

Marion Power Plant – Emery Pond

# **2018 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)
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 2018. 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 a 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. 2018 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.

The initial 8 rounds of sample collection and analyses in compliance with the Monitoring Plan (AECOM, 2017 and 2018) was completed in August 2017, background statistics were calculated for the 8 sample collection events at monitoring wells EBG, and the first semi-annual round of detection monitoring was completed during March 2018.

## 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
March 22, 2018 DTW	6.9	6.3	4.6	16.1	2.6
March 22, 2018 Elev.	517.97	513.42	509.19	502.85	517.14
August 27, 2018 DTW	8.2	10.2	7.4	16.9	8.4
August 27, 2018 Elev.	516.67	509.52	506.39	502.05	511.34

Generally, groundwater flow remained in an easterly direction for the two 2018 sampling events.

## 2.2 Sampling Results

The results of the first semi-annual sampling event showed several SSIs in the downgradient monitoring wells (see gray highlights for the March 22 sampling event in the Analytical Results Table in Appendix A). A notice of assessment monitoring was placed in the operating record on August 8, 2018 (SIPC, 2018) due to the SSIs identified in Appendix A.

Assessment Monitoring samples (40 CFR 257, Appendix III and Appendix IV) were collected on August 27, 2018. The 40 CFR 257 Appendix III samples continued to show the SSIs observed in the March 2018 sampling event. The 40 CFR 257, Appendix IV parameters were exceeded at two monitoring wells. EP-3 exceeded background and the GPS for total Cobalt, and EP-4 exceeded background and GPSs for total Cobalt and total Thallium. Total Chromium, total Lead and total Selenium have GPSs that are higher than the observed concentrations (see the August 27 sampling event data in the Analytical Results Table in Appendix A).

## 2.3 Problems Encountered and Resolutions

No additional problems were encountered during the 2018 reporting period.

## 3. Actions Planned for 2019

SIPC will continue to conduct Detection Monitoring sampling during the first semi-annual event in 2019 including the parameters that exceeded the GPS during the 2018 Assessment Monitoring event. The samples that will be collected and analyzed for are listed in Table 2.

**Table 2. Groundwater Sample Collection for 2019**

Parameter   Well ID	EBG	EP-1	EP-2	EP-3	EP-4
Appendix III parameters	x	x	x	x	x
Cobalt, total				x	x
Thallium, total					x

The second semi-annual event will have samples collected for both Appendix III and Appendix IV lists.

#### 4. References

AECOM, 2018. "Coal Combustion Residuals Rule Groundwater Monitoring System Certification", Marion Power Plant, January 29, 2018.

AECOM, 2018. "Coal Combustion Residuals Rule Statistical Methods Certification", Marion Power Plant, January 29, 2018.

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

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

USEPA, 2015. "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments". Title 40, Code of Federal Regulations, Part 257, Federal Register Vol. 80, No. 74, April 17, 2015, US Environmental Protection Agency, Washington, DC. pp. 21302-21501.

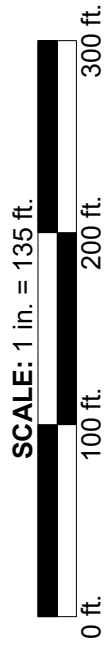
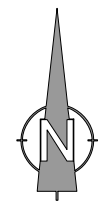


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**SITE MAP**

2018 ANNUAL GROUNDWATER REPORT  
 EMERY POND - MARION POWER PLANT  
 MARION, WILLIAMSON COUNTY, ILLINOIS

HANSON NO. 18E0007 **FIGURE NO. 1**



**CONTOUR INTERVAL = 1 ft.**

## Appendix A

### Analytical Results



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

Sampling Event				3/22/2018					8/27/2018				
PARAMETER NAME	UNITS	Bkgd. Std.	GPS	EBG	EP-1	EP-2	EP-3	EP-4	EBG	EP-1	EP-2	EP-3	EP-4
<b>Detection Monitoring List (App. III)</b>													
Boron	mg/L	0.1216	0.1216	0.033	0.38	0.24	0.078	13.	0.035	0.92	0.2	0.082	11.
Calcium	mg/L	46.304	46.304	14.	330.	230.	34.	200.	15.	410.	190.	38.	150.
Chloride	mg/L	118.63	118.63	12.	60.	30.	110.	200.	16.	63.	35.	140.	310.
Fluoride	mg/L	0.64	4.	0.53	<0.5	<0.5	<0.5	<0.5	0.55	<0.5	<0.5	<0.5	<0.5
pH	SU	6.11 - 6.94	6.11 - 6.94	6.35	6.25	6.27	6.1	6.04	6.57	6.36	6.28	6.1	5.85
Sulfate	mg/L	68.606	68.606	63.	510.	420.	110.	320.	72.	1000.	740.	150.	520.
Temperature	deg C	n/a	n/a	25.	25.	25.	25.	25.	21.7	17.3	22.5	20.9	22.5
Total Dissolved Solids	mg/L	550.58	550.58	300.	2400.	1700.	700.	2100.	360.	2700.	1800.	690.	1900.
<b>Assessment Monitoring List (App. IV)</b>													
Antimony	ug/L	5.	6.						<12.	<12.	<12.	<12.	<12.
Arsenic	ug/L	5.	10.						<300.	<300.	<300.	<300.	<300.
Barium	ug/L	249.13	2000.						91.	23.	18.	64.	23.
Beryllium	ug/L	5.	5.						<8.	<8.	<8.	<8.	<8.
Cadmium	ug/L	10.	10.						<10.	<10.	<10.	<10.	<10.
Chromium	ug/L	10.	100.						<10.	<10.	<10.	<10.	11.
Cobalt	ug/L	19.0812	19.0812						<10.	<10.	<10.	88.	310.
Lead	ug/L	10.	15.						<10.	<10.	<10.	<10.	15.
Lithium	ug/L	100.	100.						<100.	<100.	<100.	<100.	<100.
Mercury	ug/L	0.2	2.						<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	ug/L	5.	100.						<5.	<5.	<5.	<5.	<5.
Radium 226	pCi/L	1.2076	n/a						0.933	0.453	0.000	0.679	0.262
Radium 226 Uncertainty	pCi/L	n/a	n/a						0.543	0.384	0.3	0.682	0.364
Radium 228	pCi/L	2.9745	n/a						0.447	0.992	0.443	0.717	0.79
Radium 228 Uncertainty	pCi/L	n/a	n/a						0.378	0.899	0.322	0.403	0.384
Radium 226 + Radium 228	pCi/L	4.0038	5.						1.38	1.445	0.443	1.396	1.052
Selenium	ug/L	7.	50.						<2.	<2.	<2.	<2.	21.
Thallium	ug/L	50.	50.						<50.	<50.	<50.	<50.	140.

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
<b>Groundwater Protection Standards (GPS):</b>	
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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 <p><b>HANSON</b> Hanson Professional Services Inc.</p>	<p><b>POTENTIOMETRIC SURFACE MAP</b></p> <p>2018 ANNUAL GROUNDWATER REPORT EMERY POND - MARION POWER PLANT MARION, WILLIAMSON COUNTY, ILLINOIS</p>	<p>HANSON NO. 18E0007</p> <p>FIGURE NO. B-1</p>
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**SCALE:** 1 in. = 135 ft.




**CONTOUR INTERVAL = 1 ft.**





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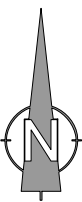


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**POTENTIOMETRIC SURFACE MAP**

**2018 ANNUAL GROUNDWATER REPORT  
EMERY POND - MARION POWER PLANT  
MARION, WILLIAMSON COUNTY, ILLINOIS**

HANSON NO. 18E0007 FIGURE NO. B-2



**SCALE: 1 in. = 135 ft.**



**CONTOUR INTERVAL = 1 ft.**