

Marion Power Plant – Emery Pond

2020 Semi-Annual Groundwater Monitoring and Corrective Action Report

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



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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)
EPA	Environmental Protection Agency
FGD	Flue Gas Desulphurization
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 has been 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). Remedy selection and implementation of corrective action has also progressed in 2020.

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 30 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 Selection and Implementation of Corrective Action

SIPC has proceeded with an assessment of corrective measures, and in conjunction with Illinois EPA Bureau of Water, has selected a remedy that meets the standards of 40 CFR 257.96(b). These measures include closure by removal of Emery Pond and the adjoining FGD Loadout Area. Following closure, the new Storm Water Basin (constructed in the footprint of Emery Pond, but no longer a CCR Unit) will have a composite liner system (recompacted soil with flexible membrane liner) installed. A perimeter drain will also be installed immediately outboard of the soil liner to protect the liner system from hydraulic pressure and to aid in collecting any potentially impacted groundwater.

The construction work for the remedy has been bid and the contractor has been selected, however construction is scheduled to coincide with an outage scheduled for October 2020. Interim measures, as required by 40 CFR 257.98(a)(3), include beginning removal of Emery Pond sediments, and maintain Emery Pond water levels as low as practical. Emery Pond had stopped taking CCR sometime in 2018.

3. Actions Planned for 2021

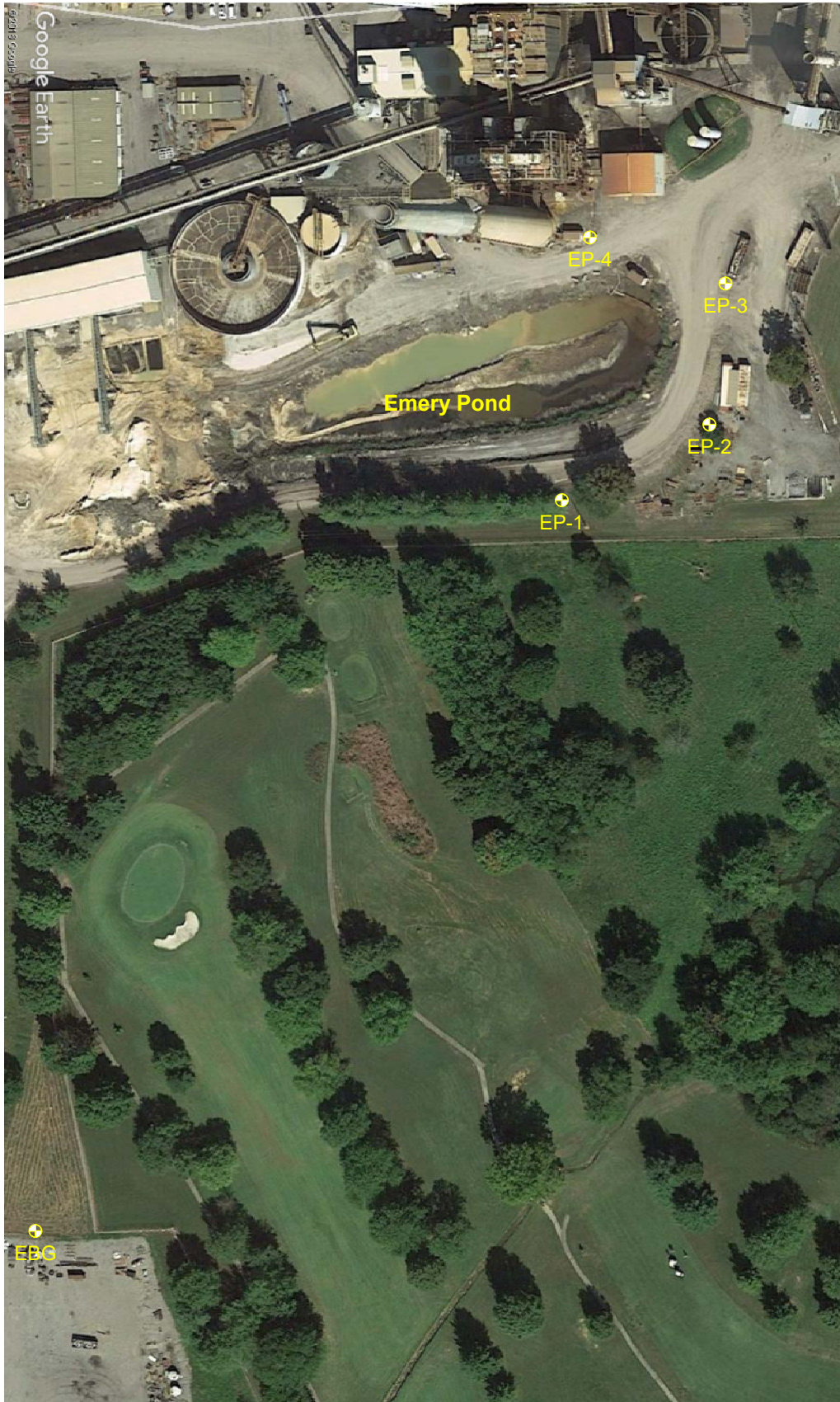
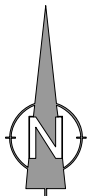
SIPC will begin Corrective Action Monitoring of groundwater in 2021 with the completion of the closure by removal and liner construction activities.

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.

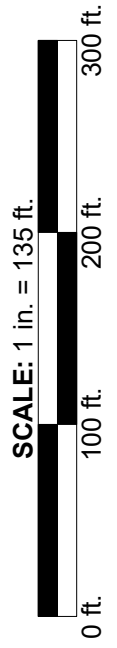
SIPC, 2018. "Assessment Monitoring Program Notification – Emery Pond Monitoring Wells", Southern Illinois Power Cooperative, Marion, IL. 1 p.




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Explanation

Monitoring Well ● EP-1



	SITE MAP	
	2019 ANNUAL GROUNDWATER REPORT EMERY POND – MARION POWER PLANT MARION, WILLIAMSON COUNTY, ILLINOIS	
HANSON NO. 20E0006		FIGURE 1

Appendix A

Analytical Results



**Appendix A. Analytical Results Table for 2019
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

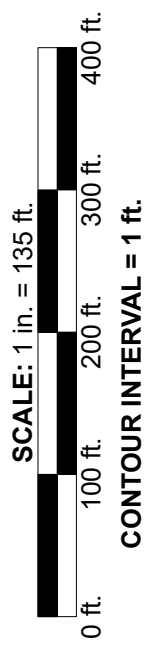
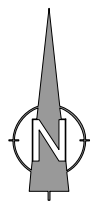
Potentiometric Surface Maps

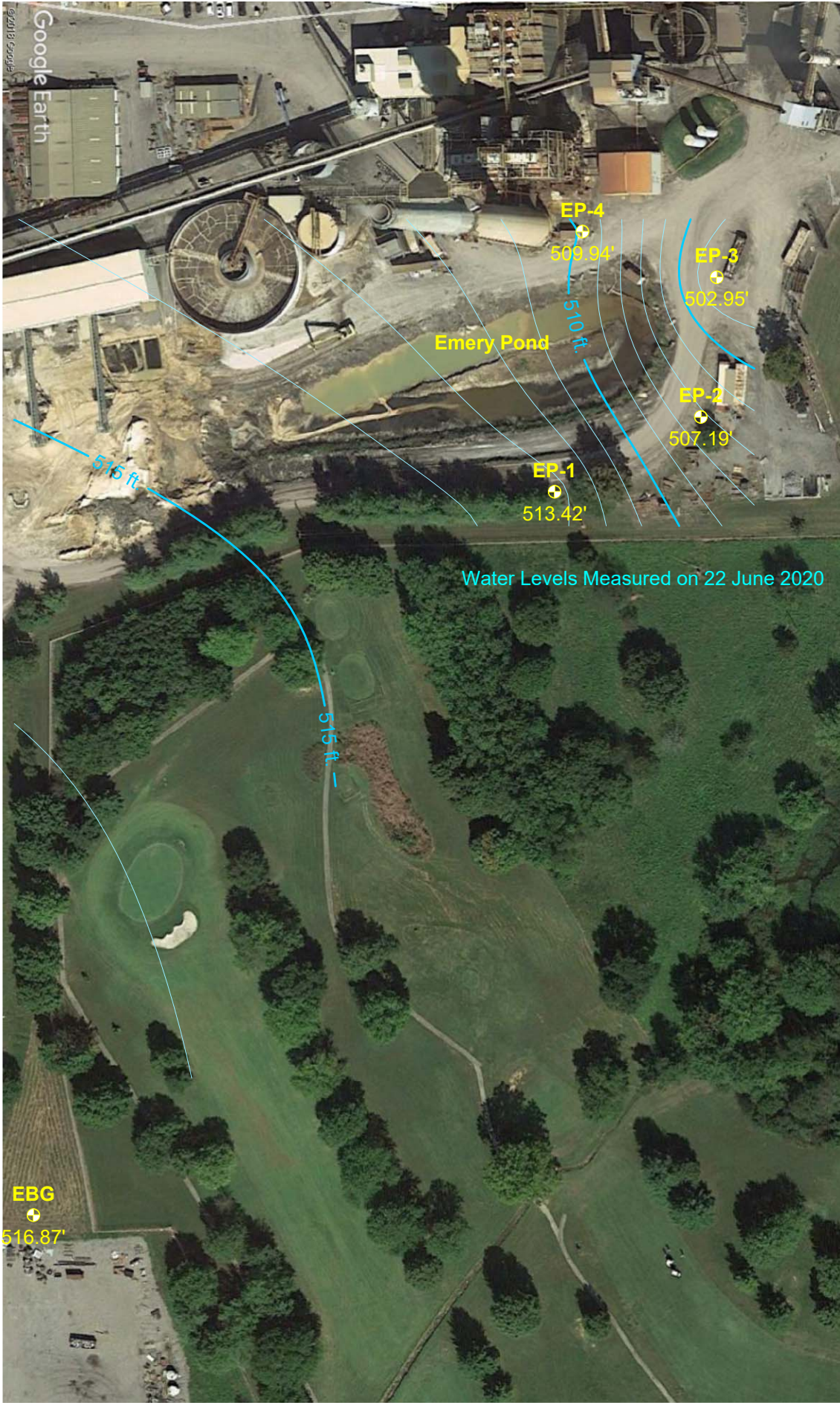





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POTENTIOMETRIC SURFACE MAP
 2019 ANNUAL GROUNDWATER REPORT
 EMERY POND - MARION POWER PLANT
 MARION, WILLIAMSON COUNTY, ILLINOIS
 HANSON NO. 20E0006 FIGURE NO. B-1





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POTENTIOMETRIC SURFACE MAP

**2019 ANNUAL GROUNDWATER REPORT
EMERY POND - MARION POWER PLANT
MARION, WILLIAMSON COUNTY, ILLINOIS**

HANSON NO. 20E0006 FIGURE NO. B-2

