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2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT HAVANA EAST ASH POND (CELLS 1, 2, 3, AND 4), HAVANA POWER STATION



Bright ideas. Sustainable change.

**2019 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT
HAVANA EAST ASH POND (CELLS 1, 2, 3, AND 4), HAVANA
POWER STATION**

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ACRONYMS AND ABBREVIATIONS

CCR	Coal Combustion Residuals
EAP	East Ash Pond
GWPS	Groundwater Protection Standard
SAP	Sampling and Analysis Plan
SSL	Statistically Significant Level

Havana

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 Havana East Ash Pond (Cells 1, 2, 3, and 4) (EAP) located at Havana Power Station near Havana, Illinois.

Groundwater is being monitored at Havana EAP in accordance with the Assessment Monitoring Program requirements specified in 40 C.F.R. § 257.95.

No changes were made to the monitoring system in 2019 (no wells were installed or decommissioned).

No Statistically Significant Levels (SSLs) of 40 C.F.R. Part 257 Appendix IV parameters were determined in 2019 and Havana EAP remains in the Assessment Monitoring Program.

Havana

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of Dynegy Midwest Generation, LLC, to provide the information required by 40 C.F.R. § 257.90(e) for Havana EAP located at Havana Power Station near Havana, 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 Statistically Significant Increase relative to background levels).
5. Other information required to be included in the Annual Report as specified in §§ 257.90 through 257.98.

This report provides the required information for Havana EAP for calendar year 2019.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the Monitoring Program status in calendar year 2019, and Havana EAP remains in the Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95.

Havana

3. KEY ACTIONS COMPLETED IN 2019

The Assessment 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 2019 (no wells were installed or decommissioned). In general, one groundwater sample was collected from each background and downgradient well during each monitoring event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (SAP) (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2019 are presented in Tables 1 and 2. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSLs of Appendix IV parameters over Groundwater Protection Standards (GWPSs).

Statistical background values are provided in Table 3 and GWPSs in Table 4.

Analytical results for the May and September 2018 sampling events were provided in the 2018 Annual Groundwater Monitoring and Corrective Action Report.

Havana

Table A – 2018-2019 Assessment Monitoring Program Summary

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s)	SSL(s) Determination Date
May 17, 2018	October 10, 2018	Appendix III Appendix IV	NA	NA
September 11, 2018	October 10, 2018	Appendix III Appendix IV Detected ¹	None	January 7, 2019
February 22, 2019	April 15, 2019	Appendix III Appendix IV	None	July 15, 2019
August 22, 2019	October 15, 2019	Appendix III Appendix IV Detected ¹	NA	TBD

Notes:

NA: Not Applicable

TBD: To Be Determined

1. Groundwater sample analysis was limited to Appendix IV parameters detected in previous events in accordance with 40 C.F.R. § 257.95(d)(1).

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2019. Groundwater samples were collected and analyzed in accordance with the SAP (NRT/OBG, 2017a), and all data were accepted.

Havana

5. KEY ACTIVITIES PLANNED FOR 2020

The following key activities are planned for 2020:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2020.
- Complete evaluation of analytical data from the downgradient wells, using GWPSs to determine whether an SSL of Appendix IV parameters has occurred.
- If an SSL is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSL or that that SSL 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 SSL, a written demonstration will be completed within 90 days of SSL determination and included in the 2020 Annual Groundwater Monitoring and Corrective Action Report.
 - If an alternate source(s) is not identified to be the cause of the SSL, the applicable requirements of 40 C.F.R. §§ 257.94 through 257.98 (e.g., assessment of corrective measures) as may apply in 2020 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, Havana East Ash Pond (Cells 1, 2, 3, and 4), Havana Power Station, Havana, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

Havana

TABLES

Havana

TABLE 1.
2019 ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HAVANA POWER STATION
UNIT ID 701 - HAVANA EAST ASH POND (CELLS 1, 2, 3, and 4)
HAVANA, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Well Identification Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date & Time Sampled	Depth to Groundwater (ft) ¹	Groundwater Elevation (ft NAVD88)	40 C.F.R. Part 257 Appendix III						
						Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (field) (S.U.)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
						6020A ²	6020A ²	9251 ²	9214 ²	SM 4500 H+B ²	9036 ²	SM 2540C ²
Background / Upgradient Monitoring Wells												
HAMW-30	40.274750	-90.066301	2/22/2019 13:03	16.53	456.37	0.0406	51.1	16	<0.10	7.9	19	236
			8/22/2019 14:30	13.05	459.85	0.0452	47.0	12	<0.10	7.7	15	204
HAMW-31	40.279920	-90.066174	2/22/2019 12:42	39.92	453.47	0.0575	63.9	13	<0.10	7.7	21	270
			8/22/2019 14:14	35.55	457.84	0.110	75.0	13	<0.10	7.1	22	284
Downgradient Monitoring Wells												
HAMW-32	40.281797	-90.074799	2/22/2019 11:53	10.38	445.12	0.0605	68.2	15	<0.10	7.6	21	290
			8/22/2019 13:12	9.72	445.78	0.0644	67.3	15	<0.10	7.3	23	272
HAMW-39	40.276874	-90.076729	2/22/2019 11:03	21.47	447.12	0.0573	57.4	13	<0.10	7.9	21	252
			8/22/2019 12:26	18.71	449.88	0.0579	60.1	13	<0.10	7.3	21	184
HAMW-40	40.278983	-90.075954	2/22/2019 11:33	24.19	446.04	0.167	76.3	25	<0.10	7.5	43	322
			8/22/2019 12:52	21.91	448.32	0.131	70.1	21	<0.10	7.3	32	262
HAMW-41	40.282144	-90.070192	2/22/2019 12:08	19.33	448.62	0.0500	66.3	14	<0.10	7.8	39	292
			8/22/2019 13:26	15.90	452.05	0.0583	69.7	15	<0.10	7.5	47	280
HAMW-42	40.285392	-90.068354	2/22/2019 12:24	33.71	448.24	0.0541	71.3	12	<0.10	7.6	39	322
			8/22/2019 13:54	30.49	451.46	0.0503	72.0	13	<0.10	7.3	29	284

[O: RAB 12/20/19, C: KLT 12/23/19]

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.
¹All depths to groundwater were measured on the first day of the sampling event.
²4-digit numbers represent SW-846 analytical methods.

TABLE 2.
2019 ANALYTICAL RESULTS - APPENDIX IV PARAMETERS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

HAVANA POWER STATION
UNIT ID 701 - HAVANA EAST ASH POND (CELLS 1, 2, 3, and 4)
HAVANA, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Well Identification Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date & Time Sampled	40 C.F.R. Part 257 Appendix IV															
				Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Cadmium, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	Radium 226/228, Combined (pCi/L)	Selenium, total (mg/L)	Thallium, total (mg/L)	
Background / Upgradient Monitoring Wells				6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	6020A ¹	7470A ¹	6020A ¹	903/904 ¹	6020A ¹	6020A ¹
HAMW-30	40.274750	-90.066301	2/22/2019 13:03	<0.0010	0.0013	0.0188	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.14	<0.0010	<0.0020	
			8/22/2019 14:30 ²	NA	0.0012	0.0155	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.70	<0.0010	NA	
HAMW-31	40.279920	-90.066174	2/22/2019 12:42	<0.0010	<0.0010	0.0227	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.18	<0.0010	<0.0020	
			8/22/2019 14:14 ²	NA	<0.0010	0.0317	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.94	<0.0010	NA	
Downgradient Monitoring Wells																			
HAMW-32	40.281797	-90.074799	2/22/2019 11:53	<0.0010	<0.0010	0.0213	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.05	<0.0010	<0.0020	
			8/22/2019 13:12 ²	NA	<0.0010	0.0197	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.37	<0.0010	NA	
HAMW-39	40.276874	-90.076729	2/22/2019 11:03	<0.0010	<0.0010	0.0122	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.31	0.0011	<0.0020	
			8/22/2019 12:26 ²	NA	<0.0010	0.0120	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.74	0.0015	NA	
HAMW-40	40.278983	-90.075954	2/22/2019 11:33	<0.0010	<0.0010	0.0234	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.25	<0.0010	<0.0020	
			8/22/2019 12:52 ²	NA	<0.0010	0.0198	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.52	<0.0010	NA	
HAMW-41	40.282144	-90.070192	2/22/2019 12:08	<0.0010	<0.0010	0.0174	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.22	<0.0010	<0.0020	
			8/22/2019 13:26 ²	NA	<0.0010	0.0186	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.89	0.0011	NA	
HAMW-42	40.285392	-90.068354	2/22/2019 12:24	<0.0010	<0.0010	0.0174	<0.0010	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.0015	<0.00020	<0.0015	0.18	<0.0010	<0.0020	
			8/22/2019 13:54 ²	NA	<0.0010	0.0167	NA	<0.0010	<0.0015	<0.0010	<0.10	<0.0010	<0.003	NA	NA	0.73	<0.0010	NA	

[O: RAB 12/20/19, C: KLT 12/23/19]

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations

mg/L = milligrams per liter

NA = Not Analyzed

pCi/L = picoCuries per liter

< = concentration is less than 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 Levels (SSLs) over Groundwater Protection Standards.

¹4-digit numbers represent SW-846 analytical methods and 3-digit numbers represent Clean Water Act analytical methods.

²Only the parameters detected during the previous sampling events were analyzed during this sampling event, in accordance with 40 C.F.R. § 257.95(d)(1).

TABLE 3.
STATISTICAL BACKGROUND VALUES
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HAVANA POWER STATION
UNIT ID 701 - HAVANA EAST ASH POND (CELLS 1, 2, 3, and 4)
HAVANA, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Statistical Background Value (UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.09
Calcium (mg/L)	76
Chloride (mg/L)	18
Fluoride (mg/L)	DQR*
pH (S.U.)	6.7 / 8.3
Sulfate (mg/L)	26
Total Dissolved Solids (mg/L)	324

[O: RAB 12/20/19, C: KLT 12/23/19]

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations

DQR = Double Quantification Rule

mg/L = milligrams per liter

S.U. = Standard Units

UPL = Upper Prediction Limit

*All upgradient results are non-detect values. A detected downgradient value is considered to be an exceedance and will be automatically resampled.

Havana

TABLE 4.
GROUNDWATER PROTECTION STANDARDS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HAVANA POWER STATION
UNIT ID 701 - HAVANA EAST ASH POND (CELLS 1, 2, 3, and 4)
HAVANA, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Groundwater Protection Standard ¹
40 C.F.R. Part 257 Appendix IV	
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.010
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.10
Cobalt (mg/L)	0.006
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.040
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.10
Radium 226+228 (pCi/L)	5
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002

[O: RAB 12/20/19, C: KLT 12/23/19]

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations

mg/L = milligrams per liter

pCi/L = picoCuries per liter

¹Groundwater Protection Standard is the higher of the Maximum Contaminant Level / Health-Based Level or background.

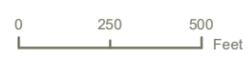
Havana

FIGURES

Havana



-  UPGRADIENT MONITORING WELL LOCATION
-  DOWNGRADIENT MONITORING WELL LOCATION
-  CCR MONITORED MULTI-UNIT
-  CCR UNIT



MONITORING WELL LOCATION MAP HAVANA EAST ASH POND CELLS 1, 2, 3, AND 4 MULTI-UNIT ID:701

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
HAVANA POWER STATION
HAVANA, ILLINOIS

FIGURE 1

O'BRIEN & GERE ENGINEERS, INC.
A RAMBOLL COMPANY

