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Date

January 31, 2020

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

EDWARDS ASH POND, EDWARDS POWER STATION



Bright ideas. Sustainable change.

**2019 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT
EDWARDS ASH POND, EDWARDS POWER STATION**

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Prepared by **Kristen L. Theesfeld**
Checked by **Nathaniel R. Keller**
Approved by **Eric J. Tlachac**
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Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA

T 414-837-3607
F 414-837-3608
<https://ramboll.com>



Kristen L. Theesfeld
Hydrogeologist



Nathaniel R. Keller
Senior Hydrogeologist

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ACRONYMS AND ABBREVIATIONS

| | |
|------|---------------------------------|
| AP | Ash Pond |
| CCR | Coal Combustion Residuals |
| GWPS | Groundwater Protection Standard |
| SAP | Sampling and Analysis Plan |
| SSL | Statistically Significant Level |

Edwards

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 Edwards Ash Pond (AP) located at Edwards Power Station near Bartonville, Illinois.

Groundwater is being monitored at Edwards AP 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 Edwards AP remains in the Assessment Monitoring Program.

Edwards

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of Illinois Power Resources Generating, LLC, to provide the information required by 40 C.F.R. § 257.90(e) for Edwards AP located at Edwards Power Station near Bartonville, 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 Edwards AP 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 Edwards AP remains in the Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95.

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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 June/July 2018 sampling events were provided in the 2018 Annual Groundwater Monitoring and Corrective Action Report.

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Table A – 2018-2019 Assessment Monitoring Program Summary

| Sampling Dates | Analytical Data Receipt Date | Parameters Collected | SSL(s) | SSL(s) Determination Date |
|---------------------------|------------------------------|---|--------|---------------------------|
| May 5-7 and 29, 2018 | October 10, 2018 | Appendix III Appendix IV | NA | NA |
| July 27 - August 27, 2018 | October 10, 2018 | Appendix III Appendix IV Detected ¹ | None | January 7, 2019 |
| February 27, 2019 | April 15, 2019 | Appendix III Appendix IV | None | July 15, 2019 |
| August 6, 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.

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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.

Edwards

6. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a. Sampling and Analysis Plan, Edwards Ash Pond, Edwards Power Station, Bartonville, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Duck Creek Power Station, Edwards Power Station, Illinois Power Resources Generating, LLC, October 17, 2017.

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TABLES

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TABLE 1.
2019 ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
EDWARDS POWER STATION
UNIT ID 301 - EDWARDS ASH POND
BARTONVILLE, 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 | | | | | | | | | | | | |
| AP-05S | 40.598814 | -89.661916 | 2/27/2019 10:07 | 5.50 | 438.03 | 0.29 | 91 | 40 | <0.250 | 7.1 | 4.0 | 880 |
| | | | 8/6/2019 13:16 | 3.22 | 440.31 | 0.24 | 110 | 37 | <0.250 | 7.1 | <1.0 | 900 |
| AW-08 | 40.593964 | -89.661996 | 2/27/2019 7:40 | 19.50 | 443.04 | 0.12 | 140 | 17 | 0.270 | 7.1 | 9.6 | 670 |
| | | | 8/6/2019 14:02 | 19.74 | 442.80 | 0.10 | 130 | 19 | 0.287 | 7.3 | 20 | 700 |
| Downgradient Monitoring Wells | | | | | | | | | | | | |
| AW-06 | 40.594237 | -89.670051 | 2/27/2019 11:09 | 26.00 | 435.57 | 0.13 | 110 | 35 | 0.280 | 7.3 | 29 | 580 |
| | | | 8/6/2019 9:52 | 27.45 | 434.12 | 0.093 | 120 | 33 | 0.393 | 7.2 | 29 | 580 |
| AW-09 | 40.590422 | -89.668777 | 2/27/2019 8:32 | 25.74 | 435.71 | 0.52 | 120 | 29 | 0.250 | 7.0 | 12 | 780 |
| | | | 8/6/2019 10:41 | 25.82 | 435.63 | 0.20 | 140 | 27 | <0.250 | 7.2 | <1.0 | 770 |
| AW-10 | 40.590733 | -89.663826 | 2/27/2019 13:25 | 0.94 | 438.99 | 0.47 | 130 | 85 | <0.250 | 7.2 | <1.0 | 1100 |
| | | | 8/6/2019 14:55 | 0.92 | 439.01 | 0.50 | 160 | 100 | <0.250 | 7.3 | <1.0 | 1200 |
| AW-11 | 40.587261 | -89.663781 | 2/27/2019 12:16 | 7.62 | 432.25 | 0.22 | 160 | 30 | <0.250 | 7.2 | <1.0 | 970 |
| | | | 8/6/2019 11:35 | 7.17 | 432.70 | 0.18 | 160 | 30 | <0.250 | 7.2 | <1.0 | 980 |

[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

EDWARDS POWER STATION
UNIT ID 301 - EDWARDS ASH POND
BARTONVILLE, 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) | |
| | | | | 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 |
| Background / Upgradient Monitoring Wells | | | | | | | | | | | | | | | | | | | |
| AP-05S | 40.598814 | -89.661916 | 2/27/2019 10:07 | <0.0030 | 0.0046 | 0.87 | <0.0010 | <0.0010 | <0.0040 | <0.0020 | <0.250 | <0.0010 | 0.020 | <0.00020 | 0.0014 | 2.30 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 13:16 ² | NA | 0.0067 | 1.1 | <0.0010 | NA | <0.0040 | <0.0020 | <0.250 | <0.0010 | 0.031 | NA | <0.0010 | 3.00 | <0.0010 | NA | |
| AW-08 | 40.593964 | -89.661996 | 2/27/2019 7:40 | <0.0030 | 0.0190 | 0.22 | <0.0010 | <0.0010 | <0.0040 | <0.0020 | 0.270 | <0.0010 | <0.01 | <0.00020 | 0.0049 | 0.402 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 14:02 ² | NA | 0.0074 | 0.18 | <0.0010 | NA | <0.0040 | <0.0020 | 0.287 | <0.0010 | 0.017 | NA | 0.0037 | 3.95 | <0.0010 | NA | |
| Downgradient Monitoring Wells | | | | | | | | | | | | | | | | | | | |
| AW-06 | 40.594237 | -89.670051 | 2/27/2019 11:09 | <0.0030 | 0.0046 | 0.18 | <0.0010 | <0.0010 | <0.0040 | <0.0020 | 0.280 | 0.0013 | <0.01 | <0.00020 | 0.0051 | 0.357 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 9:52 ² | NA | 0.020 | 0.35 | <0.0010 | NA | 0.024 | 0.010 | 0.393 | 0.011 | 0.035 | NA | 0.0055 | 1.82 | 0.002 | NA | |
| AW-09 | 40.590422 | -89.668777 | 2/27/2019 8:32 | <0.0030 | 0.0019 | 0.22 | <0.0010 | <0.0010 | <0.0040 | 0.0036 | 0.250 | <0.0010 | 0.013 | <0.00020 | 0.016 | 0.771 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 10:41 ² | NA | 0.026 | 0.54 | <0.0010 | NA | 0.017 | 0.011 | <0.250 | 0.011 | 0.036 | NA | 0.015 | 1.94 | 0.0012 | NA | |
| AW-10 | 40.590733 | -89.663826 | 2/27/2019 13:25 | <0.0030 | 0.012 | 0.93 | <0.0010 | <0.0010 | <0.0040 | 0.0037 | <0.250 | 0.0024 | 0.040 | <0.00020 | 0.028 | 1.79 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 14:55 ² | NA | 0.019 | 1.5 | 0.0014 | NA | 0.050 | 0.026 | <0.250 | 0.026 | 0.12 | NA | 0.0022 | 4.08 | 0.0033 | NA | |
| AW-11 | 40.587261 | -89.663781 | 2/27/2019 12:16 | <0.0030 | 0.013 | 0.76 | <0.0010 | <0.0010 | <0.0040 | 0.0031 | <0.250 | 0.0012 | 0.017 | <0.00020 | 0.0053 | 2.33 | <0.0010 | <0.0010 | |
| | | | 8/6/2019 11:35 ² | NA | 0.018 | 0.88 | <0.0010 | NA | <0.0040 | 0.0023 | <0.250 | <0.0010 | 0.031 | NA | 0.0046 | 1.69 | <0.0010 | NA | |

[O: 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
EDWARDS POWER STATION
UNIT ID 301 - EDWARDS ASH POND
BARTONVILLE, ILLINOIS
ASSESSMENT MONITORING PROGRAM

| Parameter | Statistical Background Value (UPL) |
|--|------------------------------------|
| 40 C.F.R. Part 257 Appendix III | |
| Boron (mg/L) | 0.42 |
| Calcium (mg/L) | 174 |
| Chloride (mg/L) | 44 |
| Fluoride (mg/L) | 0.376 |
| pH (S.U.) | 6.6 / 7.4 |
| Sulfate (mg/L) | 77.7 |
| Total Dissolved Solids (mg/L) | 940 |

[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

S.U. = Standard Units

UPL = Upper Prediction Limit

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TABLE 4.
GROUNDWATER PROTECTION STANDARDS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
EDWARDS POWER STATION
UNIT ID 301 - EDWARDS ASH POND
BARTONVILLE, 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) | 0.019 |
| Barium (mg/L) | 2 |
| Beryllium (mg/L) | 0.014 |
| 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) | 0.054 |
| 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

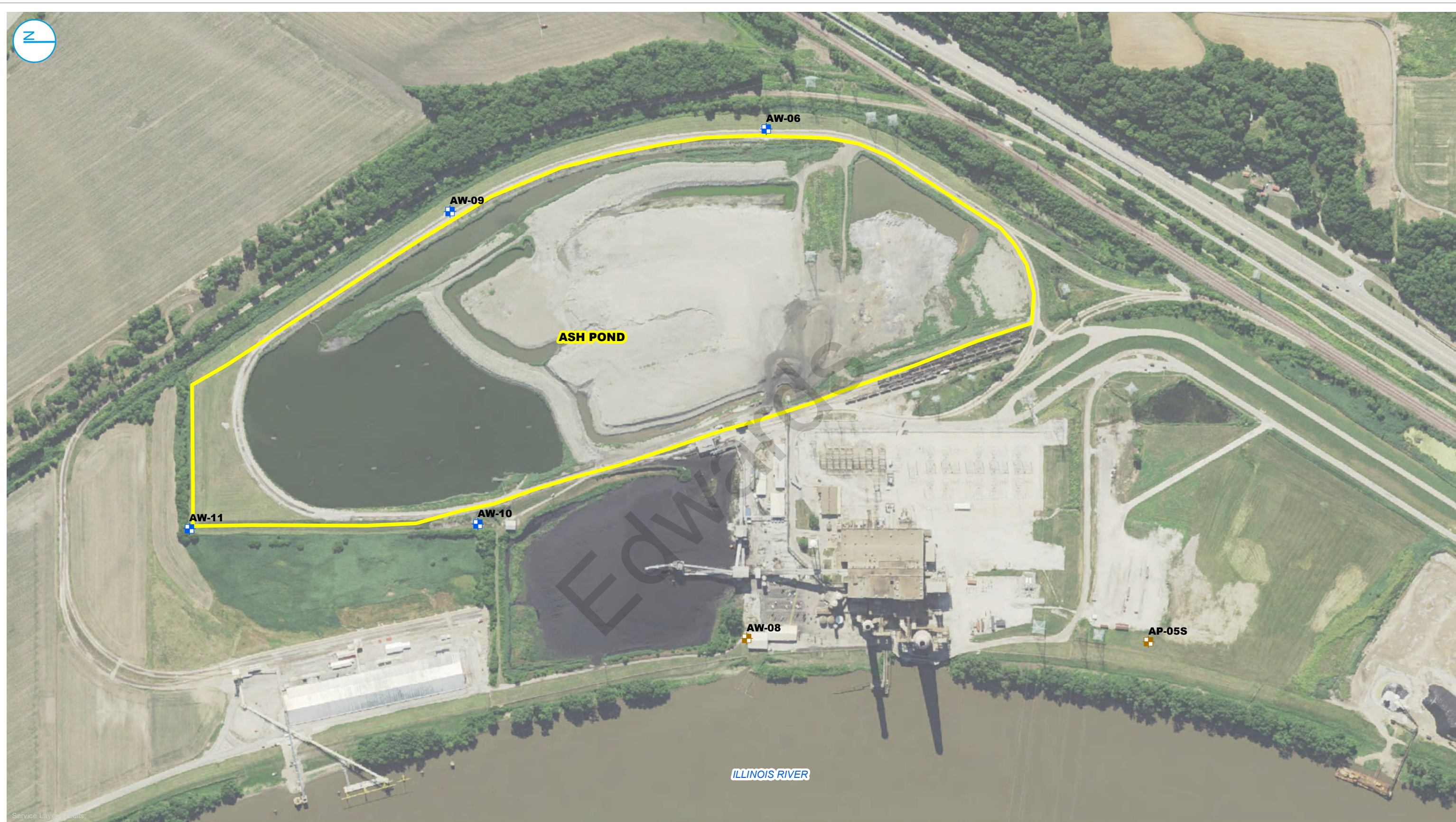
¹Groundwater Protection Standard is the higher of the Maximum Contaminant Level / Health-Based Level or background.

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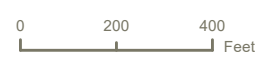
FIGURES

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Y:\Mapping\Projects\222285\MXD\2019_AnnualGWM_CAR\Figure 1_GWS_WellLoc_Edwards.mxd
PROJECT: 169000XXXXX | DATED: 1/13/2020 | DESIGNER: GALARNIC



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



MONITORING WELL LOCATION MAP EDWARDS ASH POND UNIT ID:301

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

FIGURE 1

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

