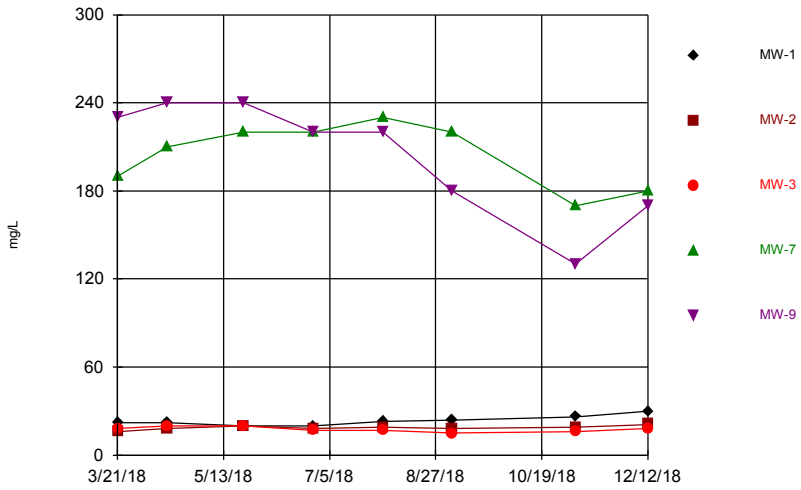
Sulfate



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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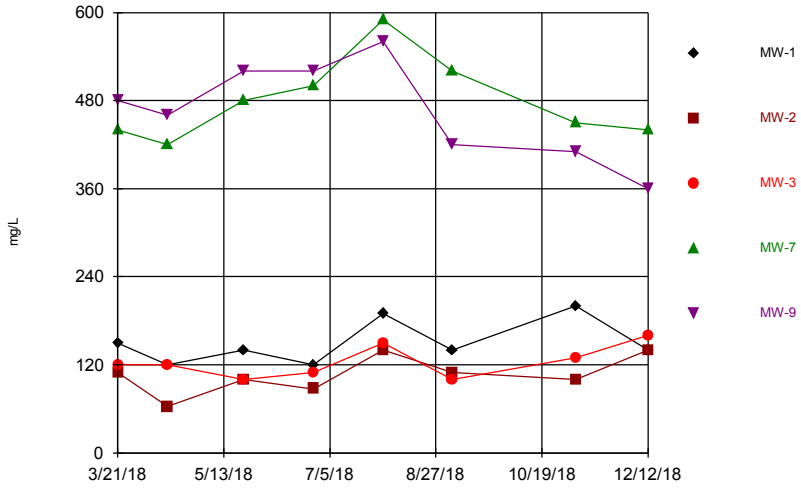
Total Dissolved Solids



Time Series Analysis Run 7/18/2019 8:57 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Appendix 7

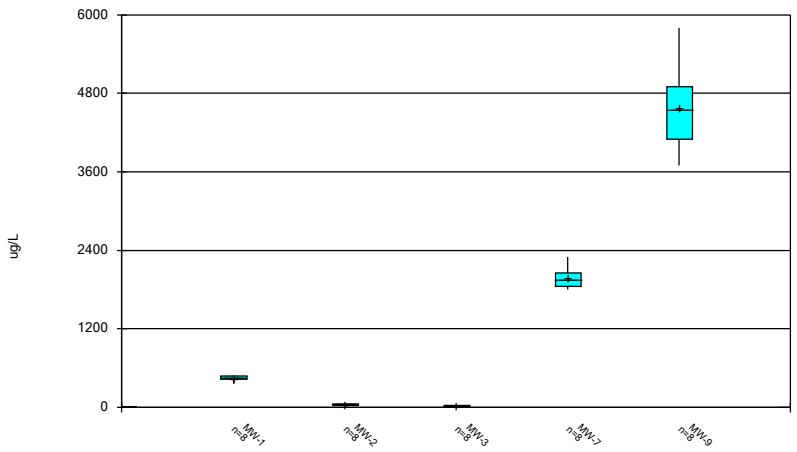
Box and Whiskers Plots

Box & Whiskers Plot (MW-1, 2, 3, 7, & 9)

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background Printed 7/18/2019, 9:02 AM

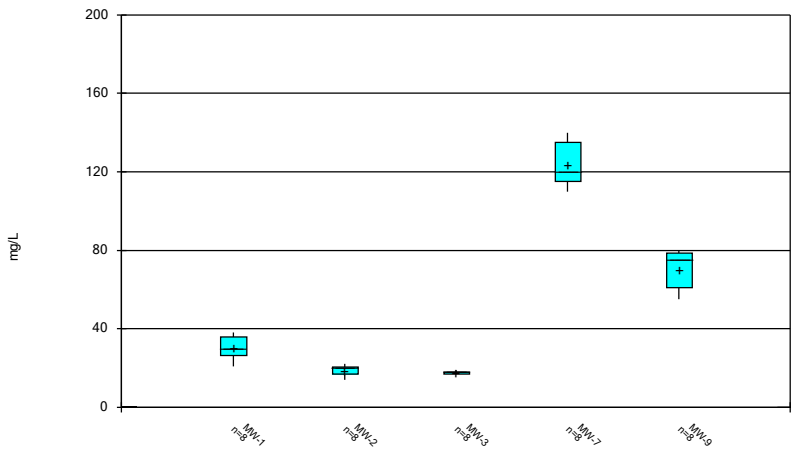
Constituent	Well	N	Mean	Median	Lower Q.	Upper Q.	Min.	Max.	%NDs
Boron (ug/L)	MW-1	8	443.8	445	430	475	360	490	0
Boron (ug/L)	MW-2	8	38.63	42.5	32	44.5	23	48	0
Boron (ug/L)	MW-3	8	23.25	23.5	20.5	26.5	17	28	0
Boron (ug/L)	MW-7	8	1975	1950	1850	2050	1800	2300	0
Boron (ug/L)	MW-9	8	4575	4550	4100	4900	3700	5800	0
Calcium (mg/L)	MW-1	8	30.38	29.5	26.5	36	21	38	0
Calcium (mg/L)	MW-2	8	18.75	19.5	17	20.5	14	22	0
Calcium (mg/L)	MW-3	8	17.75	18	17	18	17	19	0
Calcium (mg/L)	MW-7	8	123.8	120	115	135	110	140	0
Calcium (mg/L)	MW-9	8	70.38	74.5	61	78.5	55	80	0
Chloride (mg/L)	MW-1	8	5.838	6.25	3.15	8	2.8	9.1	0
Chloride (mg/L)	MW-2	8	4.625	4.45	3.8	5.7	2.3	6.8	0
Chloride (mg/L)	MW-3	8	1.338	1.35	1.25	1.4	1.2	1.5	0
Chloride (mg/L)	MW-7	8	9.775	10.5	7.95	11.5	6.3	12	0
Chloride (mg/L)	MW-9	8	15.63	16	13.5	17	11	21	0
Fluoride (mg/L)	MW-1	8	0.1983	0.1885	0.125	0.259	0.125	0.316	50
Fluoride (mg/L)	MW-2	8	0.1858	0.125	0.125	0.263	0.125	0.335	62.5
Fluoride (mg/L)	MW-3	8	0.2488	0.291	0.125	0.3235	0.125	0.386	37.5
Fluoride (mg/L)	MW-7	8	0.6919	0.6965	0.629	0.749	0.592	0.794	0
Fluoride (mg/L)	MW-9	8	0.9636	0.943	0.913	1.011	0.885	1.09	0
pH (S.U.)	MW-1	8	7.22	7.215	7.125	7.33	7.06	7.36	0
pH (S.U.)	MW-2	8	6.196	6.17	6.12	6.27	6.09	6.36	0
pH (S.U.)	MW-3	8	6.505	6.495	6.485	6.53	6.45	6.57	0
pH (S.U.)	MW-7	8	7.268	7.26	7.23	7.295	7.22	7.35	0
pH (S.U.)	MW-9	8	7.33	7.335	7.315	7.345	7.28	7.37	0
Sulfate (mg/L)	MW-1	8	23.38	22.5	21	25	20	30	0
Sulfate (mg/L)	MW-2	8	18.63	18.5	18	19.5	16	21	0
Sulfate (mg/L)	MW-3	8	17.63	17.5	16.5	19	15	20	0
Sulfate (mg/L)	MW-7	8	205	215	185	220	170	230	0
Sulfate (mg/L)	MW-9	8	203.8	220	175	235	130	240	0
Total Dissolved Solids (mg/L)	MW-1	8	150	140	130	170	120	200	0
Total Dissolved Solids (mg/L)	MW-2	8	106.3	105	93.5	125	63	140	0
Total Dissolved Solids (mg/L)	MW-3	8	123.8	120	105	140	100	160	0
Total Dissolved Solids (mg/L)	MW-7	8	480	465	440	510	420	590	0
Total Dissolved Solids (mg/L)	MW-9	8	466.3	470	415	520	360	560	0

Boron



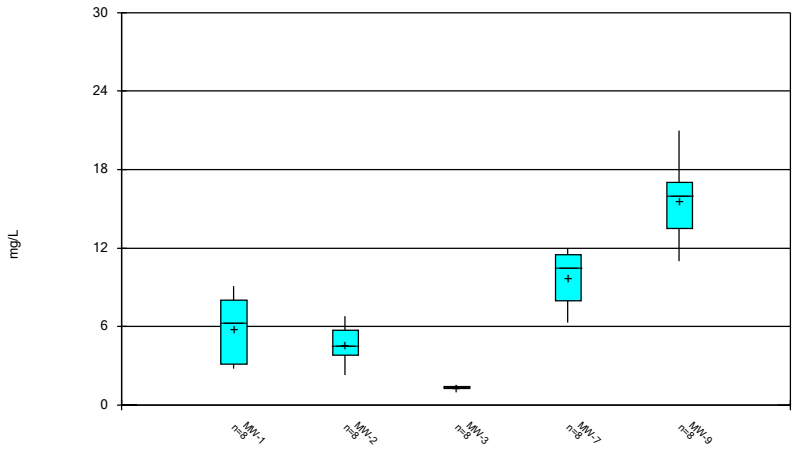
Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium



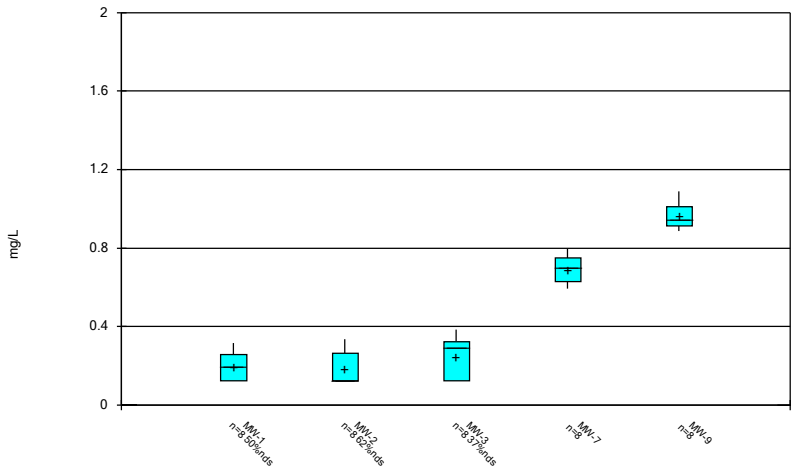
Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Chloride



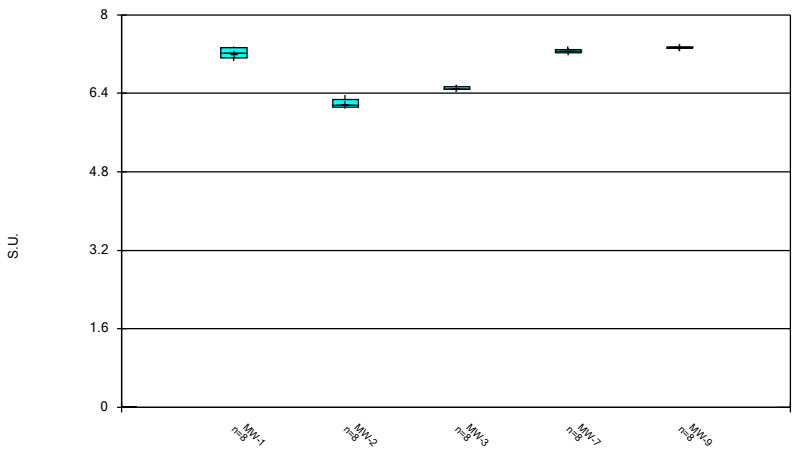
Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Fluoride



Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

pH



Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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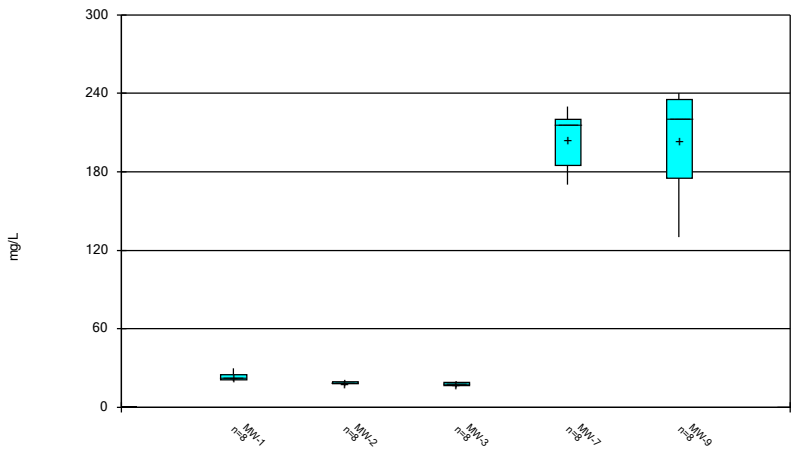
Sulfate



Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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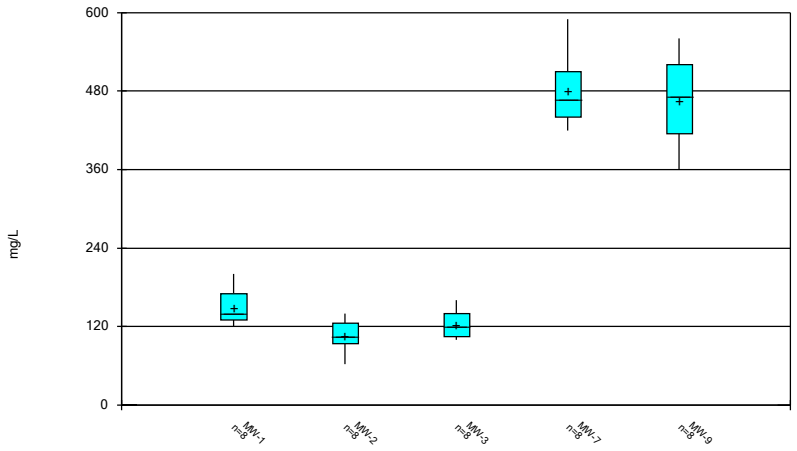
Total Dissolved Solids



Box & Whiskers Plot Analysis Run 7/18/2019 9:00 AM View: AppIII
SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Appendix 8

Prediction Limit Charts

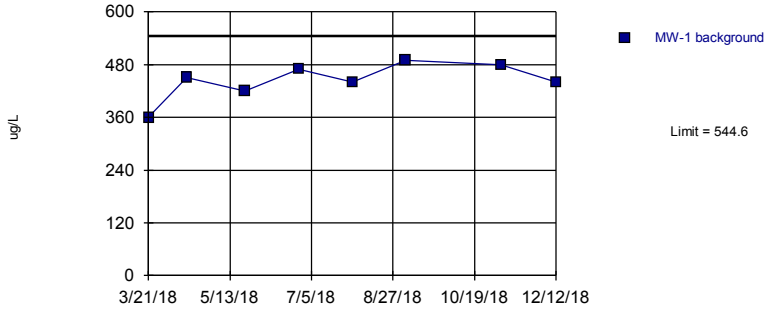
Prediction Limits - (MW-1, 2, 3, 7, & 9)

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background Printed 7/18/2019, 9:05 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (ug/L)	MW-1	544.6	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/L)	MW-2	60.53	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/L)	MW-3	32.7	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/L)	MW-7	2385	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Boron (ug/L)	MW-9	6236	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/L)	MW-1	45.18	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/L)	MW-2	25.29	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/L)	MW-3	19.49	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/L)	MW-7	152.9	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Calcium (mg/L)	MW-9	95.09	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/L)	MW-1	12.2	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/L)	MW-2	8.15	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/L)	MW-3	1.598	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/L)	MW-7	15.22	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Chloride (mg/L)	MW-9	23.28	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-1	0.313	n/a	n/a	1 future	n/a	8	50	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-2	0.335	n/a	n/a	1 future	n/a	8	62.5	n/a	0.02144	NP Intra (NDs) 1 of 2
Fluoride (mg/L)	MW-3	0.4083	n/a	n/a	1 future	n/a	8	37.5	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-7	0.8677	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-9	1.14	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
pH (S.U.)	MW-1	7.5	6.9	n/a	1 future	n/a	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-2	6.5	5.9	n/a	1 future	n/a	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-3	6.6	6.4	n/a	1 future	n/a	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-7	7.4	7.2	n/a	1 future	n/a	8	0	No	0.001253	Param Intra 1 of 2
pH (S.U.)	MW-9	7.4	7.3	n/a	1 future	n/a	8	0	No	0.001253	Param Intra 1 of 2
Sulfate (mg/L)	MW-1	31.57	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/L)	MW-2	22.33	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/L)	MW-3	21.97	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/L)	MW-7	259.2	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Sulfate (mg/L)	MW-9	301.1	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1	223.2	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-2	169.4	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-3	177.8	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-7	617.2	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-9	630.8	n/a	n/a	1 future	n/a	8	0	No	0.002505	Param Intra 1 of 2

Boron

Intrawell Parametric, MW-1



Background Data Summary: Mean=443.8, Std. Dev.=41.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9079, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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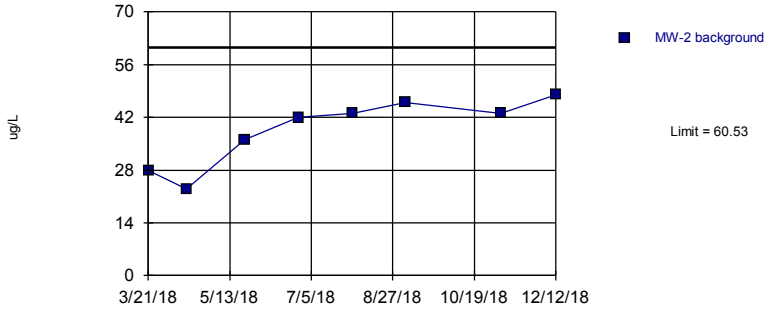
Boron

Intrawell Parametric, MW-2



Background Data Summary: Mean=38.63, Std. Dev.=8.911, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8787, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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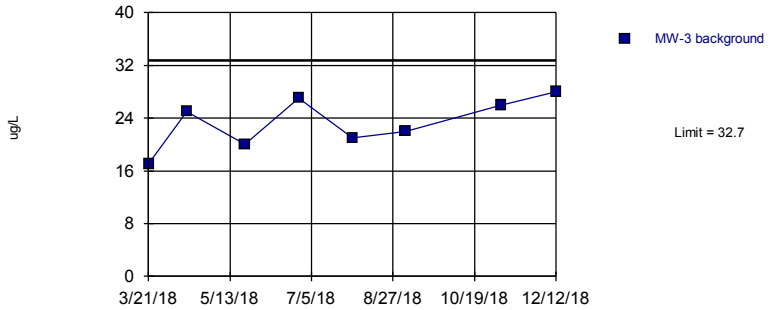
Boron

Intrawell Parametric, MW-3



Background Data Summary: Mean=23.25, Std. Dev.=3.845, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9492, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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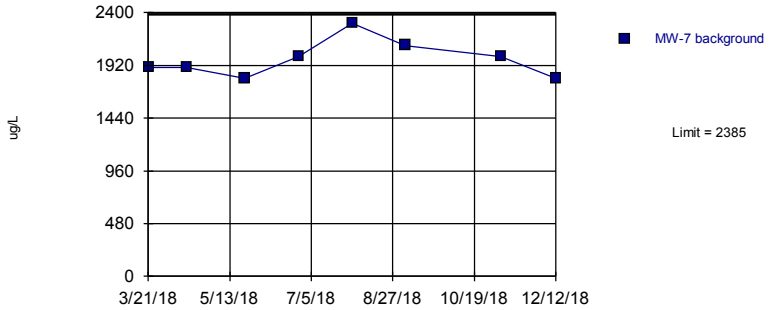
Boron

Intrawell Parametric, MW-7



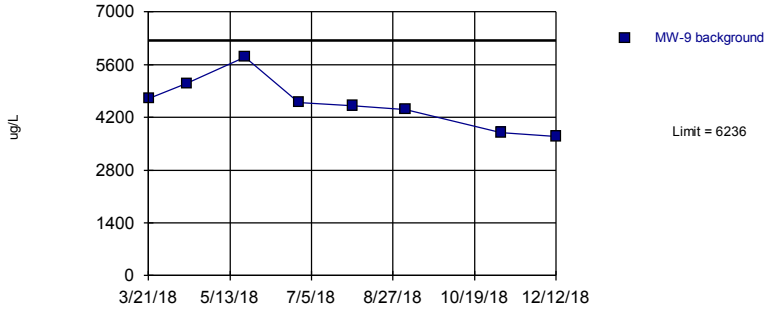
Background Data Summary: Mean=1975, Std. Dev.=166.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.907, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Boron

Intrawell Parametric, MW-9



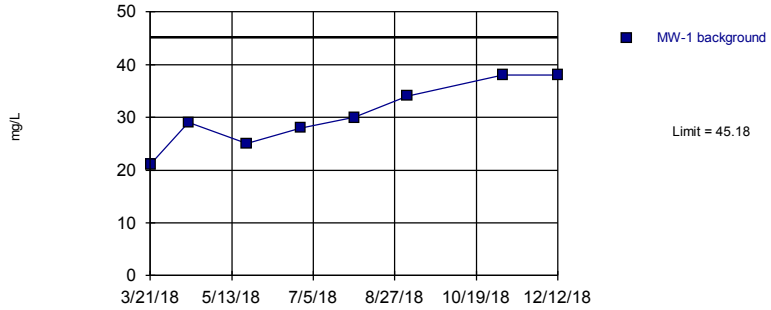
Background Data Summary: Mean=4575, Std. Dev.=675.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9478, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium

Intrawell Parametric, MW-1



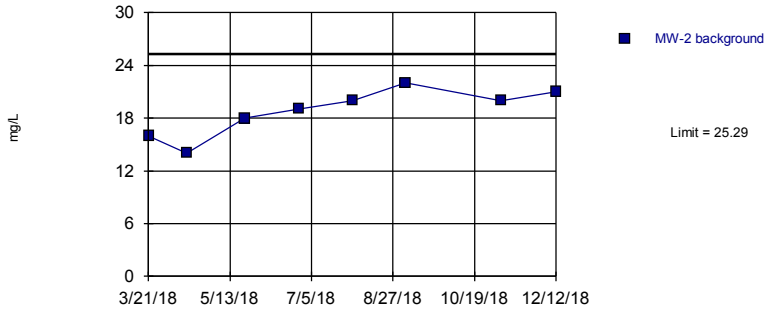
Background Data Summary: Mean=30.38, Std. Dev.=6.022, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9468, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium

Intrawell Parametric, MW-2



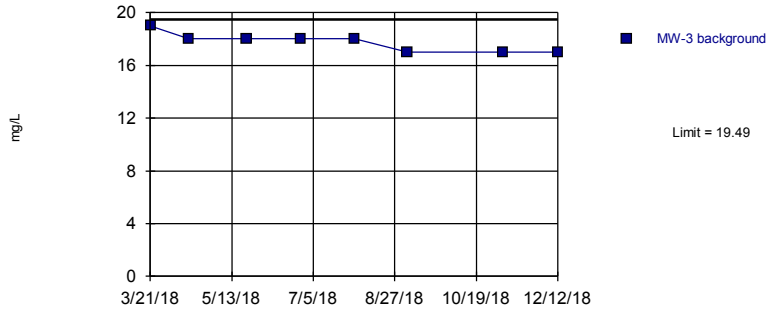
Background Data Summary: Mean=18.75, Std. Dev.=2.659, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9419, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium

Intrawell Parametric, MW-3



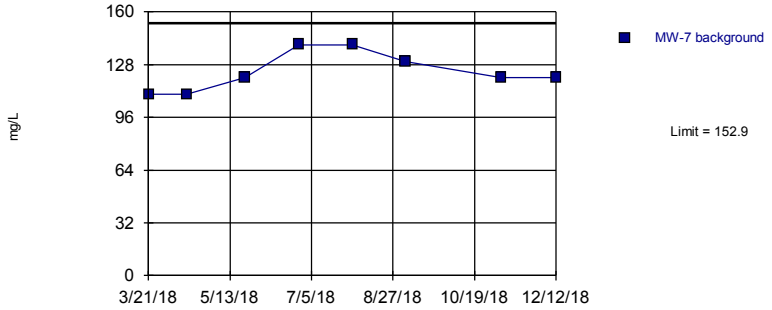
Background Data Summary: Mean=17.75, Std. Dev.=0.7071, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8268, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Calcium

Intrawell Parametric, MW-7



Background Data Summary: Mean=123.8, Std. Dev.=11.88, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8748, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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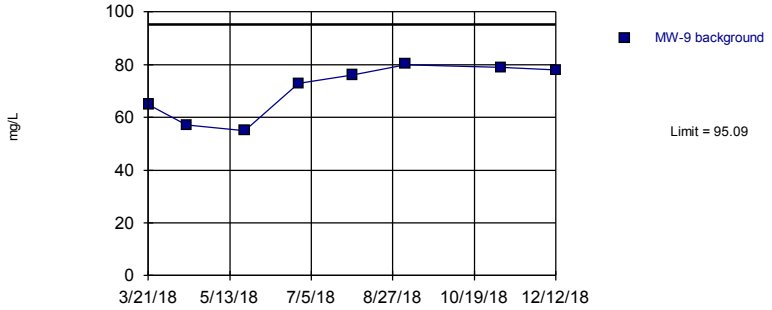
Calcium

Intrawell Parametric, MW-9



Background Data Summary: Mean=70.38, Std. Dev.=10.06, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8497, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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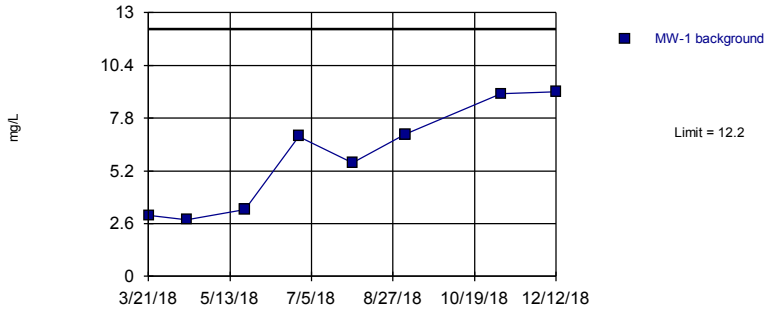
Chloride

Intrawell Parametric, MW-1



Background Data Summary: Mean=5.838, Std. Dev.=2.588, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8813, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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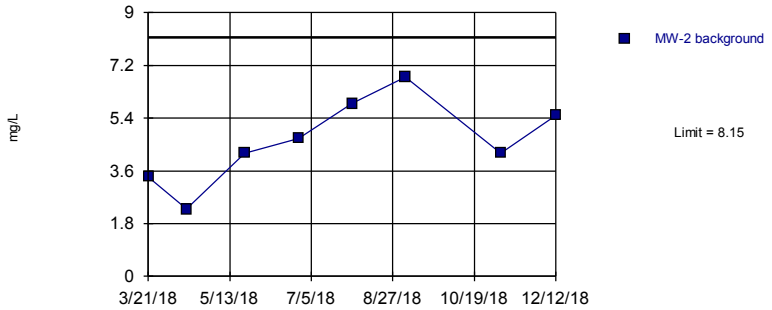
Chloride

Intrawell Parametric, MW-2



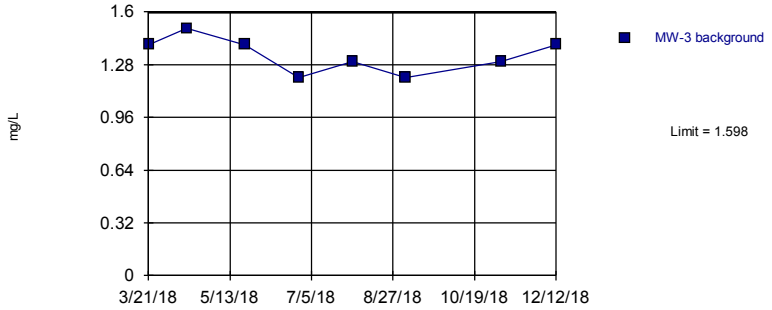
Background Data Summary: Mean=4.625, Std. Dev.=1.434, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9868, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Chloride

Intrawell Parametric, MW-3



Background Data Summary: Mean=1.338, Std. Dev.=0.1061, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9112, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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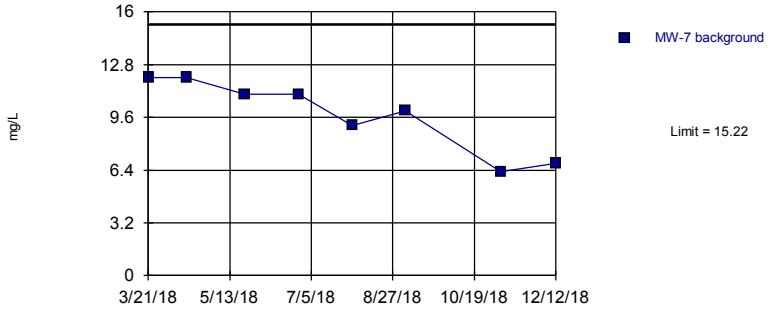
Chloride

Intrawell Parametric, MW-7



Background Data Summary: Mean=9.775, Std. Dev.=2.215, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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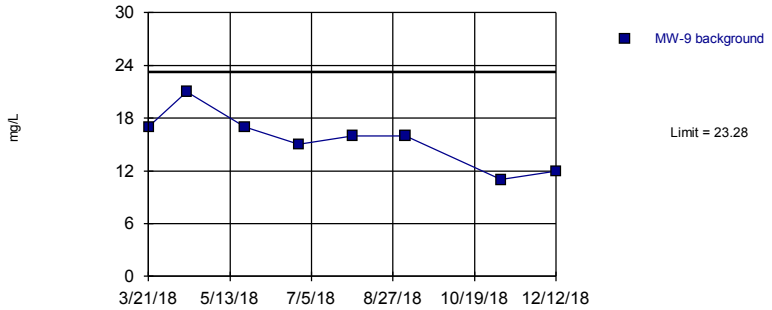
Chloride

Intrawell Parametric, MW-9



Background Data Summary: Mean=15.63, Std. Dev.=3.114, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9388, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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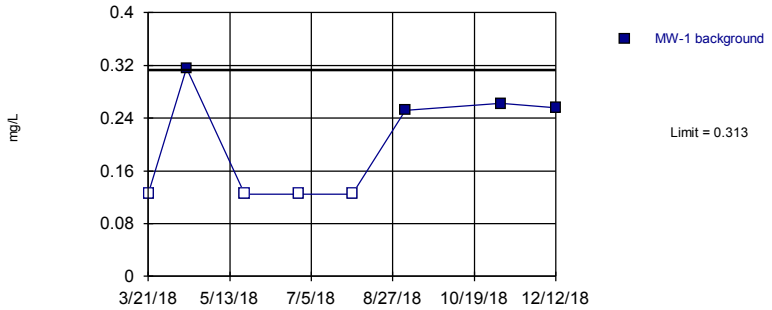
Hollow symbols indicate censored values.

Fluoride

Intrawell Parametric, MW-1



Background Data Summary (after Kaplan-Meier Adjustment): Mean=0.2608, Std. Dev.=0.02126, n=8, 50% NDs. 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. Assumes 1 future value.

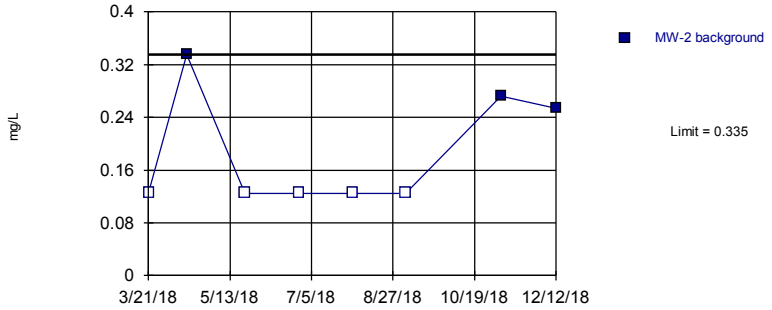
Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Hollow symbols indicate censored values.

Fluoride

Intrawell Non-parametric, MW-2



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

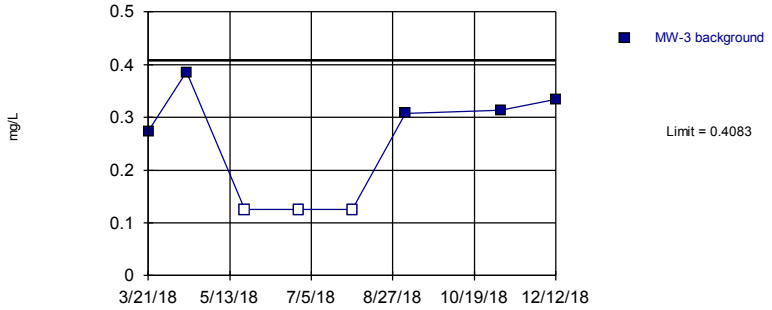
Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Hollow symbols indicate censored values.

Fluoride

Intrawell Parametric, MW-3



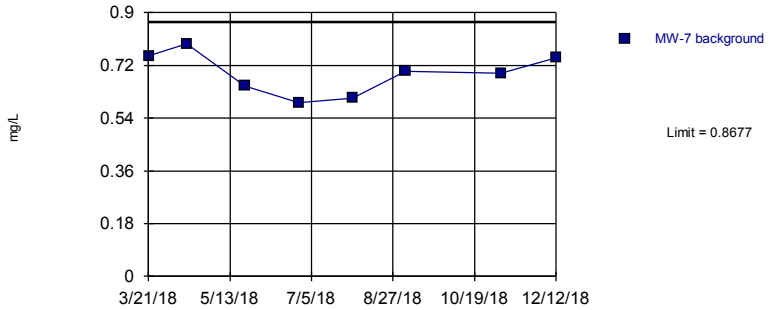
Background Data Summary (after Kaplan-Meier Adjustment): Mean=0.2956, Std. Dev.=0.04584, n=8, 37.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8336, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Fluoride

Intrawell Parametric, MW-7



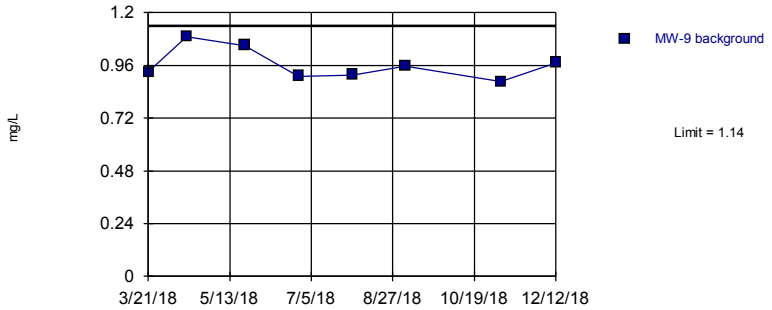
Background Data Summary: Mean=0.6919, Std. Dev.=0.07152, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9552, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Fluoride

Intrawell Parametric, MW-9



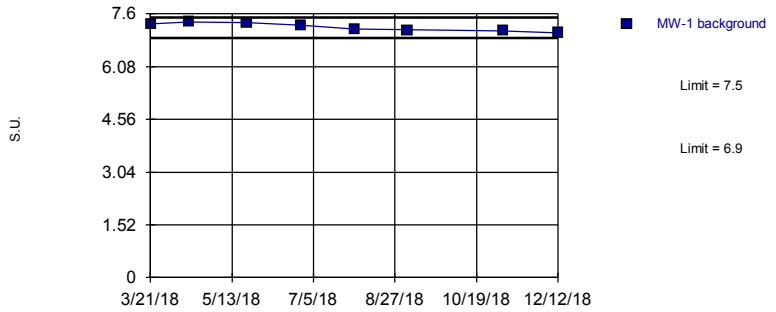
Background Data Summary: Mean=0.9636, Std. Dev.=0.07178, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8952, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

pH

Intrawell Parametric, MW-1



Background Data Summary: Mean=7.22, Std. Dev.=0.1164, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9074, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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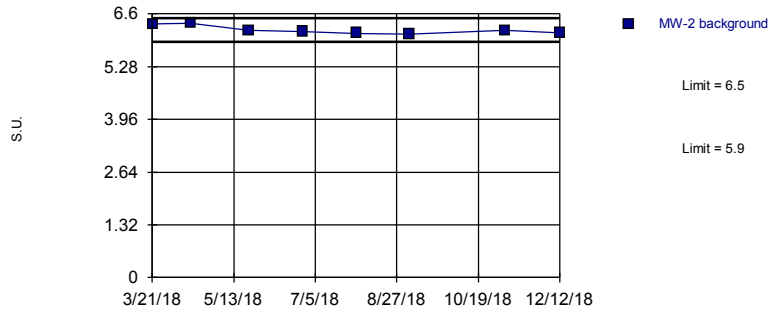
pH

Intrawell Parametric, MW-2



Background Data Summary: Mean=6.196, Std. Dev.=0.1036, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8374, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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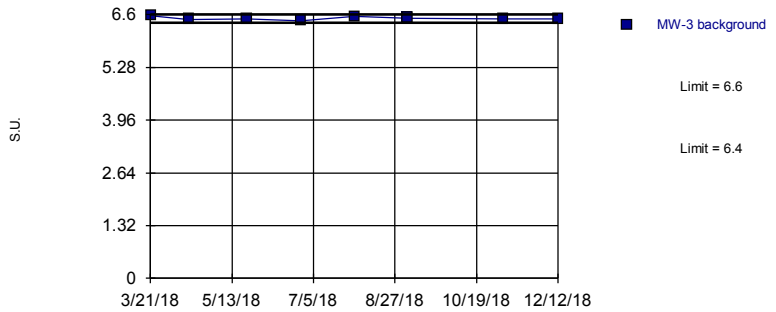
pH

Intrawell Parametric, MW-3



Background Data Summary: Mean=6.505, Std. Dev.=0.03854, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.939, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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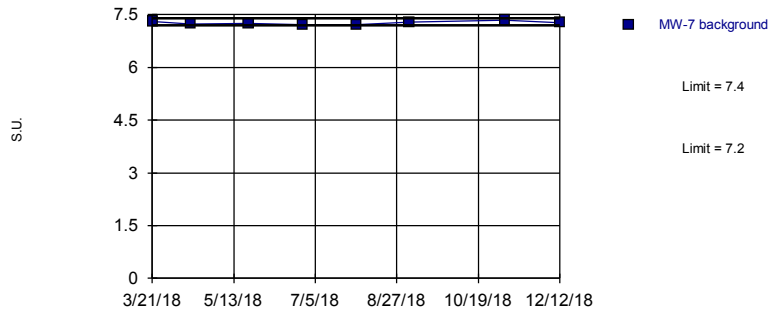
pH

Intrawell Parametric, MW-7



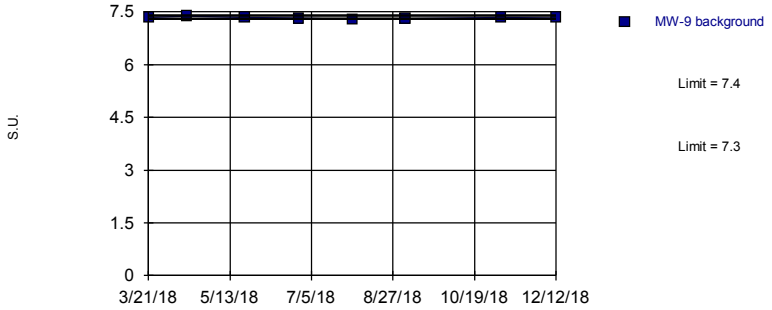
Background Data Summary: Mean=7.268, Std. Dev.=0.04464, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9288, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:03 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

pH

Intrawell Parametric, MW-9



Background Data Summary: Mean=7.33, Std. Dev.=0.02726, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9741, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

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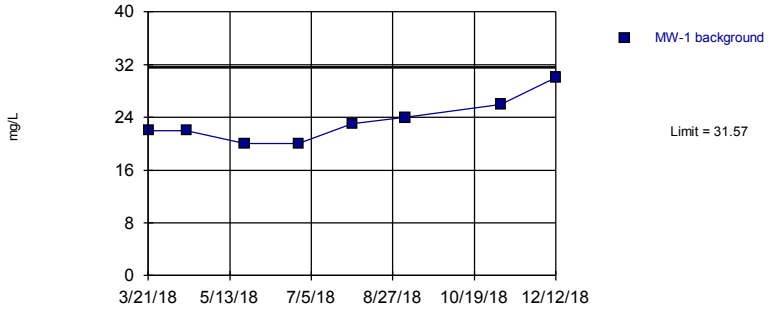
Sulfate

Intrawell Parametric, MW-1



Background Data Summary: Mean=23.38, Std. Dev.=3.335, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8964, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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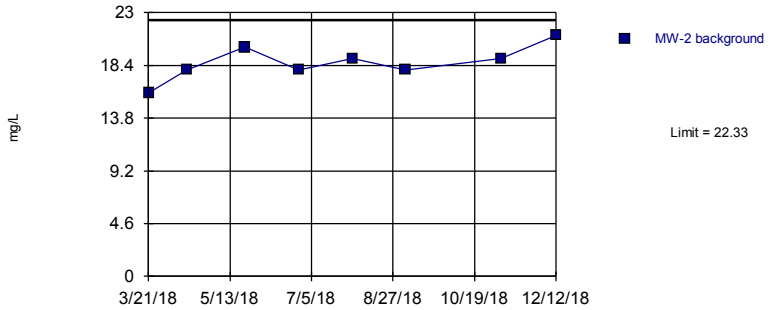
Sulfate

Intrawell Parametric, MW-2



Background Data Summary: Mean=18.63, Std. Dev.=1.506, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9528, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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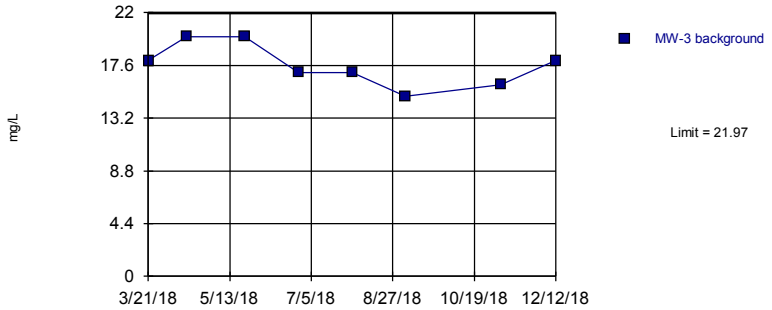
Sulfate

Intrawell Parametric, MW-3



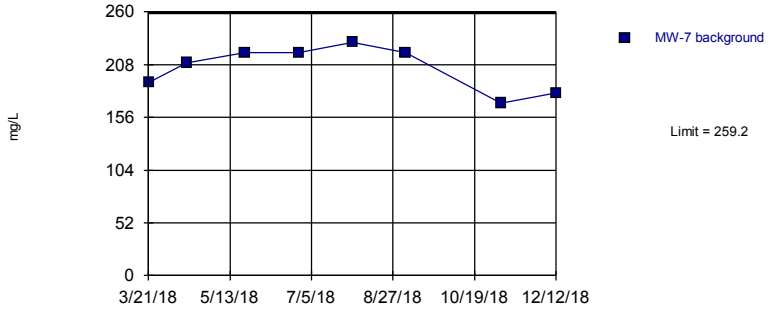
Background Data Summary: Mean=17.63, Std. Dev.=1.768, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9348, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Sulfate

Intrawell Parametric, MW-7



Background Data Summary: Mean=205, Std. Dev.=22.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8819, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

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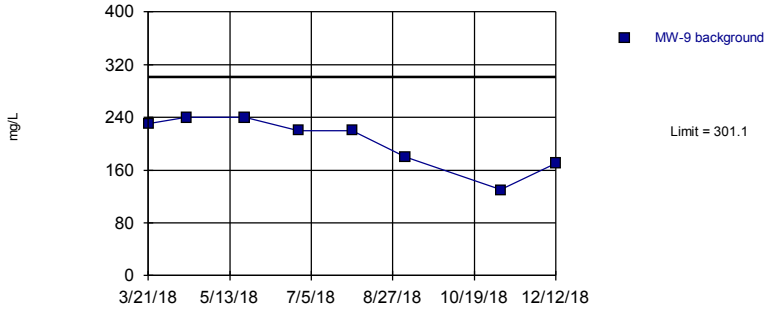
Sulfate

Intrawell Parametric, MW-9



Background Data Summary: Mean=203.8, Std. Dev.=39.62, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.864, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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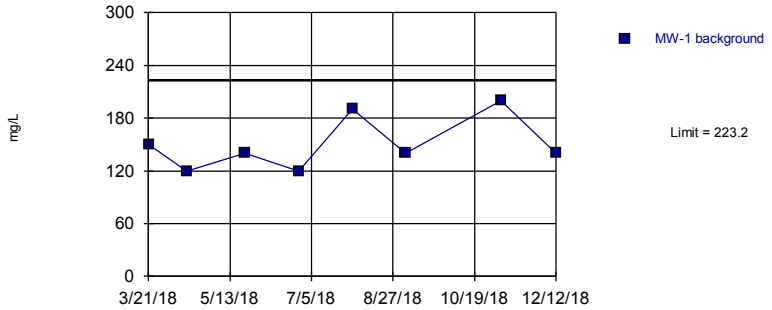
Total Dissolved Solids

Intrawell Parametric, MW-1



Background Data Summary: Mean=150, Std. Dev.=29.76, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8433, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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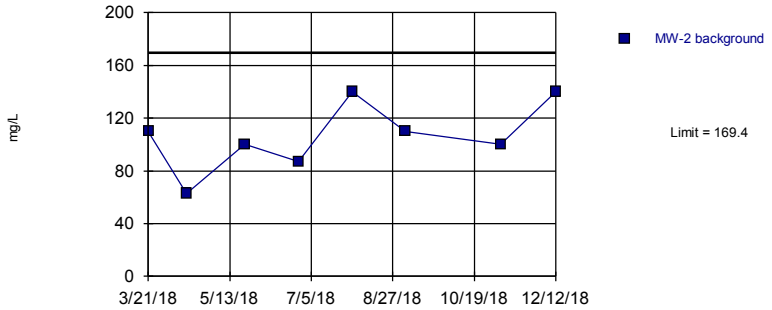
Total Dissolved Solids

Intrawell Parametric, MW-2



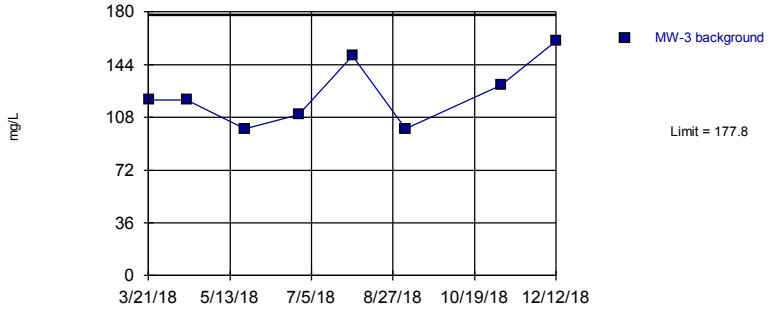
Background Data Summary: Mean=106.3, Std. Dev.=25.71, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9324, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Total Dissolved Solids

Intrawell Parametric, MW-3



Background Data Summary: Mean=123.8, Std. Dev.=22, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9132, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

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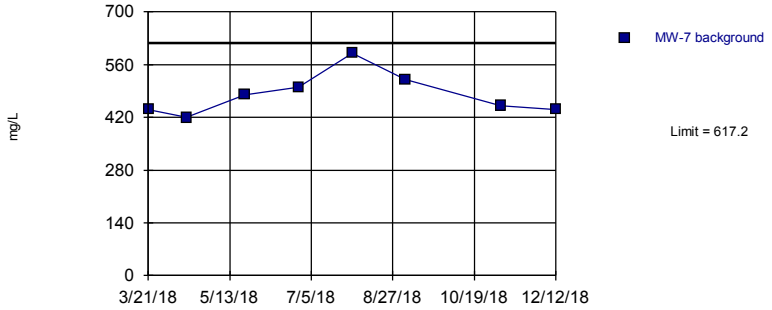
Total Dissolved Solids

Intrawell Parametric, MW-7



Background Data Summary: Mean=480, Std. Dev.=55.81, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9034, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

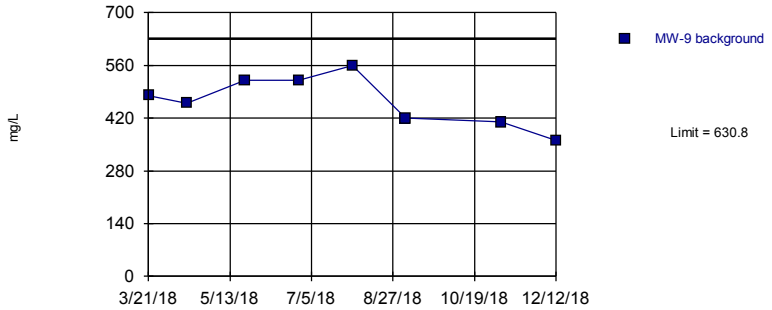
Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Sanitas™ v.9.6.18 Sanitas software licensed to GREDELL Engineering only. UG

Total Dissolved Solids

Intrawell Parametric, MW-9



Background Data Summary: Mean=466.3, Std. Dev.=66.96, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.969, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Prediction Limit Analysis Run 7/18/2019 9:04 AM View: AppIII

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: SikestonFAP Background

Appendix 9

Alternate Source Demonstrations

Appendix 9

Alternate Source Demonstration
September 11, 2020
MW-1

1505 East High Street
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www.ger-inc.biz

GREDELL Engineering Resources, Inc.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for Fly Ash Pond – Calcium, Sulfate, and Total Dissolved Solids in MW-1
Alternate Source Demonstration

Prepared for:

BMU Board of Municipal Utilities

Sikeston Power Station
1551 West Wakefield Avenue
Sikeston, MO 63801

STATE OF MISSOURI
THOMAS A. GREDELL
9-11-2020
NUMBER PE-021137
PROFESSIONAL ENGINEER

STATE OF MISSOURI
MIKEL C. CARLSON
9-11-20
RG 0126
REGISTERED GEOLOGIST

September 2020

PROFESSIONAL ENGINEER'S CERTIFICATION

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

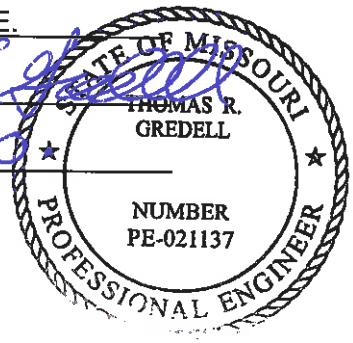
I, Thomas R. Gredell, P.E., a professional engineer licensed in the State of Missouri, hereby certify in accordance with 40 CFR 257.94(e)(2) to the accuracy of the alternate source demonstration described in the following report for the Sikeston Board of Municipal Utilities, Sikeston Power Station, Fly Ash Pond CCR unit. The report demonstrates that the statistically significant increases of sulfate, total dissolved solids, and calcium in MW-1 resulted from a source other than the CCR unit. 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 generally accepted methods.

Name: Thomas R. Gredell, P.E.

Signature: _____

Date: 9-11-2020

Registration Number: PE-021137
State of Registration: Missouri



Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond – Calcium, Sulfate, and
Total Dissolved Solids in MW-1
Alternate Source Demonstration

September 2020

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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 initiated on April 6, 2020 at the Sikeston Board of Municipal Utilities (SBMU) Sikeston Power Station's (SPS) Fly 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) for the parameters listed in Appendix III to Part 257 – Constituents for Detection Monitoring. Following this analysis, it was determined that several reported concentrations exceeded their respective prediction limits for the well constituent pairs. These well constituent pairs were; Calcium, Sulfate, and Total Dissolved Solids (TDS) in sample MW-1, Fluoride in sample MW-2, Chloride and Boron in sample MW-3, and TDS in sample MW-9. Resampling for these well constituent pairs, and Boron in MW-2, was conducted on May 21, 2020. Following receipt of final analytical data from the resampling event, it was confirmed that Calcium, Sulfate, and TDS concentrations in sample MW-1, and Fluoride in sample MW-2 represent statistically significant increases (SSIs). As a consequence, SBMU-SPS requested that Gredell Engineering conduct an evaluation of the analytical results and develop an Alternate Source Demonstration (ASD) if warranted for Calcium, Sulfate, and TDS in MW-1. Fluoride in MW-2 is the subject of a separate report. Chloride and Boron in sample MW-3, and TDS in sample MW-9 were not confirmed by resampling and therefore are not SSIs.

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. 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 certified demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e).

Gredell Engineering has completed an evaluation of the groundwater sampling event, analytical data results, and other potential factors, for the SBMU SPS Fly Ash Pond groundwater monitoring well system to determine if an alternate source is the cause of the apparent SSIs in MW-1. This report presents the results of that evaluation and includes supporting documentation.

2.0 OBSERVATIONS AND DATA COLLECTION

The Fly Ash Pond groundwater monitoring well system consists of five wells, designated MW-1, MW-2, MW-3, MW-7, and MW-9 (Figure 1). Monitoring wells MW-1, MW-2, and MW-3 were installed in April 2016. Monitoring well MW-7 was installed in April 2017. Monitoring well MW-9 was installed in November 2017. All five monitoring wells were sampled on an approximate monthly basis beginning in March 2018 and ending in December 2018 to establish a background data base. Additional information regarding these wells is available in the Groundwater Monitoring, Sampling and Analysis Plan for the site (Gredell Engineering, 2018).

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 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), SSI over background is suspected.

Monitoring well MW-1 is located west of the Fly Ash Pond and within the containment area of the coal storage area (Figure 1). The well is situated between the north edge of the coal pile and the coal pile runoff diversion ditch. MW-1 was originally installed in April 2016 as a piezometer for the hydrogeologic characterization of the uppermost aquifer flowing beneath the Fly Ash and Bottom Ash Ponds at the site (Gredell Engineering, 2017). This piezometer was converted to a downgradient monitoring well and retained for routine groundwater elevation monitoring and NPDES compliance sampling. Additional sampling locations were proposed, and two additional downgradient wells (MW-7 and MW-9) were installed for Fly Ash Pond monitoring in April 2017 and November 2017, respectively. Groundwater elevation monitoring since 2016 has consistently demonstrated that flow direction is to the west-southwest, as indicated on Figure 1.

The April 6, 2020 detection monitoring event was preceded by abnormally heavy precipitation during the months of January (5.32 inches), February (6.92 inches), and March (8.24 inches). The effects of this heavy precipitation on the local water table are apparent on Figure 2, which is a hydrograph of groundwater elevations in MW-1 overlaid on a bar graph of total annual precipitation for January 1, 2016 through May 31, 2020 (obtained from National Oceanic & Atmospheric Administration Station: Sikeston Power Station, MO US GHCND: US00237772). Note that the estimated annual precipitation plotted for 2020 (71.35 inches) is an extrapolation based on the precipitation received from January through May, 2020 In 2019, the SPS experienced a 30 to 45 percent increase in precipitation relative to the previous three years (2018, 44.39 inches; 2017, 39.78 inches, and; 2016, 41.50 inches. However, the total precipitation in 2020 as of May 31st (29.73 inches) represents an additional 3 percent increase over 2019 (28.75 inches in the same period). This abnormally heavy precipitation is manifested on the hydrograph (Figure 2) by April and May groundwater elevations in MW-1 that exceed all previously recorded measurements.

During periods of abnormally heavy rainfall, infiltration to an aquifer is increased and groundwater mounding may result. Rainfall that exceeds the infiltration capacity becomes surface runoff. Within the coal storage area, this surface runoff moves toward the unlined perimeter diversion ditch (Figure 1). Runoff concentrates in this unlined diversion and flows counterclockwise around the coal storage area within close proximity to MW-1. Because the diversion is unlined, additional infiltration and aquifer recharge is expected to occur. The excessive runoff in 2020 is illustrated by the photographs presented as Figures 3 and 4. They show considerable coal sediment in the diversion ditch, which is not apparent in a photograph dating from November 2017 (Figure 5), nor was it apparent during other field activities conducted by Gredell Engineering in 2016 through 2018.

The analytical data for Calcium, Sulfate, and TDS in MW-1 for the April sampling event, and subsequent resampling data are summarized on Table 1.

Table 1 - MW-1 Detection Monitoring Results and Prediction Limits

	Calcium (mg/L)	Sulfate (mg/L)	TDS (mg/L)
Detection Sampling 4-6-2020	48	39	230
Resample 5-21-20	60	63	260
Prediction Limit	45.18	31.57	223.2

Calcium, Sulfate, and TDS concentrations in the MW-1 sample from the April sampling event exceeded their respective prediction limits, as documented in the 2020 Annual Groundwater Monitoring Report, dated **August** 2020, and posted in the SPS operating record in compliance with USEPA Part 257.90(e) (Gredell Engineering, 2020). In May, a resampling event was conducted and, following receipt of final analytical data on June 15th, the apparent SSIs for Calcium, Sulfate, and TDS in the MW-1 sample were confirmed.

During the preparation of a previous alternate source demonstration for MW-1, additional sampling was conducted in February 2020 (Figure 1). Two temporary borings (ASD-1 and ASD-2) were advanced along the margin of the existing coal pile to allow sampling of the shallow groundwater between the coal pile and the underlying aquifer. Groundwater was also sampled at MW-1, along with a surface water sample collected from the Fly Ash Pond (FAP-SW). Each sample was analyzed for major anions and cations to conduct geochemical analysis. A Piper Trilinear Plot (Piper, 1944) was developed with Sanitas™ Water (Version 9.6.24; 2019) to identify similarities/variations in hydrochemical facies (Freeze and Cherry, 1979). The reported concentrations are summarized on Table 2. These data were used to evaluate geochemical

relationships between the samples with the objective of identifying the most plausible source for the apparent SSIs at MW-1.

Table 2 - Alternate Source Demonstration Sampling Results Summary February 2020

	ASD-1	ASD-2	MW-1	FAP-SW
Calcium (mg/L)	79.1	120	43.0	18.4
Sulfate (mg/L)	151	152	25	21
TDS (mg/L)	860	700	170	175
Magnesium (mg/L)	28.7	27.4	9.06	4.96
Potassium (mg/L)	9.74	9.46	1.72	18.7
Sodium (mg/L)	151	135	7.40	36.7
Bicarbonate (mg/L)	350	508	128	172
Carbonate (mg/L)	0	0	0	0
Chloride (mg/L)	35	20	5	5

3.0 SUMMARY OF DATA ANALYSIS AND FINDINGS

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. Chapter 4 of the Unified Guidance discusses groundwater monitoring programs and statistical analysis of the associated data. A key component of statistical analysis is "*to determine whether or not the increase is actually due to a contaminant release*". The following discussion is intended to assess the validity of apparent SSIs of Calcium, Sulfate, and TDS associated with MW-1 and demonstrate if they are the result of a contaminant release from the Fly Ash Pond or caused by an alternate source.

A release from a plausible source will contribute water with elevated concentrations of indicator constituents to the aquifer, where it mixes with, and is diluted by, the natural (un-impacted) groundwater, which is characterized by relatively low (background) concentrations of these indicator constituents. The data summarized in Table 2 demonstrate that the concentrations of Calcium, Sulfate, and TDS in samples collected from ASD-1 and ASD-2 are at least four times greater than reported for the sample from the Fly Ash Pond, and considerably higher than the sample from MW-1. This suggests that water from the coal storage area is a more plausible source for these constituents in MW-1 than water derived from the Fly Ash Pond.

The area of change in groundwater geochemistry as it flows away from a source is referred to as a mixing zone. A Piper Trilinear Plot is a common and convenient tool for showing the effects of mixing waters. The mixing zone will plot on a straight line joining the source to the receiving water (Freeze and Cherry, 1979).

The cation/anion data in Table 2 was used to produce the Piper Trilinear Plot in Figure 6. The concentrations presented in Table 2 for each constituent are first converted from mg/L to milliequivalents per liter (mEq/L) through a calculation based on their valence charge and molecular weight. The concentrations of these major anions and cations in mEq/L are then expressed in relative percentages on the trilinear plot to assess the geochemistry of the sample. Hydrochemical facies can be assessed based on the location of each point, or cluster of points, on the Piper Trilinear Plot.

Major anion data are summarized by the triangular plot on the right side of Figure 6, which indicates that all samples plot in a similar area or facies, with separation owing to minor differences in Bicarbonate concentrations (Carbonate was absent in all samples). Most notable, however, is that the anion fingerprint in MW-1 is more similar to ASD-1 and ASD-2 than it is to the sample from the Fly Ash Pond. The triangular plot on the left side summarizes the major cation data and indicates that the samples cluster in three different areas or facies (MW-1 in "Calcium-type", FAP-SW in "Sodium- or Potassium-type", and ASD-1 and ASD-2 in "No dominant type" (Freeze and Cherry, 1979)). The anion and cation data can be considered collectively with the diamond portion of the Piper Trilinear Plot to assess if all samples plot collinearly.

The Piper Trilinear Plot suggests three separate geochemical populations defined by the samples from the coal storage area (ASD-1 and ASD-2), the Fly Ash Pond (FAP-SW), and MW-1. A sample from a chemical source should plot collinear with samples associated with the mixing zone. ASD-1 and ASD-2 plot closer to MW-1 and are therefore more geochemically similar to MW-1. Conversely FAP-SW plots farther from MW-1 and is less geochemically similar to MW-1. Additionally, FAP-SW plots along a different straight line with MW-1 than ASD-1 and ASD-2. The hydrograph for MW-1 and annual precipitation data summarized on Figure 2 demonstrate that 2019 was considerably wetter than the previous three years, and 2020 is on pace to be even wetter than 2019. Moreover, this abnormal precipitation led to excessive runoff and sedimentation from the stockpiled coal into the perimeter diversion that flows near MW-1, as presented in Figures 1, 3, and 4. A photograph of the same area taken in November 2017 (Figure 5) shows no excessive sedimentation, suggesting that the atypically heavy precipitation is a changed condition resulting in increased infiltration of coal-impacted surface water downward into the groundwater environment.

4.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of the data presented in this demonstration, Gredell Engineering concludes that the apparent SSIs of Calcium, Sulfate, and TDS in MW-1, detected following the April 6, 2020 sampling event, are attributable to an alternate source originating in the coal storage area and not evidence of a release from the Fly Ash Pond. The following supports this conclusion:

- Groundwater samples collected from ASD-1 and ASD-2 in the coal storage area have elevated concentrations of Calcium, Sulfate, and TDS relative to MW-1 and the Fly Ash Pond.
- Calcium, Sulfate, and TDS concentrations derived from the Fly Ash Pond are not high enough to be mixed with (and diluted by) natural (un-impacted) groundwater and exceed their respective prediction limits for MW-1.
- Piper Trilinear Plot analysis demonstrates that groundwater from MW-1 is geochemically more similar to groundwater under the coal storage area than water in the Fly Ash Pond, and the groundwater under the coal storage area represents a different mixing zone than would result from waters in the Fly Ash Pond.
- Higher than normal precipitation preceding the groundwater monitoring resulted in excessive runoff from the coal storage area that was conveyed as surface runoff into the unlined diversion ditch that lies in close proximity to MW-1. This excessive runoff and coal sedimentation increases the likelihood that infiltration of coal impacted surface water into the groundwater environment had a deleterious effect on the sample results from MW-1. The abnormal precipitation and excessive runoff is viewed as a temporary changed condition, as evidenced by a comparison of the photographs of the perimeter diversion ditch presented as Figures 3, 4, and 5.

Based on these conclusions, Gredell Engineering recommends that semi-annual detection monitoring continue in accordance with §257.94. As subsequent analytical results are received for Calcium, Sulfate, and TDS concentrations in MW-1, they should be reviewed and appropriate steps taken if prediction limit values continue to be exceeded. Periodic inspection and maintenance of the diversion ditch enclosing the coal storage area would ensure excess sediment from the coal stockpiles is removed.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of the client and GREDELL Engineering Resources, Inc. for the specific project discussed in accordance with generally accepted environmental practices common to this locale at this time. The report is applicable only to this specific project and identified site conditions as they existed at the time of report preparation. The use of this report by others to develop independent interpretations of data or conclusions not explicitly stated in this report are the sole responsibility of those firms or individuals.

This report is not a guarantee of subsurface conditions. Variations in subsurface conditions may be present that were not identified during this or previous investigations. Interpretations of data and recommendations made in this report are based on observations of data that were available and referred to in this report unless otherwise noted. No other warranties, expressed or implied, are provided.

6.0 REFERENCES

Freeze, R.A. and Cherry J.A., 1979, *Groundwater*: Prentice-Hall, Inc. Englewood Cliffs, New Jersey, 604 p.

GREDELL Engineering Resources, Inc., 2017, Sikeston Power Station Site Characterization for Compliance with Missouri State Operating Permit #MO-0095575. Prepared for Sikeston Board of Municipal Utilities, May 31, 2017.

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Piper, A. M., 1944. A Graphical Procedure in the Geochemical Interpretation of Water Analyses. Trans. Amer. Geophys. Union, 25, pp 914-923.

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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

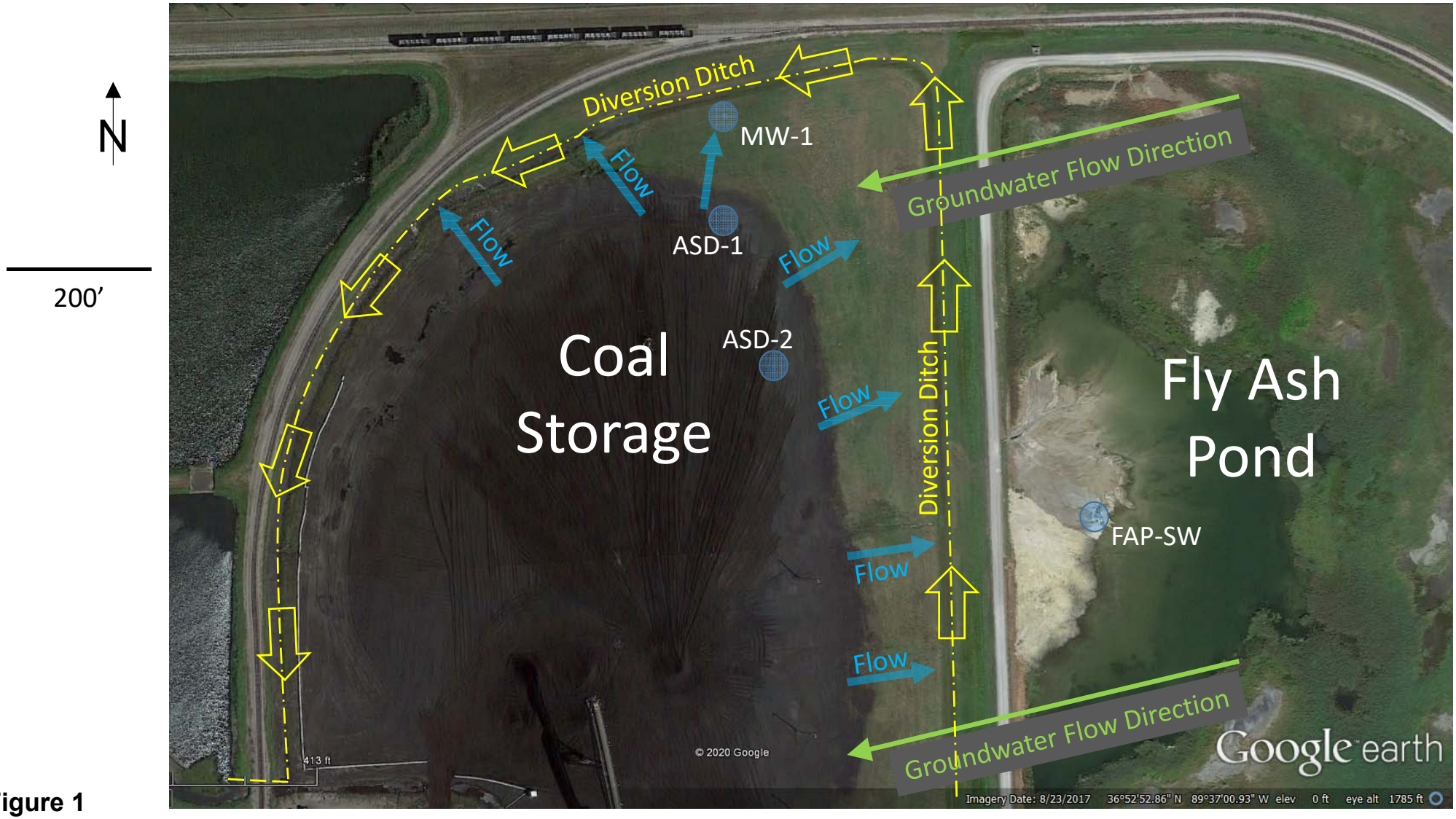


Figure 1
Site Map and Sampling Locations

Prepared by: GREDELL Engineering Resources, Inc.

Notes:

1. MW-1 groundwater elevations do not indicate sampling occurred.
2. 2020 annual precipitation extrapolated based on rainfall as of 5-31-2020.

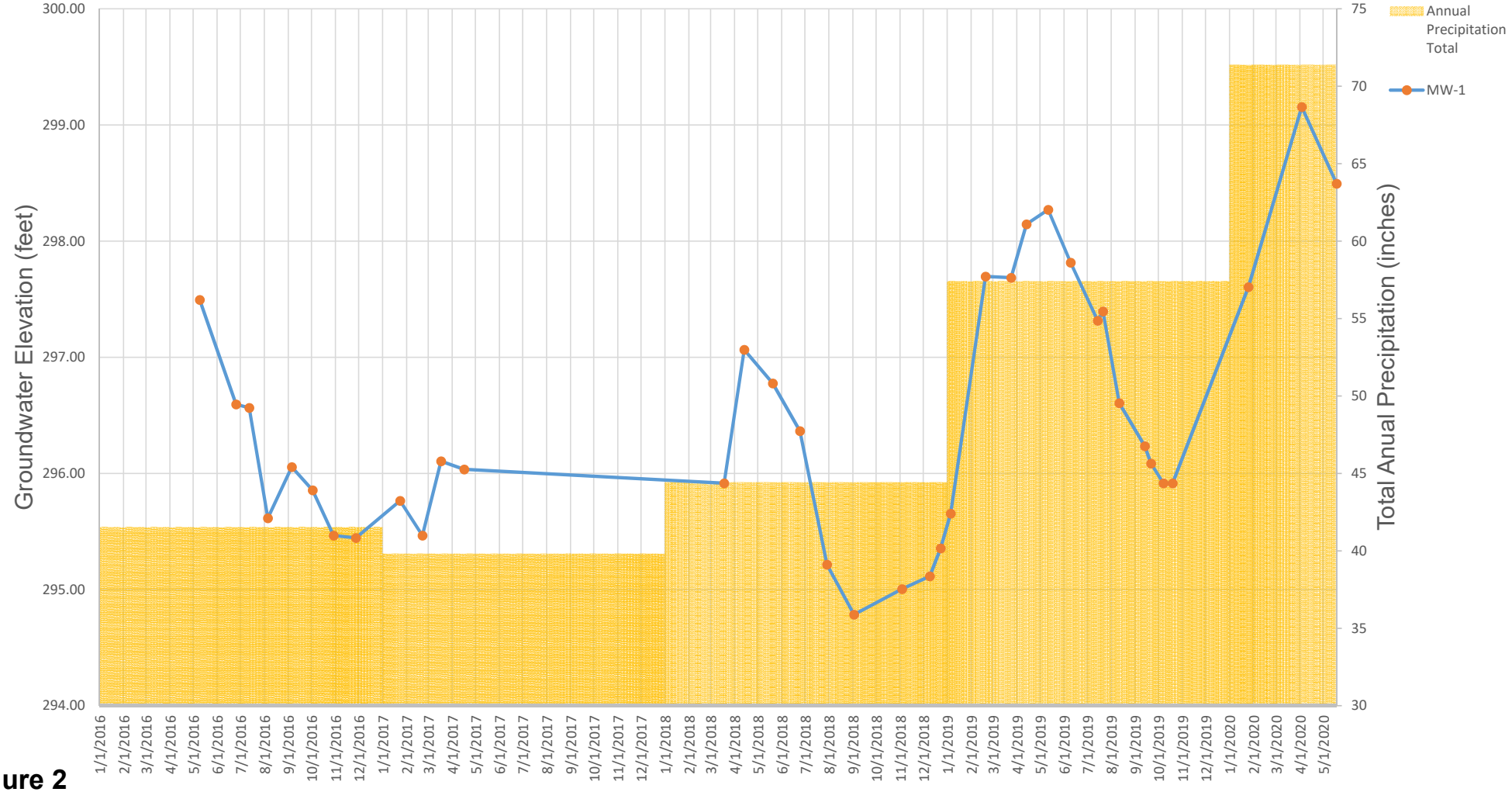


Figure 2
MW-1 Hydrograph and Annual Precipitation

Prepared by: GREDELL Engineering Resources, Inc.

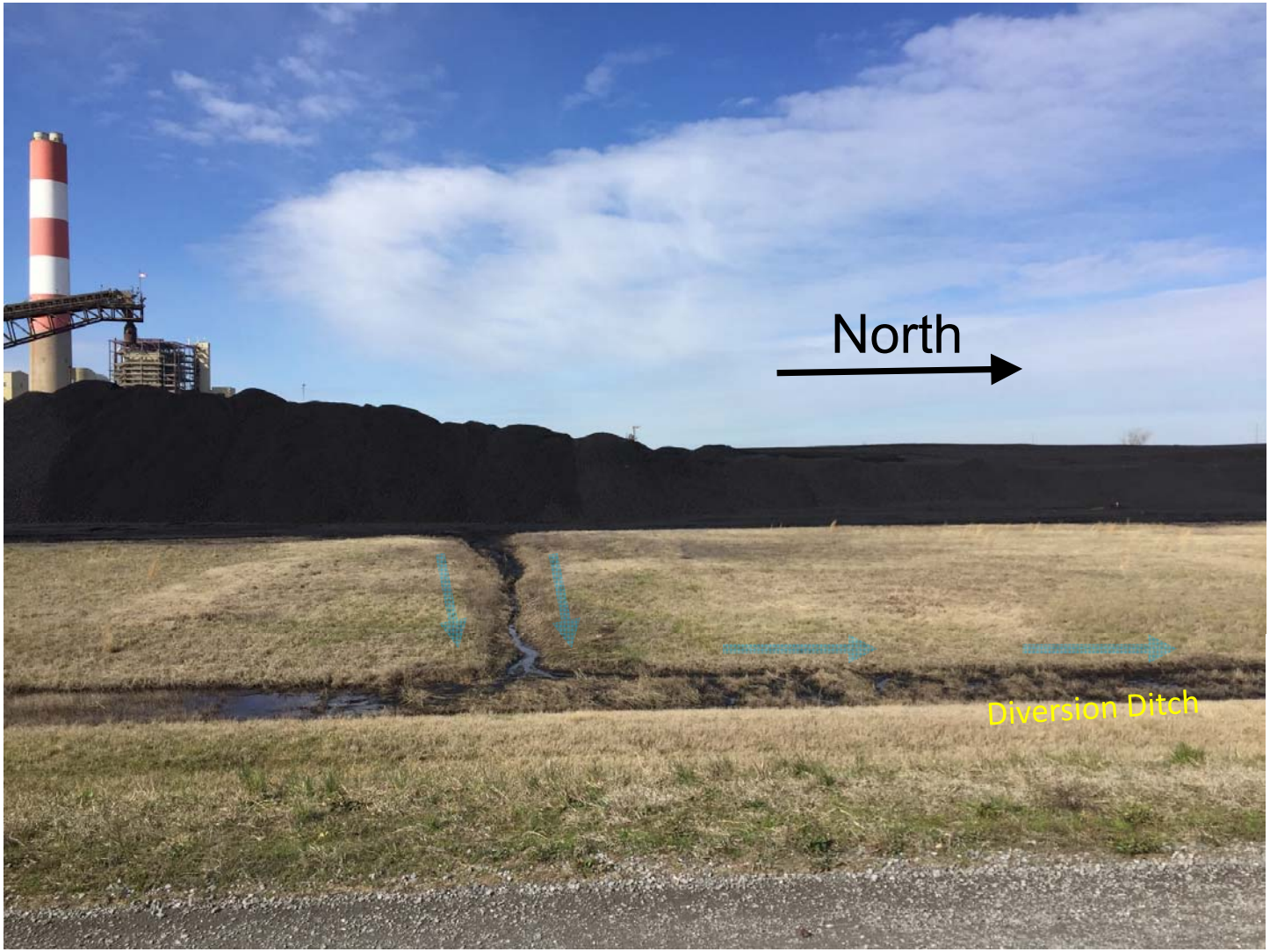


Figure 3
Diversion Ditch Photo February 2020 - Looking West

Prepared by: GREDELL Engineering Resources, Inc.

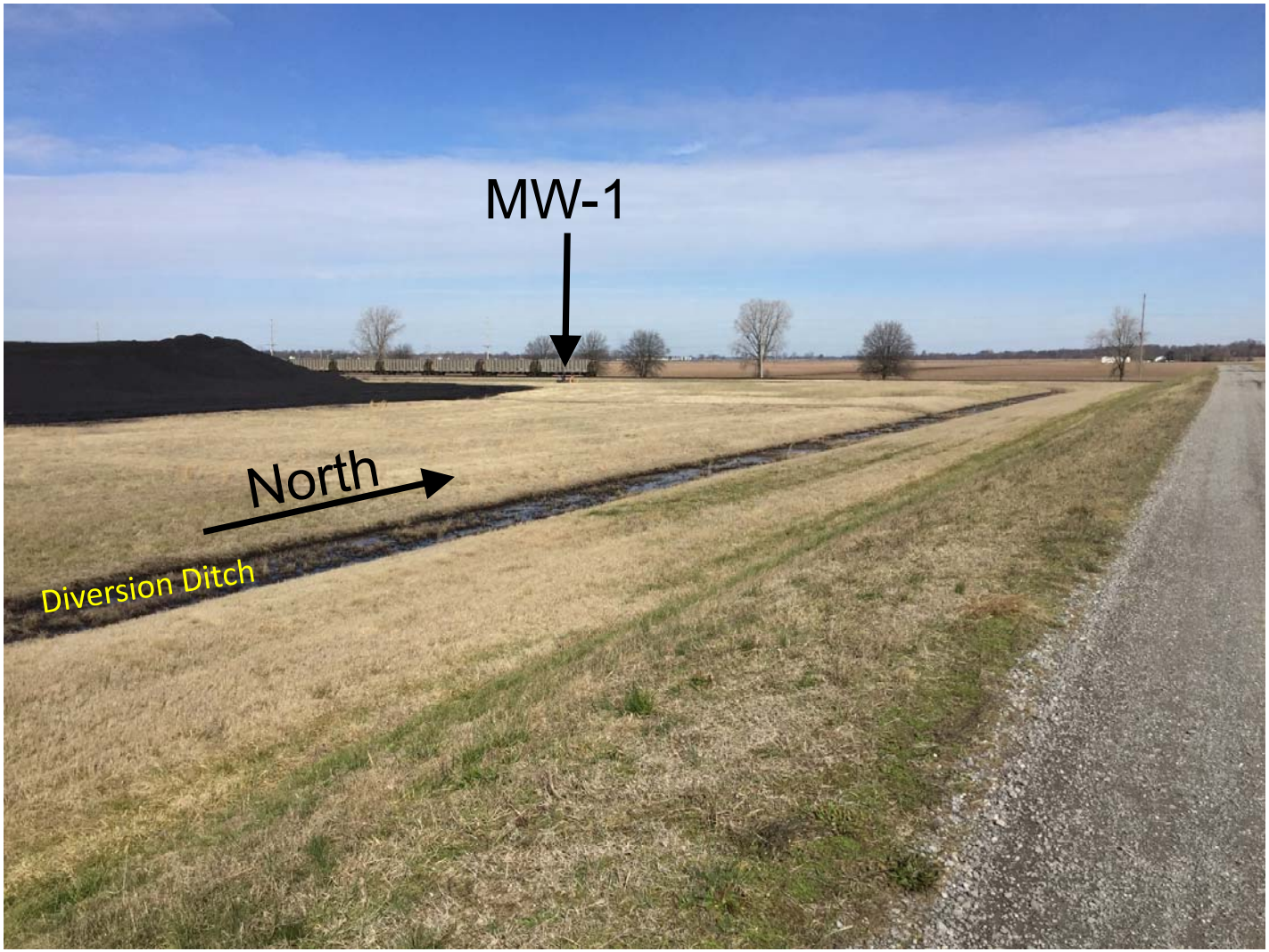
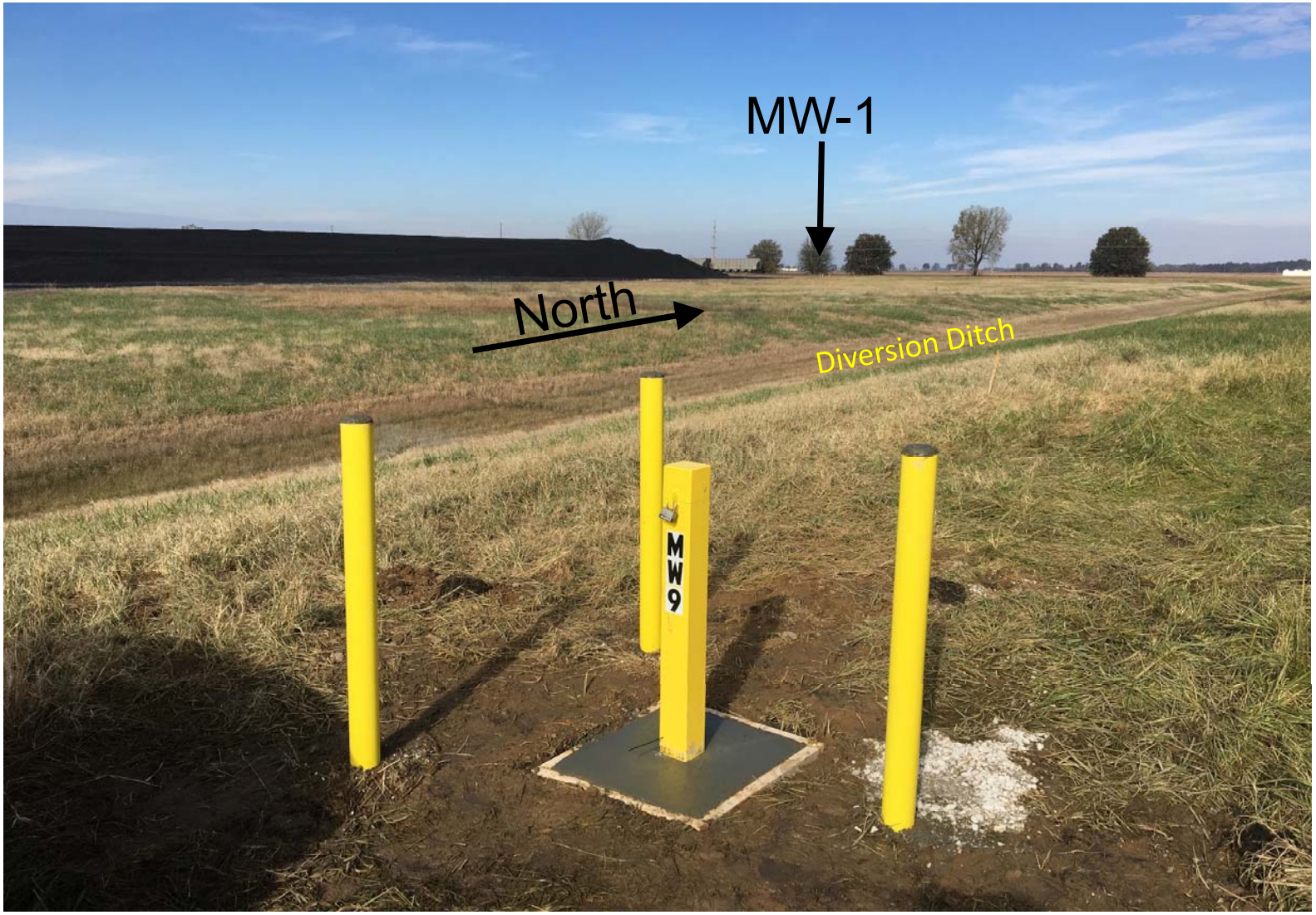


Figure 4
Diversion Ditch Photo February 2020 - Looking Northwest

Prepared by: GREDELL Engineering Resources, Inc.

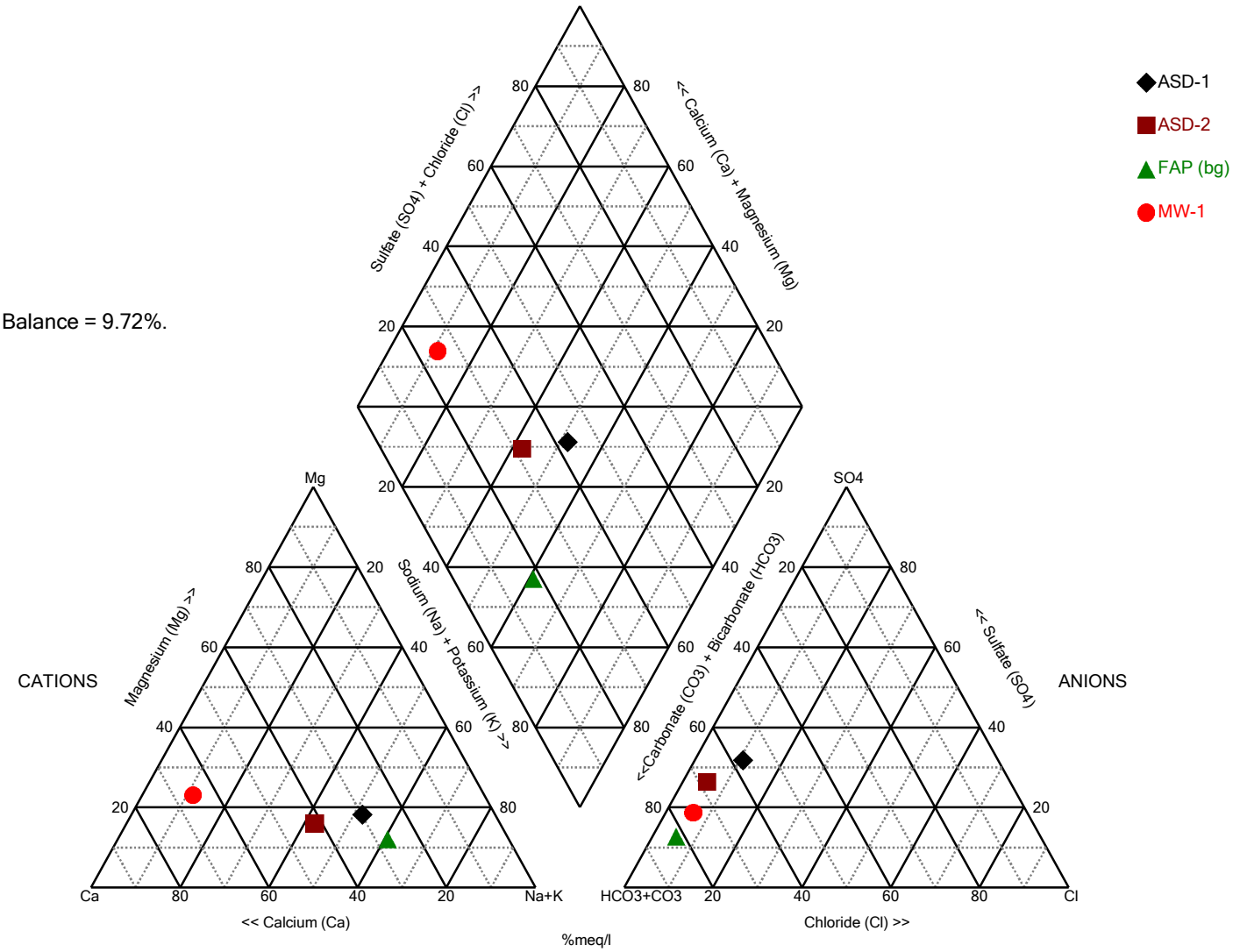


11-13-2017

Figure 5
Diversion Ditch Photo November 2017 - Looking Northwest

Prepared by: GREDELL Engineering Resources, Inc.

Cation-Anion Balance = 9.72%.



Analysis Run 3/11/2020 9:57 AM

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: ASDEDD

Figure 6
Piper Trilinear Plot

Prepared by: GREDELL Engineering Resources, Inc.

Appendix 9

Alternate Source Demonstration
September 11, 2020
MW-2

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GREDELL Engineering Resources, Inc.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond – Fluoride in MW-2
Alternate Source Demonstration

Prepared for:

Board of Municipal Utilities

Sikeston Power Station
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THOMAS R. GREDELL
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REGISTERED GEOLOGIST

September 2020

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, Fly Ash Pond CCR unit. The report demonstrates that the statistically significant increase of fluoride in MW-2 is not the result of a release from the Fly Ash Pond and is attributable to an alternate source. 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: 9-11-2020

Registration Number: PE-021137
State of Registration: Missouri

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond - Fluoride in MW-2
Alternate Source Demonstration
September 2020

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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 initiated on April 6, 2020 at the Sikeston Board of Municipal Utilities (SBMU) Sikeston Power Station's (SPS) Fly 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) for the parameters listed in Appendix III to Part 257 – Constituents for Detection Monitoring. Following this analysis, it was apparent that several reported concentrations exceeded their respective prediction limits for the well constituent pairs. These well constituent pairs were; Fluoride in sample MW-2, Chloride and Boron in sample MW-3, Total Dissolved Solids (TDS) in sample MW-9, and Calcium, Sulfate, and TDS in sample MW-1. As a consequence, resampling for the aforementioned well constituent pairs, and Boron in MW-2, was conducted on May 21, 2020. Following receipt of final analytical data from the resampling event, it was confirmed that Calcium, Sulfate, and TDS concentrations in sample MW-1, and Fluoride in sample MW-2 represent statistically significant increases (SSIs). Because MW-2 is upgradient of the Fly Ash Pond, SBMU-SPS requested that Gredell Engineering conduct an evaluation of the analytical results and develop an Alternate Source Demonstration (ASD) if warranted. Calcium, Sulfate, and TDS in MW-1 is the subject of a separate report. Chloride and Boron in sample MW-3, and TDS in sample MW-9 were not confirmed by resampling and therefore are not SSIs.

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. 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 certified demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e).

Gredell Engineering has completed an evaluation of the groundwater sampling events, analytical data results, and other potential factors, for the SBMU SPS Fly Ash Pond groundwater monitoring well system to determine if an alternate source is the cause of the apparent SSI in MW-2. This report presents the results of that evaluation and includes supporting documentation.

2.0 OBSERVATIONS AND DATA COLLECTION

The Fly Ash Pond groundwater monitoring well system consists of five wells, designated MW-1, MW-2, MW-3, MW-7, and MW-9 (Figure 1). Monitoring wells MW-1, MW-2, and MW-3 were installed in April 2016. Monitoring well MW-7 was installed in April 2017. Monitoring well MW-9 was installed in November 2017. All five monitoring wells were sampled on an approximate monthly basis beginning in March 2018 and ending in December 2018 to establish a background data base. Additional information regarding these wells is available in the Groundwater Monitoring, Sampling and Analysis Plan for the site (Gredell Engineering, 2018).

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 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), SSI over background is suspected.

The SPS initiated its semi-annual detection groundwater sampling event for the Fly Ash Pond on April 6, 2020. Final analytical results were received from the contract laboratory on April 16, 2020 (Appendix 1a). However, some results appeared elevated relative to their respective prediction limits (Fluoride in MW-2; Chloride and Boron in MW-3; TDS in MW-9; Calcium, Sulfate, and TDS in MW-1). Consequently, each constituent well pair with apparently elevated results was resampled on May 21, 2020. Final analytical results for these resamples were received from the contract laboratory on June 15, 2020 (Appendix 1b).

The following table summarizes the primary and duplicate sample Fluoride results for MW-2 during the April 6th sampling event and the May 21 resampling event. A duplicate sample was not collected from MW-2 during the May 21st resampling event.

Table 1 – MW-2 Fluoride Results - 2020

	MW-2 Fluoride (mg/L)	**MW-2 Duplicate Fluoride (mg/L)**
April 6, 2020	0.336	0.287
May 21, 2020	0.374	N/A

N/A = Not Prepared or Analyzed
MW-2 Fluoride Prediction Limit = 0.335 mg/L

Table 1 indicates that the original and resampling results for Fluoride in MW-2 exceed the 0.335 mg/L prediction limit, but the duplicate sample collected in April did not exceed the prediction limit. Although the statistical method used to assess groundwater data for the Fly Ash Pond recognizes Fluoride as an SSI in MW-2, groundwater elevation data measured since May 2016 (Table 2) clearly demonstrate that MW-2 is an upgradient well with respect to the Fly Ash Pond. Therefore, the source of the Fluoride can only be attributable to a source upgradient of MW-2 and the Fly Ash Pond.

3.0 SUMMARY OF DATA ANALYSIS AND FINDINGS

The U.S. Environmental Protection Agency (USEPA) provides Unified Guidance for statistical analysis of groundwater monitoring data (USEPA, 2009). This Unified Guidance document was reviewed to assess the validity of the apparent SSI. Chapter 4 of the Unified Guidance discusses groundwater monitoring programs and statistical analysis of the associated data. A key component of statistical analysis is "*to determine whether or not the increase is actually due to a contaminant release*". Two of these considerations are pertinent to the data associated with the Fly Ash Pond groundwater monitoring well system and for that reason are listed below.

1. Chapter 4, page 4-8: *Did the test correctly identify an actual release of an indicator or hazardous constituent?*
2. Chapter 4, page 4-9: *Are any of these contaminants observed upgradient of the regulated units?*

Each of these considerations were used to evaluate the background data and the validity of the apparent SSI for Fluoride in MW-2. The results of this evaluation are discussed below.

Unified Guidance Consideration 1

Monitoring well MW-2 was designed and located, and is monitored as an upgradient well in fulfillment of the requirement in §257.91(c)(1). Determination that MW-2 is a suitable location for monitoring upgradient groundwater in the "uppermost aquifer… passing the waste boundary of the CCR unit" was established following the completion of a year-long hydrogeologic characterization of the SPS site (Gredell Engineering, 2017). As documented in that report, 12 groundwater maps were developed showing the direction of flow and hydraulic gradient based on the monthly groundwater elevations. These groundwater maps demonstrate a consistent direction of flow showing minimal variation in hydraulic gradient over the 12 month time period extending from May 2016 to April 2017. Groundwater contours developed from the April 4, 2020 sampling event are presented for reference on Figure 1.

Since completion of the Gredell Engineering (2017) report, the piezometers installed for the hydrogeologic characterization were converted to monitoring wells MW-1 through MW-6 and have been consistently monitored since 2016. Moreover, additional monitoring wells (MW-7 through MW-9) were installed to ensure sufficient downgradient monitoring of the ash ponds at the SPS. In the five years of monitoring, the groundwater data demonstrate that MW-2 is consistently upgradient of the Fly Ash Pond (Table 2).

Based on the clear evidence that MW-2 was placed hydraulically upgradient from the Fly Ash Pond, the well is not positioned to detect a release from the pond. Therefore, it is concluded that the analytical results for MW-2 could not have correctly identified an actual release of Fluoride

from the Fly Ash Pond. Therefore, the conclusion to the first consideration question from Unified Guidance listed above is negative.

Unified Guidance Consideration 2

Relatively high concentrations of Fluoride have been observed from the public drinking water supply wells located east (upgradient) of the "regulated unit" (Fly Ash Pond). Data published by the Missouri Department of Natural Resources in their 2019 Annual Water Quality Report for the Sikeston Public Water System show Fluoride concentrations ranging from 0.61 to 0.86 mg/L (Appendix 2) and suggests that the source are "natural deposits". Similar concentrations were reported in historical Annual Water Quality Reports.

The Fluoride data pertains to the eight supply wells currently operated by the City of Sikeston. Three of these wells (W7, W8/W13, and W9) are located within one-half mile of the Fly Ash Pond (Appendices 3a and 3b). Wells W7 and W8 were drilled in 1976, whereas Well W9 was drilled in 1959. Well W8 may have been replaced by Well W13, which was drilled in 2013 (Appendices 3a and 3b). The drill data indicate that wells W7, W8/W13, and W9 all have total depths of less than 160 feet and yield water from alluvium. The alluvium is the same hydrologic unit monitored by the groundwater monitoring well system at the SPS, including MW-2.

Calculated groundwater velocities reported by Gredell Engineering (2017) for the uppermost (alluvial) aquifer at SPS range in value from 4.00 feet per day (ft/day) to 0.06 ft/day. The velocity data from that report are reproduced for reference as Table 3. When converted to feet per year and multiplied by the difference between the years 2020 and 1976, it is readily apparent that all but the lowest calculated groundwater velocities are sufficient to allow for relatively high concentrations of Fluoride to move approximately one-half mile downgradient and potentially influence the concentration of Fluoride reported at MW-2.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Gredell Engineering concludes that the apparent SSI of Fluoride in MW-2 is not the result of a release from the Fly Ash Pond and is attributable to an alternate source. The following supports this conclusion:

- Since inception of groundwater monitoring at the SPS, groundwater elevations measured in MW-2 have consistently demonstrated that it is an upgradient well with respect to the Fly Ash Pond and that it is higher in elevation than all other wells located at the site (Table 2).
- Groundwater flow direction is from the east-northeast to the west-southwest along a hydraulic gradient typically 0.001 to 0.0001 ft/ft, as documented during every monitoring event at the SPS.
- Fluoride is present in concentrations ranging from 0.61 to 0.86 mg/L in public water supply wells currently used by the City of Sikeston (Appendix 2). Three of these public wells are within one-half mile of the Fly Ash Pond and produce groundwater from the same alluvial aquifer that is monitored by MW-2 (Appendices 3a and 3b). Groundwater velocity data (Table 3) clearly indicate that travel times are sufficient to allow elevated concentrations of Fluoride to be detected in MW-2.

Based on these conclusions, Gredell Engineering recommends continuance of semi-annual detection monitoring in accordance with §257.94.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of the client and GREDELL Engineering Resources, Inc. for the specific project discussed in accordance with generally accepted environmental practices common to this locale at this time. The report is applicable only to this specific project and identified site conditions as they existed at the time of report preparation. The use of this report by others to develop independent interpretations of data or conclusions not explicitly stated in this report are the sole responsibility of those firms or individuals.

This report is not a guarantee of subsurface conditions. Variations in subsurface conditions may be present that were not identified during this or previous investigations. Interpretations of data and recommendations made in this report are based on observations of data that were available and referred to in this report unless otherwise noted. No other warranties, expressed or implied, are provided.

6.0 REFERENCES

Freeze, R.A. and Cherry J.A., 1979, *Groundwater*: Prentice-Hall, Inc. Englewood Cliffs, New Jersey, 604 p.

GREDELL Engineering Resources, Inc., 2017, Sikeston Power Station Site Characterization for Compliance with Missouri State Operating Permit #MO-0095575. Prepared for Sikeston Board of Municipal Utilities, May 31, 2017.

GREDELL Engineering Resources, Inc., 2018, Sikeston Power Station Groundwater Monitoring Sampling and Analysis Plan. Prepared for Sikeston Board of Municipal Utilities, September 10, 2018.

GREDELL Engineering Resources, Inc., 2019, 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 Sikeston Board of Municipal Utilities, January 30, 2019.

Sanitas Statistical Software, © 1992-2019 SANITAS TECHNOLOGIES, Alamosa Colorado 81101-0012.

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

O:\CADDFiles\SIKESTON\GROUNDWATER MAP\FAP\GW CONT MAP FAP APR 20.dwg, GW CONT MAP BAP, 8/10/2020 11:08:01 AM

MONITORING WELL ID	GROUNDWATER ELEVATION (FEET)	CASING ELEVATION (FEET)	NORTHING	EASTING
MW-1	299.16	312.77	383119.51	1078467.90
MW-2	300.40	308.01	382207.42	1079751.30
MW-3	300.00	308.55	381130.00	1079946.62
MW-7	298.99	315.03	381584.50	1078847.00
MW-9	299.41	314.68	382429.94	1078825.60

NOTES:
1. IMAGE PROVIDED BY BING MAPS.
2. MONITORING WELL LOCATIONS, CASING ELEVATIONS & UNDERGROUND CULVERT ELEVATIONS SURVEYED BY BOWERS SURVEYING, LLC.
3. GROUNDWATER ELEVATIONS MEASURED BY SIKESTON POWER STATION STAFF ON APRIL 6, 2020.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER® SOFTWARE.
5. DIRECTION AND RANGE OF GROUNDWATER FLOW GRADIENT AS DETERMINED BY SURFER® SOFTWARE 0.0001 FT./FT. TO 0.0001 FT./FT.

LEGEND
- PROPERTY LINE
- GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- MW — MONITORING WELL
- UG — UP GRADIENT MONITORING LOCATION
- DG — DOWN GRADIENT MONITORING LOCATION
- GENERAL FLOW DIRECTION

SCALE: 1" = 400'
0 200 400
N

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

SIKESTON POWER STATION
FLY ASH POND
ALTERNATE SOURCE DEMONSTRATION
MW-2-FLUORIDE

FIGURE 1
SITE MAP AND SAMPLING LOCATIONS
APRIL 4, 2020

SURVEYED	DESIGNED	DRAWN	CHECKED	APPROVED	DATE	SCALE	PROJECT NAME	FILE NAME	SHEET #
NA	NA	CP	KE	MCC	7/2020	AS NOTED	SIKESTON/GWMAP/FAP	GWCONT FAP 2020	1 OF 1

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.

Tables

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond - Fluoride in MW-2
Alternate Source Demonstration

Table 1
Groundwater Monitoring Well Summary

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-1	383119.51	1078467.90	310.41	312.77	37.84	274.93	10	285.1
MW-2	383207.42	1079751.30	305.53	308.01	37.42	270.59	10	280.8
MW-3	381130.00	1079946.62	306.11	308.55	37.21	271.34	10	281.5
MW-7	381584.50	1078847.00	312.70	315.03	37.37	277.66	10	287.9
MW-9	382429.94	1078825.60	311.85	314.68	37.28	277.40	10	287.6

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.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond - Fluoride in MW-2
Alternate Source Demonstration

Table 2
Historical Groundwater Elevation Summary

Well ID	MW-1	MW-2	MW-3	MW-7	MW-9
Date	Groundwater Elevation (feet MSL)				
05/12/16	297.50	298.66	298.13	NM	NM
06/28/16	296.60	298.01	297.58	NM	NM
07/15/16	296.57	297.86	297.37	NM	NM
08/08/16	295.62	297.06	297.05	NM	NM
09/08/16	296.06	297.27	296.76	NM	NM
10/05/16	295.86	296.96	296.40	NM	NM
11/01/16	295.47	296.66	296.10	NM	NM
11/30/16	295.45	296.60	296.03	NM	NM
01/26/17	295.77	296.76	296.35	NM	NM
02/24/17	295.47	296.40	296.00	NM	NM
03/20/17	296.11	296.96	296.45	NM	NM
04/19/17	296.04	296.86	296.35	NM	NM
03/21/18	295.92	296.96	296.65	295.83	296.13
04/15/18	297.07	297.86	297.60	296.95	297.18
05/23/18	296.78	298.01	297.62	296.66	296.98
06/27/18	296.37	297.61	297.21	296.26	296.56
08/01/18	295.22	296.60	296.15	295.08	295.48
09/05/18	294.79	296.11	295.68	294.71	295.01
11/06/18	295.01	296.21	295.74	294.85	295.17
12/12/18	295.12	296.21	295.79	295.06	295.36
01/08/19	295.66	296.72	296.38	295.53	295.80
02/22/19	297.70	298.67	298.35	297.59	297.84
03/27/19	297.69	298.93	298.51	297.58	297.93
04/16/19	298.15	299.29	298.93	298.01	298.38
05/14/19	298.27	299.66	299.25	298.15	298.52
06/12/19	297.82	299.24	298.82	297.76	298.10
07/17/19	297.32	298.77	298.38	297.25	297.55
07/24/19	297.40	298.80	298.41	297.33	297.65
08/14/19	296.61	298.15	297.80	296.65	296.96
09/16/19	296.24	297.70	297.22	296.14	296.50
09/24/19	296.09	297.53	297.05	295.98	296.33
10/10/19	295.92	297.29	296.84	295.80	296.13
10/22/19	295.92	297.24	296.80	295.74	296.12
01/28/20	297.61	298.73	298.34	297.42	297.80
04/06/20	299.16	300.40	300.00	298.99	299.41
05/21/20	298.50	300.02	299.55	NM	298.71

NOTES:

Maximum groundwater elevation.

Minimum groundwater elevation.

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.

Prepared by: GREDELL Engineering Resources, Inc.

Prepared by: KAE
Checked by: MCC

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond - Fluoride in MW-2
Alternate Source Demonstration

Table 3
Calculated Groundwater Velocity for Alluvial Aquifer

Location	**Sikeston Pond Area**					
Hydraulic Conductivity (K)	K_{min} = 112 ft/day					
Hydraulic Gradient (*i*)	i_{min} = 0.000172 ft/ft			i_{max} = 0.00136 ft/ft		
Effective Porosity (n)	0.10	0.20	0.30	0.10	0.20	0.30
Velocity (=Ki/n) (ft/day)	0.19	0.10	0.06	1.52	0.76	0.51
Velocity (=Ki/n) (ft/year)	70	35	23	556	278	185
Travel Distance (1976-2020) (ft)	3,094	1,547	1,031	24,463	12,231	8,154

Location	**Sikeston Pond Area**					
Hydraulic Conductivity (K)	K_{max} = 294 ft/day					
Hydraulic Gradient (*i*)	i_{min} = 0.000172 ft/ft			i_{max} = 0.00136 ft/ft		
Effective Porosity (n)	0.10	0.20	0.30	0.10	0.20	0.30
Velocity (=Ki/n) (ft/day)	0.51	0.25	0.17	4.00	2.00	1.33
Velocity (=Ki/n) (ft/year)	185	92	62	1459	730	486
Travel Distance (1976-2020) (ft)	8,121	4,061	2,707	64,214	32,107	21,405

NOTES:

1. Hydraulic conductivity based on slug test results.
2. Hydraulic gradients based on calculated maximum and minimum values as determined by Surfer© Software.
3. Effective Porosity values represent estimated range. USEPA (2009) Unified Guidance indicates 0.20 is appropriate for sandy/gravelly granular material.

Appendices

Appendix 1a

Laboratory Analytical Results and
Quality Control Reports
April 6, 2020 Sample Event

April 16, 2020

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

RE: Sikeston BMU-CCR Fly Ash Wells

Dear Luke St Mary:

Please find enclosed the analytical results for the **7** sample(s) the laboratory received on **4/8/20 10:00 am** and logged in under work order **0041811**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

NELAP ACCREDITED TNI LABORATORY

ANALYTICAL RESULTS

ANALYTICAL RESULTS

Sample: 0041811-01
Name: MW-1
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 11:13
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	5.4	mg/L		04/14/20 10:34	1	1.0	04/14/20 10:34	LAM	EPA 300.0 REV 2.1
Fluoride	0.255	mg/L		04/14/20 10:34	1	0.250	04/14/20 10:34	LAM	EPA 300.0 REV 2.1
Sulfate	39	mg/L	Q4	04/14/20 11:29	5	5.0	04/14/20 11:29	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	230	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	520	ug/L		04/14/20 08:45	5	10	04/16/20 08:49	JMW	EPA 6020A
Calcium	48000	ug/L		04/14/20 08:45	5	100	04/15/20 08:03	JMW	EPA 6020A

Sample: 0041811-02
Name: MW-2
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 09:04
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	2.1	mg/L		04/14/20 11:47	1	1.0	04/14/20 11:47	LAM	EPA 300.0 REV 2.1
Fluoride	0.336	mg/L		04/14/20 11:47	1	0.250	04/14/20 11:47	LAM	EPA 300.0 REV 2.1
Sulfate	16	mg/L	Q4	04/14/20 12:41	5	5.0	04/14/20 12:41	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	140	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	34	ug/L		04/14/20 08:45	5	10	04/16/20 08:52	JMW	EPA 6020A
Calcium	15000	ug/L		04/14/20 08:45	5	100	04/15/20 08:07	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-03
Name: MW-3
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 08:22
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	1.8	mg/L		04/13/20 19:38	1	1.0	04/13/20 19:38	KCC	EPA 300.0 REV 2.1
Fluoride	0.371	mg/L		04/13/20 19:38	1	0.250	04/13/20 19:38	KCC	EPA 300.0 REV 2.1
Sulfate	20	mg/L		04/13/20 20:33	10	10	04/13/20 20:33	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	380	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	29	ug/L		04/14/20 08:45	5	10	04/16/20 09:12	JMW	EPA 6020A
Calcium	16000	ug/L		04/14/20 08:45	5	100	04/15/20 08:10	JMW	EPA 6020A

Sample: 0041811-04
Name: MW-7
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 11:58
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	4.0	mg/L		04/13/20 20:51	1	1.0	04/13/20 20:51	KCC	EPA 300.0 REV 2.1
Fluoride	0.737	mg/L		04/13/20 20:51	1	0.250	04/13/20 20:51	KCC	EPA 300.0 REV 2.1
Sulfate	200	mg/L		04/13/20 21:09	25	25	04/13/20 21:09	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	540	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	2200	ug/L		04/14/20 08:45	5	10	04/16/20 09:20	JMW	EPA 6020A
Calcium	120000	ug/L		04/14/20 08:45	5	100	04/15/20 08:14	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-05
Name: MW-9
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 13:19
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	18	mg/L	Q4	04/14/20 14:30	5	5.0	04/14/20 14:30	LAM	EPA 300.0 REV 2.1
Fluoride	0.816	mg/L	Q3	04/14/20 12:59	1	0.250	04/14/20 12:59	LAM	EPA 300.0 REV 2.1
Sulfate	250	mg/L	Q4	04/14/20 14:48	25	25	04/14/20 14:48	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	840	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	4900	ug/L		04/14/20 08:45	5	10	04/16/20 09:23	JMW	EPA 6020A
Calcium	92000	ug/L		04/14/20 08:45	5	100	04/15/20 08:18	JMW	EPA 6020A

Sample: 0041811-06
Name: DUPLICATE WELL
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 00:00
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	2.0	mg/L		04/14/20 15:06	1	1.0	04/14/20 15:06	LAM	EPA 300.0 REV 2.1
Fluoride	0.287	mg/L		04/14/20 15:06	1	0.250	04/14/20 15:06	LAM	EPA 300.0 REV 2.1
Sulfate	16	mg/L		04/14/20 15:24	5	5.0	04/14/20 15:24	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	160	mg/L		04/09/20 13:28	1	26	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	80	ug/L		04/14/20 08:45	5	10	04/16/20 09:27	JMW	EPA 6020A
Calcium	15000	ug/L		04/14/20 08:45	5	100	04/15/20 08:30	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0041811-07
Name: FIELD BLANK
Matrix: Ground Water - Regular Sample

Sampled: 04/06/20 00:00
Received: 04/08/20 10:00
PO #: 23574

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	< 1.0	mg/L		04/14/20 16:01	1	1.0	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		04/14/20 16:01	1	0.250	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
Sulfate	< 1.0	mg/L		04/14/20 16:01	1	1.0	04/14/20 16:01	LAM	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	< 17	mg/L		04/09/20 13:28	1	17	04/09/20 14:08	CPC	SM 2540C
Total Metals - PIA									
Boron	23	ug/L		04/14/20 08:45	5	10	04/16/20 09:31	JMW	EPA 6020A
Calcium	< 100	ug/L		04/14/20 08:45	5	100	04/15/20 08:33	JMW	EPA 6020A

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B008447 - No Prep - SM 2540C									
Blank (B008447-BLK1)				Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B008447-BS1)				Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	1000	mg/L		1000		100	67.9-132		
Duplicate (B008447-DUP1)	**Sample: 0041195-01**			Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	1310	mg/L	M		727			58	5
Duplicate (B008447-DUP2)	**Sample: 0041195-02**			Prepared & Analyzed: 04/09/20					
Solids - total dissolved solids (TDS)	427	mg/L	M		360			17	5
Batch B008764 - SW 3015 - EPA 6020A									
Blank (B008764-BLK1)				Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	< 10	ug/L							
Calcium	< 100	ug/L							
LCS (B008764-BS1)				Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	574	ug/L		555.6		103	80-120		
Calcium	5060	ug/L		5556		91	80-120		
Matrix Spike (B008764-MS1)	**Sample: 0041811-07**			Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	591	ug/L		555.6	23.4	102	75-125		
Calcium	5170	ug/L		5556	86.3	92	75-125		
Matrix Spike Dup (B008764-MSD1)	**Sample: 0041811-07**			Prepared: 04/14/20 Analyzed: 04/16/20					
Boron	594	ug/L		555.6	23.4	103	75-125	0.5	20
Calcium	5420	ug/L		5556	86.3	96	75-125	5	20
Batch B008794 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B008794-CCB1)				Prepared & Analyzed: 04/13/20					
Sulfate	0.0870	mg/L							
Fluoride	0.00	mg/L							
Chloride	0.297	mg/L							
Calibration Check (B008794-CCV1)				Prepared & Analyzed: 04/13/20					
Sulfate	5.03	mg/L		5.000		101	90-110		
Fluoride	5.13	mg/L		5.000		103	90-110		
Chloride	4.73	mg/L		5.000		95	90-110		
Batch B008886 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B008886-CCB1)				Prepared & Analyzed: 04/14/20					
Fluoride	0.00	mg/L							
Chloride	0.457	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B008886-CCV1)				Prepared & Analyzed: 04/14/20					
Sulfate	5.20	mg/L		5.000		104	90-110		
Fluoride	5.18	mg/L		5.000		104	90-110		
Chloride	4.99	mg/L		5.000		100	90-110		
Matrix Spike (B008886-MS1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Chloride	6.8	mg/L		1.500	5.4	90	80-120		

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B008886 - No Prep - EPA 300.0 REV 2.1									
Matrix Spike (B008886-MS1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Sulfate	1.00E9	mg/L	Q4	1.500	38.8	NR	80-120		
Fluoride	1.54	mg/L		1.500	0.255	86	80-120		
Matrix Spike (B008886-MS2)	**Sample: 0041811-02**			Prepared & Analyzed: 04/14/20					
Fluoride	1.58	mg/L		1.500	0.336	83	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	16.1	NR	80-120		
Chloride	3.4	mg/L		1.500	2.1	84	80-120		
Matrix Spike (B008886-MS3)	**Sample: 0041811-05**			Prepared & Analyzed: 04/14/20					
Chloride	1.0E9	mg/L	Q4	1.500	18	NR	80-120		
Sulfate	1.00E9	mg/L	Q4	1.500	246	NR	80-120		
Fluoride	1.68	mg/L	Q1	1.500	0.816	58	80-120		
Matrix Spike Dup (B008886-MSD1)	**Sample: 0041811-01**			Prepared & Analyzed: 04/14/20					
Fluoride	1.51	mg/L		1.500	0.255	84	80-120	2	20
Chloride	6.7	mg/L		1.500	5.4	87	80-120	0.7	20
Sulfate	1.00E9	mg/L	Q4	1.500	38.8	NR	80-120	0	20
Matrix Spike Dup (B008886-MSD2)	**Sample: 0041811-02**			Prepared & Analyzed: 04/14/20					
Sulfate	1.00E9	mg/L	Q4	1.500	16.1	NR	80-120	0	20
Fluoride	1.61	mg/L		1.500	0.336	85	80-120	2	20
Chloride	3.4	mg/L		1.500	2.1	84	80-120	0.1	20
Matrix Spike Dup (B008886-MSD3)	**Sample: 0041811-05**			Prepared & Analyzed: 04/14/20					
Chloride	1.0E9	mg/L	Q4	1.500	18	NR	80-120	0	20
Sulfate	1.00E9	mg/L	Q4	1.500	246	NR	80-120	0	20
Fluoride	2.14	mg/L	Q2	1.500	0.816	88	80-120	24	20

NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050
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SPIL - Springfield, IL - 1210 Capitol Airport Drive, Springfield, IL 62707
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17592

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

M	Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q1	Matrix Spike failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
Q2	Matrix Spike Duplicate failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
Q3	Matrix Spike/Matrix Spike Duplicate both failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
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

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CLIENT; Sikeston BMU

PROJECT: Sikeston Power Station

PDC LAB WORKORDER: 0041811

DATE ISSUED: April 16, 2020

CASE NARRATIVE –

PDC Work Order 0041811

PDC Laboratories, Inc. received 7 water samples on April 8, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0041811

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0041811-01	4/6/20	4/8/20
MW-2	0041811-02	4/6/20	4/8/20
MW-3	0041811-03	4/6/20	4/8/20
MW-7	0041811-04	4/6/20	4/8/20
MW-9	0041811-05	4/6/20	4/8/20
DUPLICATE WELL	0041811-06	4/6/20	4/8/20
FIELD BLANK	0041811-07	4/6/20	4/8/20

QC Summary:

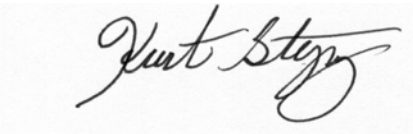
All items met acceptance criteria with the following noted exceptions:

TDS batch QC samples flagged with M, RPD outside acceptance criteria

SO4, CL, Batch QC samples flagged with Q4, sample exceeds 4x spiked values

F, batch QC sample flagged with Q3, Q2, Q1, matrix spike and spike dup outside acceptance criteria.

Certification

Signature: 

Name: Kurt Stepping

Date: April 16, 2020

Title: Senior Project Manager

PDC LABORATORIES, INC.
WWW.PDCLAB.COM

REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA		RCRA	
CCDD		TACO: RES OR IND/COMM	

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED MO

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

1 CLIENT	PROJECT NUMBER	PROJECT LOCATION	PURCHASE ORDER #
SIKESTON BMU POWER STATION		FLYASH APP III ONLY	23574
ADDRESS 1551 W WAKEFIELD	**PHONE NUMBER** 573.475.3131	**E-MAIL** LSTMARY@SBMU.NET	**DATE SHIPPED** 4-7-2020
CITY STATE ZIP SIKESTON, MO 63801	**SAMPLER (PLEASE PRINT)** Daniel Dillingham	**MATRIX TYPES:** WW- WASTEWATER; DW- DRINKING WATER; GW- GROUND WATER; WWSL- SLUDGE; NAS- NON AQUEOUS SOLID; LCHT-LEACHATE; OIL-OIL; SO-SOIL; SOL-SOLID	
CONTACT PERSON LUKE ST MARY	**SAMPLER'S SIGNATURE** Daniel a. Dillingham		

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	3 ANALYSIS REQUESTED: + CL, F, SO4, TDS	+ B, CA	REMARKS
MW-1	4-6-2020	1113	X		GW	2		X	X	
MW-2	4-6-2020	0904	X		GW	2		X	X	
MW-3	4-6-2020	0822	X		GW	2		X	X	
MW-7	4-6-2020	1158	X		GW	2		X	X	
MW-9	4-6-2020	1319	X		GW	2		X	X	
DUPLICATE WELL	4-6-2020		X		GW	2		X	X	
FIELD BLANK	4-6-2020		X		GW	2		X	X	

4 (FOR LAB USE ONLY)
LOGIN # 0041811
LOGGED BY: ZC
CLIENT: SIKESTON BMU
PROJECT: FLYASH APP III ONLY
PROJ. MGR.: KURT
CUSTODY SEAL #:

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) [X] NORMAL [ ] RUSH
DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL [ ] PHONE [ ]
EMAIL IF DIFFERENT FROM ABOVE: PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) _____

7 RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
	4-7-2020	0730			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				4/8/20	

8 COMMENTS: (FOR LAB USE ONLY)
SAMPLE TEMPERATURE UPON RECEIPT 1.5 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Page 11 of 11

Qualtrax ID #3219

Appendix 1b

Laboratory Analytical Results and
Quality Control Reports
May 21, 2020 Resample Event

June 15, 2020

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

RE: Sikeston Bottom Ash App III and App IV 2019

Dear Luke St Mary:

Please find enclosed the analytical results for the **6** sample(s) the laboratory received on **5/26/20 8:00 am** and logged in under work order **0054242**. All testing is performed according to our current TNI accreditations 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 Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

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

ANALYTICAL RESULTS

Sample: 0054242-01
Name: MW-1
Alias: RESAMPLE

Sampled: 05/21/20 12:16
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Sulfate	63	mg/L		06/02/20 00:17	10	10	06/02/20 00:17	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	260	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Calcium	60000	ug/L		06/09/20 13:19	5	200	06/11/20 08:51	JMW	EPA 6020A

Sample: 0054242-02
Name: DUPLICATE
Alias: RESAMPLE

Sampled: 05/21/20 00:00
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Sulfate	16	mg/L		06/04/20 14:35	5	5.0	06/04/20 14:35	MGU	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	100	mg/L	H	05/29/20 12:45	1	17	05/29/20 13:05	BMS	SM 2540C
Solids - total dissolved solids (TDS)	90	mg/L	M, X	05/28/20 07:45	1	17	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Calcium	18000	ug/L		06/09/20 13:19	5	200	06/11/20 08:54	JMW	EPA 6020A

ANALYTICAL RESULTS

Sample: 0054242-03
Name: MW-2
Alias: RESAMPLE

Sampled: 05/21/20 08:33
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Fluoride	0.374	mg/L		06/02/20 00:35	1	0.250	06/02/20 00:35	KCC	EPA 300.0 REV 2.1
Total Metals - PIA									
Boron	36	ug/L		06/09/20 13:19	5	10	06/11/20 08:58	JMW	EPA 6020A

Sample: 0054242-04
Name: MW-3
Alias: RESAMPLE

Sampled: 05/21/20 07:30
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	1.5	mg/L	Q1	06/02/20 02:06	1	1.0	06/02/20 02:06	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	130	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C

Sample: 0054242-05
Name: MW-9
Alias: RESAMPLE

Sampled: 05/21/20 14:24
Received: 05/26/20 08:00
Matrix: Ground Water - Regular Sample
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	560	mg/L		05/28/20 07:45	1	26	05/28/20 08:44	BMS	SM 2540C

ANALYTICAL RESULTS

Sample: 0054242-06
Name: FIELD BLANK
Matrix: Ground Water - Regular Sample

Sampled: 05/21/20 00:00
Received: 05/26/20 08:00
PO #: 23573

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Anions - PIA									
Chloride	< 1.0	mg/L		06/02/20 03:01	1	1.0	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
Fluoride	< 0.250	mg/L		06/02/20 03:01	1	0.250	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
Sulfate	< 1.0	mg/L		06/02/20 03:01	1	1.0	06/02/20 03:01	KCC	EPA 300.0 REV 2.1
General Chemistry - PIA									
Solids - total dissolved solids (TDS)	< 17	mg/L		05/28/20 07:45	1	17	05/28/20 08:44	BMS	SM 2540C
Total Metals - PIA									
Boron	< 10	ug/L		06/09/20 13:19	5	10	06/11/20 09:02	JMW	EPA 6020A
Calcium	220	ug/L		06/09/20 13:19	5	200	06/11/20 09:02	JMW	EPA 6020A

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B012525 - No Prep - SM 2540C									
Blank (B012525-BLK1)				Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B012525-BS1)				Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	947	mg/L		1000		95	67.9-132		
Duplicate (B012525-DUP2)	**Sample: 0054242-02RE1**			Prepared & Analyzed: 05/28/20					
Solids - total dissolved solids (TDS)	110	mg/L	M, X		90.0			20	
Batch B012718 - No Prep - SM 2540C									
Blank (B012718-BLK1)				Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	< 17	mg/L							
LCS (B012718-BS1)				Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	947	mg/L		1000		95	67.9-132		
Duplicate (B012718-DUP1)	**Sample: 0054242-02**			Prepared & Analyzed: 05/29/20					
Solids - total dissolved solids (TDS)	100	mg/L	H		100			0	5
Batch B013015 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B013015-CCB1)				Prepared & Analyzed: 06/01/20					
Fluoride	0.00	mg/L							
Chloride	0.552	mg/L							
Sulfate	0.00	mg/L							
Calibration Check (B013015-CCV1)				Prepared & Analyzed: 06/01/20					
Chloride	4.88	mg/L		5.000		98	90-110		
Fluoride	4.95	mg/L		5.000		99	90-110		
Sulfate	5.17	mg/L		5.000		103	90-110		
Matrix Spike (B013015-MS3)	**Sample: 0054242-03**			Prepared & Analyzed: 06/02/20					
Fluoride	1.76	mg/L		1.500	0.374	92	80-120		
Matrix Spike (B013015-MS4)	**Sample: 0054242-04**			Prepared & Analyzed: 06/02/20					
Chloride	2.6	mg/L	Q1	1.500	1.5	75	80-120		
Matrix Spike Dup (B013015-MSD3)	**Sample: 0054242-03**			Prepared & Analyzed: 06/02/20					
Fluoride	1.78	mg/L		1.500	0.374	94	80-120	2	20
Matrix Spike Dup (B013015-MSD4)	**Sample: 0054242-04**			Prepared & Analyzed: 06/02/20					
Chloride	3.1	mg/L		1.500	1.5	107	80-120	17	20
Batch B013404 - No Prep - EPA 300.0 REV 2.1									
Calibration Blank (B013404-CCB1)				Prepared & Analyzed: 06/04/20					
Sulfate	0.00	mg/L							
Calibration Check (B013404-CCV1)				Prepared & Analyzed: 06/04/20					
Sulfate	5.07	mg/L		5.000		101	90-110		
Batch B013688 - SW 3015 - EPA 6020A									
Blank (B013688-BLK1)				Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	< 10	ug/L							
Calcium	< 200	ug/L							
LCS (B013688-BS1)				Prepared: 06/09/20 Analyzed: 06/11/20					

QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B013688 - SW 3015 - EPA 6020A									
LCS (B013688-BS1)				Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	524	ug/L		555.6		94	80-120		
Calcium	5630	ug/L		5556		101	80-120		
Matrix Spike (B013688-MS1)	**Sample: 0054994-01**			Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	1900	ug/L		555.6	1340	101	75-125		
Calcium	186000	ug/L	Q4	5556	183000	63	75-125		
Matrix Spike Dup (B013688-MSD1)	**Sample: 0054994-01**			Prepared: 06/09/20 Analyzed: 06/11/20					
Boron	1920	ug/L		555.6	1340	104	75-125	1	20
Calcium	185000	ug/L	Q4	5556	183000	42	75-125	0.6	20

NOTES

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* Not a TNI accredited analyte

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TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

H	Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.
M	Analyte failed to meet the required acceptance criteria for duplicate analysis.
Q1	Matrix Spike failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
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.
X	Sample did not meet weighback criteria established in the method. Reset out of hold for confirmation of result. Both sets of data to be reported. H flagged data is to confirm the validity of the initial data in spite of the weigh back criteria.

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: 0054242

DATE ISSUED: June 15, 2020

CASE NARRATIVE –

PDC Work Order 0054242

PDC Laboratories, Inc. received 6 water samples on May 26, 2020 in good condition at our Peoria, IL facility. This sample set was designated as work order 0054242

Sample ID's		Date	
Field	**Lab ID**	**Collected**	**Received**
MW-1	0054242-01	5/21/20	5/26/20
DUPLICATE	0054242-02	5/21/20	5/26/20
MW-2	0054242-03	5/21/20	5/26/20
MW-3	0054242-04	5/21/20	5/26/20
MW-9	0054242-05	5/21/20	5/26/20
FIELD BLANK	0054242-06	5/21/20	5/26/20

QC Summary:

All items met acceptance criteria with the following noted exceptions:

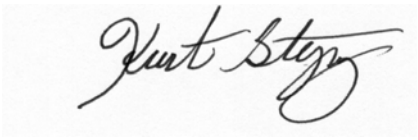
Ca, batch QC sample flagged with Q4, sample exceeds 4x spiked values

Cl, batch QC sample flagged with Q1, matrix spike outside acceptance criteria.

Initial analysis for TDS on sample 0054242-02 was below method criteria for weigh back and also was done in duplicate with an RPD greater than 5%. Flagged with X and M. See LIMS report for full X qualifier description.

TDS on sample 0054242-02 was repeated in duplicate out of hold time to confirm initial analysis. Re-analysis RPD was 0%, weigh back was acceptable. Re-analysis flagged with H for hold time.

Certification

Signature: 

Name: Kurt Stepping

Date: June 15, 2020

Title: Senior Project Manager

PDC LABORATORIES, INC.
WWW.PDCLAB.COM

REGULATORY PROGRAM (Check one:)		NPDES	
MORBCA	☐	RCRA	☐
CCDD	☐	TACO: RES OR IND/COMM	☐

CHAIN OF CUSTODY RECORD

STATE WHERE SAMPLE COLLECTED: MO

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

1 **CLIENT:** SIKESTON BMU POWER STATION
ADDRESS: 1551 W WAKEFIELD
CITY STATE ZIP: SIKESTON, MO 63801
CONTACT PERSON: LUKE ST MARY

PROJECT NUMBER:
PROJECT LOCATION: RESAMPLES
PHONE NUMBER: 573.475.3131
E-MAIL: LSTMARY@SBMU.NET
SAMPLER (PLEASE PRINT): Daniel Dillingham
SAMPLER'S SIGNATURE: Daniel a. Dillingham
PURCHASE ORDER #:
DATE SHIPPED:

MATRIX TYPES:
WW- WASTEWATER
DW- DRINKING WATER
GW- GROUND WATER
WWSL- SLUDGE
NAS- NON AQUEOUS SOLID
LCHT-LEACHATE
OIL-OIL
SO-SOIL
SOL-SOLID

3 **ANALYSIS REQUESTED**

4 (FOR LAB USE ONLY)
LOGIN #: 084242
LOGGED BY:
CLIENT: SIKESTON BMU
PROJECT: RESAMPLES MAY 2020
PROJ. MGR.: KURT
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	TDS	SULFATE	CALCIUM	FLUORIDE	BORON	CHLORIDE		REMARKS
MW-1	05-21-20	1216	X		GW	2		X	X	X					
DUPLICATE	05-21-20		X		GW	2		X	X	X					
MW-2	05-21-20	0833	X		GW	2					X	X			
MW-3	05-21-20	0730	X		GW	1		X					X		
MW-9	05-21-20	1424	X		GW	1		X							
FIELD BLANK	05-21-20		X		GW	2		X	X	X	X	X	X		

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 **TURNAROUND TIME REQUESTED** (PLEASE CHECK) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) ☒ NORMAL ☐ RUSH
DATE RESULTS NEEDED:
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL ☐ PHONE ☐
EMAIL IF DIFFERENT FROM ABOVE:
PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) _____

7 RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Ashish Patel	5-22-2020	0700			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				5/26/20	800

8 **COMMENTS: (FOR LAB USE ONLY)**

SAMPLE TEMPERATURE UPON RECEIPT: 19.0 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT: Y OR N
SAMPLE(S) RECEIVED ON ICE: Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED: Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE: _____

Qualtrax ID #3219

Appendix 2

2019 Annual Water Quality Report
For Sikeston Public Water System

SIKESTON PWS

Public Water System ID Number: MO4010743

2019 Annual Water Quality Report

(Consumer Confidence Report)

This report is intended to provide you with important information about your drinking water and the efforts made to provide safe drinking water.

Attencion!

Este informe contiene información muy importante. Tradúscalo o prequntele a alguien que lo entienda bien.
[Translated: This report contains very important information. Translate or ask someone who understands this very well.]

What is the source of my water?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and groundwater wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Our water comes from the following source(s):

Source Name	Type
PLANT 1 – WELL 11	GROUND WATER
PLANT 2 – WELLS 1, 6, 7, 12	GROUND WATER
PLANT 3 – WELLS 8, 9, 13	GROUND WATER

Source Water Assessment

The Department of Natural Resources conducted a source water assessment to determine the susceptibility of our water source to potential contaminants. This process involved the establishment of source water area delineations for each well or surface water intake and then a contaminant inventory was performed within those delineated areas to assess potential threats to each source. Assessment maps and summary information sheets are available on the internet at https://drinkingwater.missouri.edu/. To access the maps for your water system you will need the State-assigned identification code, which is printed at the top of this report. The Source Water Inventory Project maps and information sheets provide a foundation upon which a more comprehensive source water protection plan can be developed.

Why are there contaminants in my water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

Contaminants that may be present in source water include:
A. Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
B. Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.
C. Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
D. Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
E. Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Department of Natural Resources prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Department of Health regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Is our water system meeting other rules that govern our operations?

The Missouri Department of Natural Resources regulates our water system and requires us to test our water on a regular basis to ensure its safety. Our system has been assigned the identification number MO4010743 for the purposes of tracking our test results. Last year, we tested for a variety of contaminants. The detectable results of these tests are on the following pages of this report. Any violations of state requirements or standards will be further explained later in this report.

How might I become actively involved?

If you would like to observe the decision-making process that affect drinking water quality or if you have any further questions about your drinking water report, please call us at **573-380-3996** to inquire about scheduled meetings or contact persons.

Do I need to take any special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Terms and Abbreviations

Population: 16393. This is the equivalent residential population served including non-bill paying customers.
90th percentile: For Lead and Copper testing. 10% of test results are above this level and 90% are below this level.
AL: Action Level, or the concentration of a contaminant which, when exceeded, triggers treatment or other requirements which a water system must follow.
HAA5: Haloacetic Acids (mono-, di- and tri-chloracetic acid, and mono- and di-bromoacetic acid) as a group.
LRAA: Locational Running Annual Average, or the locational average of sample analytical results for samples taken during the previous four calendar quarters.
MCLG: Maximum Contaminant Level Goal, or the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MCL: Maximum Contaminant Level, or the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
n/a: not applicable.
nd: not detectable at testing limits.
NTU: Nephelometric Turbidity Unit, used to measure cloudiness in drinking water.
ppb: parts per billion or micrograms per liter.
ppm: parts per million or milligrams per liter.
RAA: Running Annual Average, or the average of sample analytical results for samples taken during the previous four calendar quarters.
Range of Results: Shows the lowest and highest levels found during a testing period, if only one sample was taken, then this number equals the Highest Test Result or Highest Value.
SMCL: Secondary Maximum Contaminant Level, or the secondary standards that are non-enforceable guidelines for contaminants and may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor or color) in drinking water. EPA recommends these standards but does not require water systems to comply
TT: Treatment Technique, or a required process intended to reduce the level of a contaminant in drinking water.
TTHM: Total Trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) as a group.

MISSOURI DEPARTMENT OF NATURAL RESOURCES

April 15, 2020

SIKESTON PWS

Public Water System ID Number: MO4010743

2019 Annual Water Quality Report

(Consumer Confidence Report)

Contaminants Report

SIKESTON PWS will provide a printed hard copy of the CCR upon request. To request a copy of this report to be mailed, please call us at **573-380-3996**. The CCR can also be found on the internet at www.dnr.mo.gov/ccr/MO4010743.pdf.

The state has reduced monitoring requirements for certain contaminants to less often than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Records with a sample year more than one year old are still considered representative. No data older than 5 years need be included. If more than one sample is collected during the monitoring period, the Range of Sampled Results will show the lowest and highest tested results. The Highest Test Result, Highest LRAA, or Highest Value must be below the maximum contaminant level (MCL) or the contaminant has exceeded the level of health based standards and a violation is issued to the water system.

Regulated Contaminants

Regulated Contaminants	Collection Date	Highest Test Result	Range of Sampled Result(s) (low – high)	Unit	MCL	MCLG	Typical Source
BARIUM	5/29/2018	0.42	0.149 - 0.42	ppm	2	2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
FLUORIDE	5/29/2018	0.86	0.61 - 0.86	ppm	4	4	Natural deposits; Water additive which promotes strong teeth
NITRATE-NITRITE	8/27/2019	0.012	0 - 0.012	ppm	10	10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits

Disinfection Byproducts	Sample Point	Monitoring Period	Highest LRAA	Range of Sampled Result(s) (low – high)	Unit	MCL	MCLG	Typical Source
(HAA5)	DBPDUAL-01	2019	16	15.6 - 15.6	ppb	60	0	Byproduct of drinking water disinfection
(HAA5)	DBPDUAL-03	2019	16	16.2 - 16.2	ppb	60	0	Byproduct of drinking water disinfection
TTHM	DBPDUAL-01	2019	16	16.2 - 16.2	ppb	80	0	Byproduct of drinking water disinfection
TTHM	DBPDUAL-03	2019	24	23.7 - 23.7	ppb	80	0	Byproduct of drinking water disinfection

Lead and Copper	Date	90th Percentile: 90% of your water utility levels were less than	Range of Sampled Results (low – high)	Unit	AL	Sites Over AL	Typical Source
COPPER	2017 - 2019	0.113	0.0197 - 0.138	ppm	1.3	0	Corrosion of household plumbing systems

Microbiological	Result	MCL	MCLG	Typical Source
COLIFORM (TCR)	In the month of July, 1 sample(s) returned as positive	Treatment Technique Trigger	0	Naturally present in the environment

Violations and Health Effects Information

During the 2019 calendar year, we had the below noted violation(s) of drinking water regulations.

Compliance Period	Analyte	Type
No Violations Occurred in the Calendar Year of 2019		

Special Lead and Copper Notice:

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. SIKESTON PWS is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800-426-4791) or at http://water.epa.gov/drink/info/lead/index.cfm.

You can also find sample results for all contaminants from both past and present compliance monitoring online at the Missouri DNR Drinking Water Watch website http://dnr.mo.gov/DWW/indexSearchDNR.jsp. To find Lead and Copper results for your system, type your water system name in the box titled Water System Name and select *Find Water Systems* at the bottom of the page. The new screen will show you the water system name and number, select and click the Water System Number. At the top of the next page, under the *Help* column find, *Other Chemical Results by Analyte*, select and click on it. Scroll down alphabetically to Lead and click the blue Analyte Code (1030). The Lead and Copper locations will be displayed under the heading *Sample Comments*. Scroll to find your location and click on the *Sample No.* for the results. If your house was selected by the water system and you assisted in taking a Lead and Copper sample from your home but cannot find your location in the list, please contact SIKESTON PWS for your results.

April 15, 2020

SIKESTON PWS

Public Water System ID Number: MO4010743

2019 Annual Water Quality Report

(Consumer Confidence Report)

Optional Monitoring (not required by EPA)

Optional Contaminants

Monitoring is not required for optional contaminants.

Secondary Contaminants	Collection Date	Your Water System Highest Sampled Result	Range of Sampled Result(s) (low - high)	Unit	SMCL
ALKALINITY, CACO3 STABILITY	5/29/2018	224	196 - 224	MG/L	
CALCIUM	5/29/2018	63	39.8 - 63	MG/L	
CHLORIDE	5/29/2018	21	10.1 - 21	MG/L	250
HARDNESS, CARBONATE	5/29/2018	207	133 - 207	MG/L	
IRON	5/29/2018	0.0116	0 - 0.0116	MG/L	0.3
MAGNESIUM	5/29/2018	12	8.14 - 12	MG/L	
MANGANESE	5/29/2018	0.002	0.0019 - 0.002	MG/L	0.05
PH	5/29/2018	7.55	7.5 - 7.55	PH	8.5
POTASSIUM	5/29/2018	2.08	1.54 - 2.08	MG/L	
SODIUM	5/29/2018	8.77	8.17 - 8.77	MG/L	
SULFATE	5/29/2018	32	14.5 - 32	MG/L	250
TDS	5/29/2018	290	174 - 290	MG/L	500
ZINC	5/29/2018	0.0252	0.0124 - 0.0252	MG/L	5

Secondary standards are non-enforceable guidelines for contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor or color) in drinking water. EPA recommends these standards but does not require water systems to comply.

Appendix 3a

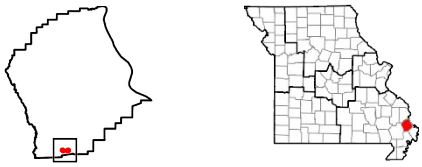
2020 Sikeston Public Well
Assessment Reports (CARES)

Sikeston

General System Information

PWSS No. 4010743

Prepared by CARES, University of Missouri Extension

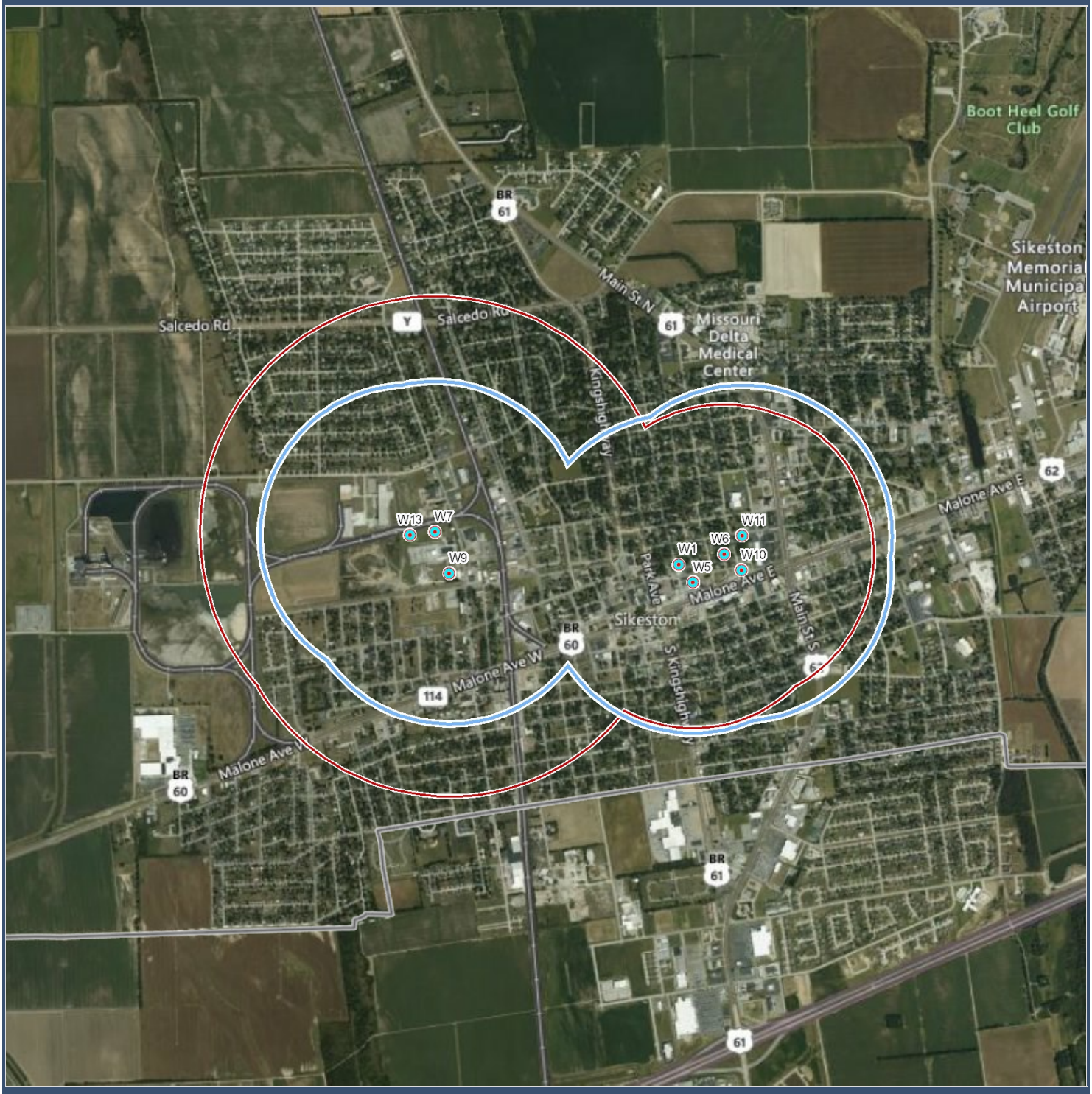
Name	Sikeston
PWSSID	MO4010743
Population Served	16,393
Primary County Served	Scott
Service Connections	7,908
Source(s) of Water	Southeast Missouri Lowlands Groundwater Province
System Classification	Community (C)
Primary Source Type	Groundwater (GW)
System Type	Municipality
System Treatment	4-log Treatment of Viruses, Fluoridation, Greensand Filtration, Sedimentation, Gaseous Pre-Chlorination, Permanganate, Slat Tray Aeration, Gaseous Post-Chlorination, Diffused Aeration, (Pre) pH Adjustment, pH Adjustment, Rapid Sand Filtration
DNR Region of Operations	Southeast Regional Office
Source Water/Wellhead Protection Plan	No
Drinking Water Watch	Drinking Water Watch
Reference Maps	

Sikeston

Overview Map (Aerial)
PWSS No. 4010743 - 8 Wells, Scott County

Map Prepared: Jun 11, 2020
Data Release: May 4, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Prepared by CARES, University of Missouri Extension



Groundwater System
- System Well

Source Water Protection Boundary
- 20-Year Time of Travel
- Half-Mile Buffer

SWAP - Source Water Assessment Plan - http://drinkingwater.missouri.edu/swap
Aerial Photos: Bing Maps, Microsoft. Jun 11, 2020.

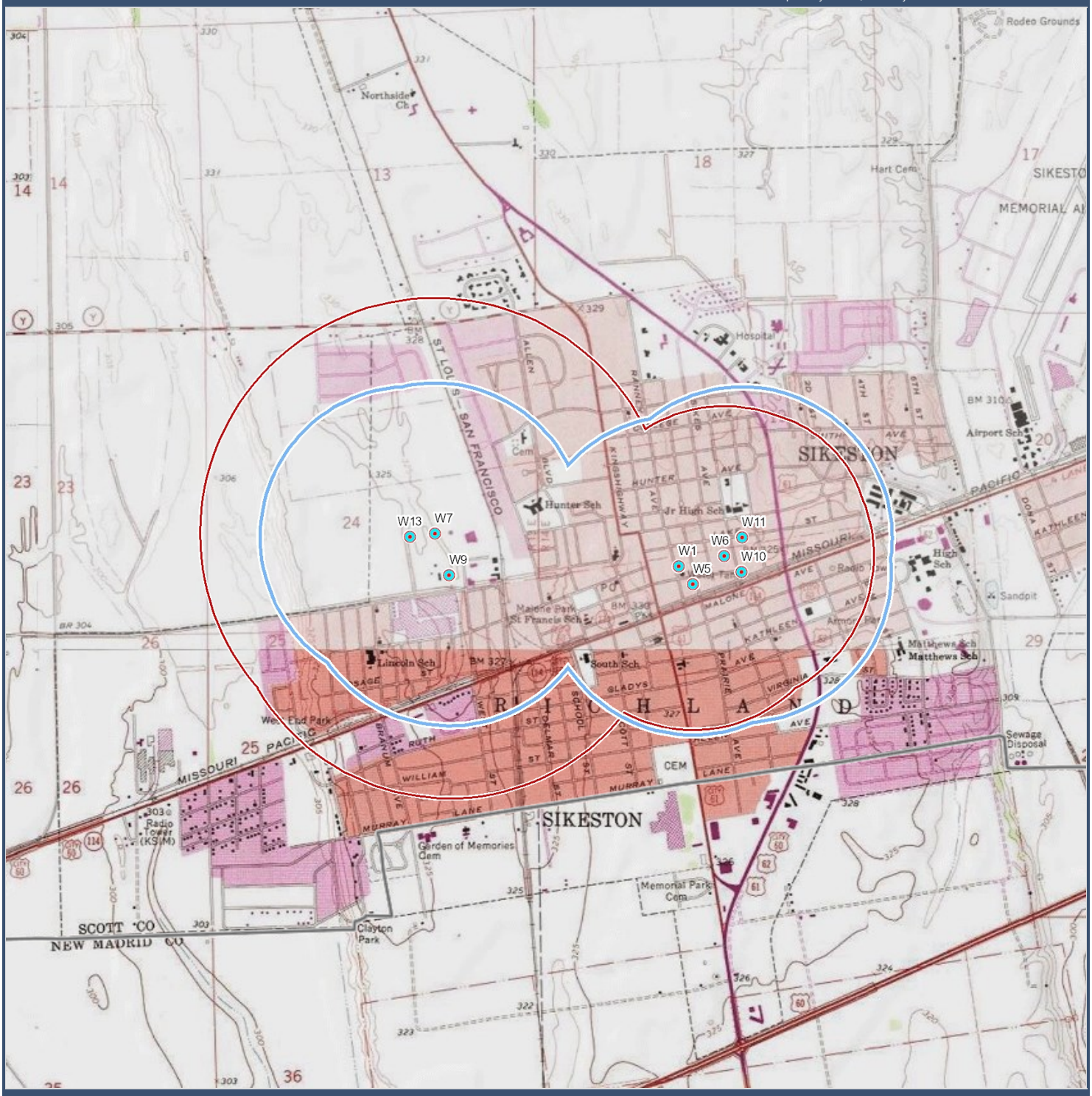
Sikeston

Overview Map (Topo)
PWSS No. 4010743 - 8 Wells, Scott County

Map Prepared: Jun 11, 2020
Data Release: May 4, 2020

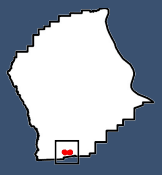
MISSOURI DEPARTMENT OF NATURAL RESOURCES

Prepared by CARES, University of Missouri Extension



Groundwater System
- System Well

Source Water Protection Boundary
- 20-Year Time of Travel
- Half-Mile Buffer



N

0 0.5 1

Miles

SWAP - Source Water Assessment Plan - http://drinkingwater.missouri.edu/swap
For basemap symbols, see the U.S. Geological Survey (USGS) publication: Topographic Map Symbols.

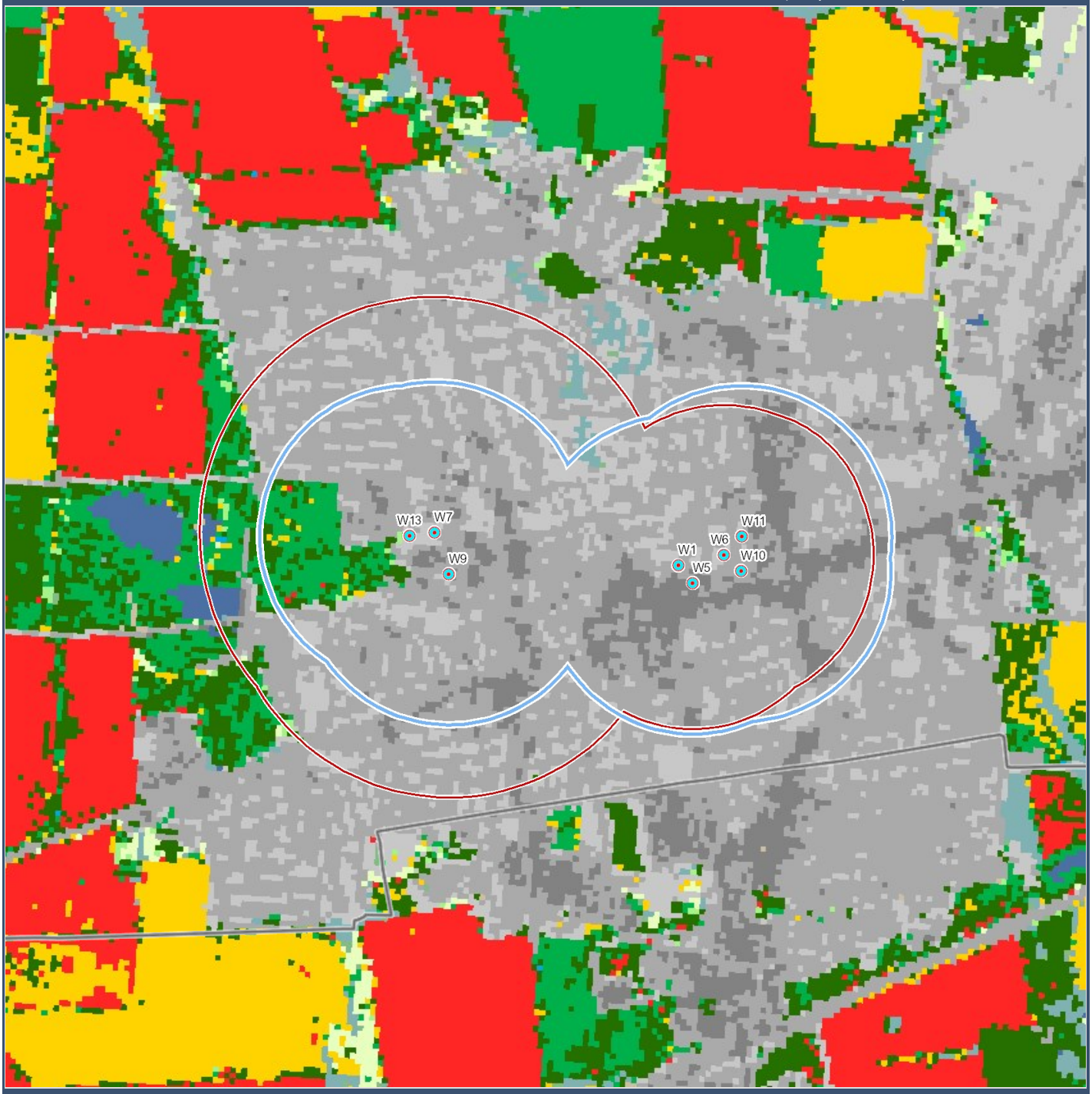
Sikeston

Overview Map (Land Use)
PWSS No. 4010743 - 8 Wells, Scott County

Map Prepared: Jun 11, 2020
Data Release: May 4, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Prepared by CARES, University of Missouri Extension



Groundwater System
System Well

Source Water Protection Boundary
20-Year Time of Travel
Half-Mile Buffer

Land Use

- Corn
- Cotton
- Rice
- Soybeans
- Other Crop
- Other Hay/Non Alfalfa
- Grassland/Pasture
- Forest/Shrubland
- Developed/High Intensity
- Developed/Low-Med Intensity
- Developed/Open Space
- Open Water
- Wetlands
- Barren

N

0 0.5 1

Miles

SWAP - Source Water Assessment Plan - http://drinkingwater.missouri.edu/swap
Aerial Photos: Bing Maps, Microsoft. Jun 11, 2020.

Sikeston

Land Use Statistics
PWSS No. 4010743

Map Prepared: Jun 11, 2020
Data Release: May 4, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Prepared by CARES, University of Missouri Extension

Land Use	% Land Area, 2017	% Land Area, 2018	% Land Area, 2019	Avg. % Land Area
Corn	0	0	0	0
Cotton	0	0	0	0
Rice	0	0	0	0
Soybeans	0	0.04	0	0.01
Other Crop	0	0	0	0
Other Hay/Non-Alfalfa	0	0	0	0
Grassland/Pasture	0	0	0	0
Forest/Shrubland	0	0	0	0
Developed/High Intensity	23.04	22.78	23.04	22.95
Developed/Low-Med Intensity	62.14	61.83	61.3	61.76
Developed/Open Space	14.82	15.35	15.66	15.27
Open Water	0	0	0	0
Wetlands	0	0	0	0
Barren	0	0	0	0

Sikeston

Well/Intake Data - PWSS No. 4010743
Scott County, Sheet 1 of 2

Sheet Prepared: Jun 11, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Prepared by CARES, University of Missouri Extension

Well Number	W1	W5	W6	W7	W9
Local Well Name	Well #1, Plant #2	Well #6, Plant #2	Well #7, Plant #2	Well #8, Plant #3	Well #10, Plant #3
Well ID #	13051	13049	13048	13047	13045
DGLS ID #	0011630	0019120	0026235		
Status	Active	Active	Active	Active	Emergency
Latitude	36.879040	36.878180	36.879540	36.880623	36.878620
Longitude	-89.586450	-89.585580	-89.583700	-89.601124	-89.600250
12-Digit Hydrologic Unit	080202010305	080202010305	080202010305	080202040604	080202040604
County	Scott	Scott	Scott	Scott	Scott
MoDNR Region	Southeast	Southeast	Southeast	Southeast	Southeast
Groundwater Province[1]	Southeast Missouri Lowlands Gr	Southeast Missouri Lowlands Gr	Southeast Missouri Lowlands Gr	Southeast Missouri Lowlands Gr	Southeast Missouri Lowlands Gr
Source Aquifer(s)[2]	Wilcox aquifer	Wilcox aquifer	Wilcox aquifer	Alluvial aquifer	Alluvial aquifer
Confined/Unconfined[3]	Unconfined	Unconfined	Unconfined	Unconfined	Unconfined
Regional Drilling Area[4]	Area 5	Area 5	Area 5	Area 5	Area 5
Total Dissolved Solids[5]	undetermined	undetermined	undetermined	undetermined	undetermined
Date Drilled (year)	1951	1960	1969	1976	1959
Material (C/U)	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Casing Base Formation	Wilcox	Wilcox	Wilcox	Alluvium	Alluvium
Total Depth Formation	Midway	Wilcox	Midway	Alluvium	Alluvium
Total Depth	421	401	404	145	142
Ground Elevation (ft)	327	326	326	325	325
Casing Depth (ft)	331	307	309	108	119
Casing Size (in)	12	18	18	18	12
Casing Type				Steel	Steel
Screen Length (ft)	81	80	80	30	21
Screen Size (in)	8	12	12	12	12
Static Water Level (ft)	60	66	65	27	30
Well Yield (gpm)	600	1100	1450	1300	1000
Head (ft)	90	69	105	57	34
Draw Down (ft)	60	54	59	33	
Pump Test Date (year)	1975	1960	1992	1976	1987
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine	Vertical Turbine	Vertical Turbine
Pump Manufacturer					
Pump Depth (ft)	150	135	170	84	64
Pump Capacity (gpm)	863	1500	1600	1350	1150
Pump Meter (Y/N)					
GWUDISW (Y/N)					
Surface Drainage					
State Approved (Y/N)					
Liquefaction Risk	High	High	High	High	High
Landslide Risk	Low	Low	Low	Low	Low
Collapse Risk	Low	Low	Low	Low	Low
Flood Risk	Low	Low	Low	Low	Low
Surface Contamination Risk	Low	Low	Low	Moderate	Moderate
Conduit Flow Risk[6]	K6	K6	K6	K6	K6

Sikeston

Well/Intake Data - PWSS No. 4010743
Scott County, Sheet 2 of 2

Sheet Prepared: Aug 12, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Prepared by CARES, University of Missouri Extension

Well Number	W10	W11	W13
Local Well Name	Well #11, Plant #1	Well #12	Well #13 Plant #3
Well ID #	13044	13043	18782
DGLS ID #			
Status	Active	Active	Active
Latitude	36.878770	36.880440	36.880459
Longitude	-89.582680	-89.582630	-89.602615
12-Digit Hydrologic Unit	080202010305	080202010305	080202040604
County	Scott	Scott	Scott
MoDNR Region	Southeast	Southeast	Southeast
Groundwater Province[1]	Southeast Missouri Lowlands	Southeast Missouri Lowlands	Southeast Missouri Lowlands
Source Aquifer(s)[2]	Wilcox	Wilcox	Alluvial
Confined/Unconfined[3]	Unconfined	Unconfined	Unconfined
Regional Drilling Area[4]	Area 5	Area 5	Area 5
Total Dissolved Solids[5]	undetermined	undetermined	undetermined
Date Drilled (year)	1987	1991	2013
Material (C/U)	Unconsolidated	Unconsolidated	Unconsolidated
Casing Base Formation	Wilcox	Wilcox	Alluvium
Total Depth Formation	Wilcox	Wilcox	Alluvium
Total Depth	390	391	160
Ground Elevation (ft)	325	325	325
Casing Depth (ft)	300	292	111
Casing Size (in)	16	18	16
Casing Type	Steel	Steel	Steel
Screen Length (ft)	80	80	110
Screen Size (in)	10	12	
Static Water Level (ft)	65	80	31
Well Yield (gpm)	1062	835	2400
Head (ft)	109	94	69
Draw Down (ft)	43		
Pump Test Date (year)	1987	1991	
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine
Pump Manufacturer			
Pump Depth (ft)	174	174	100
Pump Capacity (gpm)	1000	1000	1000
Pump Meter (Y/N)			
GWUDISW (Y/N)			
Surface Drainage			
State Approved (Y/N)			
Liquefaction Risk	High	High	High
Landslide Risk	Low	Low	Low
Collapse Risk	Low	Low	Low
Flood Risk	Low	Low	Low
Surface Contamination Risk	Low	Low	Moderate
Conduit Flow Risk[6]	K6	K6	K6

Sikeston

Contaminant Summary
PWSS No. 4010743

Sheet Prepared: Jun 11, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Prepared by CARES, University of Missouri Extension

57 potential contaminant sources in the listed databases (multiple databases may list the same contaminant source):

	Database
✔	ACRES (Assessment, Cleanup And Redevelopment Exchange System)
✔	AIR (Integrated Compliance Information System-Air)
✔	AIRS/AFS (Air Facility System)
✔	AIRS/AQS (Air Quality System)
	BR (Biennial Reporters)
	BRAC (Base Realignment And Closure)
✔	CAMDBS (Clean Air Markets Division Business Systems)
	CEDRI (Compliance And Emissions Data Reporting Interface)
	ECRM (Enforcement Criminal Records Management)
	E-GGRT (Electronic Greenhouse Gas Reporting Tool)
	EGRID (Emissions & Generation Resource Integrated Database)
✔	EIA-860 (Energy Information Administration-860 Database)
✔	EIS (Emission Inventory System)
	FFDOCKET (Federal Facility Hazardous Waste Compliance Docket)
✔	ICIS (Integrated Compliance Information System)
	LMOP (Landfill Methane Outreach Program)
	LUST-ARRA (Leaking Underground Storage Tank - American Recovery And Reinvestment Act)

	Database
	MN-TEMPO (Minnesota - Permitting, Compliance, & Enforcement)
✔	MO-DNR (Missouri Department Of Natural Resources)
✔	NCDB (National Compliance Database)
✔	NPDES (National Pollutant Discharge Elimination System)
	OTAQREG (Office Of Transportation And Air Quality Fuels Registration)
	RADINFO (Radiation Information System)
	RBLC (Ract/Bact/Laer Clearinghouse)
✔	RCRAINFO (Resource Conservation And Recovery Act Information System)
	RFS (Renewable Fuel Standard)
	RMP (Risk Management Plan)
✔	SEMS (Superfund Enterprise Management System)
✔	SFDW (Safe Drinking Water Information System)
	SSTS (Section Seven Tracking System)
	STATE (State Systems)
	TRIS (Toxics Release Inventory System)
	TSCA (Toxic Substances Control Act)
✔	SWIP (Source Water Inventory Project Field Inventory - see below)

60 potential contaminant sources in the SWIP Field Inventory:

Count	Site Type
0	Airport or abandoned airfield
0	Animal feedlot
0	Apartments and condominiums
0	Asphalt plant
6	Auto repair shop
8	Automotive dealership
0	Barber and beauty shop
0	Boat yard and marina
0	CAFO
0	Campground
2	Car wash
0	Cement Plant
0	Cemetery
0	Communication equipment mfg
0	Country club
3	Dry cleaner
1	Dumping and/or burning site
0	Electric equipment mfg or storage
0	Electric substation
0	Farm machinery storage
3	Feed/Fertilizer/Co-op
2	Fire station
2	Funeral service and crematory
1	Furniture manufacturer
0	Furniture repair or finishing shop
0	Garden and/or nursery
0	Garden, nursery, and/or florist
0	Gasoline service station
0	Golf courses
0	Government office
0	Grain bin
3	Hardware and lumber store
0	Hazardous waste (Federal facility)
1	Highway maintenance facility
0	Jewelry or metal plating shop
0	Junk yard or salvage yard
0	Lagoon (commercial)
0	Lagoon (industrial)
0	Lagoon (municipal)
0	Lagoon (residential)
0	Landfill (municipal)

Count	Site Type
0	Laundromat
0	Livestock auction
0	Machine or metalworking shop
2	Manufacturing (general)
0	Material stockpile (industrial)
0	Medical institution
0	Metal production facility
0	Mining operation
7	Other
1	Paint store
0	Park land
0	Parking lot
1	Petroleum production or storage
0	Pharmacies
0	Photography shop or processing lab
0	Pit toilet
0	Plastic material and synthetic mfg
1	Print shop
0	Railroad yard
0	Recycling/reduction facility
0	Research lab
0	Restaurant
1	Sawdust pile
0	School
0	Sports and hobby shop
0	Swimming pool
0	Tailing pond
5	Tank (above-ground fuel)
0	Tank (other)
0	Tank (pesticide)
6	Tank (underground fuel)
0	Trucking terminal
1	Veterinary service
0	Wastewater treatment facility
2	Well (abandoned)
1	Well (domestic)
0	Well (irrigation)
0	Well (livestock)
0	Well (monitoring)
0	Well (public water supply)
0	Well (unknown)

Sikeston

Susceptibility Determination
PWSS No. 4010743

Sheet Prepared: Jun 11, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Prepared by CARES, University of Missouri Extension

The Missouri Department of Natural Resources (MoDNR) has assembled this information to assess the susceptibility of drinking water sources to contamination. There are many unforseen and unpredictable factors that may cause a source to be contaminated. MoDNR routinely monitors all public supplies to ensure public health is protected. Public water systems and local communities are encouraged to take all measures possible to reduce the susceptibility of their drinking water source to chemical contamination. For more information, call 1-800-361-4827.

Dots containing numeric values correspond to the number of individual wells or surface water intakes.

	Minimally Susceptible	Moderately Susceptible	Highly Susceptible	Undetermined
GROUND WATER				
Geological and Hydrogeological Assessment Criteria				
Are any system wells deemed by the Public Drinking Water Branch to be under the direct influence of surface water?				●
Are any system wells potentially prone to karst conditions or solution flow?	●			
Do any system wells draw water from a source with high total dissolved solids (TDS)?				●
Are any system wells located proximal to known subsurface or groundwater contamination?				●
Do any system wells draw water from an unconfined aquifer?	●			
Based on known stratigraphic relationships for each well, the risk of contamination from surface sources is:	5	3		
Well Construction and Maintenance Assessment Criteria				
Are all system wells state-approved?				●
Do any system wells exhibit structural defects, construction deficiencies, or other conditions that might allow contamination to enter the well at the wellhead?				●
Are security measures in place to prevent unauthorized tampering with all system wells?				●
Does the system have back-up, emergency power available?				●
Monitoring Assessment Criteria				
Have any system wells exhibited consistent detections for any of the following parameters in raw water?				
Volatile Organic Chemicals (VOC):			●	
Synthetic Organic Chemicals (SOC):	●			
Inorganic Compounds (IOC):	●			
Nitrates/Nitrites:	●			
Radionuclides:	●			
Bacteria/Viruses/Microbial Pathogens:				●
Natural Hazard Assessment Criteria				
The number of system wells located in a region prone to flooding.	8			
The number of system wells located in a region that may experience the following conditions in the event of a large-scale earthquake.				
Potential liquefaction risk:			8	
Potential landslide risk:	8			
Potential subsurface collapse/instability risk:	8			
Are any system wells prone to declining water levels during a prolonged drought?				●
Do all system wells have lightning surge protection?				●
Potential Contaminant Inventory Assessment Criteria				
Potential sources of contamination exist within the wellhead protection area:		●		
A system well is located in an area with a high density of transportation corridors:		1	7	
A system well is located in an area that may have improperly maintained or faulty on-site septic systems:				●
Additional Assessment Criteria				
Does the system have a wellhead/source water protection plan endorsed by the Department of Natural Resources?		●		
Does the system have an emergency interconnection with a neighboring public water system?		●		

Sikeston

Notes
PWSS No. 4010743

Map Prepared: Jun 11, 2020
Data Release: May 4, 2020

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Prepared by CARES, University of Missouri Extension

1 For additional information about Missouri's regional groundwater provinces, please visit the Missouri Department of Natural Resources' Water Resources Center Web page or contact the Missouri Geological Survey.

2 Source aquifers are determined from well log information, where available, and on general water quality characteristics for the regional groundwater province within which each well is located. Source aquifers for wells with little or no well log information are inferred based on best available information.

Additional Source Aquifer Notes:

- Water sources labeled "Cincinnatian, Pennsylvanian, or Devonian/Silurian" are not regionally extensive aquifer systems in Missouri. These represent isolated, localized water-bearing formations. Broad water quality descriptions are Not currently available for these sources. "Precambrian" water sources exhibit water quality characteristics similar to the St. Francois aquifer.
- The Springfield Plateau aquifer is regionally extensive only in southwest and west-central Missouri. Aquifers labeled "Mississippian" or "Springfield Plateau (equivalent)" refer to wells that draw water from the same geological formations that comprise the Springfield Plateau aquifer, but are located in areas of the state not hydraulically connected to the regional aquifer system. Broad water quality generalizations are not available for these isolated, localized water-bearing units.

3 Unconfined aquifers are generally more vulnerable to surface or shallow subsurface contamination and warrant additional protections around the wellhead. Confined aquifers are not as vulnerable to surface or shallow subsurface contamination, but may exhibit naturally elevated levels of dissolved minerals, radionuclides, or variations in other water quality parameters such as dissolved oxygen and pH.

4 Please refer to 10 CSR 23-3.090 and 10 CSR 23-3.100 for additional information about well construction standards for Missouri's regional well drilling areas.

5 TDS1 Total dissolved solids information is currently only available for the Ozark and Springfield Plateau aquifers. Information is based on broad, regional groundwater quality trends, rather than on well-specific monitoring.

6 K6 This well is not constructed in materials prone to conduit or solution flow.

Appendix 3b

2014 Sikeston Public Well
Assessment Reports (CARES)

Sikeston

PWSS No. 4010743

8 Wells, Scott County

Prepared by:
CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS
UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

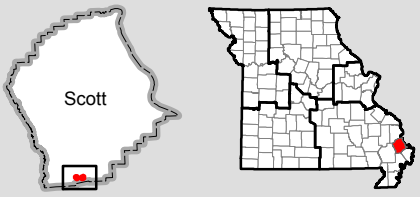
Map Update: Jun 06, 2014

Well System

- System Well

SWAP Delineation Boundary

- 20-year time of travel
- Half-mile buffer



Miles
0 0.45 0.9

SWAP - Source Water Assessment Plan -- http://drinkingwater.missouri.edu/swap/
Aerial photos: USDA National Agriculture Inventory Program (NAIP), 2012.

Sikeston

PWSS No. 4010743

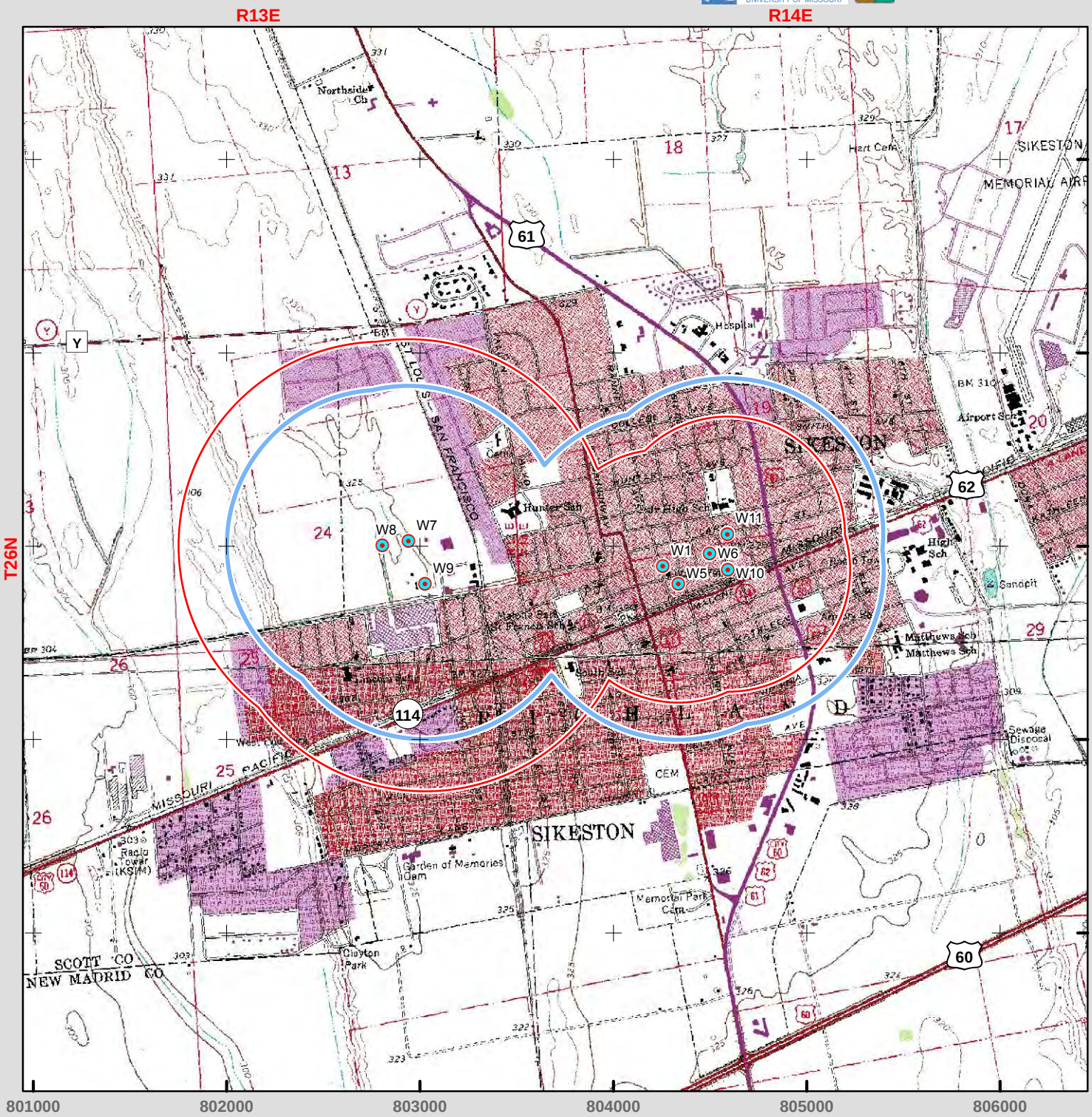
8 Wells, Scott County

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS
UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Map Update: Jun 06, 2014

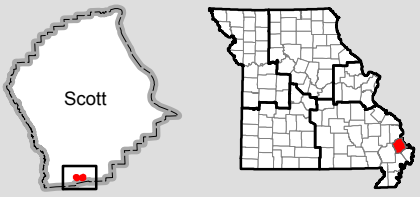


Well System

- System Well

SWAP Delineation Boundary

- 20-year time of travel
- Half-mile buffer



Miles

0 0.45 0.9

SWAP - Source Water Assessment Plan --
http://drinkingwater.missouri.edu/swap/
For basemap symbols, see the U.S. Geological Survey (USGS) publication: Topographic Map Symbols.

Sikeston

PWSS No. 4010743

Scott County, sheet 1 of 2

8 wells

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Well Number	W1	W5	W6	W7	W8
Extended PWS #	4010743101	4010743105	4010743106	4010743107	4010743108
Local Well Name	Well #1, Plant #2	Well #6, Plant #2	Well #7, Plant #2	Well #8, Plant #3	Well #9, Plant #3
Well ID #	13051	13049	13048	13047	13046
DGLS ID #	0011630	0019120	0026235		
Facility Type	City	City	City	City	City
Status	Active	Active	Active	Active	Active
Latitude	36.87904	36.87818	36.87954	36.8806231803	36.880473182
Longitude	-89.58645	-89.58558	-89.5837	-89.6011240613	-89.6026440566
Location Method	GPS	GPS	GPS	GPS	GPS
Method Accuracy (ft)	38	43	43	43	39
USGS 7.5 Quadrangle	Sikeston North	Sikeston North	Sikeston North	Sikeston North	Sikeston North
County	Scott	Scott	Scott	Scott	Scott
MoDNR Region	Southeast	Southeast	Southeast	Southeast	Southeast
Date Drilled (year)	1951	1960	1969	1976	1976
Material (C/U)	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Base of Casing Formation	Wilcox	Wilcox	Wilcox	Alluvium	Alluvium
Total Depth Formation	Midway	Wilcox	Midway	Alluvium	Alluvium
Total Depth	421	401	404	145	143
Ground Elevation (ft)					
Top Seal					
Bottom Seal					
Casing Depth (ft)	331	307	309	108	108
Casing Size (in)	12	18	18	18	18
Casing Type				Steel	Steel
Elev. of Casing Top (ft)					
Outer Casing Depth (ft)					
Outer Casing Size (in)					
Screen Length (ft)	81	80	80	30	30
Screen Size (in)	8	12	12	12	12
Static Water Level (ft)	60	66	65	27	27
Well Yield (gpm)	600	1100	1450	1300	1300
Head (ft)					
Draw Down (ft)	60	54	59	33	34
Pump Test Date (year)	1975	1960	1992	1976	
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine	Vertical Turbine	Vertical Turbine
Pump Manufacturer					
Pump Depth (ft)	150	135	170	84	84
Pump Capacity (gpm)	863	1500	1600	1350	1350
Pump Meter (Y/N)					
VOC Detection (Y/N)	N	N	N	N	N
Nitrate Detection (Y/N)	N	N	N	N	N
Chlorination (Y/N)	Y	Y	Y	Y	Y
Filtration (Y/N)	Y	Y	Y	Y	Y
GWUDISW (Y/N)					
Surface Drainage					
State Approved(Y/N)					
Date Abandoned (year)					
Date Plugged (year)					

Sikeston

PWSS No. 4010743

Scott County, sheet 2 of 2

8 wells

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Well Number	W9	W10	W11
Extended PWS #	4010743109	4010743110	4010743111
Local Well Name	Well #10, Plant #3	Well #11, Plant #1	Well #12
Well ID #	13045	13044	13043
DGLS ID #			
Facility Type	City	City	City
Status	Active	Active	Active
Latitude	36.87862	36.87877	36.88044
Longitude	-89.60025	-89.58268	-89.58263
Location Method	GPS	GPS	GPS
Method Accuracy (ft)	65	44	45
USGS 7.5 Quadrangle	Sikeston North	Sikeston North	Sikeston North
County	Scott	Scott	Scott
MoDNR Region	Southeast	Southeast	Southeast
Date Drilled (year)	1959	1987	1991
Material (C/U)	Unconsolidated	Unconsolidated	Unconsolidated
Base of Casing Formation	Alluvium	Wilcox	Wilcox
Total Depth Formation	Alluvium	Wilcox	Wilcox
Total Depth	142	390	382
Ground Elevation (ft)			
Top Seal			
Bottom Seal			
Casing Depth (ft)	119	300	292
Casing Size (in)	12	16	18
Casing Type	Steel	Steel	Steel
Elev. of Casing Top (ft)			
Outer Casing Depth (ft)			
Outer Casing Size (in)			
Screen Length (ft)	21	80	80
Screen Size (in)	12	10	12
Static Water Level (ft)	30	65	
Well Yield (gpm)	1000	1062	
Head (ft)			
Draw Down (ft)		43	
Pump Test Date (year)	1987	1987	
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine
Pump Manufacturer			
Pump Depth (ft)	64	174	174
Pump Capacity (gpm)	1150	1000	1000
Pump Meter (Y/N)			
VOC Detection (Y/N)	N	N	N
Nitrate Detection (Y/N)	N	N	N
Chlorination (Y/N)	Y	Y	Y
Filtration (Y/N)	Y	Y	Y
GWUDISW (Y/N)			
Surface Drainage			
State Approved(Y/N)			
Date Abandoned (year)			
Date Plugged (year)			

Sikeston

PWSS No. 4010743

Scott County, sheet 1 of 4

162 potential contaminant sources

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Map C.No.	CARES ID	Site Name	Type	Location Code	Accuracy Code	Method Code	Database Code
C1	140966	Elanco Products		UN	NV	UN	Dealcov
C2	108627	Scott-New Madrid Electric Coop		UN	NV	UN	Chemcov
C3	108628	Coleman Plant		UN	NV	UN	Chemcov
C4	108630	Sikeston Bd of Municipal Utilities		UN	NV	UN	Chemcov
C5	110225	Board Of Municipal Utilities		UN	NV	UN	Tanks
C6	110226	Board Of Municipal Utilities		UN	NV	UN	Tanks
C7	110379	Boyer Construction Company		UN	NV	UN	Tanks
C8	110498	Bridger Equipment Company		UN	NV	UN	Tanks
C9	110543	Brown Sand & Gravel Co, Inc		UN	NV	UN	Tanks
C10	111299	Charles Terrell		UN	NV	UN	Tanks
C11	111413	City Garage		UN	NV	UN	Tanks
C12	111527	City Of Miner		UN	NV	UN	Tanks
C13	111831	Community Shelter Workshop		UN	NV	UN	Tanks
C14	111964	Cooney Equipment Company		UN	NV	UN	Tanks
C15	112305	Dekalb Ag Research		UN	NV	UN	Tanks
C16	112309	Dekalb-pfizer Genetics		UN	NV	UN	Tanks
C17	112488	Don King Equipment		UN	NV	UN	Tanks
C18	113154	Ferrell Excavating		UN	NV	UN	Tanks
C19	113947	Hale Auction Company		UN	NV	UN	Tanks
C20	114303	Holiday 66 Service		UN	NV	UN	Tanks
C21	114332	Home Oil Co		UN	NV	UN	Tanks
C22	114397	Hucks #139		UN	NV	UN	Tanks
C23	114828	Joe Williams		UN	NV	UN	Tanks
C24	115060	Kellett Oil Co.		UN	NV	UN	Tanks
C25	115145	Kimo's Office Building		UN	NV	UN	Tanks
C26	115609	Lewis Bros Bakeries, Inc		UN	NV	UN	Tanks
C27	115921	Malone & Hyde Drug Dist-never Owned		UN	NV	UN	Tanks
C28	116354	Mhtd Dist Garage		UN	NV	UN	Tanks
C29	116376	Mid South Tractor Parts		UN	NV	UN	Tanks
C30	117395	Par Gas (sinclair)		UN	NV	UN	Tanks
C31	117520	Pepsi Cola		UN	NV	UN	Tanks
C32	118701	Santie Wholesale Oil Co		UN	NV	UN	Tanks
C33	118714	Saunders System Inc		UN	NV	UN	Tanks
C34	118760	Scott Co R-v School Dist		UN	NV	UN	Tanks
C35	118765	Scott-new Madrid-mississippi El Cor		UN	NV	UN	Tanks
C36	118815	Semo Motor Company		UN	NV	UN	Tanks
C37	118816	Semo Nursing Center Inc		UN	NV	UN	Tanks
C38	119100	Sikeston		UN	NV	UN	Tanks
C39	119102	Sikeston Coca-cola Bottling Co		UN	NV	UN	Tanks
C40	119103	Sikeston Concrete Prods Co, Inc		UN	NV	UN	Tanks
C41	119104	Sikeston General Oil Co		UN	NV	UN	Tanks
C42	119106	Sikeston Maint Shed		UN	NV	UN	Tanks
C43	119107	Sikeston Pepsi Cola		UN	NV	UN	Tanks
C44	119381	Southwestern Bell		UN	NV	UN	Tanks
C45	120481	Todd Corporation		UN	NV	UN	Tanks
C46	120611	Trigg Shell		UN	NV	UN	Tanks
C47	120622	Troop E Satellite		UN	NV	UN	Tanks
C48	120761	Union Pacific		UN	NV	UN	Tanks
C49	120798	United Parcel Service, Inc		UN	NV	UN	Tanks
C50	120840	Uptown Shell		UN	NV	UN	Tanks

Method Codes

Code	Address Matching (Geocoding)
A2	Block/Group
A3	Street Centerline
A4	Nearest Street Intersection
A5	Primary Street Name
A6	Digitization
AO	Other Address Matching
Z1	ZIP Code Centroid
	Census - 1990
C1	Block Centroid
C2	Block/Group Centroid
C3	Tract Centroid

Code	Global Positioning System
G1	Static Mode
G2	Kinematic Mode
G3	Differential Post Processing
G4	Precise Positioning Service
G5	Signal Averaging
G6	Real Time Differential Processing
	Interpolation
I1	Topo Map
I2	Aerial Photography (DOQQ)
I3	Satellite Imagery

Code	Other
P1	Land Survey
S2	Quarter Description
UN	Unknown

Location Codes

BL	Building
CF	Center of Facility
IN	Intersection
LS	Lagoon or Pond
MG	Main Access Point (Gate)
MA	Main Office
OT	Other
PL	Pile
RD	Road
TK	Tank, Standpipe, or Tower
WL	Well
UN	Unknown

Accuracy Codes

Code	Metric
m	Meters
km	Kilometers
	English
ft	Feet
yd	Yards
mi	Miles
UN	Unknown
NF	Site not found at database position
NV	Site position not verified

Sikeston

PWSS No. 4010743

Scott County, sheet 2 of 4

162 potential contaminant sources

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Map C.No.	CARES ID	Site Name	Type	Location Code	Accuracy Code	Method Code	Database Code
C51	120845	U-pump-it		UN	NV	UN	Tanks
C52	121651	Woodtruss		UN	NV	UN	Tanks
C53	121750	Quality Plating		UN	NV	UN	SMARS
C54	122606	Jerry James Trailers Inc.		UN	NV	UN	HW Gen
C55	123286	Scott-new Madrid-mississippi Electric		UN	NV	UN	HW Gen
C56	123833	Cooney Equipment Co.		UN	NV	UN	HW Gen
C57	123835	Semo Motor Co.		UN	NV	UN	HW Gen
C58	123836	Sikeston Dry Cleaners		UN	NV	UN	HW Gen
C59	123890	Todd, Inc.		UN	NV	UN	HW Gen
C60	124108	Satterfield Body Shop	Hazar Entry	CF	33 ft	I2	HW Gen
C61	124665	Missouri Delta Community Hospital		UN	NV	UN	HW Gen
C62	124814	Auto Tire & Parts		UN	NV	UN	HW Gen
C63	125054	Stricker Body Shop		UN	NV	UN	HW Gen
C64	125343	At&t		UN	NV	UN	HW Gen
C65	125753	King Cleaners		UN	NV	UN	HW Gen
C66	125930	Mid-south Tractor Parts		UN	NV	UN	HW Gen
C67	126133	Carnell's Body Shop		UN	NV	UN	HW Gen
C68	126233	Mo Dept Of Transportation		UN	NV	UN	HW Gen
C69	126406	Heritage American Homes		UN	NV	UN	HW Gen
C70	127163	One Day Cleaners		UN	NV	UN	HW Gen
C71	127545	Kelpro, Inc.		UN	NV	UN	HW Gen
C72	127758	Chamberlain's Amoco		UN	NV	UN	HW Gen
C73	127798	Canedy Sign Co., Inc.		UN	NV	UN	HW Gen
C74	127851	Faultless Cleaners		UN	NV	UN	HW Gen
C75	128391	Don King Salvage		UN	NV	UN	HW Gen
C76	128417	Bootheel Diesel Fuel Injection		UN	NV	UN	HW Gen
C77	128903	Sikeston Light And Water		UN	NV	UN	HW Gen
C78	128972	Missouri Highway & Transportation Dept.		UN	NV	UN	HW Gen
C79	129213	Media Press		UN	NV	UN	HW Gen
C80	129679	Dekalb Plant Genetics		UN	NV	UN	HW Gen
C81	129840	Quality Plating % Usepa Region Vii		UN	NV	UN	HW Gen
C82	130016	Central States Coca-cola		UN	NV	UN	HW Gen
C83	130088	Curtis H. Cline		UN	NV	UN	HW Gen
C84	130731	Dekalb Corp		UN	NV	UN	HW Gen
C85	132505	HANDY STREET CALCIUM ARSENATE SITE		UN	NV	UN	CERCLIS
C86	132606	MRM INDUSTRIES		UN	NV	UN	CERCLIS
C87	135413	Dekalb Agresearch Inc		UN	NV	UN	APCP
C88	136492	Mcmullin Gin Co Inc		UN	NV	UN	APCP
C89	136493	Sikeston Cotton Oil Mill Inc		UN	NV	UN	APCP
C90	136501	Missouri Delta Community Hospital		UN	NV	UN	APCP
C91	136502	Old Coal-fired Generator		UN	NV	UN	APCP
C92	136503	Sikeston Power Station		UN	NV	UN	APCP
C93	136505	Hendrick Concrete Products Corp		UN	NV	UN	APCP
C94	136506	Sikeston Woodworking		UN	NV	UN	APCP
C95	136510	Daily Standard		UN	NV	UN	APCP
C96	136514	Crowder Gin Company, Inc		UN	NV	UN	APCP
C97	136517	Marnor Aluminum Processing Inc		UN	NV	UN	APCP
C98	136521	Mrm Industries Inc		UN	NV	UN	APCP
C99	136528	Faultless Cleaners Inc		UN	NV	UN	APCP
C100	136537	Sikeston		UN	NV	UN	APCP

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Sikeston

PWSS No. 4010743

Scott County, sheet 3 of 4

162 potential contaminant sources

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Map C.No.	CARES ID	Site Name	Type	Location Code	Accuracy Code	Method Code	Database Code
C101	136539	King Laundry And Dry Cleaners		UN	NV	UN	APCP
C102	136540	Sikeston Dry Cleaners		UN	NV	UN	APCP
C103	385324	Magic Car Wash	Car wash	BL	33 ft	I2	CARES
C104	385325	Williams Auto Sales	Auto repair shop	BL	33 ft	I2	CARES
C105	385326	Rogers Auto Sales	Automotive dealership	BL	33 ft	I2	CARES
C106	385327	The House of Color	Paint store	BL	33 ft	I2	CARES
C107	385328	Drakes Auto Sales	Automotive dealership	BL	33 ft	I2	CARES
C108	385329	Hucks	Tank (underground fuel)	BL	33 ft	I2	CARES
C109	385330	Jim's Auto Sales	Automotive dealership	BL	33 ft	I2	CARES
C110	385331	Cox's Car Wash	Car wash	BL	33 ft	I2	CARES
C111	385332	Sinclair Gas	Tank (above-ground fuel)	BL	33 ft	I2	CARES
C112	385333	Midtown Motors	Automotive dealership	CF	33 ft	I2	CARES
C113	385334	C&C Motors	Automotive dealership	BL	33 ft	I2	CARES
C114	385335	Moll Priniting Company	Print shop	BL	33 ft	I2	CARES
C115	385336	Feeders Supply	Feed/Fertilizer/Co-op	BL	33 ft	I2	CARES
C116	385338	Meeks Print Shop	Other	BL	33 ft	I2	CARES
C117	385339	Cornell's Collision Repair	Auto repair shop	BL	33 ft	I2	CARES
C118	385340	FG Convienience Store	Tank (underground fuel)	BL	33 ft	I2	CARES
C119	385341	Rhodes Convienience Store	Tank (underground fuel)	BL	33 ft	I2	CARES
C120	385342	Animal Health Center	Veterinary service	BL	33 ft	I2	CARES
C121	385343	Elite Car Wash	Other	BL	33 ft	I2	CARES
C122	385344	Sikeston Fire Department	Fire station	BL	33 ft	I2	CARES
C123	385345	Allsops Woodworking	Furniture manufacturer	BL	33 ft	I2	CARES
C124	385346	Sonny's Solid Waste	Tank (above-ground fuel)	CF	33 ft	I2	CARES
C125	385349	Auto Repair	Auto repair shop	BL	33 ft	I2	CARES
C126	385350		Well (domestic)	WL	33 ft	I2	CARES
C127	385351	Riggs Building Supplies and Home Center	Hardware and lumber store	BL	33 ft	I2	CARES
C128	385352	Sabona Mfg.	Manufacturing (general)	BL	33 ft	I2	CARES
C129	385353	Janitrol/Janitor Supply	Other	BL	33 ft	I2	CARES
C130	385354	Patriot/Heritage Homes	Manufacturing (general)	BL	33 ft	I2	CARES
C131	385355	Sheltered Workshop	Sawdust pile	CF	33 ft	I2	CARES
C132	385356	Aramark	Dry cleaner	BL	33 ft	I2	CARES
C133	385357		Other	TK	33 ft	I2	CARES
C134	385358	Riggs Wholesale Co.	Hardware and lumber store	BL	33 ft	I2	CARES
C135	385359	Electric Substation	Other	CF	33 ft	I2	CARES
C136	385440	Sikeston Auto Service	Auto repair shop	BL	33 ft	I2	CARES
C137	385441	Sinclair Service Station	Tank (above-ground fuel)	BL	33 ft	I2	CARES
C138	385442	Phillips 66	Tank (underground fuel)	BL	33 ft	I2	CARES
C139	385443	Sikeston Laundry and Drycleaners	Dry cleaner	BL	33 ft	I2	CARES
C140	385444	C & K Building Materials	Hardware and lumber store	BL	33 ft	I2	CARES
C141	385445	King Laudry and Cleaners	Dry cleaner	BL	33 ft	I2	CARES
C142	385446	Moll Printing Co.	Other	BL	33 ft	I2	CARES
C143	385447	Premier Motor	Automotive dealership	BL	33 ft	I2	CARES
C144	385448	Amoco	Tank (underground fuel)	BL	33 ft	I2	CARES
C145	385449	Griffs Auto Sales	Automotive dealership	BL	33 ft	I2	CARES
C146	385450	Beaver Janitor Supply	Other	TK	33 ft	I2	CARES
C147	385451	Blanchard Funeral Parlor	Funeral service and crematory	BL	33 ft	I2	CARES
C148	385452	Service Station	Tank (underground fuel)	BL	33 ft	I2	CARES
C149	385453	Cargill	Feed/Fertilizer/Co-op	CF	33 ft	I2	CARES
C150	385454		Tank (above-ground fuel)	TK	33 ft	I2	CARES

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Sikeston

PWSS No. 4010743

Scott County, sheet 4 of 4

162 potential contaminant sources

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

Map C.No.	CARES ID	Site Name	Type	Location Code	Accuracy Code	Method Code	Database Code
C151	385455	Sikeston Seed Co., Inc.	Feed/Fertilizer/Co-op	BL	33 ft	I2	CARES
C152	385456	H & H Small Engine Repair	Auto repair shop	BL	33 ft	I2	CARES
C153	385457	Auto Repair	Auto repair shop	BL	33 ft	I2	CARES
C154	385458	J J Auto Sales	Automotive dealership	BL	33 ft	I2	CARES
C155	385459	Sikeston City Dump	Dumping and/or burning site	CF	33 ft	I2	CARES
C156	385460	William Farr and Purnell Funeral Home	Funeral service and crematory	BL	33 ft	I2	CARES
C157	385461		Well (abandoned)	BL	33 ft	I2	CARES
C158	385462		Well (abandoned)	BL	33 ft	I2	CARES
C159	385463	Sikeston Fire Station	Fire station	BL	33 ft	I2	CARES
C160	385464		Tank (above-ground fuel)	TK	33 ft	I2	CARES
C161	385465	Sikeston Highway Maintenence Facility	Highway maintenance facility	CF	33 ft	I2	CARES
C162	385466	Shell	Petroleum production or storage	BL	33 ft	I2	CARES

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Sikeston

PWSS No. 4010743

Contaminant Summary Sheet

162 potential contaminant sources

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Jun 09, 2014

162 Potential Contaminant Sources in the Listed Databases:

	AFS (EPA AIRS Facility Sites)		Perchlo (MoDNR Perchlorate Sites in Missouri)
16	APCP (MoDNR Air Pollution Control Program Sites)		Pest Ap (MDA Licensed Pesticide Applicators)
	APF (MoDNR Active Permitted Landfills & Transfer Stations)		RCRIS (EPA Resource Conservation and Recovery Information System)
2	CERCLIS (EPA CERCLIS)		Silos (USGS Minuteman II Missile Silos)
3	Chemcov (VA Selected Chemical Sites)	1	SMARS (MoDNR Superfund Management and Registry System)
1	Dealcov (MDA Pesticide Dealer Locations)	48	Tanks (MoDNR Petroleum Tank Database)
	Dioxin (MoDNR Confirmed Dioxin List)		Tier 2 (MERC Tier II Reports)
	Grain B (USDA Former Grain Bin Sites)		Tire D (MoDNR Resolved and Unresolved Waste Tire Dumps)
31	HW Gen (MoDNR Hazardous Waste Generators)		TRI (EPA Toxic Release Inventory)
	HW Tran (MoDNR Hazardous Waste Transporters)		VCP (MoDNR Voluntary Cleanup Program Sites)
	LUST (MoDNR Leaking Underground Storage Tanks)		WQIS (MoDNR Water Quality Information System)
	MoDOT (MoDOT Highway Maintenance Facilities)		
	PADS (EPA PCB Activity Data Base System)	60	SWIP Field Inventory (see below)

60 Potential Contaminant Sources in the SWIP Field Inventory:

0	Airport or abandoned airfield	0	Machine or metalworking shop
0	Animal feedlot	2	Manufacturing (general)
0	Apartments and condominiums	0	Material stockpile (industrial)
0	Asphalt plant	0	Medical institution
6	Auto repair shop	0	Metal production facility
8	Automotive dealership	0	Mining operation
0	Barber and beauty shop	7	Other
0	Boat yard and marina	1	Paint store
0	CAFO	0	Park land
0	Campground	0	Parking lot
2	Car wash	1	Petroleum production or storage
0	Cement Plant	0	Pharmacies
0	Cemetery	0	Photography shop or processing lab
0	Communication equipment mfg	0	Pit toilet
0	Country club	0	Plastic material and synthetic mfg
3	Dry cleaner	1	Print shop
1	Dumping and/or burning site	0	Railroad yard
0	Electric equipment mfg or storage	0	Recycling/reduction facility
0	Electric substation	0	Research lab
0	Farm machinery storage	0	Restaurant
3	Feed/Fertilizer/Co-op	1	Sawdust pile
2	Fire station	0	School
2	Funeral service and crematory	0	Sports and hobby shop
1	Furniture manufacturer	0	Swimming pool
0	Furniture repair or finishing shop	0	Tailing pond
0	Garden and/or nursery	5	Tank (above-ground fuel)
0	Garden, nursery, and/or florist	0	Tank (other)
0	Gasoline service station	0	Tank (pesticide)
0	Golf courses	6	Tank (underground fuel)
0	Government office	0	Trucking terminal
0	Grain bin	1	Veterinary service
3	Hardware and lumber store	0	Wastewater treatment facility
0	Hazardous waste (Federal facility)	2	Well (abandoned)
1	Highway maintenance facility	1	Well (domestic)
0	Jewelry or metal plating shop	0	Well (irrigation)
0	Junk yard or salvage yard	0	Well (livestock)
0	Lagoon (commercial)	0	Well (monitoring)
0	Lagoon (industrial)	0	Well (public water supply)
0	Lagoon (municipal)	0	Well (unknown)
0	Lagoon (residential)		
0	Landfill (municipal)		
0	Laundromat		
0	Livestock auction		

Sikeston

PWSS No. 4010743

Susceptibility Determination Sheet

8 wells

Prepared by:

CENTER FOR APPLIED RESEARCH AND ENVIRONMENTAL SYSTEMS UNIVERSITY OF MISSOURI

Missouri Department of Natural Resources

Sheet Update: Mar 14, 2014

The Missouri Department of Natural Resources (MoDNR) has assembled this information to assess the susceptibility of drinking water sources to contamination. There are many unforseen and unpredictable factors that may cause a source to be contaminated. MoDNR routinely monitors all public supplies to ensure public health is protected. Public water systems and local communities are encouraged to take all measures possible to reduce the susceptibility of their drinking water source to chemical contamination. For more information, call 1-800-361-4827.	Not Susceptible	Moderately Susceptible	Highly Susceptible	Incomplete Data
A system is highly susceptible because of construction deficiencies if:				
A well was not constructed according to plans approved by MoDNR-PDWB,				X
A well was not cased to a depth approved by MoDNR,				X
A well casing is not of sufficient weight,				X
A well is not sufficiently sealed (grouted) around the casing, or A well has developed holes in the casing or other flaws that compromise its integrity.				X
A system is highly susceptible due to direct influence of surface water if:				
A well has tested positive for surface water indicators such as algae or high turbidity.				X
A system is highly susceptible to surface contaminants if:				
A well casing does not extend 12 inches above the well house floor, or 18 inches above the ground surface,				X
A well casing does not extend four feet above the 100-year flood level, or four feet above the highest known flood elevation,				X
A well is not provided with a properly screened vent, or				X
All openings in a well casing are not properly sealed.				X
A system is highly susceptible based on detection histories if:				
Volatile Organic Chemicals (VOCs) have been detected in a well,	X			
Synthetic Organic Chemicals (SOCs) have been detected in a well,				X
Inorganic Chemicals (IOCs) have been detected in a well above naturally occurring levels,				X
Nitrates have been detected at or above one-half the MCL,	X			
Bacteria has been consistently detected in a well, or				X
Viruses or microbiological contaminants are detected in a well.				X
A system is highly susceptible to weather, vandalism, and sabotage if:				
A well is not in a locked well house of adequate construction.				X (1)
A system is moderately susceptible due to local geology if:				
A producing aquifer is less than 100 feet below the surface,	X			
A producing aquifer has conduit flow conditions due to surficial karst topography,				X
A producing aquifer is not overlain by an impermeable confining layer,				X
A producing aquifer is overlain by a conductive (>5X10e-4) formation (including soil), or				X
A producing aquifer is confined, but there are open wells nearby penetrating that layer.				X
A system is moderately susceptible to contaminants if:				
Any contaminants listed in Appendix F-a are found in the source water area,		X (2)		
Septic systems are present in the source water area,				X
A well is indirectly connected to a surface water body,				X
A submersible well pump cannot be ruled out from containing PCBs or PHAs, or				X
There is a high density of transportation corridors in the source water area.				X
A system is highly susceptible to contamination if:				
Any contaminant sites identified in the source water area are known to have contaminated groundwater that may migrate toward a well.				X

(1) This system was not assessed to determine if adequate security devices such as padlocks, gates, and lighting are in place to deter vandals and saboteurs. All water systems should have this type of protection in place.
(2) A well (or wells) serving this system has been determined to be susceptible due to the presence of potential contaminant sources. The water system and the wellhead protection team should take extra care to ensure that all potential contaminants in the source water area are handled properly to avoid contamination of the drinking water supply.

Appendix 9

Alternate Source Demonstration
March 10, 2021
MW-1

1505 East High Street
Jefferson City, Missouri 65101
Telephone (573) 659-9078
www.ger-inc.biz

GREDELL Engineering Resources, Inc.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for Fly Ash Pond – Calcium, Sulfate, and Total Dissolved Solids in MW-1
Alternate Source Demonstration

Prepared for:

BMU Sikeston
Board of Municipal Utilities

Sikeston Power Station
1551 West Wakefield Avenue
Sikeston, MO 63801

STATE OF MISSOURI
MIKEL C. CARLSON
3-10-21
RG 0126
REGISTERED GEOLOGIST

STATE OF MISSOURI
THOMAS R. GREDELL
03-10-21
NUMBER PE-021137
PROFESSIONAL ENGINEER

March 2021

PROFESSIONAL ENGINEER'S CERTIFICATION

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

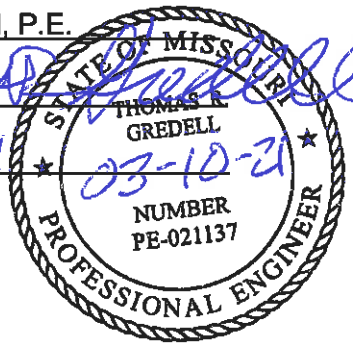
I, Thomas R. Gredell, P.E., a professional engineer licensed in the State of Missouri, hereby certify in accordance with 40 CFR 257.94(e)(2) to the accuracy of the alternate source demonstration described in the following report for the Sikeston Board of Municipal Utilities, Sikeston Power Station, Fly Ash Pond CCR unit. The report demonstrates that the statistically significant increases of sulfate, total dissolved solids, and calcium in MW-1 resulted from a source other than the CCR unit. 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 generally accepted methods.

Name: Thomas R. Gredell, P.E.

Signature: _____

Date: March 10, 2021 03-10-21

Registration Number: PE-021137
State of Registration: Missouri



Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond – Calcium, Sulfate, and
Total Dissolved Solids in MW-1
Alternate Source Demonstration

March 2021

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1.0 INTRODUCTION

This Alternate Source Demonstration (ASD) Report has been prepared to address the results of the semi-annual sampling event initiated on September 22, 2020 at the Sikeston Board of Municipal Utilities (SBMU) Sikeston Power Station's (SPS) Fly Ash Pond, a coal combustion residual (CCR) surface impoundment. Following receipt of final data on October 16, 2020, statistical analysis was performed by GREDELL Engineering Resources, Inc. (Gredell Engineering) for the parameters listed in Appendix III to Part 257 – Constituents for Detection Monitoring. Following this analysis, it was determined that several reported concentrations exceeded their respective prediction limits for the well constituent pairs. These well constituent pairs were; Boron, Calcium, Sulfate, and Total Dissolved Solids (TDS) in sample MW-1; Boron in sample MW-2, and; pH in samples MW-7 and MW-9. Resampling for these well constituent pairs was conducted on December 8, 2020 (MW-1 and MW-2), and January 26, 2021 (MW-7 and MW-9). Following receipt of final data from the resampling events, it was confirmed that Calcium, Sulfate, and TDS concentrations in sample MW-1, and pH in sample MW-9 represent statistically significant increases (SSIs). As a consequence, SBMU-SPS requested that Gredell Engineering conduct an evaluation of the results and develop ASDs if warranted for Calcium, Sulfate, and TDS in MW-1 and pH in MW-9. The apparent increase of pH in MW-9 is the subject of a separate ASD report. Boron in sample MW-2, and pH in sample MW-7 were not confirmed by resampling and therefore are not SSIs.

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. 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 certified demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e).

Gredell Engineering has completed an evaluation of the groundwater sampling event, the associated data, and other potential factors, for the SBMU SPS Fly Ash Pond groundwater monitoring well system to determine if an alternate source is the cause of the apparent SSIs of Calcium, Sulfate, and TDS in MW-1. This report presents the results of that evaluation and includes supporting documentation.

2.0 OBSERVATIONS AND DATA COLLECTION

The Fly Ash Pond groundwater monitoring well system consists of five wells, designated MW-1, MW-2, MW-3, MW-7, and MW-9 (Figure 1). Monitoring wells MW-1, MW-2, and MW-3 were installed in April 2016. Monitoring well MW-7 was installed in April 2017. Monitoring well MW-9 was installed in November 2017. All five monitoring wells were sampled on an approximate monthly basis beginning in March 2018 and ending in December 2018 to establish a background data base. Additional information regarding these wells is available in the Groundwater Monitoring, Sampling and Analysis Plan for the site (Gredell Engineering, 2018).

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 result for each detection monitoring constituent from each well is compared to its respective prediction limit. If a result exceeds the respective prediction limit for a particular constituent well pair, or is outside the predicted range (in the case of pH), SSI over background is suspected.

Monitoring well MW-1 is located west of the Fly Ash Pond and within the containment area of the coal storage area (Figure 1). The well is situated between the north edge of the coal pile and the coal pile runoff diversion ditch. MW-1 was originally installed in April 2016 as a piezometer for the hydrogeologic characterization of the uppermost aquifer flowing beneath the Fly Ash and Bottom Ash Ponds at the site (Gredell Engineering, 2017). This piezometer was converted to a downgradient monitoring well and retained for routine groundwater elevation monitoring and NPDES compliance sampling. Additional sampling locations were proposed, and two additional downgradient wells (MW-7 and MW-9) were installed for Fly Ash Pond monitoring in April 2017 and November 2017, respectively. Groundwater elevation monitoring since 2016 has consistently demonstrated that flow direction is to the west-southwest, as indicated on Figure 1.

The September 22, 2020 detection monitoring event was preceded by abnormally heavy precipitation and elevated water table conditions in 2019 and 2020 as discussed in previous reports (Gredell Engineering, 2020), and illustrated on Figure 2. The long-term changes in water table elevation are apparent on a hydrograph of groundwater elevations in all Fly Ash Pond monitoring wells (Figure 2). This figure also indicates the range in groundwater elevations during the background sampling period and each year since completion of background sampling. As is evident on this figure, there is a cyclic seasonal variance in water levels in the aquifer characterized by elevated water table conditions in the spring and lower water table in the fall. However, also evident on this figure is a multi-year trend in the groundwater elevation data characterized by progressively higher annual maximum and minimum water table elevations since inception of Part 257 Fly Ash Pond monitoring in March 2018.

During periods of abnormally heavy rainfall, infiltration to a shallow unconfined aquifer (recharge) is increased and groundwater mounding may result. Rainfall that exceeds the infiltration capacity becomes surface runoff. Within the coal storage area, this surface runoff moves toward the

unlined perimeter diversion ditch (Figure 1). Runoff concentrates in this unlined diversion and flows counterclockwise around the coal storage area within close proximity to MW-1. Because the diversion is unlined, additional infiltration and aquifer recharge is expected to occur. The excessive runoff in 2020 is illustrated by the photographs presented as Figures 3 and 4 taken in early 2020. They show considerable coal sediment in the diversion ditch, which is not apparent in a photograph from November 2017 (Figure 5).

Increased infiltration and recharge to a shallow, unconfined aquifer will cause a rise in water table elevation. As a consequence, formerly unsaturated alluvium becomes saturated and additional geochemical interactions will occur between pore waters and the newly saturated materials. These additional interactions have the potential to affect groundwater geochemistry and result in observations not previously documented for the chronically saturated (and deeper) alluvium.

The analytical data for Boron, Calcium, Sulfate, and TDS in MW-1 for the September 2020 sampling event, and subsequent resampling data are summarized on Table 1.

Table 1 - MW-1 Detection Monitoring Results and Prediction Limits

	Boron (mg/L)	Calcium (mg/L)	Sulfate (mg/L)	TDS (mg/L)
Detection Sampling September 22, 2020	620	67	67	310
Resample December 8, 2020	440	49	43	250
Prediction Limit	544.6	45.18	31.57	223.2

Boron, Calcium, Sulfate, and TDS concentrations in the MW-1 sample from the September sampling event exceeded their respective prediction limits. A resampling event was conducted and, following receipt of final analytical data on December 23, 2020, the apparent SSIs for Calcium, Sulfate, and TDS in the MW-1 sample were confirmed. However, the analytical data for Boron did not confirm an SSI in the MW-1 sample.

During the preparation of a previous ASD for MW-1 (Gredell Engineering, 2020), additional sampling was conducted in February 2020 (Figure 1). Two temporary borings (ASD-1 and ASD-2) were advanced along the margin of the existing coal pile to allow sampling of the shallow groundwater between the coal pile and the underlying aquifer. Groundwater was also sampled at MW-1, along with a surface water sample collected from the Fly Ash Pond (FAP-SW). Each sample was analyzed for major anions and cations to conduct geochemical analysis. A Piper Trilinear Plot (Piper, 1944) was developed with Sanitas™ Water (Version 9.6.24; 2019) to identify similarities/variations in hydrochemical facies (Freeze and Cherry, 1979). The reported concentrations are summarized on Table 2. These data were used to evaluate geochemical

relationships between the samples with the objective of identifying the most plausible source for the apparent SSIs at MW-1.

Table 2 - Alternate Source Demonstration Sampling Results Summary February 2020

	ASD-1	ASD-2	MW-1	FAP-SW
Calcium (mg/L)	79.1	120	43.0	18.4
Sulfate (mg/L)	151	152	25	21
TDS (mg/L)	860	700	170	175
Magnesium (mg/L)	28.7	27.4	9.06	4.96
Potassium (mg/L)	9.74	9.46	1.72	18.7
Sodium (mg/L)	151	135	7.40	36.7
Bicarbonate (mg/L)	350	508	128	172
Carbonate (mg/L)	0	0	0	0
Chloride (mg/L)	35	20	5	5

3.0 SUMMARY OF DATA ANALYSIS AND FINDINGS

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. Chapter 4 of the Unified Guidance discusses groundwater monitoring programs and statistical analysis of the associated data. A key component of statistical analysis is "*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 Fly Ash Pond groundwater monitoring well system and for that reason are listed below.

1. Chapter 4, page 4-8: *Is the result a false positive? That is, were the data tested simply an unusual sample of the underlying population triggering an SSI? Generally, this can be evaluated with repeat sampling.*
2. 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.*
3. Chapter 4, page 4-9: *Is there hydrologic evidence of any migration of contaminants from off-site sources or from other non-regulated units? Are any of these contaminants observed upgradient of the regulated units?*

Each of these considerations were used to evaluate the background data and the validity of the apparent SSIs of Boron, Calcium, Sulfate, and TDS in MW-1. The results of this evaluation are discussed below.

Unified Guidance Consideration 1

The suspicion that the September 22, 2020 results are a false positive was considered and, as suggested by Unified Guidance, was evaluated with repeat sampling. In this case, re-sampling was conducted at MW-1 on December 8, 2020 to assess the validity of the apparent SSIs. The results of the primary sampling and re-sampling event are presented in Table 1.

These data suggest that the primary sampling event data resulted in a false positive for Boron in sample MW-1. However, the following questions remain: *were the data tested simply an unusual sample of the underlying population triggering an SSI?,* or could other causative factors be present that result in unusual or elevated concentrations of Calcium, Sulfate, and TDS that trigger false positive SSIs?

Unified Guidance Consideration 2

The background sampling period for well MW-1 spans a timeframe of less than nine months. A short background sampling period may not be representative of longer-term natural variations in groundwater quality. Natural seasonal and multi-year (temporal) variations are apparent in this unconfined alluvial aquifer. These natural variations may result in changes in concentrations of detection monitoring parameters that appear to be SSIs. However, these SSIs may be *due to longer-term (i.e., seasonal or multi-year) variation* that is *not accounted for in the sampling scheme* that was intended to represent natural variations in the aquifer.

Seasonal variation characterized by higher groundwater elevations beginning in the spring followed by lower elevations beginning in the fall have been evident during each year since monitoring for Part 257 began for the Fly Ash Pond (Figure 2). The background monitoring period of the Fly Ash Pond monitoring system spanned March 2018 to December 2018, which did not include a complete cycle of seasonal variations, or a sample representative of the winter season when the resampling event occurred (January).

A three-year long increasing trend in minimum and maximum annual groundwater elevations is also evident on Figure 2. This figure is a hydrograph of groundwater elevations in all Fly Ash Pond monitoring wells. Note that Figure 2 also summarizes the range in groundwater elevations during the background sampling period and each year since background sampling was completion. This multi-year increase in groundwater elevations is the aquifer's natural response to increased recharge. Because these groundwater elevation increases are observed in all wells, including those located hydraulically upgradient of the pond, they are not attributed changes in site conditions, but rather larger-scale natural changes in the aquifer. As a result, formerly unsaturated alluvium becomes saturated and additional geochemical interactions will occur between pore waters and the newly saturated materials. These additional interactions have the potential to affect groundwater geochemistry and result in observations not previously documented for the chronically saturated (and deeper) alluvium.

In summary, there are natural seasonal and multi-year variations in the alluvial aquifer at the site that were not observed during the background monitoring period. The apparent SSIs of Calcium, Sulfate, and TDS in MW-1 may be due to temporal variation in the aquifer not accounted for in the background sampling scheme, which lead to overly-restrictive prediction limits.

Unified Guidance Consideration 3

A release from a plausible source will contribute water with elevated concentrations of indicator constituents to the aquifer. This water with elevated concentrations mixes with, and is diluted by, the natural (un-impacted) groundwater, which is characterized by relatively low (background) concentrations of these indicator constituents. The data summarized in Table 2 demonstrate that the concentrations of Calcium, Sulfate, and TDS in samples collected from ASD-1 and ASD-2 are at least four times greater than reported for the sample from the Fly Ash Pond, and considerably higher than

the sample from MW-1. This suggests that water from the coal storage area is a more plausible source for these constituents in MW-1 than water derived from the Fly Ash Pond.

The area of change in groundwater geochemistry as it flows away from a source is referred to as a mixing zone. A Piper Trilinear Plot is a common and convenient tool for showing the effects of mixing waters. The mixing zone will plot on a straight line joining the source to the receiving water (Freeze and Cherry, 1979).

The cation/anion data in Table 2 was used to produce the Piper Trilinear Plot in Figure 6. The concentrations presented in Table 2 for each constituent are first converted from mg/L to milliequivalents per liter (mEq/L) through a calculation based on their valence charge and molecular weight. The concentrations of these major anions and cations in mEq/L are then expressed in relative percentages on the trilinear plot to assess the geochemistry of the sample. Hydrochemical facies can be assessed based on the location of each point, or cluster of points, on the Piper Trilinear Plot.

Major anion data are summarized by the triangular plot on the right side of Figure 6, which indicates that all samples plot in a similar area or facies, with separation owing to minor differences in Bicarbonate concentrations (Carbonate was absent in all samples). Most notable, however, is that the anion fingerprint in MW-1 is more similar to ASD-1 and ASD-2 than it is to the sample from the Fly Ash Pond. The triangular plot on the left side summarizes the major cation data and indicates that the samples cluster in three different areas or facies (MW-1 in “Calcium-type”, FAP-SW in “Sodium- or Potassium-type”, and ASD-1 and ASD-2 in “No dominant type” (Freeze and Cherry, 1979)). The anion and cation data can be considered collectively with the diamond portion of the Piper Trilinear Plot to assess if all samples plot collinearly.

The Piper Trilinear Plot suggests three separate geochemical populations defined by the samples from the coal storage area (ASD-1 and ASD-2), the Fly Ash Pond (FAP-SW), and MW-1. A sample from a chemical source should plot collinear with samples associated with the mixing zone. ASD-1 and ASD-2 plot closer to MW-1 and are therefore more geochemically similar to MW-1. Conversely FAP-SW plots farther from MW-1 and is less geochemically similar to MW-1. Additionally, FAP-SW plots along a different straight line with MW-1 than ASD-1 and ASD-2. The hydrograph for MW-1 on Figure 2 illustrates the increase in groundwater elevations in the past three years resulting from abnormal precipitation. Moreover, this abnormal precipitation has led to excessive runoff and sedimentation from the stockpiled coal into the perimeter diversion that flows near MW-1, as presented in Figures 1, 3, and 4. A photograph of the same area taken in November 2017 (Figure 5) shows no excessive sedimentation, suggesting that the atypically heavy precipitation is a changed condition resulting in increased infiltration of coal-impacted surface water downward into the groundwater environment.

4.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of the data presented in this demonstration, Gredell Engineering concludes that the apparent SSIs of Calcium, Sulfate, and TDS in MW-1, detected following the September 22, 2020 sampling event, are attributable to false positive prediction limit exceedances of Calcium, Sulfate, and TDS at MW-1 resulting from naturally occurring variation and an alternate source originating in the coal storage area. None of these causes are attributed to or result from a release from the Fly Ash Pond. The following supports this conclusion:

- The background sampling period was completed in less than 9 months and therefore does not encompass natural seasonal or multi-year variations in groundwater chemistry.
- Natural seasonal and multi-year variation in the aquifer is demonstrated on hydrographs for each well, including wells upgradient of the ash pond. This variation leads to geochemical interactions between groundwater and previously unsaturated alluvium that did not occur during background data acquisition.
- Groundwater samples collected in the coal storage area (Gredell Engineering, 2020) have elevated concentrations of Calcium, Sulfate, and TDS relative to MW-1 and the Fly Ash Pond.
- Calcium, Sulfate, and TDS concentrations derived from the Fly Ash Pond are not high enough to be mixed with (and diluted by) natural (un-impacted) groundwater and exceed their respective prediction limits for MW-1.
- Piper Trilinear Plot analysis demonstrates that groundwater from MW-1 is geochemically more similar to groundwater under the coal storage area than water in the Fly Ash Pond, and the groundwater under the coal storage area represents a different mixing zone than would result from waters in the Fly Ash Pond.
- Higher than normal precipitation preceding the groundwater monitoring resulted in excessive runoff from the coal storage area that was conveyed as surface runoff into the unlined diversion ditch that lies in close proximity to MW-1. This excessive runoff and coal sedimentation increases the likelihood that infiltration of coal impacted surface water into the groundwater environment had a deleterious effect on the sample results from MW-1. The abnormal precipitation and excessive runoff is viewed as a temporary changed condition, as evidenced by a comparison of the photographs of the perimeter diversion ditch presented as Figures 3, 4, and 5.

Based on these conclusions, Gredell Engineering recommends that semi-annual detection monitoring continue in accordance with §257.94. Gredell Engineering also recommends the following:

- Periodic inspection and maintenance of the diversion ditch enclosing the coal storage area would ensure excess sediment from the coal stockpiles is removed.
- Update background data sets for the Fly Ash Pond groundwater monitoring system wells to included data representative of the effects resulting from multi-year variation in groundwater elevation.

- Monitoring well MW-1 should be relocated closer to the Fly Ash Pond to reduce influence of the coal storage area on groundwater monitoring results for Part 257 compliance.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of the client and GREDELL Engineering Resources, Inc. for the specific project discussed in accordance with generally accepted environmental practices common to this locale at this time. The report is applicable only to this specific project and identified site conditions as they existed at the time of report preparation. The use of this report by others to develop independent interpretations of data or conclusions not explicitly stated in this report are the sole responsibility of those firms or individuals.

This report is not a guarantee of subsurface conditions. Variations in subsurface conditions may be present that were not identified during this or previous investigations. Interpretations of data and recommendations made in this report are based on observations of data that were available and referred to in this report unless otherwise noted. No other warranties, expressed or implied, are provided.

6.0 REFERENCES

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Figures

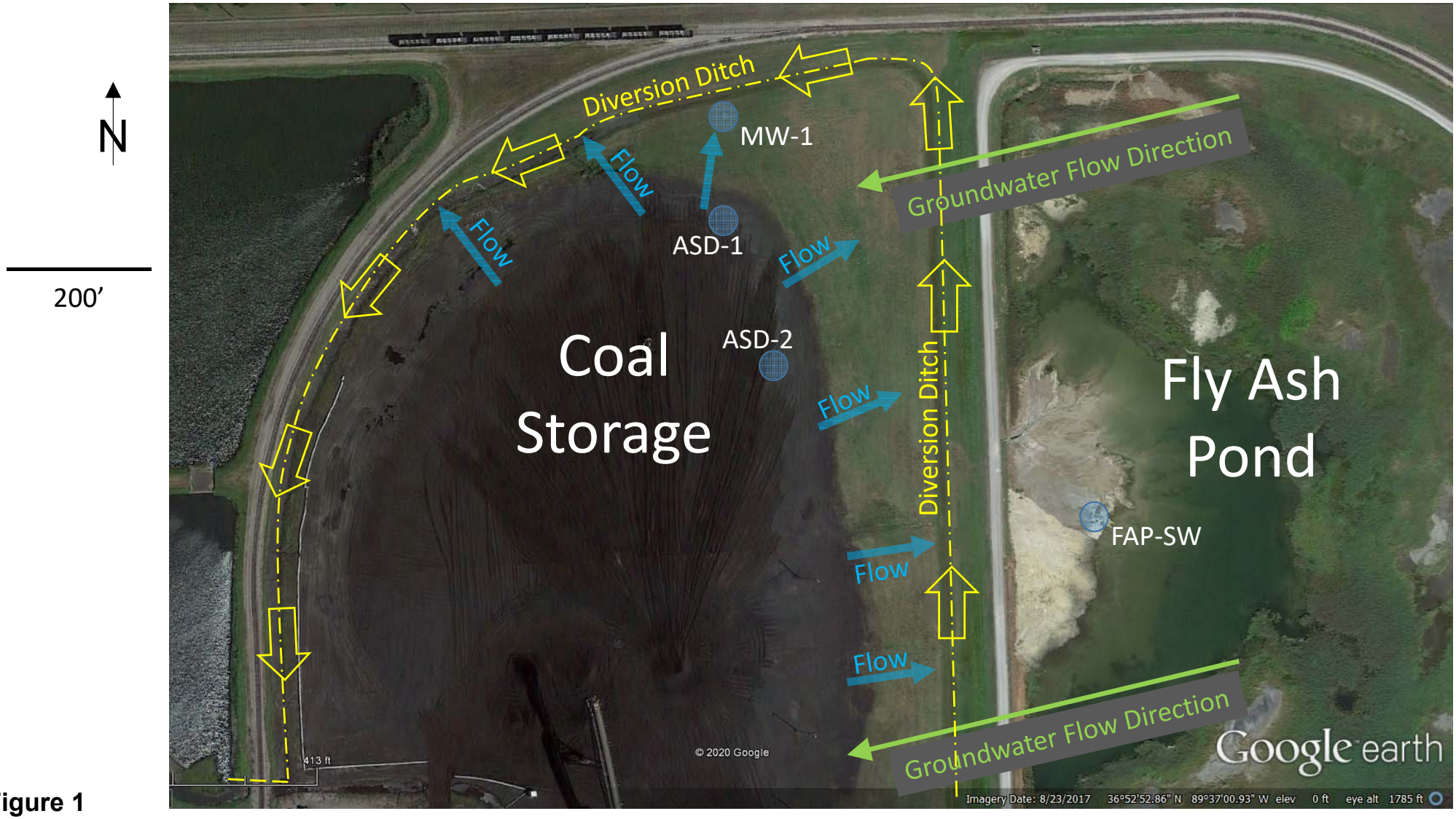


Figure 1
Site Map and Sampling Locations

Prepared by: GREDELL Engineering Resources, Inc.

Notes:

1. Groundwater elevations do not indicate chemical sampling occurred.
2. Annual range of groundwater elevations depicted with shaded boxes.

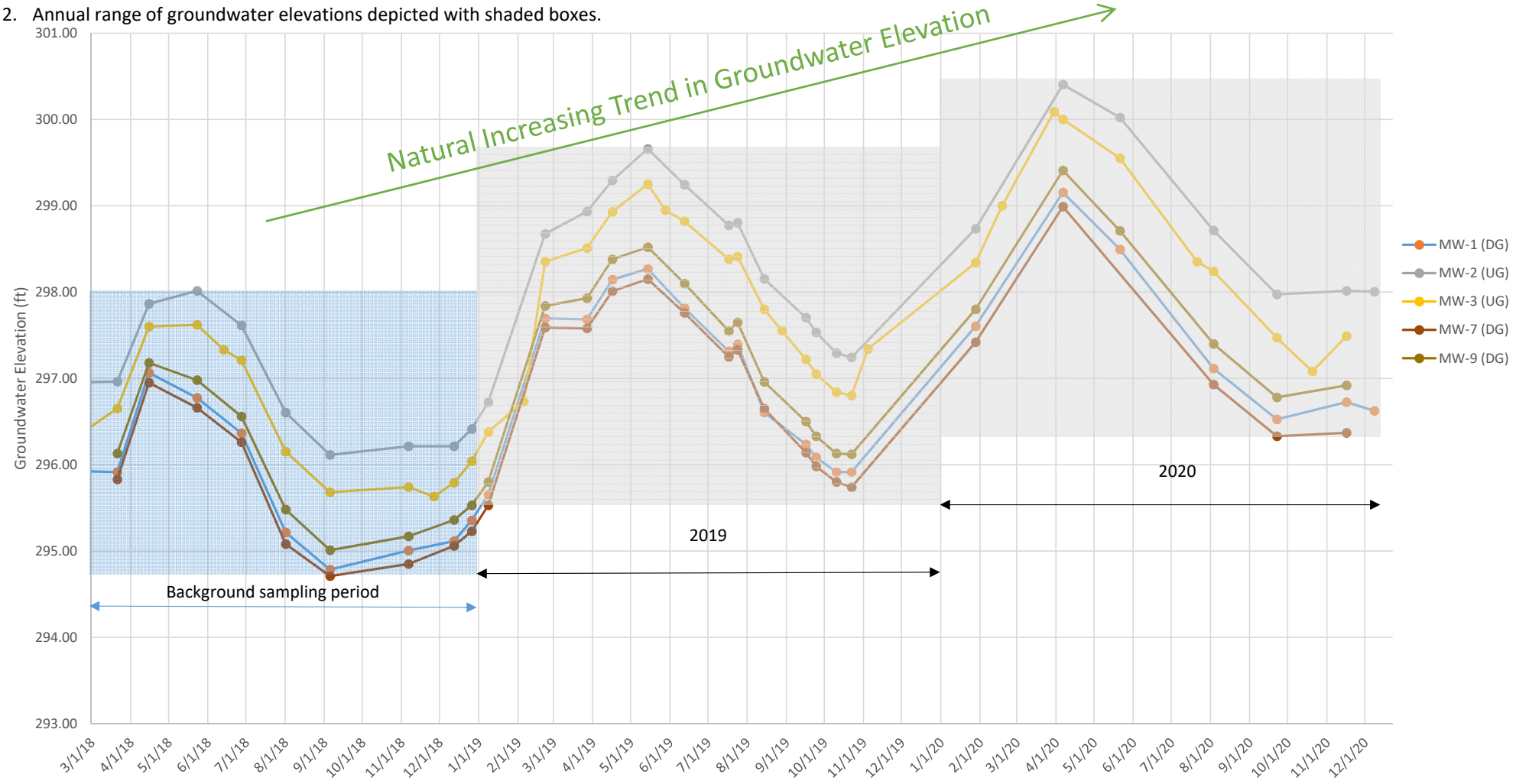


Figure 2
Fly Ash Pond Monitoring Well Hydrographs

Prepared by: GREDELL Engineering Resources, Inc.

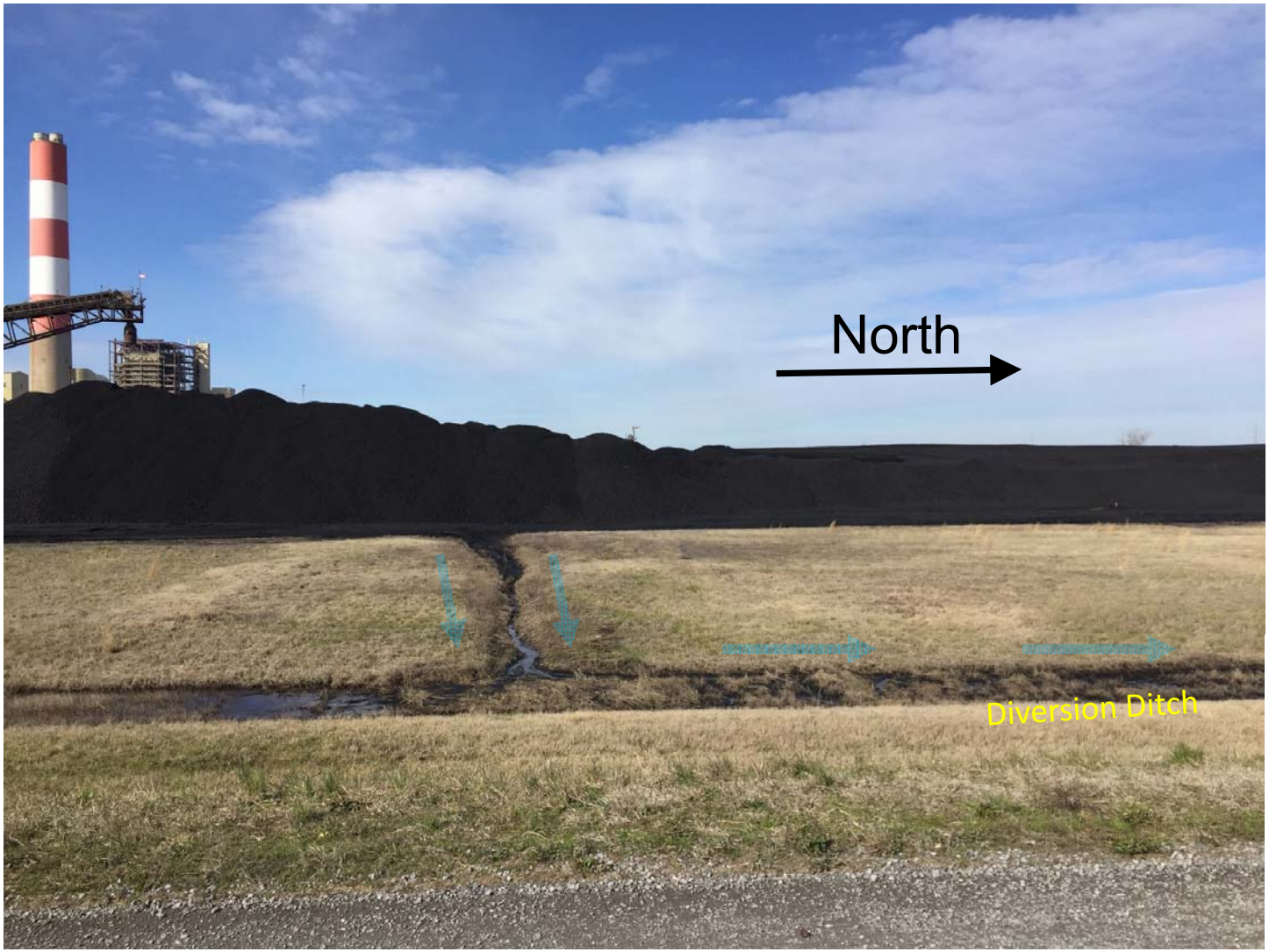


Figure 3
Diversion Ditch Photo February 2020 - Looking West

Prepared by: GREDELL Engineering Resources, Inc.

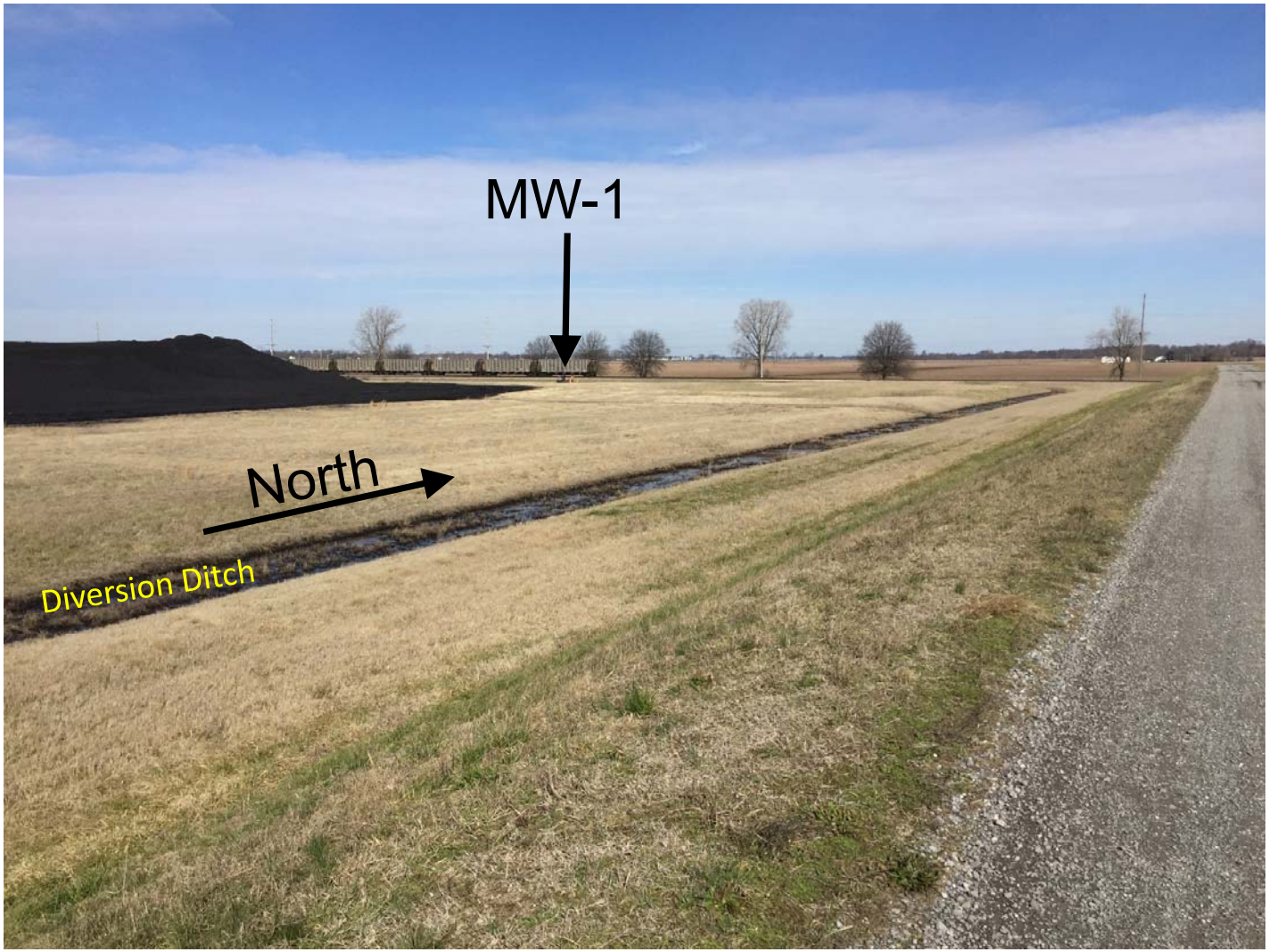
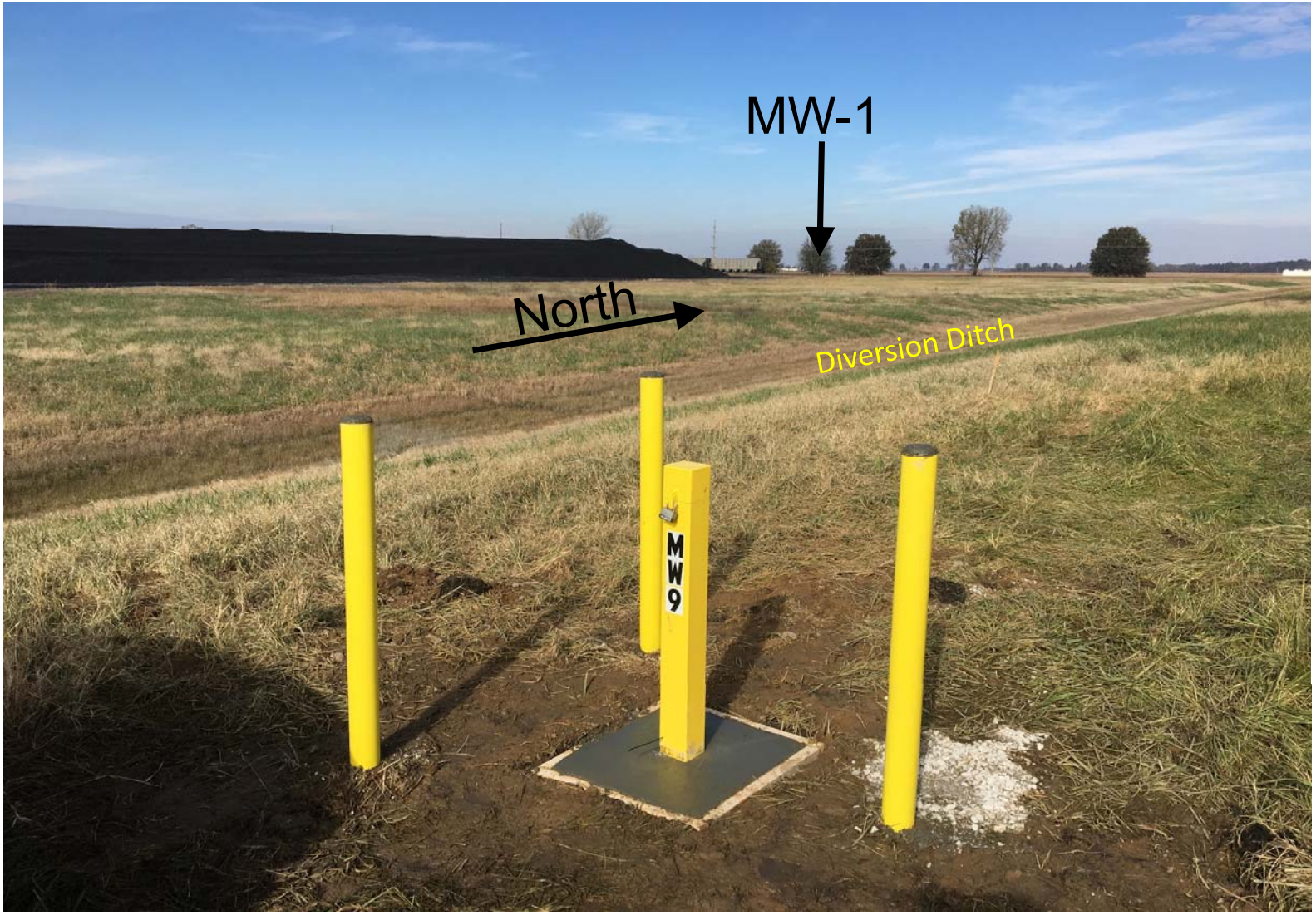


Figure 4
Diversion Ditch Photo February 2020 - Looking Northwest

Prepared by: GREDELL Engineering Resources, Inc.

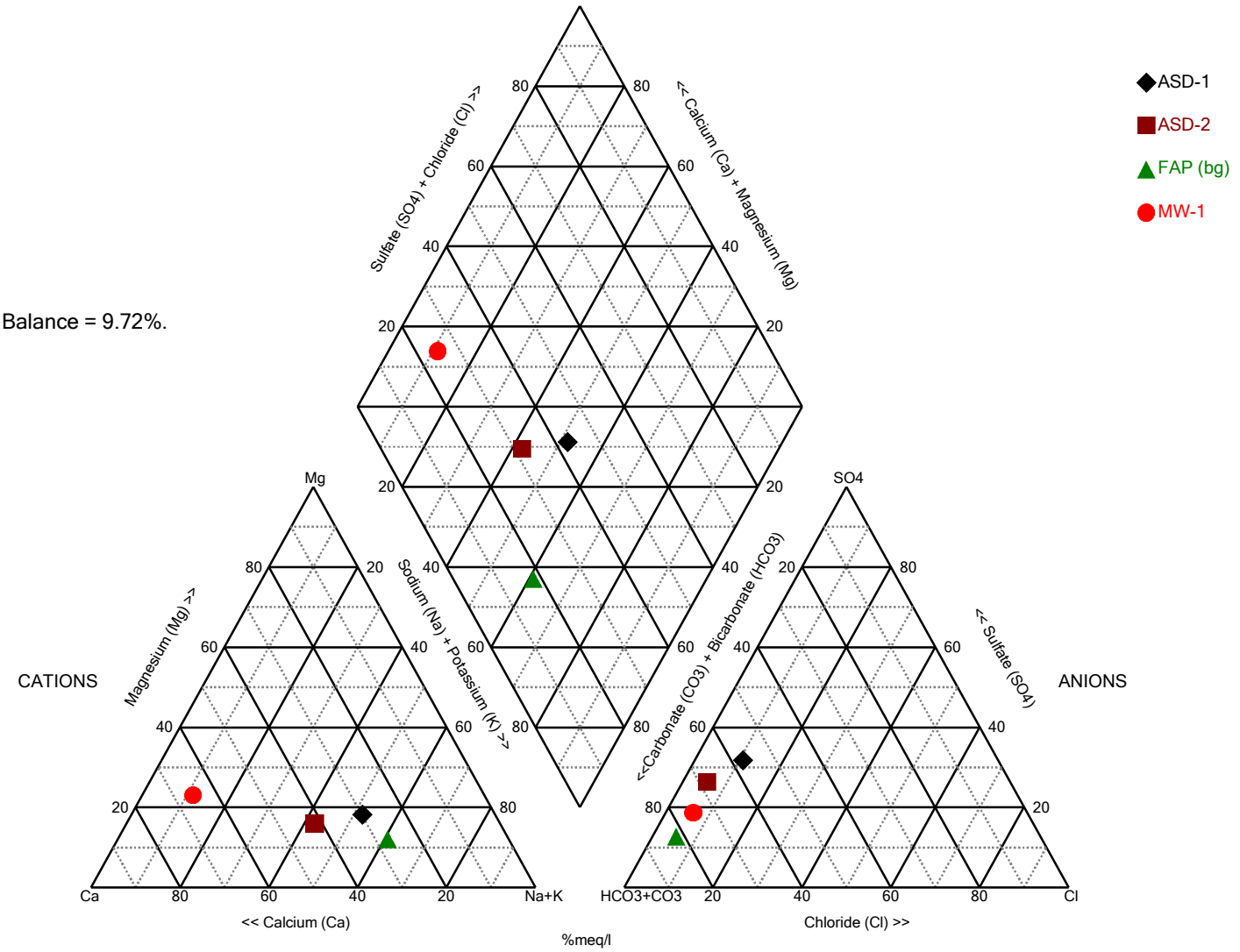


11-13-2017

Figure 5
Diversion Ditch Photo November 2017 - Looking Northwest

Prepared by: GREDELL Engineering Resources, Inc.

Cation-Anion Balance = 9.72%.



Analysis Run 3/11/2020 9:57 AM

SBMU-Sikeston Power Station Client: GREDELL Engineering Data: ASDEDD

Figure 6
Piper Trilinear Plot

Prepared by: GREDELL Engineering Resources, Inc.

Appendix 9

Alternate Source Demonstration
March 10, 2021
MW-9

1505 East High Street
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GREDELL Engineering Resources, Inc.

Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond – pH in MW-9
Alternate Source Demonstration

Prepared for:

BMU Sikeston
Board of Municipal Utilities

Sikeston Power Station
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3-10-21
NUMBER PE-021137
PROFESSIONAL ENGINEER

March 2021

PROFESSIONAL ENGINEER'S CERTIFICATION

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

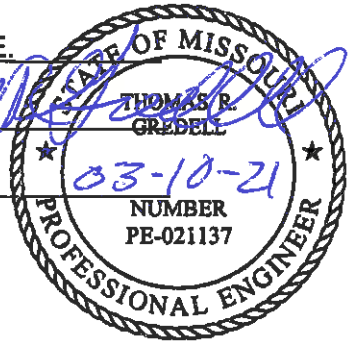
I, Thomas R. Gredell, P.E., a professional engineer licensed in the State of Missouri, hereby certify in accordance with 40 CFR 257.94(e)(2) to the accuracy of the alternate source demonstration described in the following report for the Sikeston Board of Municipal Utilities, Sikeston Power Station, Fly Ash Pond CCR unit. The report demonstrates that the statistically significant increases of pH in MW-9 resulted from a source other than the CCR unit. 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 generally accepted methods.

Name: Thomas R. Gredell, P.E.

Signature: _____

Date: March 10, 2021 03-10-21

Registration Number: PE-021137
State of Registration: Missouri



Sikeston Board of Municipal Utilities
Sikeston Power Station
Detection Monitoring Program for
Fly Ash Pond – pH in MW-9
Alternate Source Demonstration

March 2021

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1.0 INTRODUCTION

This Alternate Source Demonstration (ASD) Report has been prepared to address the results of the semi-annual sampling event initiated on September 22, 2020 at the Sikeston Board of Municipal Utilities (SBMU) Sikeston Power Station's (SPS) Fly Ash Pond, a coal combustion residual (CCR) surface impoundment. Following receipt of final data on October 16, 2020, statistical analysis was performed by GREDELL Engineering Resources, Inc. (Gredell Engineering) for the parameters listed in Appendix III to Part 257 – Constituents for Detection Monitoring. Following this analysis, it was determined that several reported concentrations exceeded their respective prediction limits for the well constituent pairs. These well constituent pairs were; Boron, Calcium, Sulfate, and Total Dissolved Solids (TDS) in sample MW-1; Boron in sample MW-2, and; pH in samples MW-7 and MW-9. Resampling for these well constituent pairs was conducted on December 8, 2020 (MW-1 and MW-2), and January 26, 2021 (MW-7 and MW-9). Following receipt of final data from the resampling events, it was confirmed that Calcium, Sulfate, and TDS concentrations in sample MW-1, and pH in sample MW-9 represent statistically significant increases (SSIs). As a consequence, SBMU-SPS requested that Gredell Engineering conduct an evaluation of the results and develop ASDs if warranted for Calcium, Sulfate, and TDS in MW-1 and pH in MW-9. The apparent increases of Calcium, Sulfate, and TDS in MW-1 relative to the background data set are the subject of a separate ASD report. Boron in sample MW-2, and pH in sample MW-7 were not confirmed by resampling and therefore are not SSIs.

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. 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 certified demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e).

Gredell Engineering has completed an evaluation of the groundwater sampling event, the associated data, and other potential factors, for the SBMU SPS Fly Ash Pond groundwater monitoring well system to determine if an alternate source is the cause of the apparent SSI in pH at MW-9. This report presents the results of that evaluation and includes supporting documentation.

2.0 OBSERVATIONS AND DATA COLLECTION

The Fly Ash Pond groundwater monitoring well system consists of five wells, designated MW-1, MW-2, MW-3, MW-7, and MW-9 (Figure 1). Monitoring wells MW-1, MW-2, and MW-3 were installed in April 2016. Monitoring well MW-7 was installed in April 2017. Monitoring well MW-9 was installed in November 2017. All five monitoring wells were sampled on an approximate monthly basis beginning in March 2018 and ending in December 2018 to establish a background data base. Additional information regarding these wells is available in the Groundwater Monitoring, Sampling and Analysis Plan for the site (Gredell Engineering, 2018).

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 result for each detection monitoring constituent from each well is compared to its respective prediction limit. If a result exceeds the respective prediction limit for a particular constituent well pair, or is outside the predicted range (in the case of pH), SSI over background is suspected.

All monitoring wells in the Fly Ash Pond groundwater monitoring system are monitored in the field for pH. All other Part 257 Appendix III detection monitoring constituents are reported following laboratory analysis. Table 1 summarizes the background and detection monitoring pH results. The bottom two rows of Table 1 summarize the Upper and Lower Prediction Limit (UPL and LPL, respectively) for pH in each well. The UPL and LPL represent the acceptable pH range in each well based on the background monitoring data.

The pH in samples MW-7 and MW-9 exceeded the UPL on September 22, 2020. These wells were resampled on January 26, 2021 to assess validity of the suspected change in conditions. The pH in sample MW-7 did not confirm a statistically significant change on January 26, 2021, but the apparent pH SSI associated with MW-9 was confirmed and is the subject of this ASD.

The September 22, 2020 detection monitoring event was preceded by abnormally heavy precipitation and elevated water table conditions in 2019 and 2020 as discussed in previous reports (Gredell Engineering, 2020), and illustrated on Figure 2. The long-term changes in water table elevation are apparent on a hydrograph of groundwater elevations in all Fly Ash Pond monitoring wells (Figure 2). This figure also indicates the range in groundwater elevations during the background sampling period and each year since completion of background sampling. As is evident on this figure, there is a cyclic seasonal variance in water levels in the aquifer characterized by elevated water table conditions in the spring and lower water table in the fall. However, also evident on this figure is a multi-year trend in the groundwater elevation data characterized by progressively higher annual maximum and minimum water table elevations since inception of Part 257 Fly Ash Pond monitoring in March 2018.

Table 1 – Fly Ash Pond Monitoring System Historical pH Database

Date	Monitoring Purpose	pH (S.U.)				
		MW-1 (DG)	MW-2 (UG)	MW-3 (UG)	MW-7 (DG)	MW-9 (DG)
3/21/2018	Background	7.31	6.35	6.57	7.30	7.35
4/15/2018	Background	7.36	6.36	6.48	7.24	7.37
5/23/2018	Background	7.35	6.18	6.49	7.25	7.34
6/27/2018	Background	7.27	6.16	6.45	7.22	7.32
8/1/2018	Background	7.16	6.11	6.55	7.22	7.28
9/5/2018	Background	7.14	6.09	6.51	7.29	7.31
11/6/2018	Background	7.11	6.19	6.49	7.35	7.34
12/12/2018	Background	7.06	6.13	6.50	7.27	7.33
3/27/2019	Detection 1	7.13	6.25	6.36	7.25	7.40
9/24/2019	Detection 2	7.0	6.1	6.5	7.3	7.4
4/6/2020	Detection 3	7.1	6.3	6.4	7.2	7.3
9/22/2020	Detection 4	7.2	6.2	6.5	7.5	7.5
1/26/2021	RESAMPLE	(NA)	(NA)	(NA)	7.4	7.5
Upper Prediction Limit		**7.5**	**6.5**	**6.6**	**7.4**	**7.4**
Lower Prediction Limit		**6.9**	**5.9**	**6.4**	**7.2**	**7.3**

Notes

1. All data transcribed from field notes.
2. (NA) denotes analysis not conducted.
3. Field pH reporting protocol changed in mid-2019 resulting in reporting fewer significant digits.

3.0 SUMMARY OF DATA ANALYSIS AND FINDINGS

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. Chapter 4 of the Unified Guidance discusses groundwater monitoring programs and statistical analysis of the associated data. A key component of statistical analysis is "*to determine whether or not the increase is actually due to a contaminant release*". The following discussion is intended to assess the validity of the apparent pH SSI associated with MW-9 and demonstrate if it is the result of a contaminant release from the Fly Ash Pond or caused by an alternate source.

1. Chapter 4, page 4-8: *Is the result a false positive? That is, were the data tested simply an unusual sample of the underlying population triggering an SSI? Generally, this can be evaluated with repeat sampling.*
2. 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.*
3. Chapter 4, page 4-9: *Was there incorrect calibration or drift in the field instrumentation? This effect should be observable in both upgradient and downgradient data and possibly over a number of sample events. The data itself may be compromised or useless.*

Each of these considerations were used to evaluate the background data and the validity of the apparent pH SSI in MW-9. The results of this evaluation are discussed below.

Unified Guidance Consideration 1

The suspicion that the September 22, 2020 pH (in both MW-7 and MW-9) results are a false positive was considered and, as suggested by Unified Guidance, was evaluated with repeat sampling. In this case, re-sampling was conducted at both wells on January 26, 2021 to assess the validity of the apparent SSIs. The results of the primary sampling and re-sampling event are presented in Table 1.

These data suggest that the primary sampling event data resulted in a false positive pH SSI in MW-7, and may have resulted in a false positive for MW-9. However, other factors discussed below warrant consideration before a false positive pH result at MW-9 can be eliminated from consideration.

Unified Guidance Consideration 2

The background sampling period for well MW-9 spans a timeframe of less than nine months. A short background sampling period may not be representative of longer-term natural variations in groundwater quality. Natural seasonal and multi-year (temporal) variations are apparent in this unconfined alluvial aquifer. These natural variations may result in changes in pH that appear to be SSIs. However, these SSIs may be *due to longer-term (i.e., seasonal or multi-year) variation* that is *not accounted for in the sampling scheme* that was intended to represent natural variations in the aquifer.

Seasonal variation characterized by higher groundwater elevations beginning in the spring followed by lower elevations beginning in the fall have been evident during each year since monitoring for Part 257 began for the Fly Ash Pond–(Figure 2). The background monitoring period of the Fly Ash Pond monitoring system spanned March 2018 to December 2018 which did not include a complete cycle of seasonal variations, or a sample representative of the winter season when the resampling event occurred (January).

A three-year long increasing trend in minimum and maximum annual groundwater elevations is also evident on Figure 2. This figure is a hydrograph of groundwater elevations in all Fly Ash Pond monitoring wells. Note that Figure 2 also summarizes the range in groundwater elevations during the background sampling period and each year since background sampling was completion. This multi-year increase in groundwater elevations is the aquifer's natural response to increased recharge. Because these groundwater elevation increases are observed in all wells, including those located hydraulically upgradient of the pond, they are not attributed changes in site conditions, but rather larger-scale natural changes in the aquifer. As a result, formerly unsaturated alluvium becomes saturated and additional geochemical interactions will occur between pore waters and the newly saturated materials. These additional interactions have the potential to affect groundwater geochemistry and result in observations not previously documented for the chronically saturated (and deeper) alluvium.

In summary, there are natural seasonal and multi-year variations in the alluvial aquifer at the site that were not observed during the background monitoring period. The apparent pH SSI in MW-9 may be due to temporal variation in the aquifer not accounted for in the background sampling scheme, which lead to overly-restrictive prediction limits.

Unified Guidance Consideration 3

Field Instrument Calibration Logs were reviewed to assess if instrument drift occurred that could account for elevated pH reporting. The pH drift as reported on the Field Instrument Calibration

Logs is summarized below on Table 2. A procedural change implemented in mid-2019 resulted in a change to the way SBMU field sampling staff report pH readings as indicated on Table 1. It was determined that the field instrument accuracy, as reported by manufacturer, is 0.1 S.U. and therefore SBMU field sampling staff adopted a procedure based on the accuracy as reported by the manufacturer of rounding the values to 0.1 S.U. in the field. Prior to this change, values were reported to 0.01 S.U. as displayed by the field meter.

Table 2 - pH Data and Field Meter Drift Summary.

Date	pH (S.U.)		Field Meter Drift @ pH = 7.00 S.U
	MW-7 (DG)	MW-9 (DG)	
9/22/2020	7.5	7.5	0.0
1/26/2021	7.4	7.5	+0.1
Upper Prediction Limit	7.4	7.4	
Lower Prediction Limit	7.2	7.3	

Calibration Logs from the September 22, 2020 sampling event do not indicate instrument drift occurred during the sampling event (Table 2). Note, drift is assessed with comparison of a post-calibration reading of a 7.00 S.U. standard to a post-sampling reading of the same 7.00 S.U. standard.

Calibrations logs from the re-sampling event indicate +0.1 S.U. instrument drift (Table 2). This measurement error potentially resulted in field readings being over-reported by 0.1 S.U. However, it is not precisely known when this instrument drift occurred during the re-sampling event. Regardless, according to field records, sample MW-9 pH was monitored immediately prior to observing and documenting the +0.1 S.U. meter drift. Therefore, the pH value reported for MW-9 on January 26, 2021 (7.5 S.U.) is likely over-reported by 0.1 S.U.

4.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of the data presented in this demonstration, Gredell Engineering concludes that the apparent pH SSI in MW-9, detected during the September, 2020 sampling event, is attributable to a false positive UPL exceedance resulting from naturally occurring variation and field instrument drift. None of these causes are attributed to or result from a release from the Fly Ash Pond. The following supports this conclusion:

- The background sampling period was completed in less than nine months and therefore does not encompass seasonal or multi-year pH variations.
- Natural seasonal and multi-year variation in the aquifer is demonstrated on hydrographs for each well, including wells upgradient of the ash pond. This variation leads to geochemical interactions between groundwater and previously unsaturated alluvium that were not occurring during background data acquisition.
- Documented pH meter drift during the sampling event was larger than the reported pH range in the background data set in MW-9.
- The documented upward pH drift is large enough to have resulted in the false positive pH UPL exceedance in MW-9.

Based on these conclusions, Gredell Engineering recommends that semi-annual detection monitoring continue in accordance with §257.94. Gredell Engineering also recommends the following:

- Field data should be transcribed exactly as reported by the instruments (do not round data in the field).
- Field equipment should be checked by the manufacturer to ensure proper operation and minimize drift errors.
- Field equipment should be frequently checked to assess drift periodically during sampling events and corrected as warranted.
- Update background data sets for the Fly Ash Pond groundwater monitoring system wells to included data representative of the effects resulting from multi-year variation in groundwater elevation.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of the client and GREDELL Engineering Resources, Inc. for the specific project discussed in accordance with generally accepted environmental practices common to this locale at this time. The report is applicable only to this specific project and identified site conditions as they existed at the time of report preparation. The use of this report by others to develop independent interpretations of data or conclusions not explicitly stated in this report are the sole responsibility of those firms or individuals.

This report is not a guarantee of subsurface conditions. Variations in subsurface conditions may be present that were not identified during this or previous investigations. Interpretations of data and recommendations made in this report are based on observations of data that were available and referred to in this report unless otherwise noted. No other warranties, expressed or implied, are provided.

6.0 REFERENCES

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Figures

O:\CADDFiles\SIKESTON\GROUNDWATER MAP\FAP\2020\GW CONT MAP FAP SEP 20.dwg, GW CONT MAP BAP, 3/1/2021 12:02:36 PM

MONITORING WELL ID	GROUNDWATER ELEVATION (FEET)	CASING ELEVATION (FEET)	NORTHING	EASTING
MW-1	296.53	312.77	383119.51	1078467.90
MW-2	297.97	306.01	383207.42	1079751.30
MW-3	297.47	308.55	381130.00	1079946.62
MW-7	296.33	315.03	381584.50	1078847.00
MW-9	296.78	314.68	382429.94	1078825.60

NOTES:
1. IMAGE PROVIDED BY BING MAPS.
2. MONITORING WELL LOCATIONS, CASING ELEVATIONS & UNDERGROUND CULVERT ELEVATIONS SURVEYED BY DAVIS ENGINEERING SERVICES.
3. GROUNDWATER ELEVATIONS MEASURED BY SIKESTON POWER STATION STAFF ON SEPTEMBER 22, 2020.
4. MAP DEVELOPMENT BASED ON CONTOURS GENERATED BY SURFER SOFTWARE
5. DETERMINED BY SURFER SOFTWARE 0.0001 FT./FT. TO 0.001 FT./FT.

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

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SIKESTON POWER STATION
FLY ASH POND
ALTERNATE SOURCE DEMONSTRATION

FIGURE 1
SITE MAP AND SAMPLING LOCATIONS
SEPTEMBER 22, 2020

SURVEYED	DESIGNED	DRAWN	CHECKED	APPROVED	DATE	SCALE	PROJECT NAME	FILE NAME	SHEET #
NA	NA	CP	KE	MCC	11/2020	AS NOTED	SIKESTON/GWMAP/FAP	GWCONT FAP 2021	1 OF 1

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Notes:

1. Groundwater elevations do not indicate chemical sampling occurred.
2. Annual range of groundwater elevations depicted with shaded boxes.

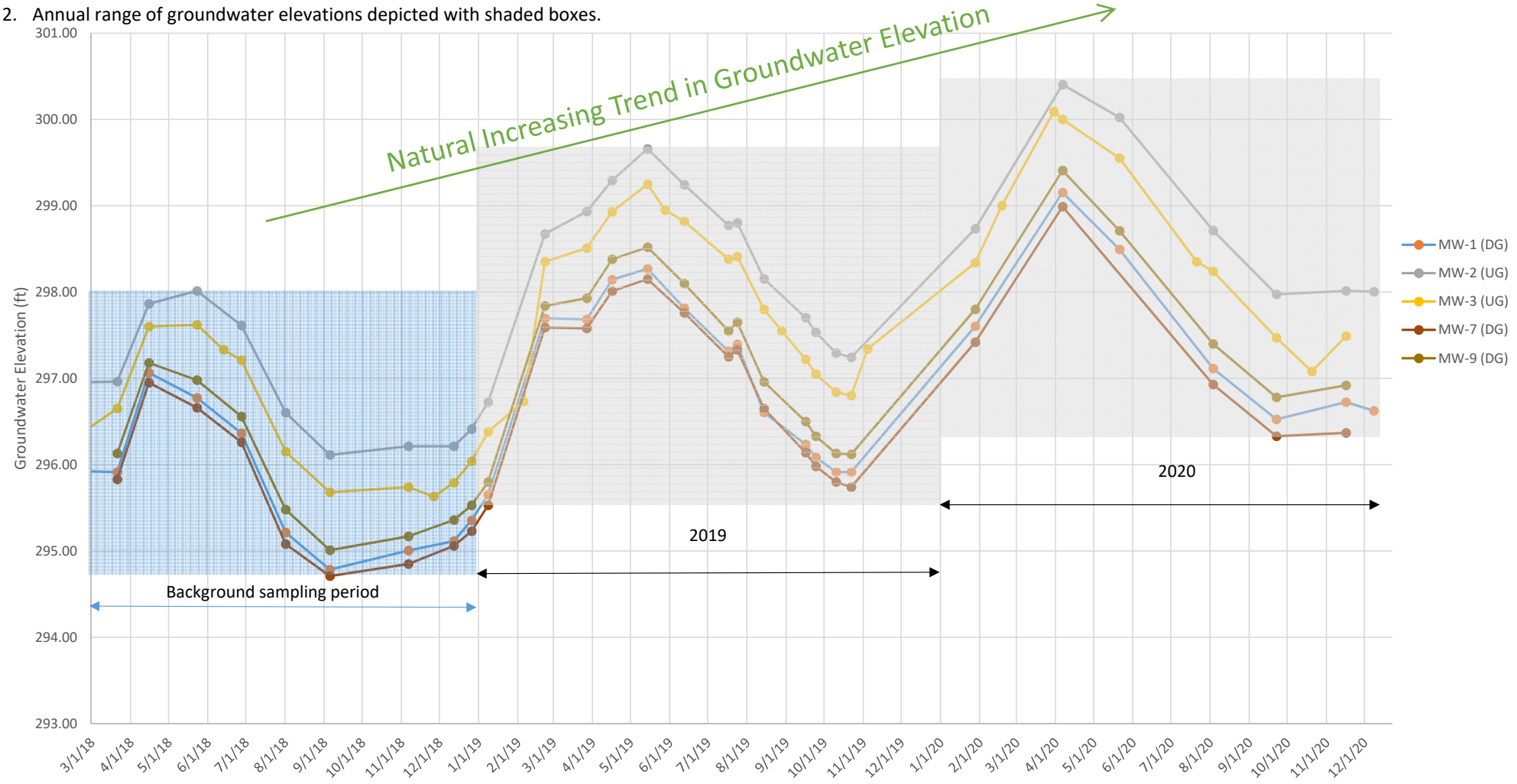

Figure 2

Fly Ash Pond Monitoring Well Hydrographs

Prepared by: GREDELL Engineering Resources, Inc.