

Marion Power Plant – Emery Pond

2020 Annual Groundwater Monitoring and Corrective Action Report

Marion Power Plant
Southern Illinois Power Cooperative
Marion, Williamson County, Illinois



Table of Contents

1. Introduction	2
2. 2020 Activities Summary.....	2
2.1 Groundwater Flow.....	3
2.2 Sampling Results	3
2.3 Problems Encountered and Resolutions.....	3
3. Actions Planned for 2021	3
4. References	4

Appendices

- Appendix A Analytical Results
- Appendix B Potentiometric Surface Maps

Figures and Tables

Figures

Figure 1. Site Map	5
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Tables

Table 1. Groundwater Depths and Elevations	3
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Acronyms and Abbreviations

CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
DTW	Depth to Water (from measuring point)
Elev.	Elevation (in North American Vertical Datum 1988)
GPS	Groundwater Protection Standard
Hanson	Hanson Professional Services Inc.
MCL	Maximum Contaminant Level
Plant	Marion Power Plant
SIPC	Southern Illinois Power Cooperative
SSI	Statistically Significant Increase
USEPA	United States Environmental Protection Agency

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1. Introduction

Hanson prepared this groundwater monitoring and corrective action plan report for the Southern Illinois Power Cooperative Marion Power Plant. This report was prepared in accordance with the “Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments” Title 40 CFR, Part 257, aka “the Rule”. The Rule regulates the disposal of CCR produced by electric generating facilities.

The Marion Plant is situated on the northwestern shoreline of Lake of Egypt, south of Marion, Illinois in Williamson County. The Marion Plant has been in operation since 1963, and utilizes Lake of Egypt for cooling and other fresh water needs. The Emery Pond is an on-site settling pond, approximately one (1) acre in size that is subject to the Rule. Precipitator, air heater, boiler, and scrubber CCR material is intermittently managed in the pond.

This report summarizes the activities related to the Rule during 2020. In accordance with the Rule, the owner or operator of an existing CCR unit must prepare an annual groundwater monitoring and corrective action report for the preceding calendar year. The report summarizes activities completed, any problems encountered, discusses corrective actions to the problems and discusses activities for the upcoming year. At a minimum, the report should contain the following information, to the extent available:

- 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.
- 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.
- In addition to all the monitoring data obtained under 40 CFR 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis at 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.
- 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 an SSI over background levels).
- Other information required to be included in the annual report as specified in 40 CFR 257.90 through 257.98.

2. 2020 Activities Summary

The Emery Pond has five groundwater monitoring wells (AECOM, 2017). One upgradient (background) well, EBG, and four detection monitoring wells, EP-1, EP-2, EP-3, and EP-4 (see Figure 1). No modifications to the existing monitoring program were performed and no needed changes were identified.

Assessment Monitoring continued at Emery Pond in 2020 for the SSIs identified in 2018 (Hanson, 2019).

2.1 Groundwater Flow

Depth to water measurements were taken prior to collecting a sample at each well. A potentiometric surface map was created to confirm groundwater flow direction. A summary of groundwater measured elevations is included in Table 1 and groundwater flow maps for each event are included in Appendix B.

Table 1. Groundwater Depths and Elevations

Sample Event Well ID	EBG	EP-1	EP-2	EP-3	EP-4
January 30, 2020 DTW	7.3	4.2	4.0	16.6	9.8
January 30, 2020 Elev.	517.57	515.52	509.79	502.35	509.94
June 22, 2020 DTW	8.0	6.3	6.6	16.0	9.8
June 22, 2020 Elev.	516.87	513.42	507.19	502.95	509.94

Generally, groundwater flow is in a northeasterly direction for the two 2020 sampling events.

2.2 Sampling Results

Previously, a notice of assessment monitoring was placed in the operating record on August 8, 2018 (SIPC, 2018) due to the SSIs identified at that time. For 2020, the results of the first semi-annual sampling event continued to show several SSIs in the downgradient monitoring wells (see gray highlights for the January 11 sampling event in the Analytical Results Table in Appendix A).

Assessment Monitoring samples (40 CFR 257, Appendix III and Appendix IV) were collected on June 22, 2020. The 40 CFR 257 Appendix III samples continued to show the SSIs observed in the January 2020 sampling event. The 40 CFR 257, Appendix IV parameters were exceeded at two monitoring wells. EP-3 exceeded background for total Arsenic and background and GPS for total Cobalt, and EP-4 exceeded background and GPSs for total Arsenic, total Cobalt, and total Lead.

2.3 Problems Encountered and Resolutions

No problems were encountered during the 2020 reporting period.

3. Actions Planned for 2021

SIPC will continue to collect Assessment Monitoring samples during the first semi-annual event in 2021 (Appendix III and Appendix IV parameters) and add the parameters that exceeded the GPS during the second semi-annual monitoring event.

Construction of the Selected Remedy (Hanson, 2021) began in late-2020 with the issuance of the Illinois EPA Bureau of Water construction permit on October 16, 2020. The Selected Remedy includes closure by removal of the CCR in Emery Pond and the adjacent Gypsum Loadout Area, construction of a new, lined, non-CCR Storm Water Basin, installation of a perimeter drain at the toe of the new liner to reduce hydrostatic pressure on the liner system and assist with groundwater cleanup, and monitoring of natural attenuation of the impacted groundwater.

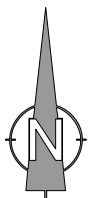
4. References

AECOM, 2017. "Draft Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule", Marion Power Plant. September 28, 2017.

Hanson, 2019. "2018 Annual Groundwater Monitoring and Corrective Action Report", Hanson Professional Services Inc., Springfield, IL. January 25, 2019.

Hanson, 2021. "Corrective Action and Selected Remedy Plan", Hanson Professional Services Inc., Springfield, IL. Revised January 25, 2021.

SIPC, 2018. "Assessment Monitoring Program Notification – Emery Pond Monitoring Wells", Southern Illinois Power Cooperative, Marion, IL. 1 p.

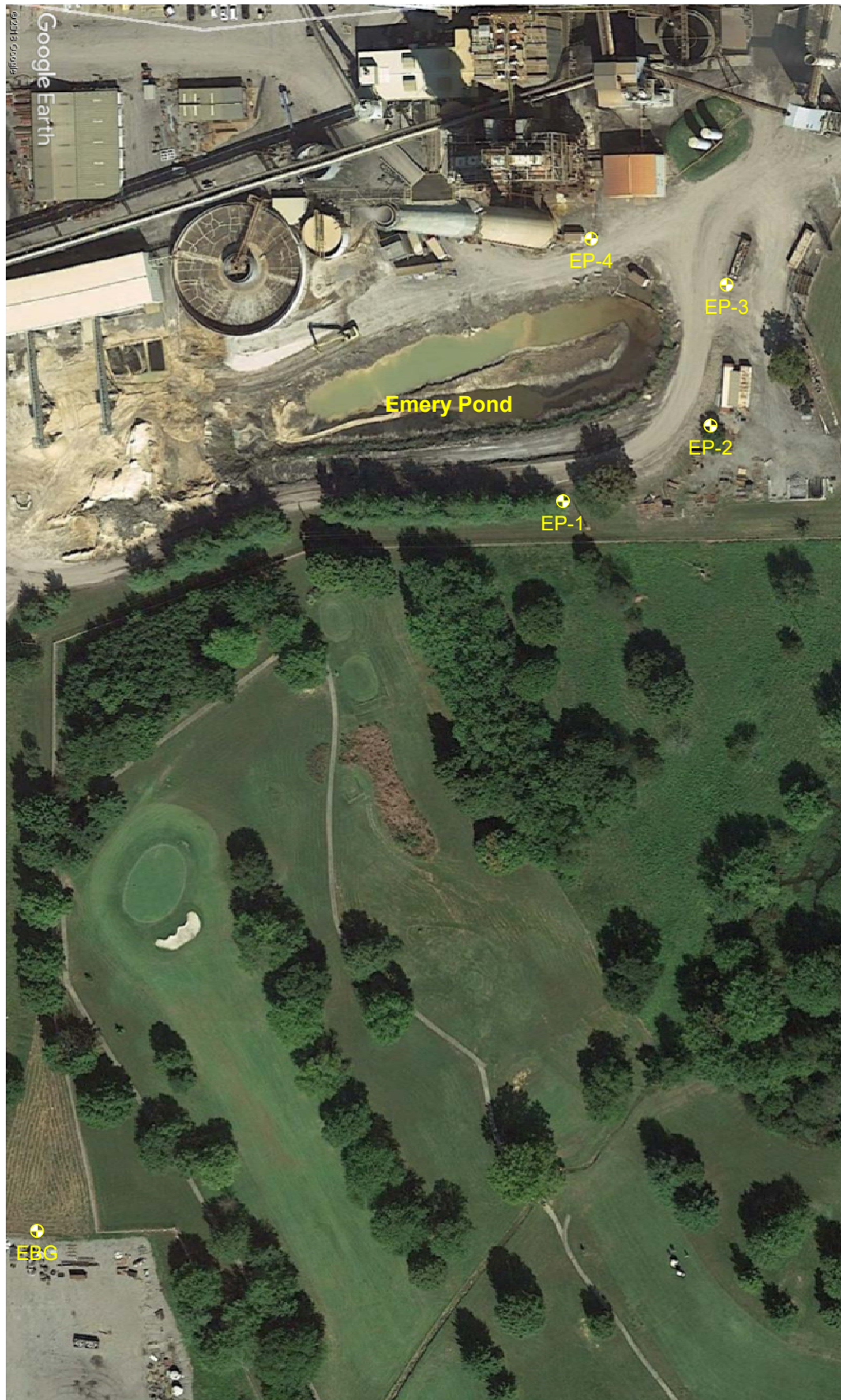


SITE MAP

2020 ANNUAL GROUNDWATER REPORT
EMERY POND – MARION POWER PLANT
MARION, WILLIAMSON COUNTY, ILLINOIS

HANSON NO. 21E0012

FIGURE 1



Explanation

Monitoring Well EP-1

SCALE: 1 in. = 135 ft.



Appendix A

Analytical Results



Appendix A. Analytical Results Table for 2020
SIPC Marion Power Plant – Emery Pond

	Sampling Date				1/30/2020					6/22/2020				
	Reporting Date				3/27/2020					7/24/2020				
	PARAMETER NAME	UNITS	Bkgd. Std.	GPS	EBG	EP-1	EP-2	EP-3	EP-4	EBG	EP-1	EP-2	EP-3	EP-4
Detection Monitoring List (App. III)	Boron	mg/L	0.1216	0.1216	<0.19	1100.	560.	<0.19	11000.	0.022	0.92	0.47	0.024	9.9
	Calcium	mg/L	46.304	46.304	12.	540.	430.	40.	170.	13.	470.	360.	80.	150.
	Chloride	mg/L	118.63	118.63	7.2	52.	13.	140.	370.	12.	34.	19.	330.	380.
	Fluoride	mg/L	0.64	4.	0.56	<0.06	<0.06	<0.06	<0.06	<0.5	<0.5	<0.5	<0.5	<0.5
	pH	SU	6.11 - 6.94	6.11 - 6.94	6.54	7.39	6.46	6.31	5.94	6.5	6.15	5.81	6.01	5.79
	Sulfate	mg/L	68.606	68.606	87.	1700.	1100.	190.	630.	81.	1400.	1200.	410.	610.
	Temperature	deg C	n/a	n/a	16.2	16.1	14.3	18.1	15.8	24.	18.1	20.5	22.2	20.6
	Total Dissolved Solids	mg/L	550.58	550.58	280.	2700.	1900.	750.	2000.	500.	2700.	2200.	960.	2500.
Assessment Monitoring List (App. IV)	Antimony	ug/L	5.	6.	◆	◆	◆	◆	◆	<0.52	<2.6	<0.52	<0.52	<0.52
	Arsenic	ug/L	5.	10.	◆	◆	◆	6.7	19.	1.1	<1.4	<0.27	5.9	14.
	Barium	ug/L	249.13	2000.	◆	◆	◆	◆	◆	68.	19.	19.	41.	27.
	Beryllium	ug/L	5.	5.	◆	◆	◆	◆	◆	<0.11	<0.55	<0.11	<0.11	<0.55
	Cadmium	ug/L	10.	10.	◆	◆	◆	◆	◆	<0.2	<0.2	<0.2	<0.2	<0.2
	Chromium	ug/L	10.	100.	◆	◆	◆	◆	◆	4.2	<1.1	<1.1	<1.1	<1.1
	Cobalt	ug/L	19.0812	19.0812	◆	◆	◆	87.	260.	1.7	<0.18	<0.037	47.	330.
	Lead	ug/L	10.	15.	◆	◆	◆	◆	◆	<3.3	<3.3	<3.3	<3.3	18.
	Lithium	ug/L	100.	100.	◆	◆	◆	◆	◆	<0.0042	<0.0042	<0.0042	0.12	<0.0042
	Mercury	ug/L	0.2	2.	◆	◆	◆	◆	◆	<0.19	<0.19	<0.19	<0.19	<0.19
	Molybdenum	ug/L	5.	100.	◆	◆	◆	◆	◆	<0.019	<0.095	<0.019	<0.019	<0.019
	Radium 226	pCi/L	1.2076	n/a	◆	◆	◆	◆	◆	0.468	0.42	0.0467	0.513	0.163
	Radium 226 Uncertainty	pCi/L	n/a	n/a	◆	◆	◆	◆	◆	♣	♣	♣	♣	♣
	Radium 228	pCi/L	2.9745	n/a	◆	◆	◆	◆	◆	0.514	0.405	0.176	0.304	0.41
	Radium 228 Uncertainty	pCi/L	n/a	n/a	◆	◆	◆	◆	◆	♣	♣	♣	♣	♣
	Radium 226 + Radium 228	pCi/L	4.0038	5.	◆	◆	◆	◆	◆	0.982	0.825	0.2227	0.817	0.573
	Selenium	ug/L	7.	50.	◆	◆	◆	◆	◆	<0.56	<2.8	3.1	<0.56	1.2
	Thallium	ug/L	50.	50.	◆	◆	◆	◆	◆	<4.	<4.	<4.	<4.	<4.

Upgradient monitoring well =	EBG
Detection monitoring well =	EP-3
Background GW Quality Standard =	5.
Concentration above Background =	140.
Concentration above GPS =	140.
pH value within meter accuracy of ±0.1 SU =	6.1
Not required per 40 CFR 257.95(d)(1) =	◆
Data not available at time of publishing =	♣

Groundwater Protection Standards (GPS):	
MCL from 40 CFR 141.61 and .66 =	10.
MCL from July 30, 2018 rulemaking =	40.
Background concentration per 257.95(h)(3) =	10.

Appendix B

Potentiometric Surface Maps





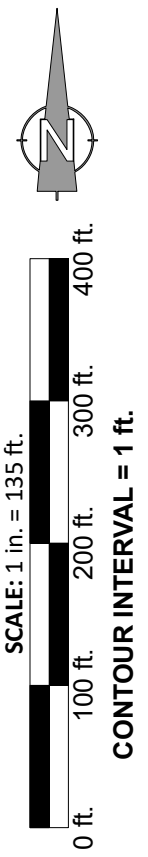
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POTENTIOMETRIC SURFACE MAP

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 MARION, WILLIAMSON COUNTY, ILLINOIS

FIGURE NO. B-1





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POTENTIOMETRIC SURFACE MAP

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EMERY POND - MARION POWER PLANT
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HANSON NO. 21E0012

FIGURE NO. B-2



SCALE: 1 in. = 135 ft.



CONTOUR INTERVAL = 1 ft.