

# Second Annual Groundwater Monitoring and Corrective Action Report

Richmond Power and Light  
Whitewater Valley Station Impoundment  
Richmond, Indiana

GAI Project Number: C151119.22, Task 006

August 2020



Prepared by: GAI Consultants, Inc.  
Murrysville Office  
4200 Triangle Lane  
Export, Pennsylvania 15632-1357

Prepared for: Richmond Power and Light  
2000 US Highway 27 South  
Richmond, Indiana 47374-7436

# Second Annual Groundwater Monitoring and Corrective Action Report

Richmond Power and Light  
Whitewater Valley Station Impoundment  
Richmond, Indiana

GAI Project Number: C151119.22, Task 006

August 2020

Prepared for:  
Richmond Power and Light  
2000 US Highway 27 South  
Richmond, Indiana 47374-7436

Prepared by:  
GAI Consultants, Inc.  
Murrysville Office  
4200 Triangle Lane  
Export, Pennsylvania 15632-1357

Report Authors:

---

A. Edward Sciulli, PG, PMP  
Senior Hydrology Manager

---

John R. Klamut, PE  
Senior Project Manager

## Table of Contents

1.0	Introduction.....	1
2.0	Impoundment.....	2
2.1	Groundwater Monitoring Network .....	2
2.2	Data Collection .....	2
2.3	Monitoring Program Transitions .....	3
2.4	Corrective Actions .....	3
2.5	2020-2021 Projected Activities .....	3
Table 1	Groundwater Analytical Assessment Monitoring Data - CCR Appendix III Constituents	
Table 2	Groundwater Analytical Assessment Monitoring Data - CCR Appendix IV Constituents	
Table 3	Groundwater Protection Standards Development	
Table 4	Groundwater Protection Standard and Lower Confidence Level Comparison	
Figure 1	Site Location Map	
Figure 2	Groundwater Monitoring System Location Map	
Figure 3	Potentiometric Surface Map-Soil 3/17/2020	

## 1.0 Introduction

Title 40 Code of Federal Regulations (CFR) §257.90 mandates that existing Coal Combustion Residual (CCR) landfills and surface impoundments, also known as CCR units, be subject to groundwater monitoring and corrective action requirements as further detailed in §257.90 through §257.98. These requirements are part of the overall CCR Rule (Rule) which was published in the Federal Register on April 17, 2015 and which became effective on October 19, 2015. Specific obligations for Owners and Operators of existing CCR units regarding the preparation of “Annual Groundwater Monitoring and Corrective Action Reports (Annual Report)” are outlined in §257.90(e)(1-5). The Richmond Power and Light (RPL) inactive surface impoundment (Impoundment) was addressed under Section §257.100, which allowed for an exemption from many of the Rule requirements and compliance deadlines.

The Rule was amended on August 5, 2016 and the amendment became effective on October 4, 2016. It amended Section §257.100 by removing the exemptions for inactive CCR surface impoundments. The amendment changed the status of inactive CCR impoundments such that they were treated as other CCR units. They were therefore given an extension of the compliance deadlines of 547 days. As a result, the first Annual Report for the Impoundment was placed within the facility’s operating record on August 1, 2019. The second Annual Report will be placed within the facility’s operating record no later than August 1, 2020.

The Annual Report must provide information to address the following aspects for the preceding calendar year:

- ▶ document the status of the groundwater monitoring and corrective action program for the respective CCR units;
- ▶ summarize key actions completed;
- ▶ describe any problems encountered and actions taken to resolve the problems; and
- ▶ offer a projection of key activities for the upcoming year.

At a minimum, the Annual Report must contain the following information to the extent applicable and available:

- ▶ a map, aerial image, or diagram showing the CCR unit and all background/upgradient and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program;
- ▶ 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 §257.90 through §257.98, a summary including the number of groundwater samples that were collected for analysis for each background/upgradient and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring (DM) or assessment monitoring (AM) programs;
- ▶ a narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from DM to AM in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and
- ▶ any other information required to be included as specified in §257.90 through §257.98.

The RPL Whitewater Valley Station (Station), is a coal-fired power plant located in Richmond, Wayne County, Indiana (see Figure 1). The Rule applies to this facility due to the management/disposal of CCR materials that are generated from the combustion of coal. The CCR unit associated with Station operations is the Impoundment used for the management of bottom ash. The CCR unit has a dedicated groundwater monitoring system that was originally installed to comply with Indiana Department of

Environmental Management (IDEM) recommendations and was subsequently evaluated and modified (as needed) for use under the CCR program.

In summary, this second Annual Report has been prepared to comply with the requirements of §257.90(e), addressing the Whitewater Valley Station's CCR Unit with respect to the groundwater monitoring and corrective actions undertaken from August 2019 through June 2020. This second Annual Report and all subsequent reports thereto will be placed in the Station's operating record per §257.105(h)(1), noticed to the State Director per §257.106(h)(1), and posted to the publicly accessible internet site per §257.107(h)(1).

## 2.0 Impoundment

### 2.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Impoundment is a subset of the larger site groundwater monitoring system established during original interactions with IDEM regarding the groundwater characterization and monitoring for the site. That larger site system, which is shown on Figure 2, is composed of:

- eight monitoring well (MW) pairs (shallow and deep wells designated as S and D) at locations A through H;
  - ▶ there is a third well at location G, a shallow well designated as MW-GSR, installed in place of MW-GS, which was found to have insufficient water for monitoring purposes.
  - ▶ it was determined during the characterization that the deep wells in each well pair would only be used as piezometers.
- two single, shallow monitoring wells at locations IS and JS;
- two older, shallow wells designated as MW-1 and MW-2 (used only as piezometers);
- nine staff gauges and/or piezometers associated with the groundwater MWs are:
  - ▶ five staff gauges (A-1, A-2, A-3, A-4, and P-4) to monitor pond levels; and
  - ▶ four piezometers (PZ-1703, PZ-1704, PZ-1705, and PZ-1706).

Piezometers PZ-1701 and PZ-1702 have been abandoned.

The monitoring wells at locations A through H were installed in 2016. The monitoring wells at locations IS and JS were installed in March 2018.

The CCR groundwater monitoring system is comprised of seven wells within the larger site groundwater monitoring system, including three upgradient wells (MW-AS, MW-FS, and MW-GSR) and four downgradient wells (MW-BS, MW-CS, MW-DS, and MW-JS). The screened intervals of the wells monitor the uppermost aquifer on site, a soil aquifer composed of a continuous confined, sand or sand and gravel layer located within or at the base of the glacial till which blankets the site. Figure 3 shows a potentiometric map of the uppermost aquifer based upon water level readings taken during the last round of AM samples in March 2020.

### 2.2 Data Collection

Per the requirements of §257.95, AM sampling began in September 2019. Samples were collected and analyzed for all Appendix III and Appendix IV parameters. The second AM sampling occurred in December 2019 and samples were analyzed for the Appendix III parameters and for Appendix IV parameters that were detected during the first AM. The third AM sampling occurred in March 2020 and samples were analyzed for the Appendix III parameters and for Appendix IV parameters that were detected during the second AM. The results from all three AM samplings for the Appendix III and Appendix IV parameters are summarized in the attached Tables 1 and 2, respectively.

Groundwater Protection Standards (GPSs) were determined for the Appendix IV parameters for samples collected in December 2019 and March 2020 and are summarized in Table 3. During the January 2020 and May 2020 reviews of the second and third AM sampling events, Lower Confidence Limits (LCLs) were determined and compared to the GPSs, as shown in Table 4. It was determined that there were statistically significant levels (SSLs) for total molybdenum in downgradient monitoring well MW-BS.

## **2.3 Monitoring Program Transitions**

The Impoundment has been transitioned into the Assessment of Corrective Measures (ACM), based upon the May 2020 review of the March 2020 AM sampling results.

## **2.4 Corrective Actions**

No corrective actions were undertaken.

## **2.5 2020-2021 Projected Activities**

Projected key activities for the upcoming year include the following:

- site characterization activities;
- completion of ACM and an ACM Report;
- public meeting and selection of corrective measure(s); and
- semi-annual groundwater sampling events to be initiated in September 2020 and March 2021.

## TABLES

**Table 1**  
**Groundwater Analytical Assessment Monitoring Data**  
**CCR Appendix III Constituents**  
**Whitewater Valley Station Impoundment**

Well	Parameter:		Boron, Total	Calcium, Total	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
	Date	Unit:	mg/L	mg/L	mg/L	mg/L	s.u.	mg/L	mg/L
MW-AS	9/16/2019		0.206	93.9	112	0.12	7.3	78.4	568
	12/3/2019		0.213	95.9	116	0.13	7.4	71.2	548
	3/17/2020		0.199	91.2	113	0.1	7.7	77.3	522
MW-BS	9/16/2019		4.4	400	224	0.25	7.4	1300	2430
	12/3/2019		4.12	393	191	0.23	7.4	1180	2280
	3/18/2020		4.38	371	212	0.27	7.7	1210	2180
MW-CS	9/16/2019		2.23	275	97.4	0.37	7.2	838	1600
	12/4/2019		2.35	248	90.2	0.2	7.3	640	1460
	3/18/2020		2.08	271	107	0.33	7.6	843	1670
MW-DS	9/16/2019		7.46	432	173	0.11	7	1100	2320
	12/4/2019		7.15	417	178	< 0.10	7.3	1110	2310
	3/17/2020		6.3	365	137	< 0.10	7.4	960	1960
MW-FS	9/17/2019		11.6	496	92.3	< 0.10	6.9	1480	2520
	12/3/2019		10.7	526	81.4	< 0.10	7	1430	2600
	3/17/2020		11.5	392	86.3	< 0.10	7.4	1170	1910
MW-GSR	9/17/2019		0.778	532	131	0.17	6.9	1870	3300
	12/3/2019		1.34	606	33.8	0.11	6.8	2110	3810
	3/17/2020		0.846	519	66.8	0.14	7.3	1970	2940
MW-JS <sup>1</sup>	9/17/2019		1.44	226	49.3	0.18	7	351	1060
	12/3/2019		0.844	152	14.3	0.15	7.1	80.9	561
	3/17/2020		0.837	159	8.7	0.12	7.6	62.1	493

Note:

1. Well was installed on March 23, 2018.

mg/L - milligrams per liter

s.u. - standard units

< - Represents non-detect. Values are shown at the laboratory reporting limit.



**Table 2**  
**Groundwater Analytical Assessment Monitoring Data**  
**CCR Appendix IV Constituents**  
**Whitewater Valley Station Impoundment**

Well	Parameter:		Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Fluoride	Lead, Total	Lithium, Total	Mercury, Total	Molybdenum, Total	Total Radium <sup>1</sup>	Selenium, Total	Thallium, Total
	Date	Unit:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	mg/L	mg/L
MW-AS	9/16/2019		< 0.0010	< 0.0010	0.0913	< 0.00020	< 0.00020	< 0.00020	< 0.0010	0.12	< 0.0010	< 0.02	< 0.002	0.0055	1.83	< 0.0010	< 0.0010
	12/3/2019			< 0.0010	0.087		< 0.00020	< 0.00020	< 0.0010	0.13	< 0.0010	< 0.02		0.0055	0.776	< 0.0010	
	3/17/2020			0.0010	0.0826		< 0.00020	< 0.0020	< 0.0010	0.1	< 0.0010	< 0.02		0.005	0.783	< 0.0010	
MW-BS	9/16/2019		< 0.0010	< 0.0010	0.0202	< 0.00020	< 0.00020	< 0.00020	0.0014	0.25	< 0.0010	0.0608	< 0.002	0.116	1.76	< 0.0010	< 0.0010
	12/3/2019			< 0.0010	0.0193		< 0.00020	< 0.00020	0.0012	0.23	< 0.0010	0.0827		0.119	1.04	< 0.0010	
	3/18/2020			< 0.0010	0.0195		< 0.00020	< 0.0020	0.0013	0.27	< 0.0010	0.0803		0.108	0.564	< 0.0010	
MW-CS	9/16/2019		< 0.0010	0.0017	0.0248	< 0.00020	< 0.00020	< 0.00020	0.0023	0.37	< 0.0010	0.0432	< 0.0020	0.126	0.937	< 0.0010	< 0.0010
	12/4/2019			0.0014	0.0211		< 0.00020	< 0.00020	0.0014	0.2	< 0.0010	0.0598		0.11	0.195	0.0022	
	3/18/2020			0.0013	0.0248		< 0.00020	< 0.0020	0.0013	0.33	< 0.0010	0.0505		0.102	0.43	0.0053	
MW-DS	9/16/2019		< 0.0010	< 0.0010	0.0306	< 0.00020	< 0.00020	< 0.00020	< 0.0010	0.11	< 0.0010	0.0422	< 0.0020	0.0091	1.4	< 0.0010	< 0.0010
	12/4/2019			< 0.0010	0.0267		< 0.00020	< 0.00020	< 0.0010	< 0.10	< 0.0010	0.0602		0.0083	0.464	< 0.0010	
	3/17/2020			< 0.0010	0.0233		< 0.00020	< 0.0020	< 0.0010	< 0.10	< 0.0010	0.0489		0.0062	0.336	< 0.0010	
MW-FS	9/17/2019		< 0.0010	< 0.0010	0.025	< 0.00020	< 0.00020	< 0.00020	0.0014	< 0.10	< 0.0010	0.264	< 0.0020	0.0588	1.73	< 0.0010	< 0.0010
	12/3/2019			< 0.0010	0.0241		< 0.00020	< 0.00020	0.0015	< 0.10	< 0.0010	0.303		0.0581	0.517	< 0.0010	
	3/17/2020			< 0.0010	0.0202		< 0.00020	< 0.0020	0.0012	< 0.10	< 0.0010	0.282		0.0604	0.599	< 0.0010	
MW-GSR	9/17/2019		< 0.0010	< 0.0010	0.0123	< 0.00020	0.00027	< 0.0020	0.0112	0.17	< 0.0010	< 0.020	< 0.0020	< 0.0010	0.905	< 0.0010	< 0.0010
	12/3/2019			< 0.0010	0.0134		0.00027	< 0.0020	0.0168	0.11	< 0.0010	0.0302		< 0.0010	0.139	< 0.0010	
	3/17/2020			< 0.0010	0.0108		0.00023	< 0.0020	0.0104	0.14	< 0.0010	0.0364		< 0.0010	1.07	< 0.0010	
MW-JS <sup>2</sup>	9/17/2019		< 0.0010	0.0041	0.172	< 0.00020	0.0004	0.004	0.0052	0.18	0.0028	0.0348	< 0.0020	0.0265	1.33	0.0015	< 0.0010
	12/3/2019			0.0064	0.134		< 0.00020	0.0124	0.0046	0.15	0.0036	0.025		0.0176	1.2	0.0032	
	3/17/2020			0.0071	0.147		< 0.00020	0.0073	0.0051	0.12	0.0041	0.0282		0.017	0.976	0.0093	

Notes:

1. Total Radium is Radium-226 and Radium-228 combined
2. Well was installed on March 23, 2018.

mg/L - milligrams per liter

pCi/L - Picocuries per liter

< - Represents non-detect. Values are shown at the laboratory reporting limit.

mg/L - milligrams per liter

pCi/L - Picocuries per liter

< - Represents non-detect. Values are shown at the laboratory reporting limit.

**Table 3**  
**Groundwater Protection Standards (GPS) Development**  
**CCR Appendix IV Constituents**  
**Whitewater Valley Station Impoundment**

Chemical Name	Unit	Samples	Detected	% Non Detect	Transformed	Method	Upper Tolerance Limit (UTL)	Federal Limit	Federal Limit Type <sup>1</sup>	GPS <sup>2</sup>
Antimony, Total	mg/L	27	0	100	No	Non-Parametric	0.001	0.006	MCL	0.006
Arsenic, Total	mg/L	27	1	96.3	No	Non-Parametric	0.001	0.01	MCL	0.01
Barium, Total	mg/L	27	27	0.0	No	Non-Parametric	0.125	2	MCL	2
Beryllium, Total	mg/L	27	0	100	No	Non-Parametric	0.0002	0.004	MCL	0.004
Cadmium, Total	mg/L	27	9	66.67	No	Non-Parametric	0.00032	0.005	MCL	0.005
Chromium, Total	mg/L	27	0	100	No	Non-Parametric	0.002	0.1	MCL	0.1
Cobalt, Total	mg/L	27	18	33.33	No	Non-Parametric	0.0142	0.006	RSL	0.0142
Fluoride	mg/L	27	8	70.37	No	Non-Parametric	0.17	4	MCL	4
Lead, Total	mg/L	27	0	100	No	NonParametric	0.001	0.015	RSL	0.015
Lithium, Total	mg/L	27	17	37.04	No	Non-Parametric	0.364	0.040	RSL	0.364
Mercury, Total	mg/L	27	0	100	No	Non-Parametric	0.002	0.002	MCL	0.002
Molybdenum, Total	mg/L	27	18	33.3	No	Non-Parametric	0.0608	0.1	RSL	0.1
Total Radium	pCi/L	27	27	0.0	No	Parametric	2.207	5	MCL	5
Selenium, Total	mg/L	27	0	100	No	Non-Parametric	0.001	0.05	MCL	0.05
Thallium, Total	mg/L	27	0	100	No	Non-Parametric	0.001	0.002	MCL	0.002

Notes:

1. MCL - USEPA Maximum Contaminant Level; RSL - USPEA Regional Screening Level
2. GPS - Groundwater Protection Standard defined as the higher of the Federal Limit and the calculated site specific background.

mg/L - milligrams per liter

pCi/L - Picocuries per liter

**Table 4**  
**Groundwater Protection Standard and Lower Confidence Limit Comparison**  
**CCR Appendix IV Constituents**  
**Whitewater Valley Station Impoundment**

Parameter	Groundwater Protection Standards	Location ID:	Lower Confidence Limit (LCL) <sup>1</sup>							
			MW-BS		MW-CS		MW-DS		MW-JS	
		Units	December 2019	March 2020	December 2019	March 2020	December 2019	March 2020	December 2019	March 2020
Antimony, Total	0.006	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Arsenic, Total	0.01	mg/L	0.001	0.001	0.0006	0.0007	0.001	0.001	0.001	0.0002
Barium, Total	2	mg/L	0.019	0.019	0.0196	0.0199	0.0272	0.0254	0.115	0.121
Beryllium, Total	0.004	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Cadmium, Total	0.005	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Chromium, Total	0.1	mg/L	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.0015
Cobalt, Total	0.0142	mg/L	0.0015	0.0014	0.0018	0.0018	0.001	0.001	0.001	0.0008
Fluoride	4	mg/L	0.125	0.135	0.219	0.227	0.10	0.10	0.15	0.14
Lead, Total	0.015	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0001
Lithium, Total	0.364	mg/L	0.0815	0.0813	0.0569	0.056	0.0497	0.0496	0.019	0.0208
Mercury, Total	0.002	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Molybdenum, Total	0.1	mg/L	0.119	0.117	0.0967	0.0973	0.0081	0.008	0.0179	0.0176
Total Radium	5	pCi/L	0.845	0.807	0.376	0.382	0.378	0.373	0.910	0.927
Selenium, Total	0.05	mg/L	0.001	0.001	0.0010	0.0023	0.0010	0.001	0.0019	0.0026
Thallium, Total	0.002	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Note:

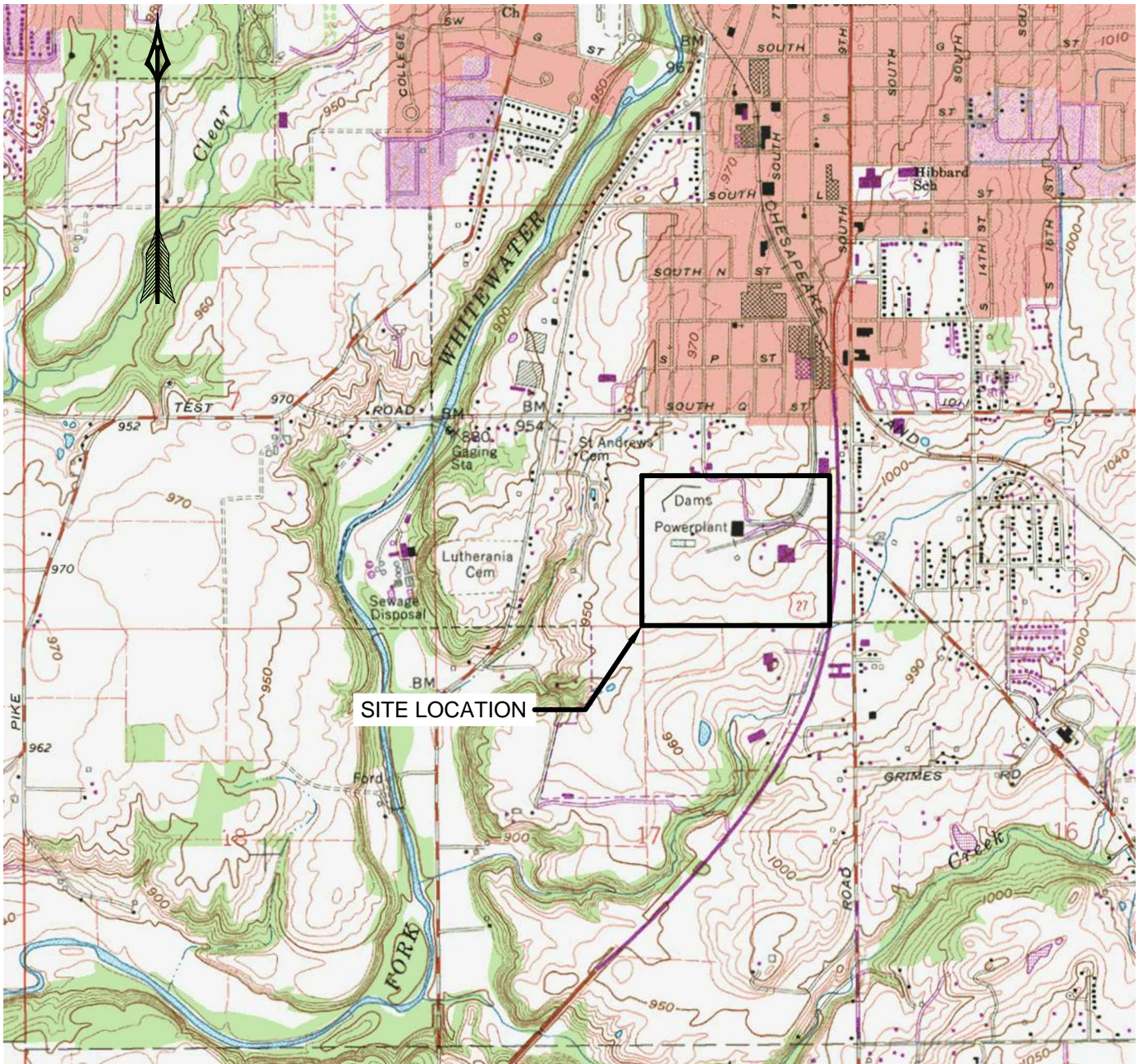
1. Lower Confidence Levels were determined for samples collected during the second and third Assessment Monitoring events in December 2019 and March 2020, respectively.
2. Highlighted values indicate a Statistically Significant Level (SSL)

mg/L - milligrams per liter

pCi/L - Picocuries per liter

## FIGURES


GAI CAD FILE PATH: Z:\Energy\2015\C151119.04 - RPL GW IDEM Closure Nar\CAD\Production Drawings\C151119-04-002-001-A2-001.dwg



MAP REFERENCE:  
RICHMOND, IN 7.5 MINUTE  
QUADRANGLE DATED 1960  
PHOTO REVISED 1981

SCALE: 1" = 2000'



DRAWING TITLE		GAI DRAWING NUMBER:		
FIGURE 1 - SITE LOCATION MAP		A2-001		
PROJECT	 gai consultants	GAI FILE NUMBER:		
WHITEWATER IDEM CLOSURE PLAN		C151119-04-002-001-A2-001		
CLIENT		DRAWN BY:	CHECKED BY:	APPROVED BY:
RICHMOND POWER AND LIGHT COMPANY		MAYHOEJ		
RICHMOND, INDIANA		SHEET NO.:	SCALE:	ISSUE DATE:
		1 OF 1	AS SHOWN	08/16/2016
		© 2016 GAI Consultants		

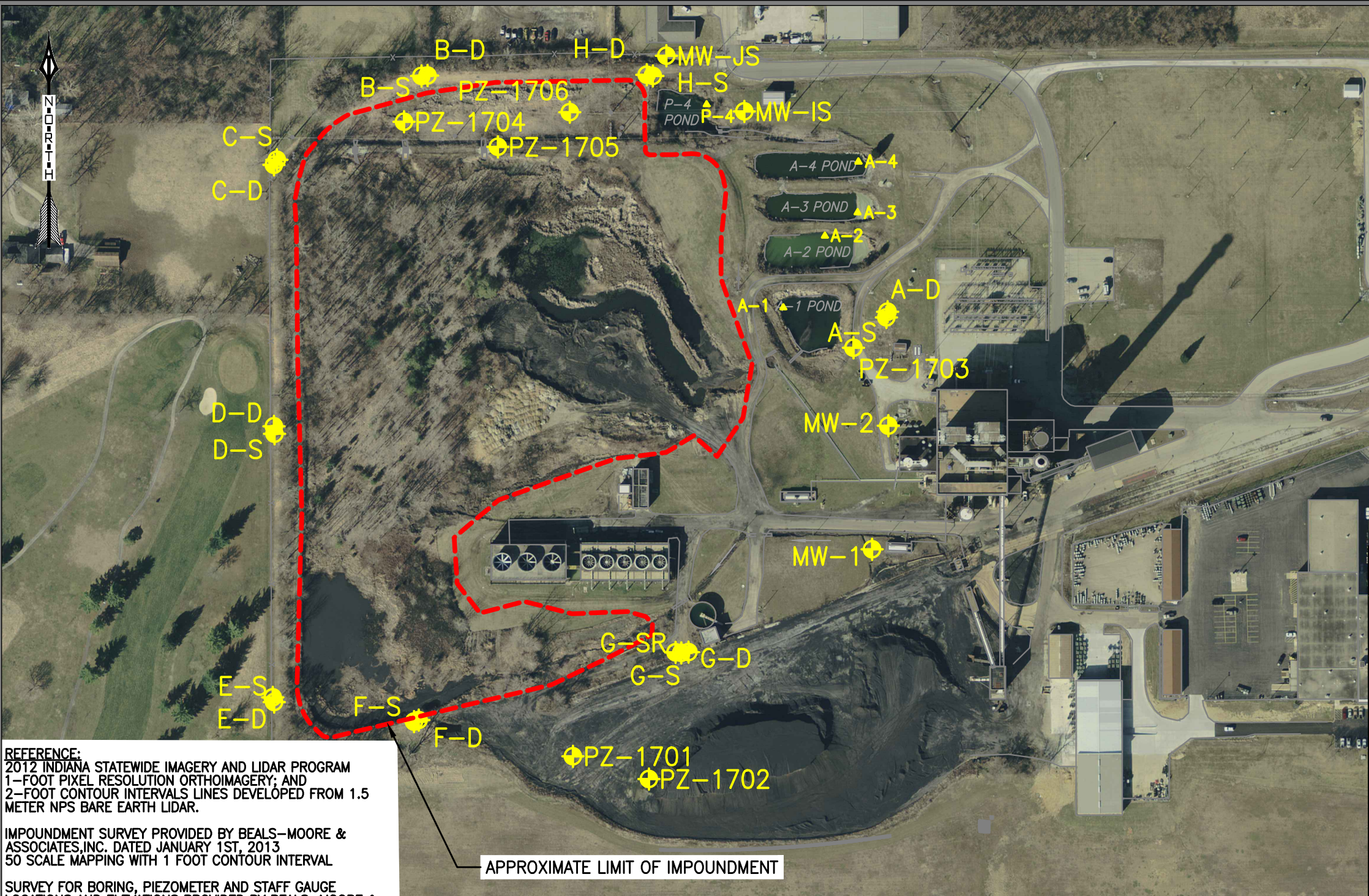
This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

ISSUING OFFICE: Pittsburgh | 385 E. Waterfront Drive, Homestead, PA 15120

PLOTTED ON: 8/17/2016 10:38:44 AM PLOTTED BY: William Harris PLOT FILE: GAI.stb



PLOTTED ON: 7/31/2019 2:15:39 PM  
 PLOTTED BY: Ed Mayhood  
 PLOT FILE: GAI.stb



REFERENCE:  
 2012 INDIANA STATEWIDE IMAGERY AND LIDAR PROGRAM  
 1-FOOT PIXEL RESOLUTION ORTHOIMAGERY; AND  
 2-FOOT CONTOUR INTERVALS LINES DEVELOPED FROM 1.5  
 METER NPS BARE EARTH LIDAR.  
 IMPOUNDMENT SURVEY PROVIDED BY BEALS-MOORE &  
 ASSOCIATES, INC. DATED JANUARY 1ST, 2013  
 50 SCALE MAPPING WITH 1 FOOT CONTOUR INTERVAL  
 SURVEY FOR BORING, PIEZOMETER AND STAFF GAUGE  
 LOCATIONS AND ELEVATIONS PROVIDED BY BEALS-MOORE &  
 ASSOCIATES, INC. DATED APRIL 15TH, 2016, SEPTEMBER 27,  
 2016 AND JULY 10, 2017.

▲A-2

◆A-S

---

STAFF GAUGE LOCATION  
 BORING LOCATION  
 APPROXIMATE LIMIT OF IMPOUNDMENT

SCALE: 1" = 200'

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
2	5/23/2018	MAYHOEJ	HENGELM	TURKARJ	ADDED MW-IS AND MW-JS
1	9/30/2016	NEIMAJC	MURAOTI	TURKARJ	ADDED BORINGS G, H, MW-1 AND MW-2
REVISION RECORD					

DRAWING TITLE		
FIGURE 2-GROUNDWATER MONITORING SYSTEM LOCATION MAP		
PROJECT		CLIENT
IMPOUNDMENT CLOSURE WHITEWATER VALLEY STATION WAYNE COUNTY RICHMOND, INDIANA 47374	 gai consultants	RICHMOND POWER & LIGHT 2000 US 27 SOUTH RICHMOND, INDIANA 47374

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	MURAOTI	TURKARJ
REVISION	SCALE:	ISSUE DATE:
1	AS SHOWN	05/24/2018
SHEET NO.: 1 OF 1		
GAI FILE NUMBER: C151119-04-002-001-B2-028		
GAI DRAWING NUMBER: B2-028		



