2018 Annual Groundwater Monitoring and Corrective Action Report

Coffeen GMF Gypsum Stack Pond – CCR Unit ID 103
Coffeen Power Station
134 Cips Lane
Coffeen, Illinois 62017

Illinois Power Generating Company

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OBG
Part of Ramboll

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Coffeen Power Station
Coffeen, Illinois

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Illinois Power Generating Company

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ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, part of Ramboll
SSI	Statistically Significant Increase
S.U.	Standard Units
TDS	Total Dissolved Solids

SECTION 1: INTRODUCTION

This report has been prepared on behalf of Illinois Power Generating Company by O'Brien & Gere Engineers, part of Ramboll (OBG), to provide the information required by the Code of Federal Regulations (CFR) found in 40 CFR 257.90(e) for the Coffeen GMF Gypsum Stack Pond located at Coffeen Power Station near Coffeen, Illinois.

In accordance with 40 CFR 257.90(e), the owner or operator of an existing Coal Combustion Residual (CCR) unit must prepare an annual groundwater monitoring and corrective action report, for the preceding calendar year, that documents the status of the groundwater monitoring and corrective action program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects key activities for the upcoming year. At a minimum, the annual report must contain the following information, to the extent available:

1. A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit.
2. Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken.
3. In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs.
4. A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98[1].

This report provides the required information for the Coffeen GMF Gypsum Stack Pond for calendar year 2018.

[1] For calendar year 2018, corrective action and other information required to be included in the annual report as specified in §§ 257.96 through 257.98 is not applicable.

SECTION 2: MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

Detection Monitoring Program sampling event dates and parameters collected are provided in the detection monitoring program summary table below. One sample was collected from each background and downgradient well in the monitoring system during most sampling events. Exceptions include the sampling event on January 25-26, 2018, when samples were only collected from the downgradient monitoring wells that had Statistically Significant Increases (SSIs) of Appendix III parameters over background concentrations during the previous sampling event on October 28, 2017 and October 30-31, 2017, and analyzed for only those SSI parameters, as allowed for by the Statistical Analysis Plan, Coffeen Power Station, Newton Power Station, Illinois Power Generating Company (NRT/OBG, 2017a).

Analytical data was evaluated after each event in accordance with the Statistical Analysis Plan to identify SSIs.

Detection Monitoring Program Summary

Sampling Dates	Parameters Collected	SSIs	ASD Completion
October 28, 30, and 31, 2017	Appendix III	Yes	April 9, 2018
January 25 and 26, 2018	SSI	Not Applicable	Not Applicable
May 11, 14, and 15, 2018	Appendix III	No	Not Applicable
November 2, 2018	Appendix III	To Be Determined	To Be Determined

Potential alternate sources were evaluated as outlined in the 40 CFR § 257.94(e)(2). An alternate source demonstration (ASD) was completed and certified by a qualified professional engineer. The date the ASD was completed is provided in the detection monitoring program summary table. The ASD is included in Appendix A.

Statistical background values are provided in Table 1. Analytical results from the events summarized in the detection monitoring program summary table above are included in Table 2.

The Coffeen GMF Gypsum Stack Pond remains in the Detection Monitoring Program in accordance with 40 CFR 257.94.

SECTION 3: KEY ACTIONS COMPLETED IN 2018

Three groundwater monitoring events were completed in 2018 under the Detection Monitoring Program. These events occurred in January, May, and November, and are detailed in Section 2. One groundwater sample was collected from each background and downgradient well in the monitoring system during each event.

One statistical resampling event, as allowed by the Statistical Analysis Plan, Coffeen Power Station, Illinois Power Generating Company (NRT/OBG, 2017a) was completed in January 2018, and is also detailed in Section 2. One groundwater sample was collected from the downgradient monitoring wells that had SSIs during the previous sampling event on October 28, 30, and 31, 2017, and analyzed for only those SSI parameters.

All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017b). All monitoring data obtained under 40 CFR §§ 257.90 through 257.98 (as applicable) in 2018 are presented in Table 2.

The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells is presented in Figure 1. No changes were made to the monitoring well network in 2018.

SECTION 4: PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the groundwater monitoring program during 2018. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017b), and all data was accepted.

SECTION 5: KEY ACTIVITIES PLANNED FOR 2019

The following key activities are planned for 2019:

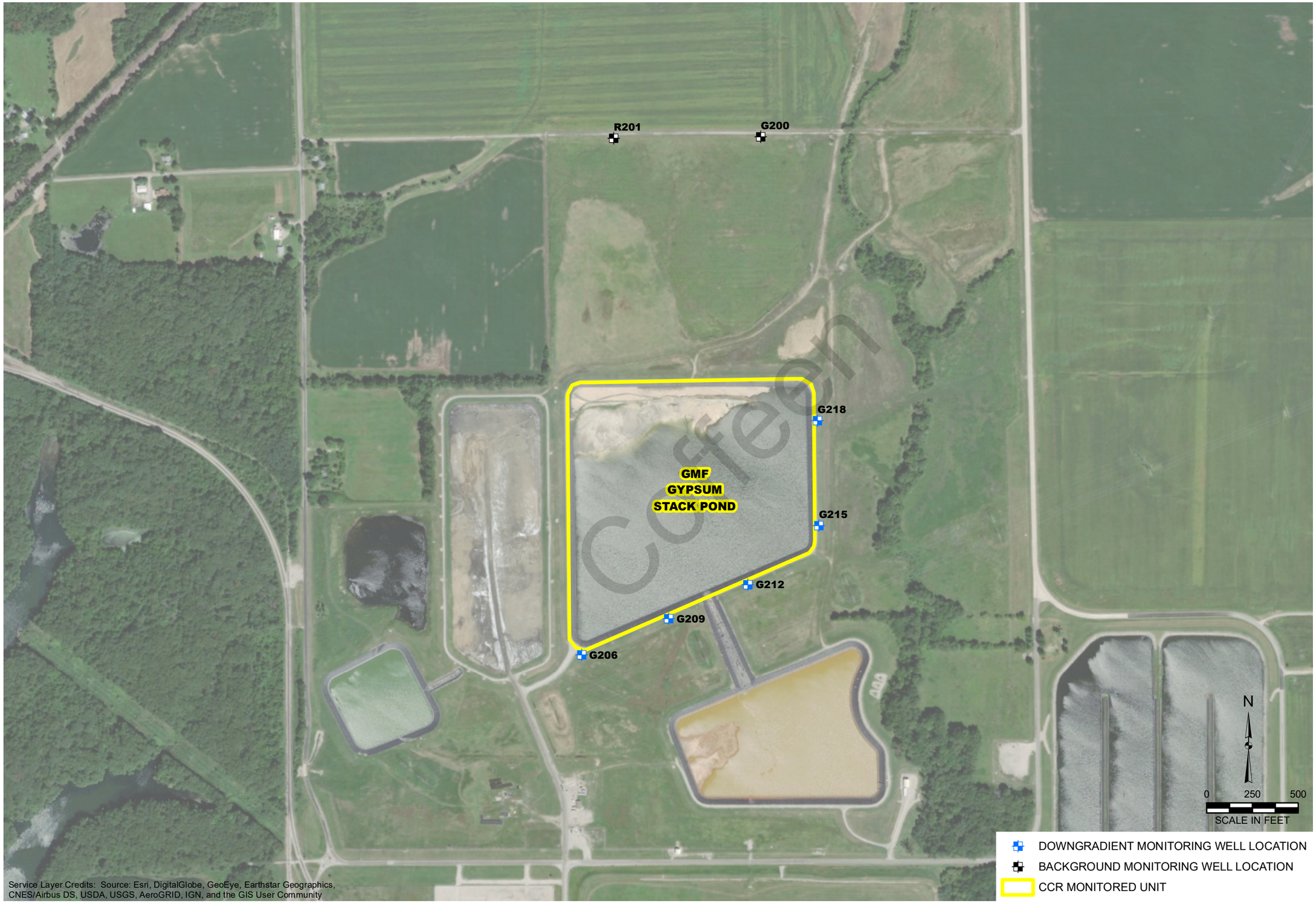
- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for first and third quarters of 2019.
- Complete evaluation of analytical data from the downgradient wells, using background data to determine whether an SSI of Appendix III parameters over background concentrations has occurred.
- If an SSI is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSI or that SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is demonstrated to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the annual groundwater monitoring and corrective action report for 2019.
  - If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 CFR §§ 257.94 through 257.98 (e.g., assessment monitoring) as may apply in 2019 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

REFERENCES

Natural Resource Technology, an OBG Company, 2017a, Statistical Analysis Plan, Coffeen Power Station, Newton Power Station, Illinois Power Generating Company, October 17, 2017.

Natural Resource Technology, an OBG Company, 2017b, Sampling and Analysis Plan, Coffeen GMF Gypsum Stack Pond, Coffeen Power Station, Coffeen, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Figures



DRAWN BY/DATE:
SDS 11/28/18
REVIEWED BY/DATE:
RAB 1/24/19
APPROVED BY/DATE:
KLT 1/28/19

GROUNDWATER SAMPLING WELL LOCATION MAP
COFFEEN GMF GYPSUM STACK POND
UNIT ID: 103

2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 70099

FIGURE NO: 1

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Tables

Table 1. Statistical Background Values

2018 Annual Groundwater Monitoring and Corrective Action Report
Coffeen Power Station
Unit ID 103 - GMF Gypsum Stack Pond

Parameter	Statistical Background Value
Appendix III	
Boron (mg/L)	0.39
Calcium (mg/L)	142.936
Chloride (mg/L)	96
Fluoride (mg/L)	0.493
pH (S.U.)	6.9 / 7.3
Sulfate (mg/L)	300
TDS (mg/L)	928

[O: KLS 8/28/18, C: RAB 8/28/18]

Notes:

mg/L = milligrams per liter
S.U.= Standard Units
TDS = Total Dissolved Solids

Table 2. Appendix III Analytical Results

2018 Annual Groundwater Monitoring and Corrective Action Report
Coffeen Power Station
Unit ID 103 - GMF Gypsum Stack Pond

Sample Location	Date Sampled	B, total (mg/L)	Ca, total (mg/L)	Cl, total (mg/L)	F, total (mg/L)	pH (field) (S.U.)	SO4, total (mg/L)	TDS (mg/L)
Background / Upgradient Monitoring Wells								
G200	10/28/2017	0.34	81	65	0.328	7.2	100	520
	1/25/2018	NA	NA	71	0.303	7.2	NA	NA
	5/11/2018	<0.01	90	85	<0.25	7.0	100	460
	11/2/2018	0.011	95	61	0.391	7.0	100	480
R201	10/28/2017	0.017	93	30	0.380	7.1	89	660
	1/25/2018	NA	NA	31	0.338	7.0	NA	NA
	5/11/2018	<0.01	87	54	0.306	7.1	190	640
	11/2/2018	<0.01	82	24	0.419	7.1	110	470
Downgradient Monitoring Wells								
G206	10/30/2017	<0.01	90	30	0.472	7.2	120	460
	5/15/2018	0.032	73	26	0.480	7.0	130	450
	11/2/2018	<0.01	85	25	0.360	7.0	120	440
G209	10/31/2017	0.012	150	63	0.519	7.1	95	730
	1/25/2018	NA	120	NA	0.456	7.0	NA	NA
	5/15/2018	0.019	140	65	0.428	7.2	250	760
	11/2/2018	0.013	160	59	0.410	7.2	240	740
G212	10/31/2017	<0.01	50	42	0.326	7.3	55	340
	5/14/2018	0.014	51	40	0.407	7.2	52	350
	11/2/2018	<0.01	53	43	0.289	7.3	49	600
G215	10/31/2017	0.025	90	48	0.420	7.2	110	470
	5/15/2018	0.063	130	70	0.329	6.9	220	660
	11/2/2018	0.088	120	55	0.314	6.8	170	480
G218	10/31/2017	<0.01	110	91	0.437	6.9	140	660
	1/26/2018	NA	NA	NA	NA	6.9	NA	NA
	5/15/2018	0.014	110	91	0.413	7.0	140	640
	11/2/2018	<0.01	130	84	0.375	6.9	140	280

[O: RAB 12/27/18, C: JQW 12/27/18][U: RAB 1/25/19]

Notes:
mg/L = milligrams per liter
S.U. = Standard Units
TDS = Total Dissolved Solids
NA = Not Analyzed
< = concentration is less than the reporting limit

Appendix A

Alternate Source Demonstration

April 9, 2018

This alternate source demonstration report has been prepared on behalf of Illinois Power Generating Company by O'Brien & Gere Engineers, Inc. (OBG) to provide pertinent information pursuant to 40 CFR § 257.94(e)(2) for the Coffeen Power Station GMF Gypsum Stack Pond located near Coffeen, Illinois.

Initial background groundwater monitoring consisting of a minimum of eight samples as required under 40 CFR § 257.94(b) was initiated in November 2015 and completed prior to October 17, 2017. The first semi-annual detection monitoring sample was collected on October 28-31, 2017. Evaluation of analytical data from the first detection monitoring sample for statistically significant increases (SSIs) of 40 CFR Part 257 Appendix III parameters over background concentrations was completed within 90 days of sample collection and receipt of sample results. That evaluation identified SSIs at downgradient monitoring wells as follows:

- pH less than the background lower prediction limit at well G218
- Calcium and fluoride at well G209

In accordance with the Statistical Analysis Plan[1], to verify these SSIs, wells G209 and G218 were resampled on January25-26, 2018 and analyzed for only the SSI parameters. Following evaluation of analytical data from the resamples for SSIs, only the following SSI remained:

- pH less than the background lower prediction limit at well G218

40 CFR § 257.94(e)(2) allows the owner or operator 90 days from the date of an SSI determination to complete a written demonstration that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality ("alternate source demonstration"). Pursuant to 40 CFR § 257.94(e)(2), the following demonstrates that the SSI for pH, as previously determined on January 9, 2018, resulted from error in the way field measurements during sampling were reported due to the meter accuracy (i.e., sampling error). This alternate source demonstration was completed within 90 days of determination of the SSI (April 9, 2018) as required by 40 CFR § 257.94(e)(2).

The Multi Water Quality Checker U-52[2], manufactured by Horiba, was used for both background and detection monitoring at the Coffeen GMF Gypsum Stack Pond. The measurements reported from the sampling events and the statistical prediction limits were not corrected for meter accuracy. The meter is accurate to 0.1 S.U.; however, measurements were reported to 0.01 S.U. Table 1 is an excerpt from the manufacturer's product specifications regarding accuracy of pH measurements. Table 2 provides the uncorrected and corrected values for the first detection monitoring sampling event in October 2017, the resampling event in January 2018, and the lower prediction limit.

[1] Natural Resource Technology, an OBG Company, Statistical Analysis Plan, Coffeen Power Station, Newton Power Station, Illinois Power Generating Company, October 17, 2017.

[2] From http://www.horiba.com/us/en/process-environmental/application/sewage-treatment/details/u-50-multiparameter-water-quality-checker-368/

Measurement principle	Glass electrode method
Range	pH 0 to 14
Resolution	0.01pH
Repeatability	±0.05pH
Accuracy	±0.1pH

Table 1. Horiba U52 pH Specifications

	Uncorrected Value	Corrected Value
Detection Monitoring Event #1	6.89	6.9
Detection Monitoring Event #1 Resample	6.90	6.9
Lower Prediction Limit (background)	6.91	6.9

Table 2. Uncorrected and Corrected pH Values

This information serves as the written alternate source demonstration report prepared in accordance with 40 CFR § 257.94(e)(2) that the SSI for pH identified during the detection monitoring program resulted from error in the way field measurements during sampling were reported, both during detection monitoring sampling events and background sampling events, and is not due to the CCR unit. Therefore, an assessment monitoring program is not required and the Coffeen GMF Gypsum Stack Pond will remain in detection monitoring.

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
O'Brien & Gere Engineers, Inc.
Date: April 9, 2018

I, Nicole M. Pagano, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Nicole M. Pagano
Professional Geologist
196-000750
O'Brien & Gere Engineers, Inc.
Date: April 9, 2018

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