Prepared for
Illinois Power Generating Company

Date
January 31, 2021

Project No.
1940074915

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

COFFEEN GMF GYPSUM STACK POND, COFFEEN POWER STATION

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2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
COFFEEN GMF GYPSUM STACK POND, COFFEEN POWER STATION

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Approved by	**Lauren D. Cook**
Description	**Annual Report in Support of the CCR Rule**

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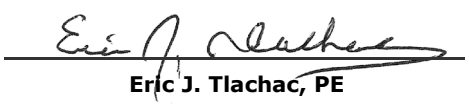

Eric J. Tlachac, PE
Managing Engineer

CONTENTS

TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CMA	Corrective Measures Assessment
GMF	Gypsum Management Facility
SAP	Sampling and Analysis Plan
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.90(e) for the Coffeen Gypsum Management Facility (GMF) Gypsum Stack Pond located at Coffeen Power Station near Coffeen, Illinois.

Groundwater is being monitored at Coffeen GMF Gypsum Stack Pond in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94.

No changes were made to the monitoring system in 2020 (no wells were installed or decommissioned).

The following Statistically Significant Increases (SSIs) of 40 C.F.R. Part 257 Appendix III parameter concentrations greater than background concentrations were determined:

- Fluoride at wells G206 and G209
- Calcium at well G209
- pH at well G206

Alternate Source Demonstrations (ASDs) were completed for the SSIs referenced above and Coffeen GMF Gypsum Stack Pond remains in the Detection Monitoring Program.

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of Illinois Power Generating Company, to provide the information required by 40 C.F.R. § 257.90(e) for Coffeen GMF Gypsum Stack Pond located at Coffeen Power Station near Coffeen, Illinois.

In accordance with 40 C.F.R. § 257.90(e), the owner or operator of a Coal Combustion Residuals (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 SSI relative to background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.
6. A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:
   i. At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
   ii. At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
   iii. If it was determined that there was a SSI over background for one or more constituents listed in Appendix III of §257 pursuant to §257.94(e):
      A. Identify those constituents listed in Appendix III of §257 and the names of the monitoring wells associated with the SSI(s).
      B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv. If it was determined that there was a Statistically Significant Level (SSL) above the Groundwater Protection Standard (GWPS) for one or more constituents listed in Appendix IV of §257 pursuant to §257.95(g) include all of the following:

   A. Identify those constituents listed in Appendix IV of §257 and the names of the monitoring wells associated with the SSL(s).

   B. Provide the date when the Corrective Measures Assessment (CMA) was initiated for the CCR unit.

   C. Provide the date when the public meeting was held for CMA for the CCR unit.

   D. Provide the date when the CMA was completed for the CCR unit.

v. Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection.

vi. Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.

This report provides the required information for Coffeen GMF Gypsum Stack Pond for calendar year 2020.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the monitoring program status in calendar year 2020, and Coffeen GMF Gypsum Stack Pond remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.

3. KEY ACTIONS COMPLETED IN 2020

The Detection Monitoring Program is summarized in Table A. 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 system in 2020. In general, one groundwater sample was collected from each background and downgradient well during each monitoring event.[1] All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2020, and analytical results for the August 2019 sampling event, are presented in Table 1. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSIs of Appendix III parameters relative to background concentrations.

Statistical background values are provided in Table 2.

Potential alternate sources were evaluated as outlined in the 40 C.F.R. § 257.94(e)(2). ASDs were completed and certified by a qualified professional engineer. The dates the ASDs were completed are provided in Table A. The ASDs are included in Appendix A.

[1] Sampling was limited to G206 and G209 during the May 2020 sampling event to confirm Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event to confirm SSIs, as allowed by the Statistical Analysis Plan.

Table A – 2019–2020 Detection Monitoring Program Summary

Sampling Date	Analytical Data Receipt Date	Parameters Collected	SSI(s)	SSI(s) Determination Date	ASD Completion Date
August 12 - 14, 2019	October 15, 2019	Appendix III	Calcium at well G209; Fluoride at wells G206 and G209	January 13, 2020	April 13, 2020
January 21 - 22, 2020	April 15, 2020	Appendix III	pH at well G206	July 14, 2020	October 12, 2020
May 5, 2020 [1]	May 19, 2020	Appendix III Greater than Background [2]			
August 11 - 13, 2020	October 15, 2020	Appendix III	TBD	TBD	TBD

Notes:

NA: Not Applicable
TBD: To Be Determined
1. Sampling was limited to G206 and G209 during the May 2020 sampling event to confirm Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event to confirm SSIs, as allowed by the Statistical Analysis Plan.
2. Groundwater sample analysis was limited to Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event to confirm SSIs, as allowed by the Statistical Analysis Plan.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2020. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a), and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2021

The following key activities are planned for 2021:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2021.
- Complete evaluation of analytical data from the downgradient wells, using background data to determine whether an SSI of Appendix III parameters detected at concentrations greater than 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 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 2021 Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 C.F.R. §§ 257.94 through 257.98 as may apply in 2021 (*e.g.*, Assessment Monitoring) will be met, including associated recordkeeping/notifications required by 40 C.F.R. §§ 257.105 through 257.108.

6. REFERENCES

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

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Coffeen Power Station, Newton Power Station, Illinois Power Generating Company, October 17, 2017.

TABLES

TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
COFFEEN POWER STATION
103 - GMF GYPSUM STACK POND
COFFEEN, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft) 6020A	Groundwater Elevation (ft NAVD88) 6020A	Boron, total (mg/L) 6020A	Calcium, total (mg/L) 6020A	Chloride, total (mg/L) 9251	Fluoride, total (mg/L) 9214	pH (field) (STD) SM4500 H+B	Sulfate, total (mg/L) 9036	Total Dissolved Solids (mg/L) SM 2540C
G200 Background	39.0751386	-89.3950088	8/5/2019	3.9	622.04							
			8/12/2019			<0.01	92	58	0.405	7.0	110	540
			1/20/2020	3.22	622.72							
			1/21/2020			<0.01	110	100	0.302	7.2	120	520
			8/10/2020	7.78	618.16							
			8/11/2020			<0.01	85	63	0.427	7.2	110	530
G206 Downgradient	39.0673987	-89.3985475	8/5/2019	11.26	621.56							
			8/14/2019			0.013	120	22	0.506	7.1	120	470
			1/20/2020	10.06	622.76							
			1/21/2020			<0.01	84	24	0.389	7.5	120	470
			5/5/2020	9.8	623.02					7.5		
			8/10/2020	12.9	619.92							
			8/13/2020			0.015	81	23	0.391	7.4	130	500
G209 Downgradient	39.0679228	-89.3968503	8/5/2019	11.45	621.46							
			8/14/2019			0.011	160	61	0.586	7.2	240	830
			1/20/2020	10.22	622.69							
			1/22/2020			0.017	150	59	0.406	6.9	250	730
			5/5/2020	9.95	622.96		140			7.2		
			8/10/2020	13.32	619.59							
			8/13/2020			0.018	150	65	0.474	7.2	270	800
G212 Downgradient	39.0684296	-89.395318	8/5/2019	12.63	620.26							
			8/14/2019			<0.01	53	43	0.437	7.3	51	380
			1/20/2020	10.79	622.1							
			1/22/2020			0.012	61	42	0.283	7.2	58	340
			8/10/2020	13.75	619.14							
			8/13/2020			<0.01	54	42	0.323	7.3	53	430
G215 Downgradient	39.0693092	-89.39394	8/5/2019	15.51	617.55							
			8/14/2019			0.085	100	49	0.458	7.0	120	520
			1/20/2020	13.55	619.51							

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TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
COFFEEN POWER STATION
103 - GMF GYPSUM STACK POND
COFFEEN, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft) 6020A	Groundwater Elevation (ft NAVD88) 6020A	Boron, total (mg/L) 6020A	Calcium, total (mg/L) 6020A	Chloride, total (mg/L) 9251	Fluoride, total (mg/L) 9214	pH (field) (STD) SM4500 H+B	Sulfate, total (mg/L) 9036	Total Dissolved Solids (mg/L) SM 2540C
G215 Downgradient	39.0693092	-89.39394	1/22/2020			0.064	99	48	0.35	7.1	130	460
			8/10/2020	15.95	617.11							
			8/13/2020			0.051	110	70	0.366	7.2	210	710
G218 Downgradient	39.0708763	-89.393956	8/5/2019	15.25	617.86							
			8/14/2019			<0.01	130	81	0.449	7.0	150	660
			1/20/2020	13.18	619.93							
			1/22/2020			0.011	130	83	0.379	7.1	170	560
			8/10/2020	15.69	617.42							
			8/13/2020			<0.01	120	84	0.34	7.1	220	720
R201 Background	39.0751423	-89.3978553	8/5/2019	3.99	622.35							
			8/12/2019			<0.01	120	71	0.466	7.1	220	760
			1/20/2020	3.46	622.88							
			1/21/2020			0.01	130	66	0.309	7.2	210	770
			8/10/2020	7.45	618.89							
			8/11/2020			<0.01	120	87	0.364	6.9	240	790

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
ft = foot/feet
mg/L = milligrams per liter
NAVD88 = North American Vertical Datum of 1988
S.U. = Standard Units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Increases (SSIs) over background.
4-digit numbers below parameter represent SW-846 analytical methods and alpha-numeric values that begin with SM represent Standard Methods for the Examination of Water and Wastewater.

TABLE 2.
STATISTICAL BACKGROUND VALUES
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
COFFEEN POWER STATION
103 - GMF GYPSUM STACK POND
COFFEEN, ILLINOIS
DETECTION MONITORING PROGRAM

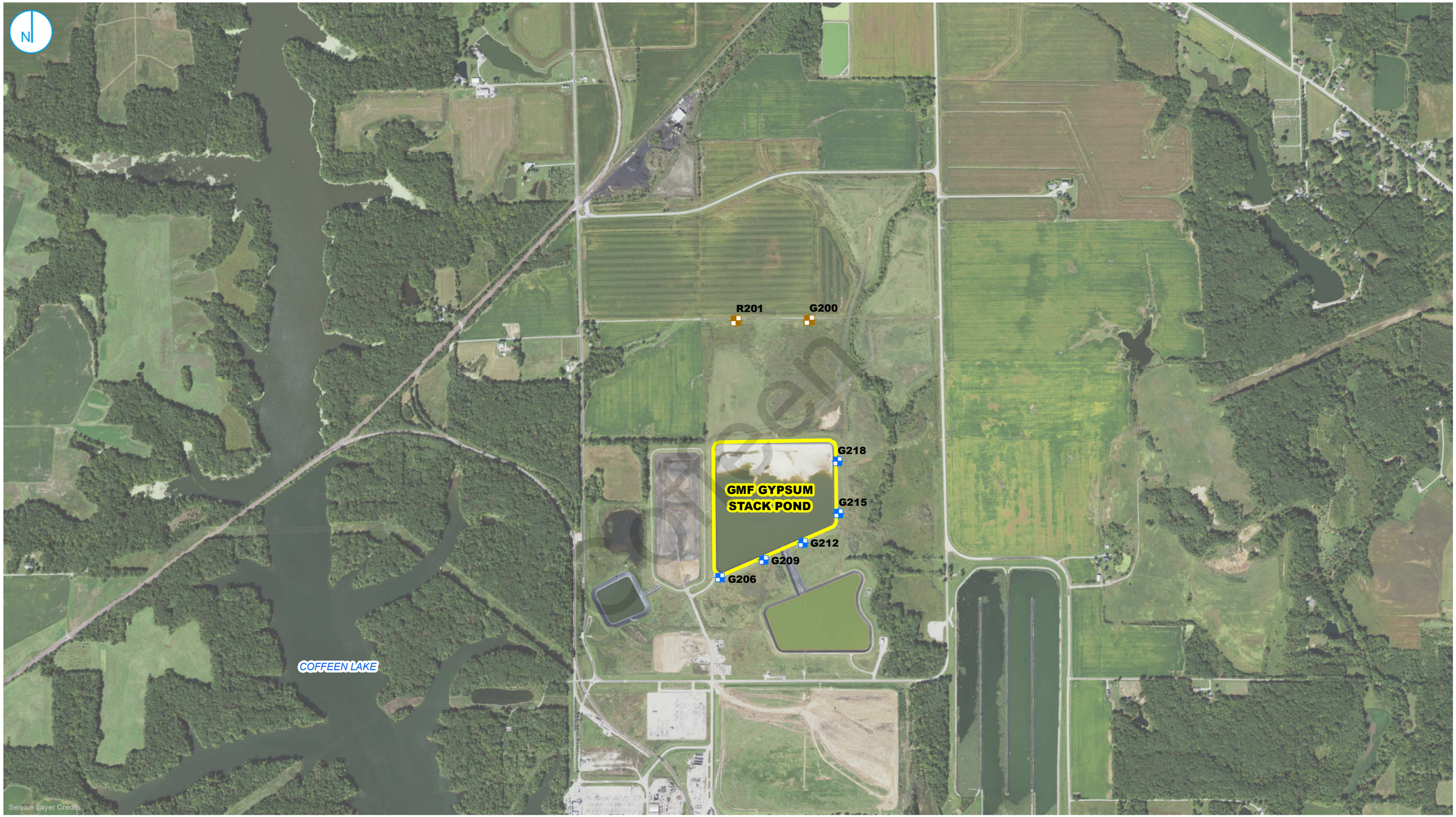
Parameter	Statistical Background Value (UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.39
Calcium (mg/L)	2
Chloride (mg/L)	96
Fluoride (mg/L)	0.493
pH (S.U.)	6.9 / 7.3
Sulfate (mg/L)	300
Total Dissolved Solids (mg/L)	928

[O: KLT 12/11/19, C: RAB 12/11/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
S.U. = Standard Units
UPL = Upper Prediction Limit

FIGURES

Y:\Mapping\Projects\22\2285\MXD\2020_AnnualGWM_CAR\Figure 1_GWS_WellLoc_CoffeenGMFGSP.mxd



PROJECT: 169000XXXX | DATED: 1/25/2021 | DESIGNER: galarmmc

- DOWNGRADIENT MONITORING WELL LOCATION
- BACKGROUND MONITORING WELL LOCATION
- CCR MONITORED UNIT

0 500 1,000 Feet

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

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

FIGURE 1

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ENGINEERING SOLUTIONS, INC.

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APPENDICES

Intended for
Dynegy Coffeen, LLC

Date
April 13, 2020

Project No.
74915

40 C.F.R. § 257.95(g)(3)(ii): ALTERNATE SOURCE DEMONSTRATION

COFFEEN GMF GYPSUM STACK POND

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CERTIFICATIONS

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
Illinois
O'Brien & Gere Engineers, Inc., a Ramboll Company
Date: April 13, 2019

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., a Ramboll Company
Date: April 13, 2020

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CONTENTS

TABLES (IN TEXT)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
C.F.R.	Code of Federal Regulations
cm/s	centimeters per second
CV	coefficient of variation
GMF	Gypsum Management Facility
HDPE	high-density polyethylene
IEPA	Illinois Environmental Protection Agency
LOE	line of evidence
mg/L	milligrams per liter
msl	above mean sea level North American Vertical Datum of 1988
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc., part of Ramboll
Site	Coffeen Power Station
SSI	Statistically Significant Increase
UPL	Upper Prediction Limit

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of Statistically Significant Increases (SSIs) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Illinois Power Generating Company by O'Brien & Gere Engineers, Inc., a Ramboll Company (Ramboll) to provide pertinent information pursuant to 40 C.F.R. § 257.94(e)(2) for the Coffeen Gypsum Management Facility (GMF) Gypsum Stack Pond, located near Coffeen, Illinois.

The fifth semi-annual detection monitoring samples (Detection Monitoring Round 5 [D5]) were collected on August 12-14, 2019 and analytical data were received on October 15, 2019. In accordance with 40 C.F.R. § 257.93(h)(2), statistical analysis of the data to identify SSIs of 40 C.F.R. Part 257 Appendix III parameters over background concentrations was completed by January 13, 2020, within 90 days of receipt of the analytical data. The statistical determination identified the following SSIs at downgradient monitoring wells:

- Fluoride at wells G206 and G209
- Calcium at well G209

Pursuant to 40 C.F.R. § 257.94(e)(2), the following demonstrates that sources other than the Coffeen GMF Gypsum Stack Pond were the cause of the SSIs listed above. This ASD was completed by April 13, 2020, within 90 days of determination of the SSIs, as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The Coffeen Power Station (Site) is located in Montgomery County, in central Illinois, approximately 2 miles south of the city of Coffeen. The area is bordered by Coffeen Lake to the west, east, and south, and by agricultural land to the north. Several underground coal mines were historically operated both beneath and in the vicinity of the site.

2.2 Geology and Hydrogeology

The site geologic and hydrogeologic setting summarized below is from the Coffeen Hydrogeologic Monitoring Plan (NRT/OBG, 2017).

Pleistocene deposits of unlithified glacial diamictons, lacustrine/alluvial deposits, and windblown loess overlie Pennsylvanian-age bedrock throughout central Illinois. The most extensive glacial deposits are those from the Illinoian Stage which cover much of the state and are present at the Site. Windblown (aeolian) deposits, the Peoria and Roxana Silts, cover the glacial deposits over a majority of the state. These units are fine-grained deposits blown from river valleys by prevailing winds.

Till members of the Glasford Formation include the Smithboro Member, the Mulberry Grove Member, the Vandalia Member, and the Hagarstown Member (oldest to youngest). The Smithboro Member is described as a gray, compact, silty till. The Smithboro is bounded below by the Yarmouth Soil. The Mulberry Grove Member is intermittent at the Site and is described as a calcareous gray silt and fine sand containing some fossil mollusks. The Vandalia Member is a sandy till with thin lenticular bodies of silt, sand, and gravel. It is calcareous, except where weathered, generally gray, and moderately compact. The Hagarstown Member is bounded at the top by the Sangamon Soil. The member consists of gravelly till, poorly sorted gravel, well sorted gravel, and sand.

The Quaternary deposits in the Coffeen area consist mainly of diamictons and intercalated outwash deposits that were deposited during Illinoian and Pre-Illinoian glaciations. The unconsolidated deposits and bedrock which occur at the Site include the following units (beginning at the ground surface):

- Ash/Gypsum Fill Units – CCR and gypsum within the various CCR Units.
- Upper Confining Unit – Low permeability clays and silts, including the Roxana Silt and Peoria Silt (Loess Unit) and the upper clayey till portion of the Hagarstown Member.
- Uppermost Aquifer – Thin (generally less than 3 feet), moderate to high permeability sand, silty sand, and sandy silt/clay units which include the Hagarstown Member (also referred to as the Hagarstown Beds) and the upper Vandalia Till Member (where weathered).
- Lower Confining Unit – Thick (generally greater than 15 feet), very low permeability sandy, silt till, or clay till that includes the unweathered Vandalia Member, Mulberry Grove Member (discontinuous), and Smithboro Member.
- Bedrock – Pennsylvanian-age Bond Formation characterized by limestone and calcareous clays and shales.

Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the Coffeen Power Station. The CCR units at the Site are located between the two lobes of the lake (identified as "Coffeen Lake" and "Unnamed Tributary" on Figure 1), which results in a north/south trending groundwater divide observed beneath the CCR units. Groundwater flow is to the southeast or southwest, downgradient of the divide, converging on the tributary valleys leading to Coffeen Lake on the east and west sides of the property.

Groundwater elevations were obtained from measurements in monitoring wells on August 5, 2019 prior to a combined sampling event for the five CCR units located at Coffeen Power Station. As noted above, groundwater sampling for D5 occurred on August 12-14, 2019. Water levels in the Gypsum Stack Pond area ranged from about 616 feet to 622 feet MSL (Figure 1). The groundwater elevations and flow direction for the Coffeen Power Station during the D5 sampling event are shown in Figure 1, and generally follow the flow patterns established by the groundwater divide beneath the CCR units.

2.3 Groundwater and GMF Gypsum Stack Pond Monitoring

Figure 1 shows all monitoring wells present at the site, including those in the groundwater monitoring systems established in accordance with 40 C.F.R. § 257.91 at Ash Pond No. 1, Ash Pond No. 2, the GMF Recycle Pond, the Landfill and the Gypsum Stack Pond. The GMF Gypsum Stack Pond is a 77-acre facility that has been in operation since 2010. The monitoring system for the Gypsum Stack Pond includes background wells R201 and G200, located north of the Gypsum Stack Pond, and downgradient monitoring wells are G206, G209, G212, G215, and G218 (Figure 2).

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

Lines of evidence supporting this ASD include the following:

1. GMF Gypsum Stack Pond Composite Liner Design.
2. The ionic composition of GMF Gypsum Stack Pond water is different from the ionic composition of groundwater.
3. Calcium and fluoride were present in groundwater in the vicinity of the GMF Gypsum Stack Pond prior to the unit being placed into service at concentrations that exceeded current background concentrations.
4. Concentrations of boron and sulfate, common indicators for CCR impacts to groundwater, are near or below background concentrations and are stable in the downgradient wells.

These lines of evidence are described and supported in greater detail below.

3.1 LOE #1: GMF Gypsum Stack Pond Composite Liner Design

Construction of the GMF Gypsum Stack Pond was in accordance with Water Pollution Control Permit 2008-EA-4661 granted by the Illinois Environmental Protection Agency. The GMF Gypsum Stack Pond composite liner includes the following components:

- 60-mil high-density polyethylene (HDPE) geomembrane liner.
- Three-foot-thick layer of recompacted, low-permeability soil having a maximum hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s).

The Illinois Environmental Protection Agency (IEPA)-approved Coffeen GMF Gypsum Stack Pond composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b).

The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner suggests that the GMP Gypsum Stack Pond is not the source of the observed SSIs.

3.2 LOE #2: The Ionic Composition of GMF Gypsum Stack Pond Water is Different from the Ionic Composition of Groundwater

Piper diagrams graphically represent ionic composition of aqueous solutions. A Piper diagram displays the position of water samples relative to their major cation and anion content on the two lower triangular portions of the diagram, providing the information which, when combined on the central, diamond-shaped portion of the diagram, identifies compositional categories or groupings (hydrochemical facies). Figure A, below, is a Piper diagram that displays the ionic composition of groundwater samples from the background and downgradient monitoring wells associated with the GMF Gypsum Stack Pond and surface water samples collected from the GMF Gypsum Stack Pond. Gypsum Stack Pond water was collected from locations GPa, GPb, GPc, and GPd, also shown on Figure 2. Groundwater and surface water samples were most recently collected and analyzed for major ion concentrations in Q3 2017 and Q3 2016, respectively, to support groundwater source analyses. The ionic compositional groupings identified are shown in

the black and green ellipses on the diamond portion of the Piper diagram and are discussed in more detail below.

It is evident from the Piper diagram that the background and downgradient groundwater (enclosed within the black ellipse) are in the calcium-bicarbonate facies, and that the water from the GMF Gypsum Stack Pond (enclosed within a green ellipse) are in the calcium-sulfate facies. The differences in ionic composition between the groundwater and Gypsum Stack Pond water indicate that the Gypsum Stack Pond is not the source of CCR constituents detected in groundwater.

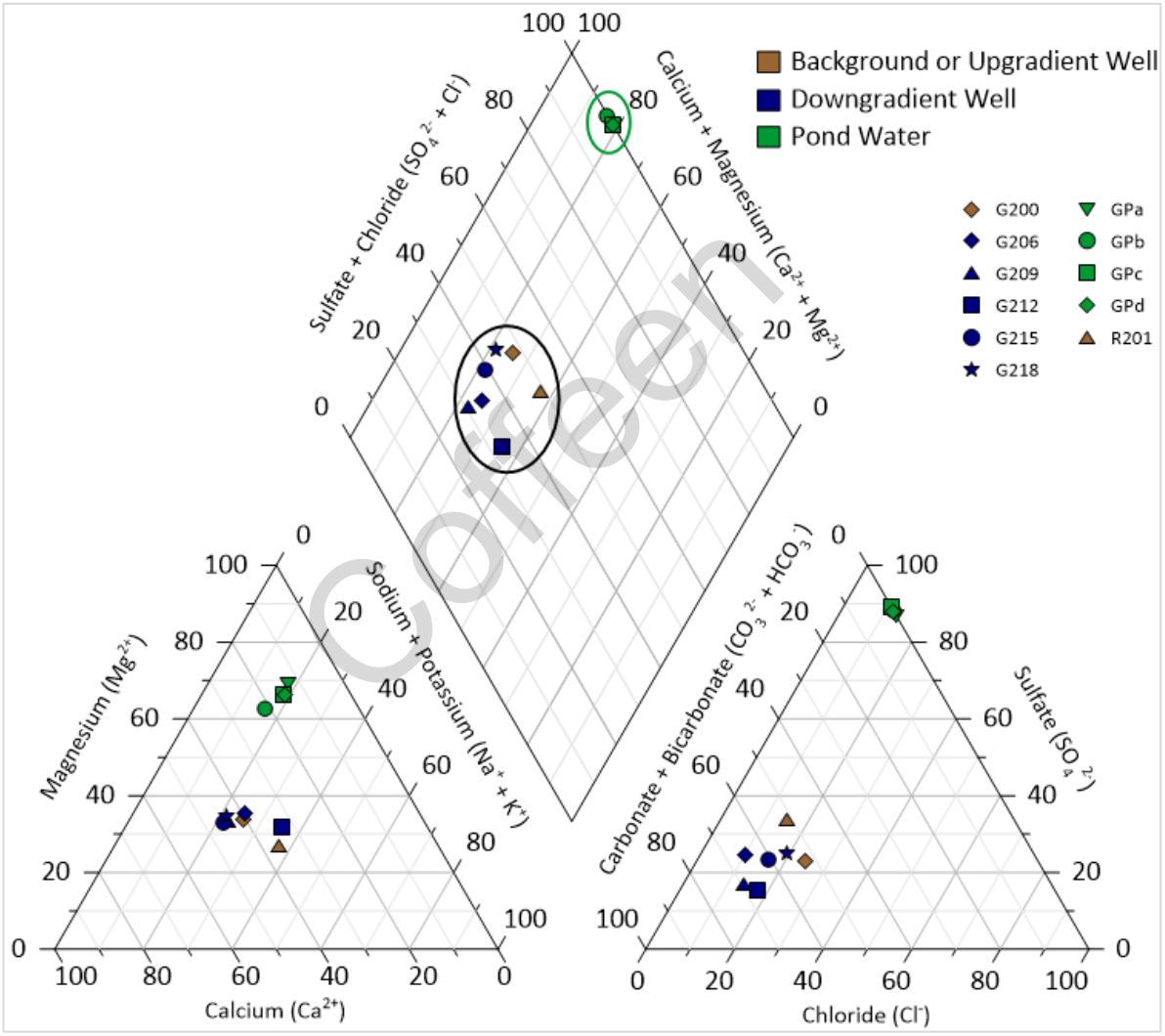


Figure A. Piper Diagram Showing Ionic Composition of Samples of Background and Downgradient Groundwater Associated with the GMF Gypsum Stack Pond and Samples of Surface Water from the GMF Gypsum Stack Pond.

3.3 LOE #3: Calcium and Fluoride Were Present in Groundwater in the Vicinity of the GMF Gypsum Stack Pond Prior to the Unit Being Placed Into Service at Concentrations that Exceeded Current Background Concentrations

Calcium was detected in groundwater samples collected from monitoring well G205 (see Figure 2) prior to the GMF Gypsum Stack Pond being placed into service in 2010. A box plot for G205 calcium concentrations measured in eight samples collected in 2008 and 2009 is shown in Figure B. Calcium concentrations at G205 ranged from 83 milligrams per liter (mg/L) to 160 mg/L and were most often between 87.8 mg/L (first quartile) and 142.5 mg/L (third quartile).

The calcium SSI concentration of 160 mg/L identified at well G209 during D5 was above the background Upper Prediction Limit (UPL) of 143 mg/L, but within the range of concentrations observed at G205 in 2008 and 2009, before GMF Gypsum Stack Pond was placed into service. Therefore, the GMF Gypsum Stack Pond is not the source of the calcium SSI in well G209.

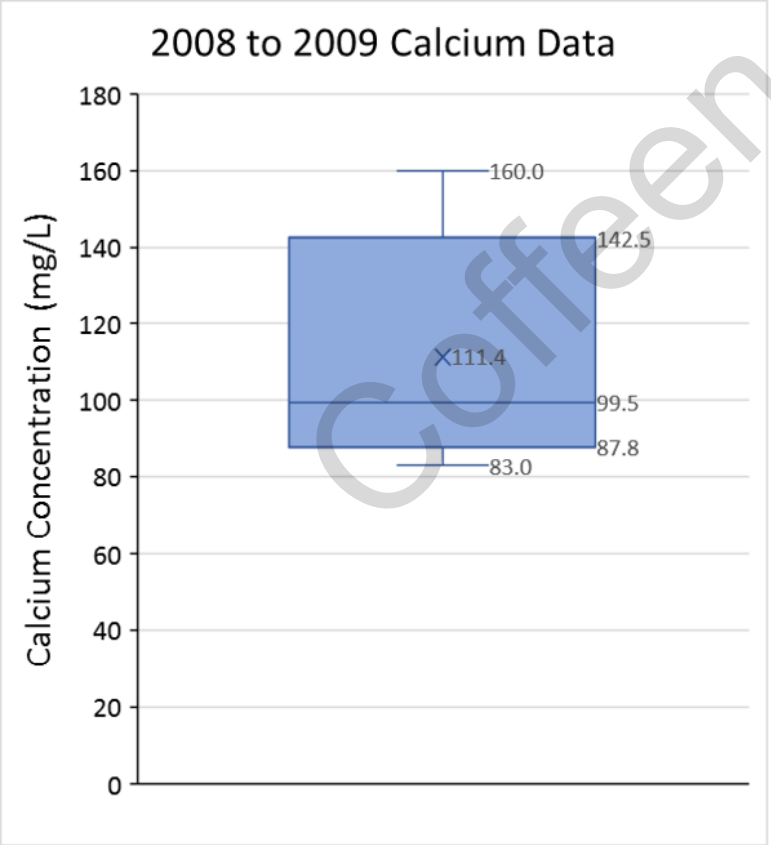


Figure B. Box Plot of Calcium Concentrations in Monitoring Well G205 from 2008-2009, before the GMF Gypsum Stack Pond was Placed into Service.

Fluoride was detected in groundwater samples collected from the area of the Gypsum Stack Pond prior to it being placed into service in 2010. Wells MW04S to MW12S are screened in the uppermost aquifer with wells G206 and G209 and are located either near the current background monitoring wells or in areas now downgradient of the Gypsum Stack Pond. Wells MW04S, MW05S, MW10S, MW11S, and MW12S are shown on Figure 1; the other wells are farther north

relative to the area of the figure. Fluoride concentrations measured in 2006 and 2007 ranged from 0.081 to 0.80 mg/L (Figure C) and were most often between 0.29 mg/L (first quartile) and 0.53 mg/L (third quartile).

During the D5 sampling event, fluoride SSIs were identified in G206 and G209 at concentrations of 0.51 mg/L and 0.59 mg/L, respectively. These are within the range of concentrations observed in wells MW04S through MW12S in 2006 and 2007, before the Gypsum Stack Pond was placed into service. Therefore, the GMF Gypsum Stack Pond is not the source of the fluoride SSIs in G206 and G209.

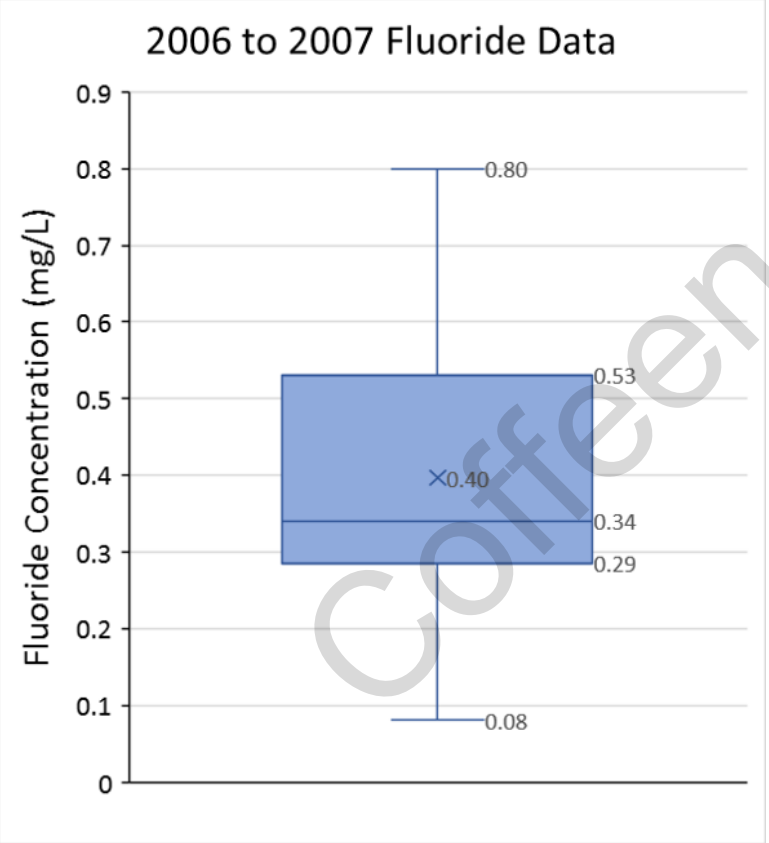


Figure C. Box Plot of Fluoride Concentrations in non-CCR Monitoring Wells MW04S through MW12S from 2006-2007, before the GMF Gypsum Stack Pond was Placed into Service.

3.4 LOE #4: Concentrations of Boron and Sulfate, Common Indicators for CCR Impacts to Groundwater, are Near or Below Background Concentrations and are Stable in the Downgradient Wells

Boron and sulfate are common indicators of CCR impacts to groundwater due to their leachability from CCR and mobility in groundwater; however, downgradient concentrations are near or below the reporting limit (boron) or background well concentrations as described below.

Boron

During the D5 monitoring event, boron concentrations are near or below analytical method reporting limits with the exception of downgradient monitoring well G215 (Table 1). All

downgradient monitoring well boron concentrations were below the UPL of 0.39 mg/L (Table 1). Boron is consistently below the reporting limit (0.01 mg/L) in the majority of the wells, precluding trend analysis.

Table A. Summary Statistics for Boron in Groundwater (from November 2015 to August 2019).

Monitoring Well	% Non-Detects	Boron (mg/L)		
		Minimum	Maximum	Median
Background Wells				
G200	46	0.010	0.39	0.010
R201	69	0.010	0.017	0.010
Downgradient Wells				
G206	69	0.010	0.11	0.010
G209	38	0.010	0.019	0.011
G212	85	0.010	0.016	0.010
G215	0	0.015	0.097	0.027
G218	85	0.010	0.014	0.010

Sulfate

Sulfate concentrations in downgradient wells and background wells are shown on Figure D. All sulfate concentrations in downgradient wells are below the UPL of 300 mg/L, determined from concentrations in background monitoring wells G200 and R201. Maximum sulfate concentrations measured in groundwater at each downgradient well between 2015 and 2019 ranged from 59 mg/L to 280 mg/L.

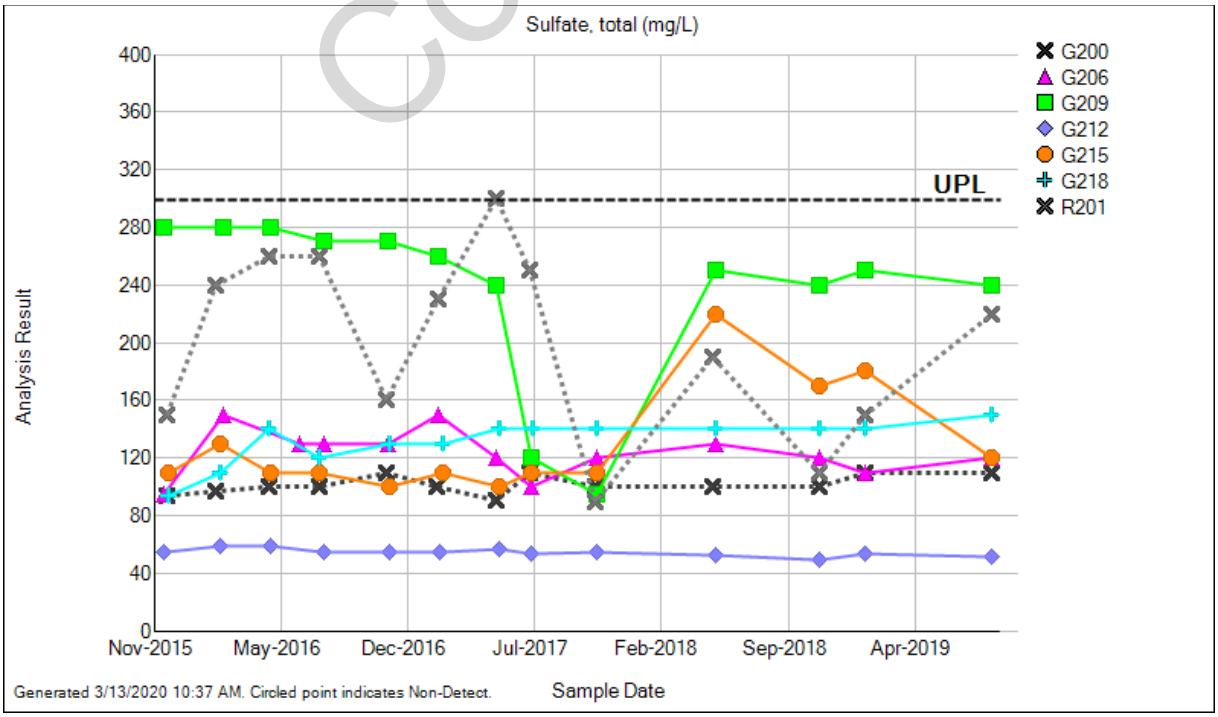


Figure D. Sulfate Time Series

Mann-Kendall trend analysis tests were performed to determine if sulfate concentrations at each well are increasing, decreasing or stable (i.e., no statistically significant upward or downward trend). If the Mann-Kendall test did not identify a trend, the coefficient of variation (CV) was calculated to determine if the concentrations are too variable to identify a trend (i.e., CV greater than or equal to 1). If a trend was identified, the CV was calculated to indicate whether data used to establish the trend are suggestive of a low- or high-magnitude trend. Data with a CV less than or equal to 1 suggest a low-magnitude trend.

Sulfate concentrations were stable in background well R201, and downgradient wells G206 and G215. A statistically significant downward trend was identified in downgradient wells G209 and G212. A statistically significant upward trend was identified in upgradient monitoring well G200 and downgradient monitoring well G218. Although the sulfate trends at these wells were determined to be significant based on the Mann-Kendall test, the concentrations demonstrated low variability (CV less than or equal to 1), suggesting a low-magnitude trend. Table 2 provides summary statistics, including CV and trend per well.

Concentrations of boron and sulfate near or below background levels, and the relative stability of these concentrations, are evidence that the Gypsum Stack Pond is not the source of CCR constituents detected in the downgradient groundwater monitoring wells.

Table B. Summary Statistics for Sulfate in Groundwater (from November 2015 to August 2019).

Monitoring Well	Sulfate (mg/L)					
	Minimum	Maximum	Median	Standard Deviation	Trend	CV
Background Wells						
G200	90	110	100	6.5	upward	0.06
R201	89	300	220	64	stable	0.32
Downgradient Wells						
G206	95	150	120	16	stable	0.13
G209	95	280	250	59	downward	0.25
G212	49	59	54	2.9	downward	0.05
G215	100	220	110	37	stable	0.29
G218	94	150	140	15	upward	0.12

4. CONCLUSIONS

Based on these four lines of evidence, it has been demonstrated that the Coffeen GMF Gypsum Stack Pond is not the source of the fluoride SSIs in G206 and G209, or the calcium SSI in G209.

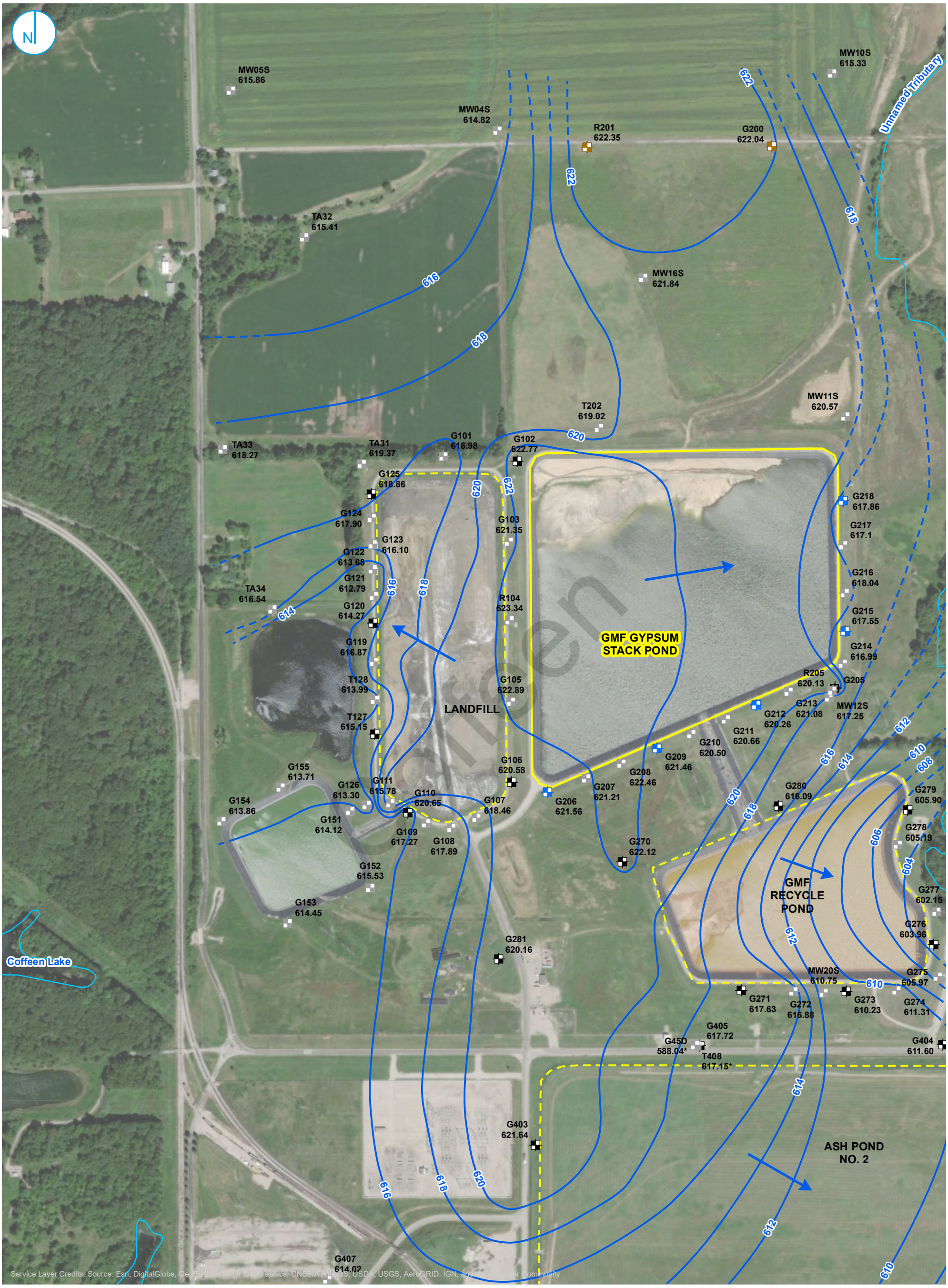
1. GMF Gypsum Stack Pond Composite Liner Design.
2. The ionic composition of GMF Gypsum Stack Pond water is different from the ionic composition of groundwater.
3. Calcium and fluoride were present in groundwater in the vicinity of the GMF Gypsum Stack Pond prior to the unit being placed into service at concentrations that exceeded current background concentrations.
4. Concentrations of boron and sulfate, common indicators for CCR impacts to groundwater, are near or below background concentrations and are stable in the downgradient wells.

This information serves as the written ASD prepared in accordance with 40 C.F.R. § 257.94(e)(2) that SSIs observed during D5 were not due to the GMF Gypsum Stack Pond. Therefore, an assessment monitoring program is not required and the GMF Gypsum Stack Pond will remain in detection monitoring.

5. REFERENCES

Natural Resource Technology, and OBG Company (NRT), October 17, 2017. *Hydrogeologic Monitoring Plan. Coffeen Ash Pond No. 1 – CCR Unit ID 101, Coffeen Ash Pond No. 2 – CCR Unit ID 102, Coffeen GMF Gypsum Stack Pond – CCR Unit ID 103, Coffeen GMF Recycle Pond – CCR Unit ID 104, Coffeen Landfill – CCR Unit ID 105.* Coffeen Power Station, Coffeen, Illinois. Illinois Power Generating Company.

FIGURES



BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
CCR RULE MONITORING WELL
NON-CCR RULE MONITORING WELL
ABANDONED MONITORING WELL
CCR UNIT BOUNDARY, SUBJECT SITE
CCR UNIT BOUNDARY
SURFACE WATER FEATURE

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 200 400 Feet

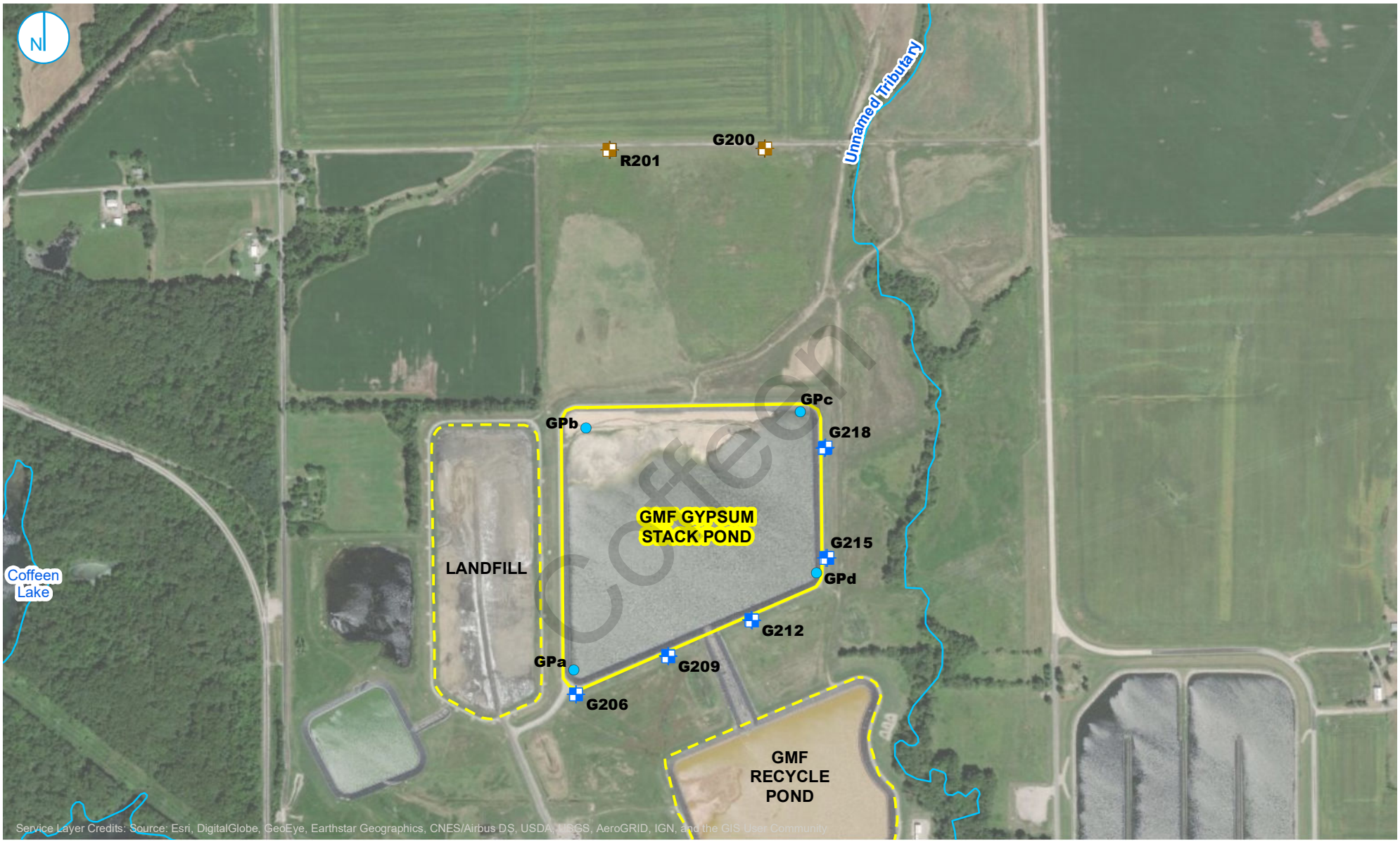
GROUNDWATER ELEVATION CONTOUR MAP AUGUST 5, 2019

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION
COFFEEN GMF GYPSUM STACK POND
COFFEEN POWER STATION
COFFEEN, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
POND WATER SAMPLE LOCATION
CCR UNIT BOUNDARY, SUBJECT SITE
CCR UNIT BOUNDARY
SURFACE WATER FEATURE

0 350 700 Feet

SAMPLE LOCATION MAP

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION
COFFEEN GMF GYPSUM STACK POND
COFFEEN POWER STATION
COFFEEN, ILLINOIS

FIGURE 2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Intended for
Dynegy Coffeen, LLC

Date
October 12, 2020

Project No.
74915

40 C.F.R. § 257.95(g)(3)(ii): ALTERNATE SOURCE DEMONSTRATION

COFFEEN GMF GYPSUM STACK POND

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Brian G. Hennings, 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.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 12, 2020

I, Anne Frances Ackerman, 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.

Anne Frances Ackerman
Qualified Professional Engineer
062-060586
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 12, 2020

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CONTENTS

TABLES (IN TEXT)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
cm/s	centimeters per second
f/k/a	formerly known as
GMF	Gypsum Management Facility
HDPE	high-density polyethylene
IEPA	Illinois Environmental Protection Agency
LOE	line of evidence
mg/L	milligrams per liter
msl	above mean sea level North American Vertical Datum of 1988
NRT/OBG	Natural Resource Technology, an OBG Company
Site	Coffeen Power Station
SSI	Statistically Significant Increase
UPL	Upper Prediction Limit

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of Statistically Significant Increases (SSIs) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Illinois Power Generating Company by Ramboll Americas Engineering Solutions, Inc., formerly known as (f/k/a) O'Brien & Gere Engineers, Inc. to provide pertinent information pursuant to 40 C.F.R. § 257.94(e)(2) for the Coffeen Gypsum Management Facility (GMF) Gypsum Stack Pond, located near Coffeen, Illinois.

The sixth semi-annual detection monitoring samples (Detection Monitoring Round 6 [D6]) were collected on January 21 and 22, 2020 and analytical data were received on April 15, 2020. In accordance with 40 C.F.R. § 257.93(h)(2), statistical analysis of the data to identify SSIs of 40 C.F.R. Part 257 Appendix III parameters over background concentrations was completed by July 14, 2020, within 90 days of receipt of the analytical data. The statistical determination identified the following SSI at downgradient monitoring wells:

- pH at well G206
- Calcium at well G209

In accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017a), wells G206 and G209 were resampled on May 5, 2020 and analyzed only for pH and calcium (respectively) to confirm the SSIs. Following evaluation of analytical data from the resample event, the following SSI was confirmed:

- pH at well G206

Pursuant to 40 C.F.R. § 257.94(e)(2), the following demonstrates that sources other than the Coffeen GMF Gypsum Stack Pond were the cause of the SSI listed above. This ASD was completed by October 12, 2020, within 90 days of determination of the SSI, as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The Coffeen Power Station (Site) is located in Montgomery County, in central Illinois, approximately 2 miles south of the city of Coffeen. The area is bordered by Coffeen Lake to the west, east, and south, and by agricultural land to the north. Several underground coal mines were historically operated both beneath and in the vicinity of the Site.

2.2 Geology and Hydrogeology

The site geologic and hydrogeologic setting summarized below is from the Coffeen Hydrogeologic Monitoring Plan (NRT/OBG, 2017b).

Pleistocene deposits of unlithified glacial diamictons, lacustrine/alluvial deposits, and windblown loess overlie Pennsylvanian-age bedrock throughout central Illinois. The most extensive glacial deposits are those from the Illinoian Stage which cover much of the state and are present at the Site. Windblown (aeolian) deposits, the Peoria and Roxana Silts, cover the glacial deposits over a majority of the state. These units are fine-grained deposits blown from river valleys by prevailing winds.

Till members of the Glasford Formation include the Smithboro Member, the Mulberry Grove Member, the Vandalia Member, and the Hagarstown Member (oldest to youngest). The Smithboro Member is described as a gray, compact, silty till. The Smithboro is bounded below by the Yarmouth Soil. The Mulberry Grove Member is intermittent at the Site and is described as a calcareous gray silt and fine sand containing some fossil mollusks. The Vandalia Member is a sandy till with thin lenticular bodies of silt, sand, and gravel. It is calcareous, except where weathered, generally gray, and moderately compact. The Hagarstown Member is bounded at the top by the Sangamon Soil. The member consists of gravelly till, poorly sorted gravel, well sorted gravel, and sand.

The Quaternary deposits in the Coffeen area consist mainly of diamictons and intercalated outwash deposits that were deposited during Illinoian and Pre-Illinoian glaciations. The unconsolidated deposits and bedrock which occur at the Site include the following units (beginning at the ground surface):

- Ash/Gypsum Fill Units – CCR and gypsum within the various CCR Units.
- Upper Confining Unit – Low permeability clays and silts, including the Roxana Silt and Peoria Silt (Loess Unit) and the upper clayey till portion of the Hagarstown Member.
- Uppermost Aquifer – Thin (generally less than 3 feet), moderate to high permeability sand, silty sand, and sandy silt/clay units which include the Hagarstown Member (also referred to as the Hagarstown Beds) and the upper Vandalia Till Member (where weathered).
- Lower Confining Unit – Thick (generally greater than 15 feet), very low permeability sandy, silt till, or clay till that includes the unweathered Vandalia Member, Mulberry Grove Member (discontinuous), and Smithboro Member.
- Bedrock – Pennsylvanian-age Bond Formation characterized by limestone and calcareous clays and shales.

Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the Coffeen Power Station. The CCR units at the Site are located between the two lobes of the lake (identified as "Coffeen Lake" and "Unnamed Tributary" on Figure 1), which results in a north/south trending groundwater divide observed beneath the CCR units. Groundwater flow is to the southeast or southwest, downgradient of the divide, converging on the tributary valleys leading to Coffeen Lake on the east and west sides of the property.

Groundwater elevations were obtained from measurements in monitoring wells on January 20, 2020 prior to a combined sampling event for the five CCR units located at Coffeen Power Station. Water levels in the Gypsum Stack Pond area ranged from about 619 feet to 627 feet above mean sea level North American Vertical Datum of 1988 (msl) (Figure 1). The groundwater elevations and flow directions for the Coffeen Power Station during the D6 sampling event are shown in Figure 1, and generally follow the flow patterns established by the groundwater divide beneath the CCR units. The groundwater flow beneath the GMF Gypsum Stack Pond was to the southeast, toward the unnamed tributary, on January 20, 2020.

2.3 Groundwater and GMF Gypsum Stack Pond Monitoring

Figure 1 shows all monitoring wells present at the Site, including those in the groundwater monitoring systems established in accordance with 40 C.F.R. § 257.91 at Ash Pond No. 1, Ash Pond No. 2, the GMF Recycle Pond, the Landfill and the GMF Gypsum Stack Pond. The GMF Gypsum Stack Pond is a 77-acre facility that has been in operation since 2010. The monitoring system for the GMF Gypsum Stack Pond includes background wells R201 and G200, located north of the Gypsum Stack Pond, and downgradient monitoring wells are G206, G209, G212, G215, and G218 (Figure 2). The GMF Gypsum Stack Pond surface water was sampled at two locations in the northwest and northeast corners of the pond (GPb and GPc, respectively) during the D6 sampling event.

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

Lines of evidence (LOE) supporting this ASD include the following:

1. GMF Gypsum Stack Pond Composite Liner Design.
2. The ionic composition of GMF Gypsum Stack Pond water is different from the ionic composition of groundwater.
3. Concentrations of boron, a common indicator for CCR impacts to groundwater, is near or below background concentrations in the downgradient wells.

These LOE are described and supported in greater detail below.

3.1 LOE #1: GMF Gypsum Stack Pond Composite Liner Design

Construction of the GMF Gypsum Stack Pond was in accordance with Water Pollution Control Permit 2008-EA-4661 granted by the Illinois Environmental Protection Agency (IEPA). The GMF Gypsum Stack Pond composite liner system includes the following components:

- 60-mil high-density polyethylene (HDPE) geomembrane liner.
- Three-foot-thick layer of recompacted, low-permeability soil having a maximum hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s).

The IEPA-approved Coffeen GMF Gypsum Stack Pond composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b).

The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner system suggests that the GMP Gypsum Stack Pond is not the source of the pH SSI in G206.

3.2 LOE #2: The Ionic Composition of GMF Gypsum Stack Pond Water is Different from the Ionic Composition of Groundwater

Piper diagrams graphically represent ionic composition of aqueous solutions. A Piper diagram displays the position of water samples relative to their major cation and anion content on the two lower triangular portions of the diagram, providing the information which, when combined on the central, diamond-shaped portion of the diagram, identifies compositional categories or groupings (hydrochemical facies). Figure A, below, is a Piper diagram that displays the ionic composition of groundwater samples from the monitoring wells associated with the GMF Gypsum Stack Pond and pond surface water samples (GPb and GPc) collected during the D6 sampling event. The ionic compositional groupings identified are shown in the black and green ellipses on the diamond portion of the Piper diagram and are discussed in more detail below.

The Piper diagram that the background and downgradient groundwater (enclosed within the black ellipse) are in the calcium-bicarbonate facies, and that the water from the GMF Gypsum Stack Pond (enclosed within a green ellipse) are in the calcium-sulfate facies. The differences in ionic composition between the groundwater and GMF Gypsum Stack Pond water indicate that the GMF Gypsum Stack Pond is not the source of CCR constituents detected in groundwater.

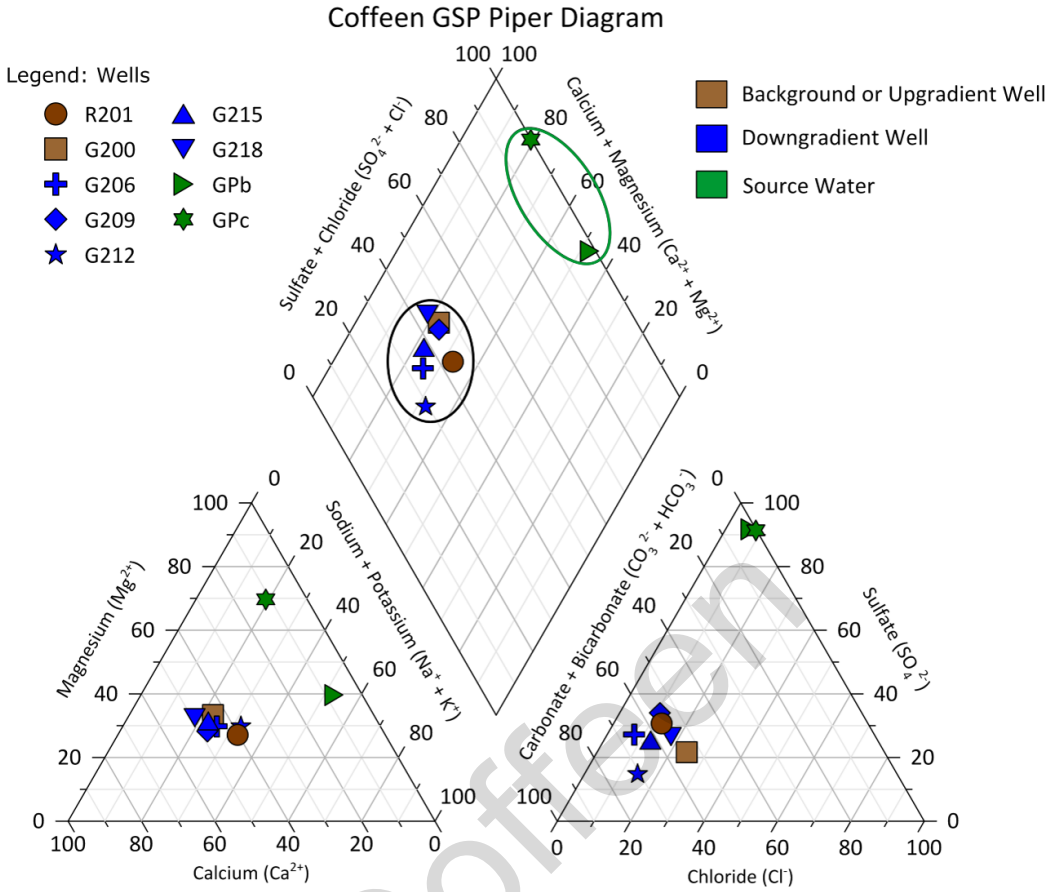


Figure A. Piper Diagram Showing Ionic Composition of Samples of Background and Downgradient Groundwater Associated with the GMF Gypsum Stack Pond and Samples of Surface Water from the GMF Gypsum Stack Pond.

3.3 LOE #3: Concentrations of Boron, a Common Indicator for CCR Impacts to Groundwater, is Near or Below Background Concentrations in the Downgradient Wells

Boron is a common indicator of CCR impacts to groundwater due to its leachability from CCR and mobility in groundwater; however, downgradient concentrations are near or below the reporting limit or background well concentrations as described below.

Boron

Since 2015 (when compliance monitoring began), boron concentrations have remained near or below analytical method reporting limit (0.01 milligrams per liter [mg/L]) except at downgradient monitoring well G215 (Table A). At well G206 (the location of the SSI), 71% of samples have been below the detection limit. Additionally, all downgradient monitoring well boron concentrations were below the upper prediction limit (UPL) of 0.39 mg/L (Table A). Low concentrations of boron from November 2015 through the D6 sampling event (January 2020) indicate that the downgradient wells have not been affected by CCR.

Table A. Summary Statistics for Boron in Groundwater (from November 2015 to January 2020).

Monitoring Well	% Non-Detects	Boron Concentrations (mg/L)		
		Minimum	Maximum	Median
Background Wells				
G200	50	0.010	0.39	0.010
R201	64	0.010	0.017	0.010
Downgradient Wells				
G206	71	0.010	0.11	0.010
G209	36	0.010	0.019	0.012
G212	79	0.010	0.016	0.010
G215	0	0.015	0.097	0.027
G218	79	0.010	0.014	0.010

4. CONCLUSIONS

Based on these three LOE, it has been demonstrated that the Coffeen GMF Gypsum Stack Pond is not the source of the pH SSI in G206.

1. GMF Gypsum Stack Pond Composite Liner Design.
2. The ionic composition of GMF Gypsum Stack Pond water is different from the ionic composition of groundwater.
3. Concentrations of boron, a common indicator for CCR impacts to groundwater, are near or below background concentrations in the downgradient wells.

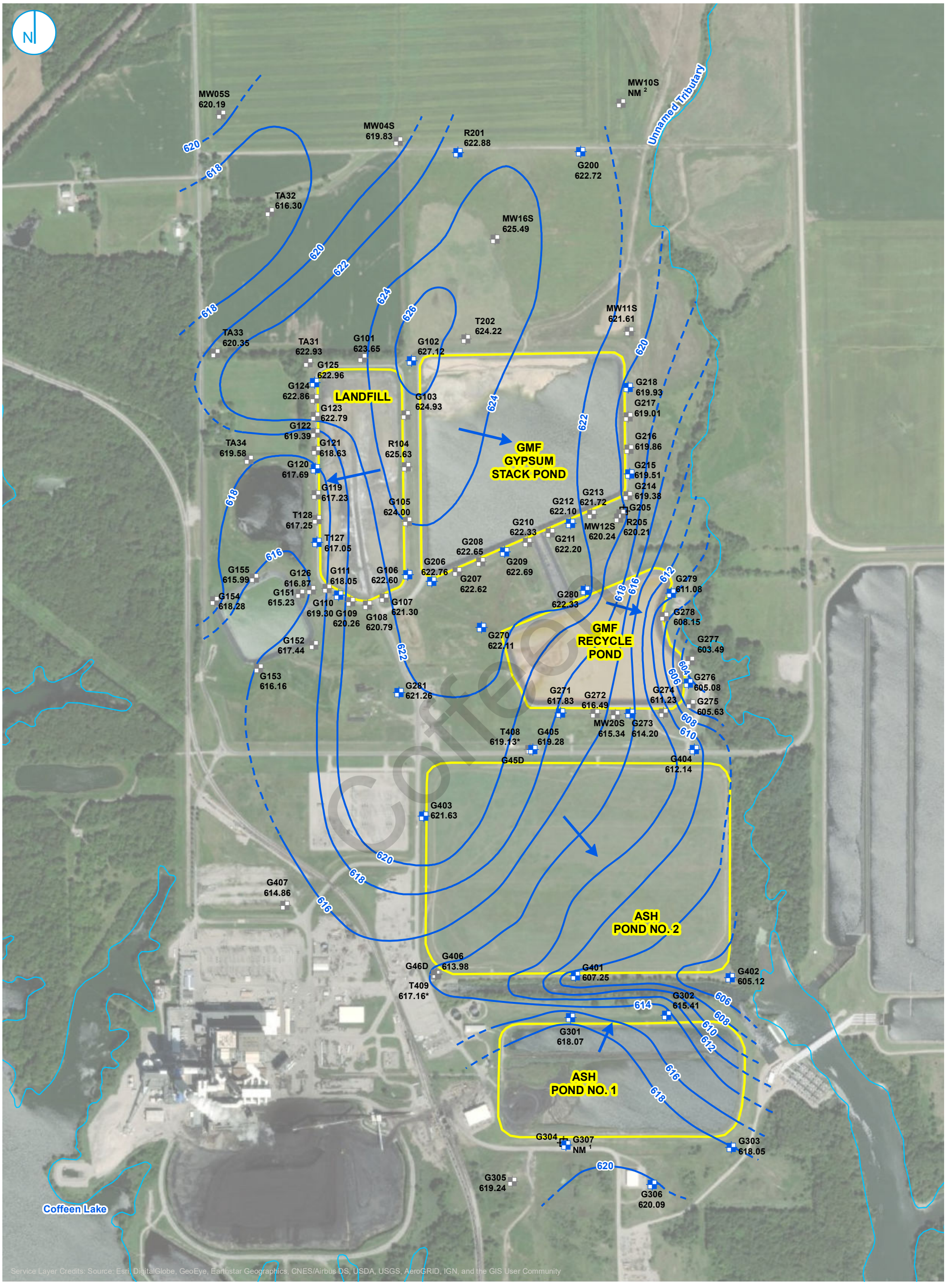
This information serves as the written ASD prepared in accordance with 40 C.F.R. § 257.94(e)(2) that the SSI observed during the D6 monitoring event were not due to the GMF Gypsum Stack Pond. Therefore, an assessment monitoring program is not required and the GMF Gypsum Stack Pond will remain in detection monitoring.

5. REFERENCES

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

Natural Resource Technology, an OBG Company (NRT/OBG), October 17, 2017b. *Hydrogeologic Monitoring Plan. Coffeen Ash Pond No. 1 – CCR Unit ID 101, Coffeen Ash Pond No. 2 – CCR Unit ID 102, Coffeen GMF Gypsum Stack Pond – CCR Unit ID 103, Coffeen GMF Recycle Pond – CCR Unit ID 104, Coffeen Landfill – CCR Unit ID 105.* Coffeen Power Station, Coffeen, Illinois. Illinois Power Generating Company.

FIGURES



- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- ABANDONED MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR UNIT BOUNDARY
- SURFACE WATER FEATURE

NOTE:
* = NOT USED FOR CONTOURING
NM = NOT MEASURED
[1] G307 WAS FROZEN DURING THE JANUARY 20, 2020 SAMPLING EVENT AND WATER LEVEL COULD NOT BE COLLECTED.
[2] MW10S WAS DAMAGED PRIOR TO THE JANUARY 20, 2020 SAMPLING EVENT AND WATER LEVEL COULD NOT BE COLLECTED.

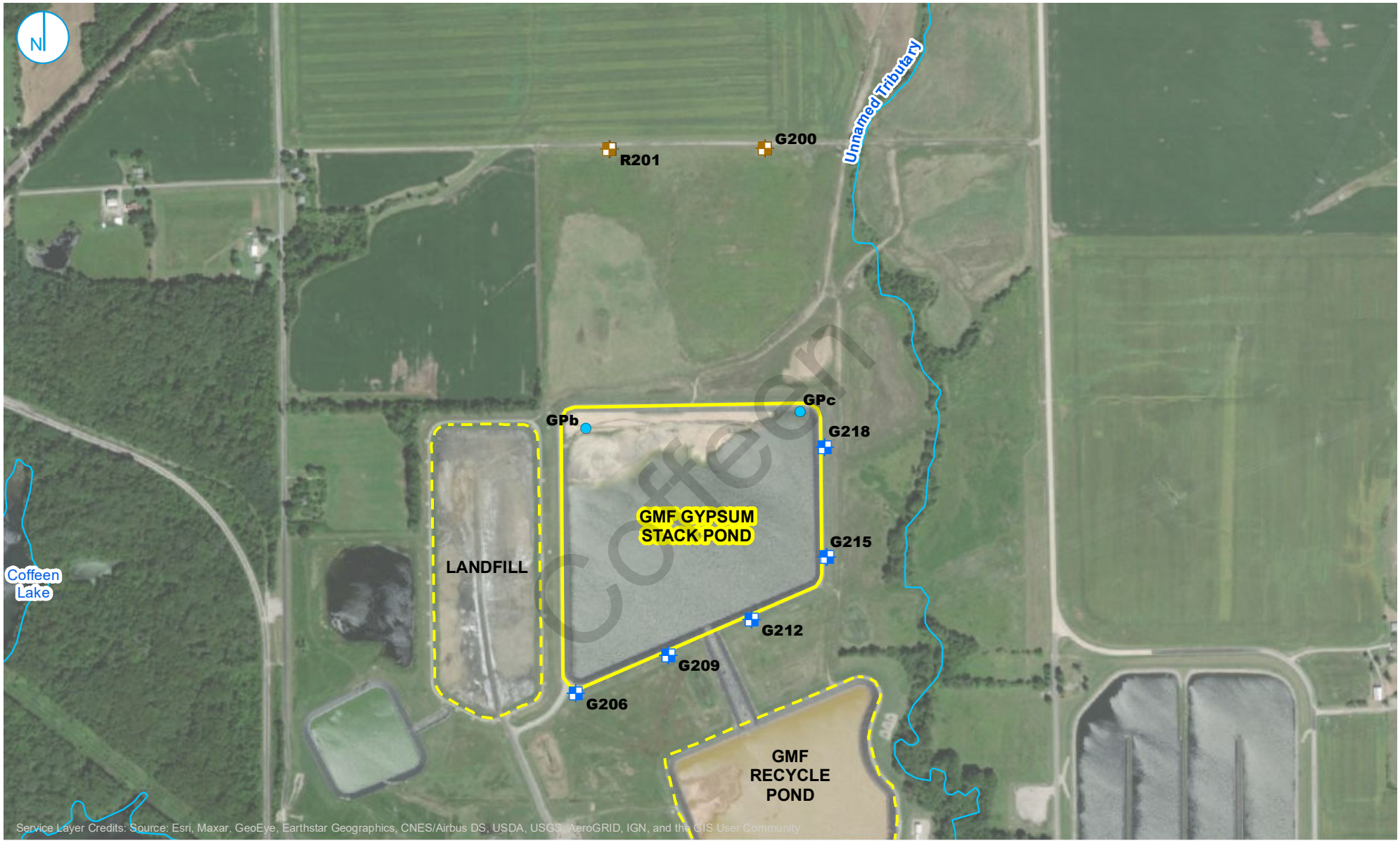
0 300 600 Feet

GROUNDWATER ELEVATION CONTOUR MAP JANUARY 20, 2020

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY



BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
POND WATER SAMPLE LOCATION
CCR UNIT BOUNDARY, SUBJECT SITE
CCR UNIT BOUNDARY
SURFACE WATER FEATURE

0 350 700 Feet

SAMPLE LOCATION MAP

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION
COFFEEN GMF GYPSUM STACK POND
COFFEEN POWER STATION
COFFEEN, ILLINOIS

FIGURE 2

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RAMBOLL