2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

HAVANA EAST ASH POND (CELLS 1, 2, 3, AND 4), HAVANA POWER STATION
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

<table>
<thead>
<tr>
<th>CCR</th>
<th>Coal Combustion Residuals</th>
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<tr>
<td>EAP</td>
<td>East Ash Pond</td>
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<tr>
<td>GWPS</td>
<td>Groundwater Protection Standard</td>
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<tr>
<td>SAP</td>
<td>Sampling and Analysis Plan</td>
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<td>SSL</td>
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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.
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.
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.
# Table A – 2018-2019 Assessment Monitoring Program Summary

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

**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.
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 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.

<table>
<thead>
<tr>
<th>Well Identification Number</th>
<th>Latitude (Decimal Degrees)</th>
<th>Longitude (Decimal Degrees)</th>
<th>Date &amp; Time Sampled</th>
<th>Depth to Groundwater (ft)</th>
<th>Groundwater Elevation (ft NAVD88)</th>
<th>Boron, total (mg/L)</th>
<th>Calcium, total (mg/L)</th>
<th>Chloride, total (mg/L)</th>
<th>Fluoride, total (mg/L)</th>
<th>pH (field) (S.U.)</th>
<th>Sulfate, total (mg/L)</th>
<th>Total Dissolved Solids (mg/L)</th>
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</thead>
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<tr>
<td>HAMW-30</td>
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<td><strong>Background / Upgradient Monitoring Wells</strong></td>
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<td></td>
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<td></td>
<td></td>
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**Notes:**

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

ft = foot/feet

mg/L = milligrams per liter

NAVDD88 = 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.

All depths to groundwater were measured on the first day of the sampling event.

4-digit numbers represent SW-846 analytical methods.
<table>
<thead>
<tr>
<th>Well Identification Number</th>
<th>Date &amp; Time</th>
<th>Concentration (mg/L)</th>
<th>Notes</th>
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<td>HAMW-30</td>
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<tr>
<td>HAMW-31</td>
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<td>NA 0.0012 0.0155 NA &lt;0.0010 &lt;0.0015 &lt;0.0010 &lt;0.10 &lt;0.0010 &lt;0.0015 NA 0.70 &lt;0.0010 NA</td>
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<td></td>
</tr>
</tbody>
</table>

Notes:
- 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.

Statistically Significant Levels (SSLs) over Groundwater Protection Standards.

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

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Statistically Significant Levels (SSLs) over Groundwater Protection Standards.

40 C.F.R. Part 257 Appendix IV

HAMW-42 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 <0.0015 <0.0015 0.18 <0.0010 <0.0020 |

Havana Power Station
HAVANA, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Background / Upgradient Monitoring Wells

Downgradient Monitoring Wells

Notes:
- 40 C.F.R. = Title 40 of the Code of Federal Regulations
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Statistically Significant Levels (SSLs) over Groundwater Protection Standards.

40 C.F.R. Part 257 Appendix IV

HAMW-42 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 <0.0015 <0.0015 0.18 <0.0010 <0.0020 |

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Statistically Significant Levels (SSLs) over Groundwater Protection Standards.

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.

Statistically Significant Levels (SSLs) over Groundwater Protection Standards.
### 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

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

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<thead>
<tr>
<th>Parameter</th>
<th>Groundwater Protection Standard¹</th>
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</thead>
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<td></td>
</tr>
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<td>Arsenic (mg/L)</td>
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<td>Barium (mg/L)</td>
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<td>Beryllium (mg/L)</td>
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<td>Cadmium (mg/L)</td>
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<tr>
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</tr>
<tr>
<td>Fluoride (mg/L)</td>
<td>4</td>
</tr>
<tr>
<td>Lead (mg/L)</td>
<td>0.015</td>
</tr>
<tr>
<td>Lithium (mg/L)</td>
<td>0.040</td>
</tr>
<tr>
<td>Mercury (mg/L)</td>
<td>0.002</td>
</tr>
<tr>
<td>Molybdenum (mg/L)</td>
<td>0.10</td>
</tr>
<tr>
<td>Radium 226+228 (pCi/L)</td>
<td>5</td>
</tr>
<tr>
<td>Selenium (mg/L)</td>
<td>0.05</td>
</tr>
<tr>
<td>Thallium (mg/L)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

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.
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

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

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

FIGURE 1