

Annual Groundwater Monitoring Report

Southwestern Electric Power Company

J. Robert Welsh Power Plant
CN 602843245; RN100213370

Primary Bottom Ash Pond CCR Management Unit

1187 Country Road 4865

Titus County

Pittsburg, Texas

January 31, 2022

Prepared by:
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1 Riverside Plaza
Columbus, Ohio 43215



An **AEP** Company

BOUNDLESS ENERGY™

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Abbreviations:

ASD - Alternate Source Demonstration

CCR – Coal Combustion Residual

GWPS - Groundwater protection standards

PBAP – Primary Bottom Ash Pond

SSI - Statistically Significant Increase

SSL – Statistically Significant Level

TCEQ – Texas Commission on Environmental Quality

I. **Overview**

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for an existing Coal Combustion Residual (CCR) unit at Southwestern Electric Power Company's, a wholly-owned subsidiary of American Electric Power Company (AEP), Welsh Power Plant. The Texas Commission on Environmental Quality's (TCEQ's) CCR rules require that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31, 2022.

In general, the following activities were completed:

- At the start of the current annual reporting period, the PBAP was operating under the Assessment monitoring program.
- At the end of the current annual reporting period, the PBAP was operating under the Assessment monitoring program.
- The PBAP initiated an assessment monitoring program on April 13, 2018.
- Data and statistical analysis not available for the previous reporting period indicated that during the 2nd semi-annual 2020 sampling event (October, 2020):
 - Statistically significant increases (SSIs) were determined for:
 - Boron at AD-8
 - Fluoride at AD-8
 - Statistically significant levels (SSLs) were identified for
 - Lithium in AD-9
- Annual groundwater sampling was conducted in February 2021;
- First semi-annual groundwater sampling event was conducted in June 2021;
 - Statistically significant increase (SSI):
 - Boron at AD-8
 - pH at AD-9
 - No SSLs were identified.
- Statistical evaluation of the 2nd semi-annual 2021 groundwater sampling event conducted in October 2021 is underway.

The major components of this annual report, to the extent applicable at this time, are presented in sections that follow:

- A map, aerial photograph or a drawing showing the PBAP CCR management unit, all groundwater monitoring wells and monitoring well identification numbers;
- All of the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of assessment monitoring programs is included in Appendix 1;
- Statistical comparison of monitoring data to determine if there have been SSI(s) and SSLs, where applicable (Appendix 2);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions, where applicable (Appendix 3);
- A summary of any transition between monitoring programs or an alternate monitoring frequency, if applicable (Appendix 4).
- Identification of any monitoring wells that were installed, or decommissioned during the preceding year, along with a statement as to why that happened, where applicable (Appendix 5,); and
- Other information required to be included in the annual report, field sheets, analytical reports, etc. (Appendix 6)

In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

IV. Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction and Discussion

Appendix 1 contains potentiometric maps with the static water elevation, groundwater flow direction for each monitoring event and tables showing groundwater velocity and the groundwater quality data collected under 30 TAC 352.951.

V. Groundwater Quality Data Statistical Analysis

Appendix 2 contains the statistical analysis reports available for this reporting period.

Data and statistical analysis not available for the previous reporting period indicated that during the 2nd semi-annual 2020 sampling event (October 14, 2020):

- Statistically significant increases (SSIs) were determined for:
 - Boron at AD-8
 - Fluoride at AD-8
- Statistically significant levels (SSLs) were identified for
 - Lithium in AD-9

The annual sampling event for Appendix III and IV was conducted February 23, 2021 and satisfies the requirement of 30 TAC 352.951.

First semi-annual groundwater sampling event was conducted in June 2021;

- Statistically significant increase (SSI):
 - Boron at AD-8
 - pH at AD-9
- No SSLs were identified.

Statistical evaluation of the 2nd semi-annual 2021 groundwater sampling event conducted in October 2021 is underway.

VI. Alternate Source Demonstrations completed

An ASD was successfully conducted for the potential lithium SSL determined in AD-9 during the statistical evaluation of the 2nd semi-annual 2020 groundwater monitoring event. The ASD was submitted to TCEQ on April 26, 2021.

No ASDs were conducted for the PBAP's SSIs.

The successful ASD is found in Appendix 3.

VII. Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency

As of this annual groundwater report, the CCR Unit remains in assessment monitoring and will be sampled on a semi-annual basis.

VIII. Other Information Required

Field sheets and laboratory reports are located in Appendix 6.

IX. Description of Any Problems Encountered and Actions Taken

No significant problems were encountered.

X. A Projection of Key Activities for the Upcoming Year

- Complete the statistical evaluation of the 2nd semi-annual 2021 groundwater monitoring event;
- Assessment monitoring will continue on a semiannual groundwater sampling schedule for 30 TAC 352 Appendix III and IV constituents;
- Conducted the annual groundwater sampling event for all constituents listed in 30 TAC 352 Appendix III and IV;
- Evaluation of the assessment monitoring results from a statistical analysis viewpoint, looking for SSIs above background as well as SSLs above GWPS;
- If needed, ASDs will be conducted to evaluate if the unit can remain in assessment monitoring or the unit will move to an assessment of corrective measures;
- Responding to any new data received in light of CCR rule requirements; and
- Preparation of the next annual groundwater report.

APPENDIX 1

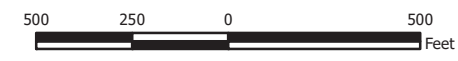
Potentiometric maps and tables follow, showing the groundwater monitoring data collected, the rate and direction of groundwater flow, and a summary showing the number of samples collected per monitoring well. The dates that the samples were collected also is shown.



- Legend**
- Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - Groundwater Elevation Contour (Inferred)
 - Approximate Groundwater Flow Direction
 - CCR Units

Notes

- Monitoring well coordinates and water level data (collected on February 23, 2021) provided by AEP.
- AD-2, AD-3, AD-4C, AD-6, AD-7, AD-10, AD-12, AD-16R, and AD-18 were not gauged during the February 2021 event.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016).
- Groundwater elevation units are feet above mean sea level.



Beth Ann Gross
July 16, 2021

Geosyntec Consultants, Inc.
Texas Firm Registration No. 1182

**Groundwater Potentiometric Map
February 2021**

AEP Welsh Power Plant
Cason, Texas

Geosyntec
consultants

Figure

1

Columbus, Ohio

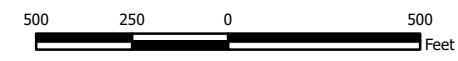
2021/06/30



- Legend**
- ◆ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - - - Groundwater Elevation Contour (Inferred)
 - ➔ Approximate Groundwater Flow Direction
 - ▭ CCR Units

Notes

- Monitoring well coordinates and water level data (collected on June 2, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016).
- Groundwater elevation units are feet above mean sea level.



11/22/2021
Beth Ann Gross
 Geosyntec Consultants
 Texas Registered Engineering Firm No. F-1182

**Groundwater Potentiometric Map
 June 2021**

AEP Welsh Power Plant
 Cason, Texas

Geosyntec
 consultants

Columbus, Ohio

2021/11/19

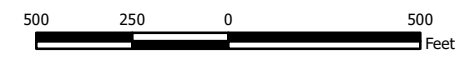
Figure
2



- Legend**
- Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - Groundwater Elevation Contour (Inferred)
 - Approximate Groundwater Flow Direction
 - CCR Units

Notes

- Monitoring well coordinates and water level data (collected on October 21, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016).
- Groundwater elevation units are feet above mean sea level.



Beth Ann Gross

January 25, 2022

Geosyntec Consultants, Inc.
Texas Firm Registration No. 1182

**Groundwater Potentiometric Map
October 2021**

AEP Welsh Power Plant
Cason, Texas

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Figure

3

Columbus, Ohio

2022/01/20

Distance between wells.

	AD-1	AD-2	AD-3	AD-4C	AD-5	AD-6	AD-7	AD-8	AD-9	AD-10	AD-11	AD-12	AD-13	AD-14	AD-15	AD-16R	AD-17
AD-1	-	1083.7	1329.8	1304.3	2611.8	2133.7	2515.6	2677.1	1797.4	1961.0	1510.0	1379.4	1445.6	1169.2	2361.0	1558.3	1876.4
AD-2		-	547.2	1044.6	3701.466	3379.7	3372.1	3369.2	2531.5	2422.1	2015.7	2347.6	2148.8	1546.7	3033.9	1737.9	2725.4
AD-3			-	615.0	3888.4	3377.6	3237.9	3149.4	2342.6	2108.7	1751.5	2693.8	2007.4	1295.3	2822.2	1332.8	3176.0
AD-4C				-	3632.5	3077.4	2728.7	2565.9	1795.8	1488.4	1170.2	2657.3	1486.6	758.6	2240.3	718.2	3205.5
AD-5					-	580.0	2141.1	2753.3	2522.0	3128.3	2918.9	1598.5	3024.8	3022.1	2745.3	3418.4	1729.4
AD-6						-	1647.8	2244.4	1935.8	2517.7	2325.1	1392.6	1861.5	2444.5	2198.9	2814.5	1725.5
AD-7							-	644.5	965.3	1473.1	1577.6	2659.6	1250.7	1976.8	734.8	2148.8	3166.7
AD-8								-	861.6	1108.4	1396.9	3090.5	1238.4	1860.4	337.5	1878.6	3645.0
AD-9									-	614.4	633.4	2414.6	376.6	1028.0	567.5	1197.6	3013.3
AD-10										-	455.3	2842.4	708.1	877.6	804.9	791.3	3454.6
AD-11											-	2482.0	456.2	470.4	1059.2	562.4	3085.9
AD-12												-	2148.3	2305.2	2900.6	2740.2	617.1
AD-13													-	754.4	939.5	1002.3	2753.1
AD-14														-	1519.7	429.5	2906.9
AD-15															-	1560.0	3476.1
AD-16R																-	3340.9
AD-17																	-

Wells CCR Unit monitoring wells

	up	AD-1	AD-2	BASP	BASP	up	AD-5	AD-6	AD-7	PBAP	PBAP	LF	AD-11	AD-12	LF	AD-14	AD-15	BASP	up	AD-17	AD-18	AD-22	AD-23
TOC, ft		357.57	346.16	333.10	333.28	351.00	346.33	350.82	340.01	343.09	343.01	342.18	369.33	347.00	345.43	343.29	353.55	357.10		346.17	360.22	368.82	
D(R bgs)		25.00	25.00	17.00	15.00	30.00	33.00	38.00	26.00	35.00	35.00	20.00	30.00	16.00	18.00	46.00	27.00	40.00		29.00	20.00	20.00	
11/17/17		16.39	8.06	6.89	12.66				13.25	12.59		13.28		12.46	12.8	20.48							
2/23/17		17.83	8.18	8.39	14.83				15.74	15.04		13.93		15.17	14.56	21.36							
6/6/17		16.96	9.03	7.65	14				14.11	13.33		14.11		14.75	14.23	21.26	25.16						
8/18/17		17.19	15.06	9.01	7.87	13.76	13.25	16.51	13.49	13.15	18.85	13.84	21.43	14.98	14.66	21.05	26.18	22.86					
10/6/17		17.87	NG	9.86	9.08	13.6	13.89	NG	NG	13.62	NG	14.33	NG	15.58	15.52	21.22	26.37	22.93					
5/23/18		17.26		11.31	8.74	15.44			14.29	13.77		15.82		16.62	14.86	23.03	24.83	24.25					
8/14/18		18.41		10.08	9.85	14.63			14.17	13.51		14.51		15.99	16.05	21.72	26.64	23.15					
2/20/19		15.62	12.69	7.13	6.78	12.85	12.76	16.52	13.64	13.06	19.09	13.38	18.97	13.4	11.18	20.69	22.16	22.24					
5/30/19		11.89		7.45	7.13	13.46			13.92	13.26		14.1		13.54	10.66	21.26	14.53	21.97					
7/24/19		13.62	13.61	8.38	8.55	14.11		16.21	14.21	13.52	19.25	14.21		14.77	13.58	21.86	21.38	22.16					
2/17/20		15.69				12.44			13.97	13.51		14.08		13.62	11.99	21.17		22.16					
5/20/20		13.48	12.94	7.72	7.08	13.21	12.71	16.56	3.69	13.34	19.4	13.85	19.11	13.71	11.46	21.12	23.13	22	5.41	2.29	4.21		
7/22/20		15.39		8.62	8.65	13.96			14.01	13.95		14.25		15.23	14.26	21.52	23.99	22.25					
10/14/20		17.01	14.94	9.53	9.09	13.65	13.18	17.41	14.65	14.49	19.39	14.69	20.84	16.03	5.39	22.17	25.88	22.41	7.85	10.38	11.19		
12/10/20		17.53		9.59	8.11	13.39											26.43	22.47					
2/23/21		15.89				12.84												338.16					
06/02/21		11.75	11.45	6.74	6.41	13.85	10.37	16.92	13.17	13.17	19.14	13.48	18.21	12.31	9.55	20.84	22.96	22.17	4.58	1.13	1.00		
07/20/21		14.69		8.36	7.83	14.4											23.75	22.28					
10/20/21		17.03	15.07	10.24	9.7	14.25	13.7	17.54	14.78	14.58	19.63	15.1	21.36	16.06	15.7	22.96	25.97	22.57					

Hydraulic gradient. Use row 73 10/20/2021

	AD-1	AD-2	AD-3	AD-4C	AD-5	AD-6	AD-7	AD-8	AD-9	AD-10	AD-11	AD-12	AD-13	AD-14	AD-15	AD-16R	AD-17
AD-1	-		0.2561	0.2539	0.1236	0.1516	0.1339	0.1242	0.1854	0.1659	0.2176	0.2344	0.2263	0.2976	0.1402	0.2116	0.1707
AD-2		-	0.6223	0.3170	0.0872	0.0957	0.0999	0.0987	0.1317	0.1343	0.1630	0.1378	0.1522	0.2250	0.1091	0.1897	0.1175
AD-3			-	0.0154	0.0045	0.0050	0.0012	0.0025	0.0031	0.0073	0.0069	0.0064	0.0067	0.0057	0.0034	0.0081	0.0064
AD-4C				-	0.0023	0.0024	0.0021	0.0006	0.0012	0.0039	0.0022	0.0029	0.0027	0.0023	0.0001	0.0019	0.0034
AD-5					-	0.0012	0.0065	0.0041	0.0008	0.0019	0.0003	0.0014	0.0003	0.0014	0.0029	0.0020	0.0015
AD-6						-	0.0080	0.0040	0.0050	0.0007	0.0021	0.0001	0.0019	0.0100	0.0033	0.0022	0.0019
AD-7							-	0.0064	0.0036	0.0078	0.0052	0.0050	0.0077	0.0057	0.0079	0.0033	0.0052
AD-8								-	0.0008	0.0067	0.0029	0.0030	0.0045	0.0082	0.0050	0.0015	0.0034
AD-9									-	0.0131	0.0075	0.0041	0.0165	0.0143	0.0041	0.0030	0.0043
AD-10										-	0.0072	0.0007	0.0026	0.0259	0.0071	0.0057	0.0014
AD-11											-	0.0021	0.0031	0.0414	0.0023	0.0022	0.0027
AD-12												-	0.0017	0.0107	0.0026	0.0023	0.0049
AD-13													-	0.0277	0.0041	0.0026	0.0025
AD-14														-	0.0112	0.0425	0.0095
AD-15															-	0.0008	0.0031
AD-16R																-	0.0028
AD-17																	-

effective porosity(n) = 0.3
 Hydraulic conductivity of aquifer (k) = 18.25ft/yr
 Max gradient (dh/dl)
 0.622

$$v = k \frac{(dh / dl)}{n}$$

Groundwater elevations, sea level

	BKG	aux	BASP	BASP	BKG	aux	aux	PBAP	PBAP	aux	LF	aux	LF	LF	PBAP	BASP	BKG	aux	aux	aux	AD-18	AD-22	AD-23	Max	Min	gw velocity
TOC, ft	357.57	346.16	333.10	333.28	351.00	346.33	350.82	340.01	343.09	343.01	342.18	369.33	347.00	345.43	343.29	353.55	357.10	346.17	360.22	368.82						
01/17/17	341.18		325.04	326.39	338.34			326.76	330.50		328.90		334.54	332.63	322.81		333.94						338.34	322.81	0.774	50.85
02/23/17	339.74		324.92	324.89	336.17			324.27	328.05		328.25		331.83	330.87	321.93		333.94					336.17	321.93	0.770	50.59	
06/06/17	340.61		324.07	325.63	337.00			326.01	329.76		328.07		332.25	331.20	322.03	328.39	334.55					337.00	322.03	0.720	47.30	
08/18/17	340.38	331.10	324.09	325.41	337.24	333.08	334.31	326.52	329.94	324.16	328.34	347.90	332.02	330.77												

**Residence Time Calculation Summary
Welsh Primary Bottom Ash Pond**

Geosyntec Consultants, Inc.

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2021-02		2021-06		2021-10	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Primary Bottom Ash Pond	AD-1 ^[1]	2.0	2.0	29.7	3.8	16.2	3.0	20.5
	AD-5 ^[1]	2.0	0.9	67.8	2.1	28.7	1.2	52.6
	AD-8 ^[2]	2.0	4.3	14.2	4.7	13.0	3.1	19.8
	AD-9 ^[2]	2.0	4.5	13.7	4.7	12.9	4.9	12.3
	AD-15 ^[2]	2.0	5.2	11.8	6.4	9.6	6.9	8.8
	AD-17 ^[1]	2.0	1.4	43.7	8.7	7.0	7.3	8.3

Notes:

[1] - Upgradient Well

[2] - Downgradient Well

**Table 1 - Groundwater Data Summary: AD-1
Welsh - PBAP
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/26/2016	Background	0.346	36.5	5	< 0.083 U1	5.9	42	252
7/27/2016	Background	0.35	39.6	4	< 0.083 U1	5.3	36	239
9/30/2016	Background	0.332	15	5	< 0.083 U1	5.4	35	173
10/19/2016	Background	0.398	19.1	4	< 0.083 U1	5.2	42	192
12/12/2016	Background	0.394	8.74	4	< 0.083 U1	5.2	40	200
1/17/2017	Background	0.656	129	4	< 0.083 U1	7.1	68	538
2/23/2017	Background	0.7	147	9	< 0.083 U1	6.9	68	612
6/7/2017	Background	0.449	15.1	4	< 0.083 U1	5.1	42	176
10/6/2017	Detection	0.453	14.3	4	< 0.083 U1	5.3	40	160
5/24/2018	Assessment	0.345	10.2	4	< 0.083 U1	5.2	43	150
8/14/2018	Assessment	0.443	5.95	5	< 0.083 U1	5.2	44	160
2/20/2019	Assessment	0.504	142	2.82	0.24	7.3	49.2	522
5/30/2019	Assessment	0.689	138	1.59	0.29	6.7	43.3	588
7/24/2019	Assessment	0.644	62.7	2	0.106 J1	6.0	58	180
2/17/2020	Assessment	0.626	115	3.41	0.31	5.8	56.3	488
5/20/2020	Assessment	0.801	126	1.83	0.20	7.2	51.4	508
10/14/2020	Assessment	0.670	3.88	2.16	0.25	4.5	66.9	183
2/23/2021	Assessment	0.617	113	--	0.31	6.6	--	--
6/2/2021	Assessment	0.786	97.1	2.26	0.30	6.2	61.4	400
10/20/2021	Assessment	0.732	4.8	2.21	0.22	4.4	72.4	190

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-1
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/26/2016	Background	< 0.93 U1	1.39361 J1	191	0.271453 J1	0.213294 J1	0.240267 J1	1.15339 J1	1.184	< 0.083 U1	< 0.68 U1	0.01	0.033	0.53149 J1	1.74922 J1	0.959865 J1
7/27/2016	Background	< 0.93 U1	< 1.05 U1	191	0.315631 J1	0.0940357 J1	< 0.23 U1	0.615933 J1	0.9952	< 0.083 U1	< 0.68 U1	0.019	0.00793 J1	< 0.29 U1	1.81763 J1	< 0.86 U1
9/30/2016	Background	< 0.93 U1	2.96797 J1	141	0.382874 J1	< 0.07 U1	5	0.850408 J1	1.38	< 0.083 U1	3.38434 J1	0.014	0.01773 J1	< 0.29 U1	1.02629 J1	< 0.86 U1
10/19/2016	Background	< 0.93 U1	< 1.05 U1	114	0.311247 J1	< 0.07 U1	0.412131 J1	0.649606 J1	1.141	< 0.083 U1	< 0.68 U1	0.008	0.00534 J1	1.39872 J1	2.03168 J1	1.25062 J1
12/12/2016	Background	< 0.93 U1	< 1.05 U1	72	0.34133 J1	< 0.07 U1	< 0.23 U1	0.424105 J1	0.719	< 0.083 U1	< 0.68 U1	0.008	0.01521 J1	< 0.29 U1	1.85825 J1	< 0.86 U1
1/17/2017	Background	< 0.93 U1	< 1.05 U1	410	0.0366913 J1	< 0.07 U1	< 0.23 U1	0.480125 J1	3.009	< 0.083 U1	< 0.68 U1	0.000275956 J1	< 0.005 U1	< 0.29 U1	4.04737 J1	< 0.86 U1
2/23/2017	Background	< 0.93 U1	< 1.05 U1	488	< 0.02 U1	< 0.07 U1	< 0.23 U1	0.765099 J1	4.309	< 0.083 U1	< 0.68 U1	0.001	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/7/2017	Background	< 0.93 U1	1.14 J1	93.46	0.37 J1	< 0.07 U1	0.66 J1	0.77 J1	0.676	< 0.083 U1	< 0.68 U1	0.00902	0.007 J1	< 0.29 U1	2.1 J1	< 0.86 U1
5/24/2018	Assessment	3.17 J1	< 1.05 U1	79.9	0.39 J1	< 0.07 U1	< 0.23 U1	0.35 J1	1.983	< 0.083 U1	< 0.68 U1	0.00814	0.006 J1	< 0.29 U1	1.38 J1	< 0.86 U1
8/14/2018	Assessment	0.03 J1	0.21	63.0	0.482	0.02	0.160	0.797	1.102	< 0.083 U1	0.238	0.00708	0.013 J1	0.21	1.7	0.03 J1
2/20/2019	Assessment	0.16	0.46	457	0.09 J1	0.01 J1	0.306	0.399	3.159	0.24	0.124	0.00155	< 0.005 U1	1 J1	0.7	< 0.1 U1
5/30/2019	Assessment	0.16	0.60	512	0.244	0.01 J1	0.1 J1	0.756	2.717	0.29	0.197	< 0.009 U1	< 0.005 U1	2.43	1.4	< 0.1 U1
7/24/2019	Assessment	0.08 J1	0.39	245	0.540	0.02 J1	0.1 J1	0.789	1.819	0.106 J1	0.1 J1	0.00557	< 0.005 U1	2 J1	3.4	< 0.1 U1
2/17/2020	Assessment	0.33	0.49	303	0.07 J1	0.02 J1	0.1 J1	0.28	2.665	0.31	0.1 J1	0.00105	< 0.002 U1	1 J1	2.3	< 0.1 U1
5/20/2020	Assessment	0.15	0.53	394	0.270	0.02 J1	0.1 J1	0.490	2.312	0.20	0.1 J1	0.00301	< 0.002 U1	2 J1	2.8	< 0.1 U1
10/14/2020	Assessment	< 0.1 U1	0.3 J1	84.7	0.984	< 0.05 U1	0.9 J1	2.12	1.552	0.25	0.3 J1	0.00932	0.003 J1	< 2 U1	5.3	< 0.5 U1
2/23/2021	Assessment	0.24	0.74	338	0.136	0.03 J1	0.338	0.477	1.737	0.31	0.852	0.00155	< 0.002 U1	1 J1	2.5	< 0.1 U1
6/2/2021	Assessment	0.18	0.66	349	0.088	0.01 J1	0.32	0.474	2.15	0.30	0.09 J1	0.00052	0.002 J1	4.8	1.26	< 0.04 U1
10/20/2021	Assessment	0.04 J1	0.20	86.1	0.932	0.026	0.33	2.44	0.99	0.22	0.23	0.00756	0.003 J1	< 0.1 U1	7.39	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-5
Welsh - PBAP
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/31/2016	Background	0.03	36.9	15	0.3469 J1	6.4	123	337
7/28/2016	Background	0.04	44.7	16	< 0.083 U1	5.4	163	360
9/30/2016	Background	0.04	46.3	15	0.2436 J1	5.3	190	416
10/20/2016	Background	0.05	50.7	14	< 0.083 U1	5.9	267	448
12/13/2016	Background	0.05	49.6	13	< 0.083 U1	6.2	233	484
1/17/2017	Background	0.04	49.8	14	< 0.083 U1	6.3	234	438
2/23/2017	Background	0.04	33	15	< 0.083 U1	5.5	127	286
6/7/2017	Background	0.05281	49.7	14	< 0.083 U1	6.0	82	300
10/6/2017	Detection	0.04322	33.1	16	< 0.083 U1	5.6	82	258
5/24/2018	Assessment	0.05007	28.1	22	< 0.083 U1	6.2	60	242
8/15/2018	Assessment	0.050	40.5	19	< 0.083 U1	6.2	240	428
2/21/2019	Assessment	0.033	33.9	24.7	0.21	5.4	46.5	220
5/30/2019	Assessment	0.03 J1	30.0	22.3	0.29	6.3	51.3	238
7/24/2019	Assessment	0.04 J1	41.1	18	0.112 J1	6.3	90	354
2/17/2020	Assessment	0.03 J1	39.8	19.8	0.22	5.5	43.7	248
5/20/2020	Assessment	0.03 J1	40.2	22.3	0.18	6.8	55.5	264
10/14/2020	Assessment	0.04 J1	36.6	18.8	0.18	6.5	148	338
2/23/2021	Assessment	0.03 J1	30.9	--	0.23	6.0	--	--
6/2/2021	Assessment	0.027 J1	24.4	19.6	0.21	5.8	53.8	220
10/20/2021	Assessment	0.038 J1	38.4	17.4	0.17	5.6	155	370

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-5
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/31/2016	Background	< 0.93 U1	< 1.05 U1	57	0.149801 J1	0.0765156 J1	0.555038 J1	14	1.634	0.3469 J1	< 0.68 U1	0.135	0.01135 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
7/28/2016	Background	2.05116 J1	2.90819 J1	93	0.518653 J1	0.502155 J1	0.411466 J1	15	4.75	< 0.083 U1	< 0.68 U1	0.191	0.01516 J1	< 0.29 U1	1.08901 J1	< 0.86 U1
9/30/2016	Background	< 0.93 U1	4.7609 J1	87	0.251584 J1	< 0.07 U1	0.90676 J1	14	3.33	0.2436 J1	< 0.68 U1	0.186	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/20/2016	Background	< 0.93 U1	< 1.05 U1	70	0.08781 J1	0.107488 J1	0.248085 J1	9	2.319	< 0.083 U1	< 0.68 U1	0.225	< 0.005 U1	1.36984 J1	< 0.99 U1	< 0.86 U1
12/13/2016	Background	< 0.93 U1	1.15381 J1	53	0.164529 J1	0.203546 J1	0.747921 J1	13	2.182	< 0.083 U1	< 0.68 U1	0.199	0.00802 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/17/2017	Background	< 0.93 U1	< 1.05 U1	47	0.0574718 J1	0.180502 J1	< 0.23 U1	12	1.023	< 0.083 U1	< 0.68 U1	0.239	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/23/2017	Background	< 0.93 U1	< 1.05 U1	42	0.0306858 J1	< 0.07 U1	< 0.23 U1	13	1.788	< 0.083 U1	< 0.68 U1	0.166	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/7/2017	Background	< 0.93 U1	3.85 J1	87.7	0.08 J1	0.39 J1	0.28 J1	11.93	2.32	< 0.083 U1	< 0.68 U1	0.124	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
5/24/2018	Assessment	< 0.93 U1	< 1.05 U1	71.16	< 0.02 U1	0.23 J1	0.8 J1	14.24	1.946	< 0.083 U1	< 0.68 U1	0.121	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/15/2018	Assessment	0.01 J1	1.69	63.7	0.055	0.008 J1	0.072	11.4	0.316	< 0.083 U1	0.079	0.147	< 0.005 U1	0.13	0.08 J1	< 10 U1
2/21/2019	Assessment	0.02 J1	1.59	69.4	0.08 J1	< 0.01 U1	0.432	8.58	1.267	0.21	0.147	0.0807	< 0.005 U1	< 0.4 U1	0.1 J1	< 0.1 U1
5/30/2019	Assessment	< 0.02 U1	3.05	60.5	0.08 J1	< 0.01 U1	0.06 J1	11.8	1.431	0.29	0.05 J1	0.104	0.006 J1	< 0.4 U1	0.05 J1	< 0.1 U1
7/24/2019	Assessment	< 0.02 U1	2.48	77.4	0.05 J1	< 0.01 U1	0.05 J1	8.38	2.533	0.112 J1	< 0.05 U1	0.108	< 0.005 U1	< 0.4 U1	0.06 J1	< 0.1 U1
2/17/2020	Assessment	0.03 J1	2.17	109	0.09 J1	0.02 J1	0.336	4.52	2.393	0.22	0.227	0.0732	< 0.002 U1	0.9 J1	0.2	< 0.1 U1
5/20/2020	Assessment	< 0.02 U1	1.78	93.1	0.05 J1	0.01 J1	0.1 J1	7.65	1.612	0.18	0.07 J1	0.0740	< 0.002 U1	< 0.4 U1	0.09 J1	< 0.1 U1
10/14/2020	Assessment	< 0.02 U1	6.28	71.7	0.09 J1	< 0.01 U1	0.09 J1	14.9	2.7	0.18	0.05 J1	0.134	< 0.002 U1	< 0.4 U1	0.1 J1	< 0.1 U1
2/23/2021	Assessment	< 0.02 U1	2.06	68.3	0.03 J1	< 0.01 U1	0.1 J1	6.31	1.397	0.23	< 0.05 U1	0.0705	< 0.002 U1	< 0.4 U1	0.03 J1	< 0.1 U1
6/2/2021	Assessment	< 0.02 U1	1.72	49.3	0.018 M1, J1	< 0.004 U1	0.26	10.5	2.47	0.21	< 0.05 U1	0.0764 M1	< 0.002 U1	0.1 J1	< 0.09 U1	< 0.04 U1
10/20/2021	Assessment	< 0.02 U1	1.44	53.2	0.018 J1	< 0.004 U1	0.23	6.85	2.68	0.17	< 0.05 U1	0.133 M1	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

**Table 1 - Groundwater Data Summary: AD-8
Welsh - PBAP
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/31/2016	Background	1.46	32.6	36	0.6507 J1	6.9	217	524
7/28/2016	Background	1.44	25.9	26	0.485 J1	5.4	202	469
9/29/2016	Background	1.51	24.3	28	0.4912 J1	7.7	186	432
10/20/2016	Background	1.54	25.9	30	0.6234 J1	6.1	184	424
12/12/2016	Background	1.53	23.6	27	0.5355 J1	5.6	168	442
1/19/2017	Background	1.53	18.7	24	0.5574 J1	6.2	153	352
2/22/2017	Background	1.67	19.3	22	< 0.083 U1	6.8	163	356
6/6/2017	Background	1.39	17.4	22	0.6628 J1	5.6	151	368
10/5/2017	Detection	1.49	14.9	20	< 0.083 U1	6.7	128	284
1/4/2018	Detection	1.47	--	--	--	--	--	--
5/23/2018	Assessment	--	--	--	0.501 J1	6.2	--	--
8/15/2018	Assessment	--	--	--	--	6.8	--	--
9/17/2018	Assessment	1.30	15.0	24	--	--	122	288
2/5/2019	Assessment	2.55	19.7	22.8	0.72	5.4	153	--
2/21/2019	Assessment	1.47	17.6	23.2	0.66	6.4	163	352
4/30/2019	Assessment	1.21	--	--	--	6.9	--	--
5/29/2019	Assessment	1.07	16.9	19.5	0.89	5.5	150	324
7/23/2019	Assessment	1.21	20.8	15	0.559 J1	6.6	145	392
2/17/2020	Assessment	1.25	14.6	17.0	0.67	6.5	159	344
5/19/2020	Assessment	1.23	15.1	16.5	0.66	6.4	149	336
7/22/2020	Assessment	1.14	--	--	--	6.6	--	--
10/12/2020	Assessment	1.10	17.2	13.6	0.88	6.8	138	298
2/23/2021	Assessment	1.18	14.8	--	0.69	6.1	--	--
6/1/2021	Assessment	1.10	15.3	14.8	0.73	5.3	162	330
10/19/2021	Assessment	1.10	17.2	13.7	0.90	5.5	139	300

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-8
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/31/2016	Background	< 0.93 U1	1.06251 J1	34	0.114491 J1	< 0.07 U1	2	7	1.046	0.6507 J1	< 0.68 U1	0.122	0.02103 J1	1.01326 J1	1.37017 J1	1.18455 J1
7/28/2016	Background	1.46141 J1	< 1.05 U1	26	0.171642 J1	< 0.07 U1	0.751164 J1	9	1.584	0.485 J1	< 0.68 U1	0.098	0.00859 J1	1.48301 J1	1.96333 J1	< 0.86 U1
9/29/2016	Background	< 0.93 U1	< 1.05 U1	23	< 0.02 U1	< 0.07 U1	0.51348 J1	7	6.3	0.4912 J1	< 0.68 U1	0.111	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/20/2016	Background	< 0.93 U1	< 1.05 U1	24	0.028758 J1	< 0.07 U1	0.617826 J1	7	0.3449	0.6234 J1	< 0.68 U1	0.135	< 0.005 U1	0.838863 J1	< 0.99 U1	1.64377 J1
12/12/2016	Background	< 0.93 U1	< 1.05 U1	21	< 0.02 U1	< 0.07 U1	< 0.23 U1	7	1.083	0.5355 J1	< 0.68 U1	0.11	0.01007 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/19/2017	Background	< 0.93 U1	< 1.05 U1	20	< 0.02 U1	< 0.07 U1	< 0.23 U1	6	0.823	0.5574 J1	< 0.68 U1	0.094	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/22/2017	Background	< 0.93 U1	< 1.05 U1	19	< 0.02 U1	< 0.07 U1	< 0.23 U1	6	0.536	< 0.083 U1	< 0.68 U1	0.092	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	< 0.93 U1	< 1.05 U1	19.08	< 0.02 U1	< 0.07 U1	< 0.23 U1	3.86 J1	1.0735	0.6628 J1	< 0.68 U1	0.09491	0.008 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
5/23/2018	Assessment	3.19 J1	< 1.05 U1	22.12	< 0.02 U1	< 0.07 U1	< 0.23 U1	3.19 J1	0.3366	0.501 J1	< 0.68 U1	0.0956	< 0.005 U1	< 0.29 U1	1.75 J1	< 0.86 U1
8/15/2018	Assessment	0.01 J1	0.31	21.2	0.008 J1	0.02 J1	0.050	5.36	3.44	--	0.039	0.0555	--	0.16	0.07 J1	0.129
2/21/2019	Assessment	< 0.02 U1	0.57	28.1	0.03 J1	0.03 J1	0.456	2.88	0.417	0.66	0.223	0.0911	< 0.005 U1	< 0.4 U1	0.1 J1	< 0.1 U1
5/29/2019	Assessment	< 0.02 U1	0.37	30.3	< 0.02 U1	0.02 J1	0.1 J1	6.03	0.911	0.89	0.07 J1	0.067	< 0.005 U1	< 0.4 U1	0.06 J1	0.1 J1
7/23/2019	Assessment	< 0.02 U1	0.41	31.0	< 0.02 U1	0.02 J1	0.09 J1	7.07	0.72	0.559 J1	0.08 J1	0.0641	< 0.005 U1	< 0.4 U1	0.08 J1	0.1 J1
2/17/2020	Assessment	< 0.02 U1	0.55	38.9	< 0.02 U1	0.05 J1	0.244	1.02	1.257	0.67	0.1 J1	0.124	< 0.002 U1	< 0.4 U1	0.08 J1	< 0.1 U1
5/19/2020	Assessment	< 0.02 U1	0.27	21.1	< 0.02 U1	0.04 J1	0.2 J1	1.17	0.344	0.66	< 0.05 U1	0.0872	< 0.002 U1	< 0.4 U1	0.07 J1	< 0.1 U1
10/12/2020	Assessment	< 0.02 U1	0.30	25.9	< 0.02 U1	0.04 J1	0.06 J1	5.71	0.267	0.88	0.06 J1	0.0615	< 0.002 U1	< 0.4 U1	0.08 J1	0.1 J1
2/23/2021	Assessment	< 0.02 U1	0.31	24.2	< 0.1 U1	0.03 J1	0.1 J1	0.899	0.544	0.69	0.06 J1	0.104	< 0.002 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
6/1/2021	Assessment	< 0.02 U1	0.37	47.9	0.01 J1	0.029	0.28	1.04	0.69	0.73	0.07 J1	0.0818	< 0.002 U1	< 0.1 U1	< 0.09 U1	0.05 J1
10/19/2021	Assessment	< 0.02 U1	0.25	23.3	< 0.01 U1	0.021	0.27	4.13	1.15	0.90	< 0.05 U1	0.0690	< 0.002 U1	< 0.1 U1	< 0.09 U1	0.11 J1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-9
Welsh - PBAP
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/31/2016	Background	0.12	229	88	0.4191 J1	6.3	1,352	2,541
7/28/2016	Background	0.105	255	98	0.4339 J1	5.0	1,464	2,564
9/29/2016	Background	0.115	220	86	0.304 J1	4.7	1,301	2,448
10/19/2016	Background	0.109	228	76	0.6227 J1	5.2	1,350	2,494
12/12/2016	Background	0.108	250	92	< 0.083 U1	5.7	1,639	2,667
1/19/2017	Background	0.312	91.1	54	< 0.083 U1	5.4	884	1,360
2/22/2017	Background	0.1	258	86	< 0.083 U1	5.8	1,774	2,662
6/6/2017	Background	0.146	191	19	< 0.083 U1	4.6	105	308
10/5/2017	Detection	0.129	9.64	20	< 0.083 U1	5.8	86	248
5/23/2018	Assessment	--	--	--	< 0.083 U1	5.3	--	--
8/15/2018	Assessment	--	--	--	--	5.0	--	--
9/17/2018	Assessment	0.198	230	103	--	--	1,910	2,694
2/5/2019	Assessment	0.096	133	27.9	0.16	4.2	181	--
2/21/2019	Assessment	1.39	211	89	0.19	5.0	1,350	2,240
4/30/2019	Assessment	0.07	--	--	--	4.5	--	--
5/29/2019	Assessment	0.06 J1	10.1	44.0	0.16	3.6	503	1,758
7/23/2019	Assessment	0.081	222	77	0.5736 J1	6.3	1,701	2,460
2/17/2020	Assessment	0.12	11.5	19.9	0.15	6.0	100	282
5/19/2020	Assessment	0.066	11.3	44.8	0.1 J1	4.9	536	902
10/12/2020	Assessment	0.100	11.8	18.8	0.19	4.8	100	296
2/23/2021	Assessment	0.219	11.6	--	0.21	4.7	--	--
6/1/2021	Assessment	0.221	12.5	16.7	0.19	4.4	118	300
10/19/2021	Assessment	0.226	11.9	31.8	0.19	4.3	374	700

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-9
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/31/2016	Background	< 0.93 U1	< 1.05 U1	51	0.999439 J1	1	< 0.23 U1	27	2.945	0.4191 J1	< 0.68 U1	1.32	0.0194 J1	< 0.29 U1	1.04175 J1	< 0.86 U1
7/28/2016	Background	< 0.93 U1	< 1.05 U1	31	0.726564 J1	2	0.262163 J1	22	1.447	0.4339 J1	< 0.68 U1	1.38	0.045	< 0.29 U1	8	< 0.86 U1
9/29/2016	Background	< 0.93 U1	< 1.05 U1	33	0.582852 J1	0.187457 J1	< 0.23 U1	12	3.199	0.304 J1	< 0.68 U1	1.17	0.00739 J1	< 0.29 U1	3.52832 J1	< 0.86 U1
10/19/2016	Background	< 0.93 U1	< 1.05 U1	26	0.478576 J1	0.965032 J1	< 0.23 U1	16	1.311	0.6227 J1	< 0.68 U1	1.44	< 0.005 U1	< 0.29 U1	3.09028 J1	< 0.86 U1
12/12/2016	Background	< 0.93 U1	< 1.05 U1	27	0.481339 J1	2	< 0.23 U1	24	3	< 0.083 U1	< 0.68 U1	1.33	0.02123 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/19/2017	Background	< 0.93 U1	< 1.05 U1	98	2	0.693618 J1	< 0.23 U1	42	2.349	< 0.083 U1	< 0.68 U1	0.634	0.00717 J1	< 0.29 U1	< 0.99 U1	1.7755 J1
2/22/2017	Background	< 0.93 U1	< 1.05 U1	22	0.301057 J1	0.680144 J1	< 0.23 U1	24	2.32	< 0.083 U1	< 0.68 U1	1.41	< 0.005 U1	< 0.29 U1	1.06022 J1	1.45295 J1
6/6/2017	Background	< 0.93 U1	< 1.05 U1	42.27	0.77 J1	2.22	< 0.23 U1	24.16	1.586	< 0.083 U1	< 0.68 U1	1	0.006 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
5/23/2018	Assessment	< 0.93 U1	< 1.05 U1	30.45	0.32 J1	2.88	< 0.23 U1	26.7	2.556	< 0.083 U1	< 0.68 U1	1.2	< 0.005 U1	< 0.29 U1	< 0.99 U1	8.46
8/15/2018	Assessment	< 10 U1	1.68	24.2	0.268	0.06	0.420	11.1	1.864	--	0.262	0.851	--	0.11	0.3	0.062
2/21/2019	Assessment	< 0.02 U1	1.18	52.4	0.474	0.09	0.313	14.8	2.51	0.19	0.08 J1	1.12	0.01 J1	< 0.4 U1	0.3	0.1 J1
5/29/2019	Assessment	< 0.02 U1	0.20	49.7	0.941	0.21	0.346	15.9	1.36	0.16	0.07 J1	0.225	< 0.005 U1	< 0.4 U1	0.2	0.2 J1
7/23/2019	Assessment	< 0.02 U1	1.39	32.1	0.361	0.06	0.2 J1	12.7	1.689	0.5736 J1	0.2 J1	1.11	< 0.005 U1	< 0.4 U1	0.4	< 0.1 U1
2/17/2020	Assessment	< 0.02 U1	0.33	52.8	0.979	0.24	0.608	17.7	1.938	0.15	0.2 J1	0.218	0.002 J1	< 0.4 U1	0.3	0.2 J1
5/19/2020	Assessment	< 0.02 U1	0.25	51.6	0.933	0.24	0.458	16.5	1.854	0.1 J1	0.07 J1	0.160	0.003 J1	< 0.4 U1	0.4	0.2 J1
10/12/2020	Assessment	< 0.02 U1	0.72	55.3	1.27	0.22	0.471	18.6	2.838	0.19	0.349	0.194	0.003 J1	< 0.4 U1	0.3	0.2 J1
2/23/2021	Assessment	< 0.02 U1	0.27	54.9	1.51	0.33	0.373	21.7	1.557	0.21	0.1 J1	0.189	0.003 J1	< 0.4 U1	0.4	0.2 J1
6/1/2021	Assessment	< 0.02 U1	0.21	51.6	1.15	0.353	0.59	20.6	1.74	0.19	0.08 J1	0.141	0.003 J1	< 0.1 U1	0.31 J1	0.22
10/19/2021	Assessment	< 0.02 U1	0.30	50.3	1.36	0.315	0.68	20.6	1.74	0.19	0.1 J1	0.184 P3	0.003 J1	< 0.1 U1	0.34 J1	0.23

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

Table 1 - Groundwater Data Summary: AD-15

Geosyntec Consultants, Inc.

Welsh - PBAP

Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/31/2016	Background	0.329	5.09	30	< 0.083 U1	5.6	24	188
7/28/2016	Background	0.407	3.83	34	< 0.083 U1	4.8	28	196
9/29/2016	Background	0.36	13.7	28	0.2621 J1	4.6	23	367
10/19/2016	Background	0.152	4.57	26	< 0.083 U1	4.4	17	152
12/12/2016	Background	0.334	3.6	26	< 0.083 U1	4.7	19	204
1/19/2017	Background	0.413	3.35	32	< 0.083 U1	5.8	25	176
2/22/2017	Background	0.1	4.21	20	< 0.083 U1	4.6	8	88
6/6/2017	Background	0.321	3.57	27	< 0.083 U1	4.8	19	184
10/5/2017	Detection	0.395	3.08	30	< 0.083 U1	5.9	21	200
5/23/2018	Assessment	--	--	--	< 0.083 U1	4.8	--	--
8/15/2018	Assessment	--	--	--	--	4.6	--	--
9/17/2018	Assessment	0.341	3.04	37	--	--	24	174
2/5/2019	Assessment	0.03 J1	2.18	20.6	0.06	3.9	0.2 J1	--
2/21/2019	Assessment	0.169	2.67	28.2	0.09	5.0	10.6	150
5/29/2019	Assessment	< 0.02 U1	2.97	21.4	0.06 J1	4.9	2.1	34
7/23/2019	Assessment	0.306	3.45	28	0.086 J1	3.2	18	214
2/17/2020	Assessment	0.419	3.64	34.3	0.11	4.5	21.5	234
5/19/2020	Assessment	0.376	3.37	34.1	0.07	5.3	19.0	216
10/12/2020	Assessment	0.334	2.99	30.4	0.10	5.1	17.1	170
2/23/2021	Assessment	0.03 J1	2.30	--	0.08	4.4	--	--
6/1/2021	Assessment	0.213	3.0	28.4	0.10	4.4	11.4	150
10/19/2021	Assessment	0.218	2.7	28.0	0.09	4.4	10.3	140

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-15
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/31/2016	Background	< 0.93 U1	12	215	0.959793 J1	0.351465 J1	17	11	2.284	< 0.083 U1	7	0.017	0.054	1.77432 J1	3.46337 J1	< 0.86 U1
7/28/2016	Background	< 0.93 U1	6	124	0.362598 J1	0.111427 J1	4	6	1.322	< 0.083 U1	< 0.68 U1	0.021	0.01646 J1	0.586779 J1	1.19442 J1	< 0.86 U1
9/29/2016	Background	< 0.93 U1	131	1,930	15	7	280	134	9.92	0.2621 J1	161	0.149	0.707	3.60313 J1	14	< 0.86 U1
10/19/2016	Background	< 0.93 U1	23	415	2	0.575938 J1	54	19	3.567	< 0.083 U1	22	0.036	0.1	1.54555 J1	1.17613 J1	1.55993 J1
12/12/2016	Background	< 0.93 U1	6	184	0.695316 J1	0.246456 J1	15	10	3.36	< 0.083 U1	3.96087 J1	0.013	0.026	0.463544 J1	1.32943 J1	< 0.86 U1
1/19/2017	Background	< 0.93 U1	6	153	0.449612 J1	< 0.07 U1	9	7	2.386	< 0.083 U1	2.87518 J1	0.008	0.01932 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/22/2017	Background	< 0.93 U1	20	353	2	0.319406 J1	49	20	2.261	< 0.083 U1	19	0.025	0.058	1.42695 J1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	< 0.93 U1	8.54	166	0.61 J1	0.48 J1	12.35	8.44	2.491	< 0.083 U1	2.98 J1	0.0108	0.022 J1	< 0.29 U1	2.71 J1	< 0.86 U1
10/5/2017	Assessment	< 0.93 U1	2.56 J1	102	0.03 J1	0.1 J1	2.63	4.74 J1	1.46	< 0.083 U1	< 0.68 U1	0.00562	< 0.005 U1	< 0.29 U1	1.54 J1	1.37 J1
8/15/2018	Assessment	0.03 J1	3.26	85.2	0.116	0.01 J1	0.481	3.71	1.076	--	0.438	0.00338	--	0.05 J1	0.9	0.090
2/21/2019	Assessment	< 0.02 U1	2.21	76.6	0.208	0.01 J1	0.225	2.9	0.841	0.09	0.104	0.00294	< 0.005 U1	< 0.4 U1	0.4	< 0.1 U1
5/29/2019	Assessment	0.05 J1	2.95	203	1.50	0.08	9.31	5.49	3.55	0.06 J1	9.85	0.01 J1	0.081	< 0.4 U1	5.1	0.1 J1
7/23/2019	Assessment	0.03 J1	2.10	113	0.573	0.04 J1	2.26	5.41	2.245	0.086 J1	2.87	0.00414	0.025	< 0.4 U1	1.6	< 0.1 U1
2/17/2020	Assessment	0.09 J1	9.12	115	0.39	0.02 J1	6.01	4.08	2.546	0.11	4.8	0.00509	0.013	3.32	1.7	0.1 J1
5/19/2020	Assessment	0.02 J1	3.94	80.3	0.09 J1	0.01 J1	0.2 J1	3.28	1.115	0.07	0.09 J1	0.00383	< 0.002 U1	< 0.4 U1	0.7	< 0.1 U1
10/12/2020	Assessment	0.03 J1	4.90	83.4	0.146	0.01 J1	0.425	3.93	1.604	0.10	0.417	0.00393	0.003 J1	< 0.4 U1	0.7	< 0.1 U1
2/23/2021	Assessment	< 0.02 U1	1.39	72.4	0.190	0.02 J1	0.1 J1	2.61	1.021	0.08	0.08 J1	0.00167	< 0.002 U1	< 0.4 U1	0.2	< 0.1 U1
6/1/2021	Assessment	< 0.02 U1	3.04	76.9	0.138	0.015 J1	0.31	2.73	1.45	0.10	< 0.05 U1	0.00330	< 0.002 U1	< 0.1 U1	0.43 J1	0.05 J1
10/19/2021	Assessment	< 0.02 U1	3.72	73.1	0.143	0.009 J1	0.31	2.84	2.02	0.09	0.07 J1	0.00435	< 0.002 U1	< 0.1 U1	0.55	0.06 J1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: AD-17

Geosyntec Consultants, Inc.

Welsh - PBAP

Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/26/2016	Background	0.121	200	43	0.4023 J1	7.2	1,166	1,810
7/27/2016	Background	0.119	195	32	0.4135 J1	5.7	1,005	1,576
9/30/2016	Background	0.111	191	36	0.3055 J1	6.2	1,055	1,663
10/20/2016	Background	0.124	194	32	0.583 J1	6.1	1,163	1,612
12/13/2016	Background	0.135	196	31	0.5399 J1	6.0	1,096	1,560
1/17/2017	Background	0.101	196	33	< 0.083 U1	5.9	1,445	1,686
2/22/2017	Background	0.135	189	30	< 0.083 U1	5.7	1,055	1,628
6/6/2017	Background	0.121	188	30	< 0.083 U1	5.8	1,105	1,578
10/5/2017	Detection	0.183	183	31	< 0.083 U1	5.9	1,090	1,548
5/24/2018	Assessment	0.239	193	39	< 0.083 U1	6.3	1,067	1,836
8/15/2018	Assessment	0.118	187	40	< 0.083 U1	5.6	1,168	1,748
2/21/2019	Assessment	0.151	207	43.2	0.18	6.9	1,060	1,722
5/30/2019	Assessment	0.158	202	41.7	< 0.04 U1	6.1	1,120	1,546
7/24/2019	Assessment	0.113	216	37	0.085 J1	6.0	1,127	1,864
2/17/2020	Assessment	0.104	184	36.0	0.16	5.9	1,070	1,750
5/20/2020	Assessment	0.115	250	47.7	0.15	5.7	1,190	1,890
10/14/2020	Assessment	0.100	185	35.7	0.17	5.4	1,060	1,720
2/23/2021	Assessment	0.098	168	--	0.17	5.6	--	--
6/2/2021	Assessment	0.124	233	44.9	0.31	5.7	1,210	1,890
10/20/2021	Assessment	0.104	164	37.3	0.16	5.1	1,040	1,710

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-17
Welsh - PBAP
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/26/2016	Background	< 0.93 U1	1.37501 J1	21	0.173275 J1	2	1	63	1.525	0.4023 J1	< 0.68 U1	0.37	0.032	< 0.29 U1	< 0.99 U1	< 0.86 U1
7/27/2016	Background	1.13716 J1	< 1.05 U1	20	0.307264 J1	4	1	68	2.78	0.4135 J1	< 0.68 U1	0.374	0.02133 J1	1.04115 J1	4.56733 J1	< 0.86 U1
9/30/2016	Background	< 0.93 U1	< 1.05 U1	31	0.175474 J1	0.848199 J1	3	58	2.358	0.3055 J1	< 0.68 U1	0.354	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/20/2016	Background	< 0.93 U1	< 1.05 U1	34	0.200656 J1	2	4	65	2.224	0.583 J1	< 0.68 U1	0.394	< 0.005 U1	0.322249 J1	3.34422 J1	< 0.86 U1
12/13/2016	Background	< 0.93 U1	< 1.05 U1	17	0.0498325 J1	3	0.816224 J1	68	2.384	0.5399 J1	< 0.68 U1	0.323	0.01485 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/17/2017	Background	< 0.93 U1	< 1.05 U1	14	0.0319852 J1	3	68	68	2.436	< 0.083 U1	< 0.68 U1	0.341	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/22/2017	Background	< 0.93 U1	< 1.05 U1	20	0.0665729 J1	2	1	73	2.288	< 0.083 U1	< 0.68 U1	0.331	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	< 0.93 U1	< 1.05 U1	10.33	< 0.02 U1	6.06	< 0.23 U1	74.8	1.598	< 0.083 U1	< 0.68 U1	0.329	0.013 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
5/24/2018	Assessment	< 0.93 U1	< 1.05 U1	9.65	< 0.02 U1	6.46	< 0.23 U1	71.73	1.939	< 0.083 U1	< 0.68 U1	0.308	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/15/2018	Assessment	0.02 J1	1.83	12.8	0.069	0.25	0.604	43.5	2.35	< 0.083 U1	1.10	0.243	0.011 J1	0.35	0.3	0.074
2/21/2019	Assessment	0.08 J1	2.51	120	0.24	0.27	3.34	64.5	2.657	0.18	2.49	0.268	0.007 J1	0.7 J1	0.8	< 0.1 U1
5/30/2019	Assessment	< 0.02 U1	0.41	19.6	0.02 J1	0.03 J1	0.246	51.1	2.508	< 0.04 U1	0.03 J1	0.341	< 0.005 U1	< 0.4 U1	0.06 J1	< 0.1 U1
7/24/2019	Assessment	< 0.02 U1	1.07	14.3	0.130	0.03 J1	0.228	57.7	3.45	0.085 J1	0.263	0.283	< 0.005 U1	< 0.4 U1	0.1 J1	< 0.1 U1
2/17/2020	Assessment	< 0.02 U1	0.72	9.6	0.04 J1	< 0.01 U1	0.08 J1	42.3	3.46	0.16	< 0.05 U1	0.273	< 0.004 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
5/20/2020	Assessment	< 0.02 U1	0.86	11.4	0.07 J1	0.02 J1	0.231	70.0	2.76	0.15	0.08 J1	0.302	< 0.002 U1	< 0.4 U1	0.09 J1	< 0.1 U1
10/14/2020	Assessment	< 0.02 U1	0.84	10.9	0.04 J1	0.01 J1	0.327	45.4	2.169	0.17	0.2 J1	0.274	< 0.002 U1	< 0.4 U1	0.06 J1	< 0.1 U1
2/23/2021	Assessment	< 0.02 U1	0.61	10.6	0.03 J1	0.03 J1	0.1 J1	41.1	1.433	0.17	0.08 J1	0.249	< 0.002 U1	< 0.4 U1	0.04 J1	< 0.1 U1
6/2/2021	Assessment	< 0.02 U1	0.84	10.9	0.066	0.026	0.38	72.9	2.4	0.31	0.09 J1	0.311	< 0.002 U1	0.2 J1	< 0.09 U1	< 0.04 U1
10/20/2021	Assessment	< 0.02 U1	0.57	10.2	0.035 J1	0.019 J1	0.38	42.9	1.73	0.16	0.07 J1	0.250	< 0.002 U1	< 0.1 U1	< 0.09 U1	0.05 J1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

APPENDIX 2

Where applicable, shown in this appendix are the results from statistical analyses, and a description of the statistical analysis method chosen.

STATISTICAL ANALYSIS SUMMARY PRIMARY BOTTOM ASH POND

**J. Robert Welsh Plant
Pittsburg, Texas**

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec 
consultants

engineers | scientists | innovators

941 Chatham Lane
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February 11, 2021

CHA8500

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LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
PBAP	Primary Bottom Ash Pond
QA	Quality Assurance
QC	Quality Control
RSL	Regional Screening Level
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at the Primary Bottom Ash Pond (PBAP), an existing CCR unit at the Welsh Power Plant located in Pittsburg, Texas.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron at the PBAP. An alternative source was not identified at the time, so the PBAP has been in assessment monitoring since. Groundwater protection standards (GWPS) were set in accordance with 40 CFR 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted. During the most recent assessment monitoring events, completed in February and May 2020, an SSL was identified for lithium at well AD-9 (Geosyntec, 2020a). One assessment monitoring event was conducted at the PBAP in October 2020 in accordance with 40 CFR 257.95. The results of the October 2020 assessment event are documented in this report.

Groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact data usability.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. An SSL was identified for lithium. Thus, either the unit will move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A. The statistical analysis and certification of the selected methods were completed within 90 days of obtaining the data.

SECTION 2

PRIMARY BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(d)(1) (October 2020). Samples from both sampling events were analyzed for the Appendix III and Appendix IV parameters. A summary of data collected during these assessment monitoring events may be found in Table 1.

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program (NELAP). Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks (LRBs), continuing calibration verification (CCV) samples, and laboratory fortified blanks (LFBs).

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.27b statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for the PBAP were conducted in accordance with the October 2020 *Statistical Analysis Plan* (Geosyntec, 2020b), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in October 2020 were screened for potential outliers. No outliers were identified for this event.

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec, 2020b). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or risk-based level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for barium, beryllium, and combined radium. Non-parametric tolerance limits were

calculated for antimony, arsenic, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, and selenium due to apparent non-normal distributions and for thallium due to a high non-detect frequency. The calculated tolerance limits and the final GWPSs are summarized in Table 2.

2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B.

The following SSL was identified at the Welsh PBAP:

- The LCL for lithium exceeded the GWPS of 0.394 mg/L at AD-9 (0.758 mg/L).

As a result, the Welsh PBAP will either move to an assessment of corrective measures or an alternative source demonstration will be conducted to evaluate if the unit can remain in assessment monitoring.

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPL) were previously updated for Appendix III parameters after sufficient data was collected following the background monitoring period (Geosyntec, 2019). Intrawell tests were used to evaluate potential SSIs for calcium, chloride, fluoride, sulfate, and total dissolved solids (TDS), whereas interwell tests were used to evaluate potential SSIs for boron and pH. Prediction limits were updated using data through May 2020 for intrawell prediction limits and October 2020 for interwell prediction limits.

Mann-Whitney (Wilcoxon rank-sum) tests were performed to determine whether the newer data are affected by a release from the PBAP. Because the interwell Appendix III limits and the Appendix IV GWPSs are based on data from upgradient wells which we would not expect to have been impacted by a release, these tests were used for intrawell Appendix III tests only. Mann-Whitney tests were used to compare the medians of historical data (May 2016 – February 2019) to the new compliance samples (February 2019 – May 2020) for calcium, chloride, fluoride, sulfate, and TDS. Results were evaluated to determine if the medians of the two groups were similar at the 99% confidence level. Where no significant difference was found, the new compliance data were added to the background dataset. Where a statistically significant difference was found between the medians of the two groups, the data were reviewed to evaluate the cause of the difference and to determine if adding newer data to the background dataset, replacing the background dataset with the newer data, or continuing to use the existing background dataset was most appropriate. If the differences appeared to have been caused by a release, then the previous background dataset would have continued to be used.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B. Significant differences were found between the two groups for chloride in upgradient well AD-5 and downgradient well AD-8, and for fluoride in upgradient wells AD-1, AD-17 and AD-5, and in downgradient well AD-15. However, because AD-5 is an upgradient monitoring well and more recent data are similar to background and better represent the groundwater quality upgradient of the facility, the background dataset was updated to include the compliance data for chloride at AD-5. Additionally, the prediction limits were also updated to include data through May 2020 for fluoride in wells AD-1, AD-15, and AD-5 because there are many non-detects in the background set. For chloride in well AD-8 and fluoride in well AD-17, the test showed significant differences. In order to better characterize the background concentration, the prediction limits for chloride in well AD-8 and for fluoride in well AD-17 were calculated with data from January 2017 through May 2020 only.

After the revised background set was established, a parametric or non-parametric analysis was selected based on the distribution of the data and the frequency of non-detect data. Estimated results less than the practical quantitation limit (PQL) – i.e., “J-flagged” data – were considered detections and the estimated results were used in the statistical analyses. Non-parametric analyses were selected for datasets with at least 50% non-detect data or datasets that could not be normalized. Parametric analyses were selected for datasets (either transformed or untransformed) that passed the Shapiro-Wilk / Shapiro-Francia test for normality. The Kaplan-Meier non-detect adjustment was applied to datasets with between 15% and 50% non-detect data. For datasets with fewer than 15% non-detect data, non-detect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or non-parametric) and transformation (where applicable) for each background dataset are shown in Attachment B.

Intrawell UPLs were updated using all the historical data through May 2020 to represent background values, except for chloride at well AD-8 and fluoride at well AD-17. Interwell UPLs and the LPL for pH were updated using all data through October 2020. The updated prediction limits are summarized in Table 3. Intrawell tests continued to be used to evaluate potential SSIs for calcium, chloride, fluoride, sulfate, and TDS, whereas interwell tests continued to be used to evaluate potential SSIs for boron and pH. The intrawell UPLs were calculated for a one-of-two retesting procedure; i.e., if at least one sample in a series of two does not exceed the UPL, then it can be concluded that an SSI has not occurred. The retesting procedures allows achieving an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

2.2.4 Evaluation of Potential Appendix III SSIs

While SSLs were identified, a review of the Appendix III results were also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

Data collected during the October 2020 assessment monitoring event from each compliance well were compared to the prediction limits to evaluate results above background values. The results

from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.700 mg/L at AD-8 (1.10 mg/L).
- Fluoride concentrations exceeded the intrawell UPL of 0.737 mg/L at AD-8 (0.88 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the initial (October 2020) sample was above the UPL or below the LPL. Based on these results, the boron and fluoride concentrations at AD-8 appear to be above background concentrations and the unit will remain assessment monitoring.

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the October 2020 data. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. An SSL was identified for lithium. Appendix III parameters were compared to recalculated prediction limits, with exceedances identified for boron and fluoride.

Based on this evaluation, the Welsh PBAP CCR unit will either move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring.

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2019. Statistical Analysis Summary – Primary Bottom Ash Pond, J. Robert Welsh Plant. December 16, 2019.

Geosyntec. 2020a. Statistical Analysis Summary – Primary Bottom Ash Pond, J. Robert Welsh Plant. September 1, 2020.

Geosyntec. 2020b. Statistical Analysis Plan. October 2020.

TABLES

**Table 1 - Groundwater Data Summary
Welsh Plant - Primary Bottom Ash Pond**

Parameter	Unit	AD-1	AD-5	AD-8	AD-9	AD-15	AD-17
		10/14/2020	10/14/2020	10/12/2020	10/12/2020	10/12/2020	10/14/2020
Antimony	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.03 J	0.1 U
Arsenic	µg/L	0.3 J	6.28	0.30	0.72	4.90	0.84
Barium	µg/L	84.7	71.7	25.9	55.3	83.4	10.9
Beryllium	µg/L	0.984	0.09 J	0.1 U	1.27	0.146	0.04 J
Boron	mg/L	0.670	0.04 J	1.10	0.100	0.334	0.100
Cadmium	µg/L	0.2 U	0.05 U	0.04 J	0.22	0.01 J	0.01 J
Calcium	mg/L	3.88	36.6	17.2	11.8	2.99	185
Chloride	mg/L	2.16	18.8		18.8	30.4	35.7
Chromium	µg/L	0.9 J	0.09 J	0.06 J	0.471	0.425	0.327
Cobalt	µg/L	2.12	14.9	5.71	18.6	3.93	45.4
Combined Radium	pCi/L	1.552	2.7	0.267	2.838	1.604	2.169
Fluoride	mg/L	0.25	0.18	0.88	0.19	0.10	0.17
Lead	µg/L	0.3 J	0.05 J	0.06 J	0.349	0.417	0.2 J
Lithium	mg/L	0.00932	0.134	0.0615	0.194	0.00393	0.274
Mercury	µg/L	0.003 J	0.005 U	0.005 U	0.003 J	0.003 J	0.005 U
Molybdenum	µg/L	10 U	2 U	2 U	2 U	2 U	2 U
Selenium	µg/L	5.3	0.1 J	0.08 J	0.3	0.7	0.06 J
Sulfate	mg/L	66.9	148	138	100	17.1	1,060
Thallium	µg/L	2 U	0.5 U	0.1 J	0.2 J	0.5 U	0.5 U
Total Dissolved Solids	mg/L	183	338	298	296	170	1,720
pH	SU	4.5	6.5	6.8	4.8	5.1	5.4

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

SU: standard unit

pCi/L: picocuries per liter

U: Parameter was not present in concentrations above method detection limit and is reported as the reporting limit

J: Estimated value. Parameter was detected in concentrations below the reporting limit

**Table 2: Groundwater Protection Standards
Welsh Plant - Primary Bottom Ash Pond**

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006		0.003	0.006
Arsenic, Total (mg/L)	0.01		0.006	0.01
Barium, Total (mg/L)	2		5	5
Beryllium, Total (mg/L)	0.004		0.00077	0.004
Cadmium, Total (mg/L)	0.005		0.0065	0.007
Chromium, Total (mg/L)	0.1		0.004	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.075	0.075
Combined Radium, Total (pCi/L)	5		4.00	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	n/a	0.015	0.003	0.015
Lithium, Total (mg/L)	n/a	0.04	0.394	0.394
Mercury, Total (mg/L)	0.002		0.000033	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.002	0.1
Selenium, Total (mg/L)	0.05		0.005	0.1
Thallium, Total (mg/L)	0.002		0.001	0.002

Notes:

MCL = Maximum Contaminant Level

CCR = Coal Combustion Residual

Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Grey cells indicate the GWPS is based on the calculated UTL, which is higher than the MCL or CCR Rule-specified value.

**Table 3 - Appendix III Data Summary
Welsh - Primary Bottom Ash Pond**

Analyte	Unit	Description	AD-15	AD-8	AD-9
			10/12/2020	10/12/2020	10/12/2020
Boron	mg/L	Interwell Background Value (UPL)	0.700		
		Analytical Result	0.334	1.10	0.100
Calcium	mg/L	Intrawell Background Value (UPL)	5.40	32.4	299
		Analytical Result	2.99	17.2	11.8
Chloride	mg/L	Intrawell Background Value (UPL)	38.8	35.5	138
		Analytical Result	30.4	13.6	18.8
Fluoride	mg/L	Intrawell Background Value (UPL)	1.00	0.737	1.00
		Analytical Result	0.10	0.88	0.19
pH	SU	Interwell Background Value (UPL)	7.0		
		Interwell Background Value (LPL)	4.8		
		Analytical Result	5.1	6.8	4.8
Sulfate	mg/L	Intrawell Background Value (UPL)	33.2	230	2,530
		Analytical Result	17.1	138	100
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	249	553	3,070
		Analytical Result	170	298	296

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Welsh Primary Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

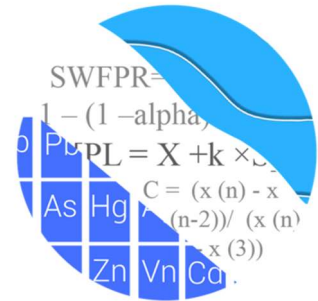
Licensing State

02.11.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



January 4, 2020

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
941 Chatham Lane, #103
Columbus, OH 43221

Re: Welsh PBAP - Assessment Monitoring Event & Background Update 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis and background update of the groundwater data for American Electric Power Inc.'s Welsh PBAP. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at the site for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** AD-1, AD-5, AD-17
- **Downgradient wells:** AD-8, AD-9, AD-15

Data were sent electronically, and the statistical analysis was reviewed by Dr. Jim Loftis, Civil & Environmental Engineering professor emeritus at Colorado State University and Senior Advisor to Groundwater Stats Consulting. The analysis was conducted according to the Statistical Analysis Plan prepared by GSC and approved by Dr. Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC.

The CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS

- **Appendix IV** (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

Time series plots for Appendix III and IV parameters are provided for all wells and constituents and are used to evaluate concentrations over the entire record (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells. Values flagged as outliers may be seen in the Outlier Summary table following this letter (Figure C) and are plotted in a lighter font and disconnected symbol on the time series graphs. Note that the measured concentrations of most metals for September 30, 2016 at well AD-15 are very high compared to the rest of the observations, which suggests a possible laboratory problem. These values were flagged as outliers as they do not appear to represent the population at this well.

Summary of Statistical Methods:

- 1) Intrawell prediction limits, combined with a 1-of-2 resample plan for calcium, chloride, fluoride, sulfate, and TDS
- 2) Interwell prediction limits combined with a 1-of-2 resample plan for boron and pH

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. Parametric limits are based on a significance level of 0.05 for each semi-annual event. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. The significance level of a nonparametric tests depends on the background sample size. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits as appropriate. Nondetects are handled as follows:

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean

and standard deviation of the historical concentrations to account for concentrations below the reporting limit.

- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

Summary of Background Screening Conducted in December 2017

Outlier Evaluation

Time series plots are used to identify suspected outliers, or extreme values that would result in limits that are not conservative from a regulatory perspective, in proposed background data. Suspected outliers at all wells for Appendix III and Appendix IV parameters were formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits.

Tukey's outlier test noted a few outliers that were flagged as outliers and a summary of those values was submitted with the screening. The outliers identified by Tukey's test for TDS in well AD-15, however, were not flagged as these values were not unusual to the data set at the time and were similar to observations reported in neighboring wells. Flagged values may be seen in a lighter font on the time series graphs.

No seasonal patterns were observed on the time series plots; therefore, no deseasonalizing adjustments were made. When seasonal patterns are observed, data may be deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release. It was noted that for each constituent evaluated, the highest concentrations are reported in the upgradient wells.

The Sen's Slope/Mann Kendall trend test was used to evaluate all data at each well to identify statistically significant increasing or decreasing trends. Statistically significant (decreasing) trends were relatively low in magnitude when compared to average concentrations; therefore, no adjustments were required.

Appendix III – Determination of Spatial Variation

The Analysis of Variance (ANOVA) was used to statistically evaluate differences in average concentrations among upgradient wells, which assists in identifying the most appropriate statistical approach. Interwell tests, which compare downgradient well data to statistical limits constructed from pooled upgradient well data, are appropriate when average concentrations are similar across upgradient wells. Intrawell tests, which compare

compliance data from a single well to screened historical data within the same well, are appropriate when upgradient wells exhibit spatial variation; when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; and when downgradient water quality is unimpacted compared to upgradient water quality for the same parameter.

All Appendix III parameters except pH exhibited significant spatial variation when evaluated using the ANOVA. Therefore, these parameters were further evaluated as described for the appropriateness of intrawell testing to accommodate the groundwater quality. A summary table of the ANOVA results was included with the 2017 screening reports.

Appendix III - Statistical Limits

Intrawell limits constructed from carefully screened background data from within each well serve to provide statistical limits that are conservative (i.e. lower) from a regulatory perspective, and that will rapidly identify a change in more recent compliance data from within a given well. This statistical method removes the element of variation from across wells and eliminates the chance of mistaking natural spatial variation for a release from the facility. Prior to performing intrawell prediction limits, several steps are required to reasonably demonstrate that downgradient water quality does not have existing impacts from the practices of the facility.

Exploratory data analysis was used as a general comparison of concentrations in downgradient wells for all Appendix III parameters recommended for intrawell analyses to concentrations reported in upgradient wells. Upper tolerance limits are used in conjunction with confidence intervals to determine whether the estimated averages in downgradient wells are higher than observed levels upgradient of the facility. The upper tolerance limits were constructed to represent the upper range of background levels at the site.

In cases where downgradient average concentrations are higher than observed upgradient concentrations for a given constituent, an independent study and hydrogeological investigation would be required to identify local geochemical conditions and expected groundwater quality for the region to justify an intrawell approach. Such an assessment is beyond the scope of services provided by Groundwater Stats Consulting. When there is not an obvious explanation for observed differences in concentration between the downgradient wells and the upgradient wells, interwell prediction limits will initially be selected for the statistical method until further evidence shows that concentrations are due to natural variation rather than a result of the facility.

Parametric upper tolerance limits were constructed with a target of 99% confidence and 95% coverage using pooled upgradient well data for each of the Appendix III parameters. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. As more data are collected, the background population is better represented and the confidence and coverage levels increase.

Confidence intervals were constructed on downgradient wells for each of the Appendix III parameters and compared to the upper tolerance limits discussed above to determine intrawell eligibility. When the entire confidence interval is above the upgradient upper tolerance limit for a given parameter, interwell methods are initially recommended. Therefore, only parameters with confidence intervals which did not exceed background limits are eligible for intrawell methods.

Confidence intervals for the above parameters were found to be within their respective background limit for all Appendix III parameters with the exception of boron. Therefore, intrawell methods were recommended for calcium, chloride, fluoride, sulfate, and TDS; and interwell methods were recommended for boron as well as pH which the ANOVA identified as having no variation among upgradient wells.

All available data through June 2017 at each well were used to establish intrawell background limits for the parameters identified above based on a 1-of-2 resample plan to be used for future comparisons. Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed from upgradient wells for boron and pH.

In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of an additional sample to determine whether the initial exceedance is confirmed. When the resample confirms the initial exceedance, a statistically significant increase (SSI) is identified and further research would be required to identify the cause of the exceedance (i.e. impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no further action is necessary.

December 2020 – Update of Background Data and Statistical Limits

Prediction limits were updated in November 2019 and are re-evaluated for updating in this report. Tukey's outlier test and visual screening were used to identify outliers using pooled upgradient well data through September 2020 for boron and pH which use interwell prediction limits, and at all wells for calcium, chloride, fluoride, sulfate, and TDS which use intrawell prediction limits (Figure C). Tukey's test did not identify any new

outliers except for calcium at upgradient well AD-17. This value was not flagged as an outlier as the value seems to be in line with the surrounding population. A list of all values flagged as outliers may be seen in the outlier summary (Figure C).

For constituents requiring intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through February 2019 to the new compliance samples at each well through May 2020 to evaluate whether the groups are statistically different at the 99% confidence level. When differences exist, background data are generally not updated with more recent compliance data (Figure D). Statistically significant differences were found for chloride in upgradient well AD-1 and downgradient well AD-8, as well as all fluoride in all upgradient wells and downgradient well AD-15.

Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background are not updated to include the newer data but will be reconsidered in the future. However, the background record was updated with more recent, lower-concentration, data through May 2020 for chloride in upgradient well AD-1. The records were updated also for fluoride in well AD-1, AD-15, and AD-5 as many of the reported values in the background set are non-detects. Chloride in well AD-8 and fluoride in well AD-17, however, show significant differences between the median concentrations of background and compliance sets and were truncated to include data from January 2017 through May 2020 only, as shown in the Background Date Ranges table. Note that due to the substitution of the most recent reporting limit for nondetect data, the May 2019 reporting limit of 0.2 mg/L was substituted for fluoride nondetects at well AD-17 because that was the most recent nondetect. All other wells use 1 mg/L, which was the reporting limit for fluoride through 2018. None of the wells have more recent nondetects.

All other records were updated with data through May 2020. A summary of these results follows this letter, and the significant test results are included with the Mann Whitney test section at the end of this report. All data will be reevaluated during the next background update, and earlier measurements will be deselected if they no longer represent present-day groundwater quality.

Intrawell prediction limits using all historical data (except as noted in the date range table) reported through May 2020, combined with a 1-of-2 resample plan, were constructed, and a summary of the updated limits follows this letter (Figure E).

For the interwell constituents, boron and pH, the Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells to identify statistically significant increasing or

decreasing trends. The results of the trend analyses showed a statistically significant increasing trend for boron in upgradient well AD-1 (Figure F). However, the more recent concentrations were similar to two higher values earlier in the record. Therefore, no adjustment to the background period was made at this time.

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells through October 2020 for boron and pH (Figure G). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. A summary table of the updated limits may be found following this letter in the Prediction Limit Summary Tables.

Evaluation of Appendix IV Parameters

Upper tolerance limits were used to calculate background limits from all available pooled upgradient well data for each Appendix IV parameter (Figure H). Background data are screened for outliers and extreme trending patterns that would lead to artificially elevated statistical limits. High outliers are also cautiously flagged in the downgradient wells when they are clearly much different from the rest of the data. This is generally a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals, although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean. Flagging high outliers should have no effect on the lower limit of nonparametric confidence intervals. Flagged values may be seen on the Outlier Summary following this letter.

Parametric tolerance limits use a target of 95% confidence and 95% coverage. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure I).

Confidence intervals were then constructed on downgradient wells for each of the Appendix IV parameters and compared to the corresponding GWPS, i.e. highest limit of the MCL, CCR-Rule specified level, or background as discussed above (Figure J). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No confidence intervals exceedances were found except for lithium in well AD-9. A summary of the confidence interval results follows this letter.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Welsh PBAP. If you have any questions or comments, please feel free to contact us .

For Groundwater Stats Consulting,

A handwritten signature in black ink, appearing to read 'Easton Rayner', with a stylized, flowing script.

Easton Rayner
Groundwater Analyst

A handwritten signature in black ink, appearing to read 'Kristina Rayner', with a clear, cursive script.

Kristina L. Rayner
Groundwater Statistician

Date Ranges

Date: 1/4/2021 4:58 PM

Welsh PBAP Client: Geosyntec Data: Welsh PBAP

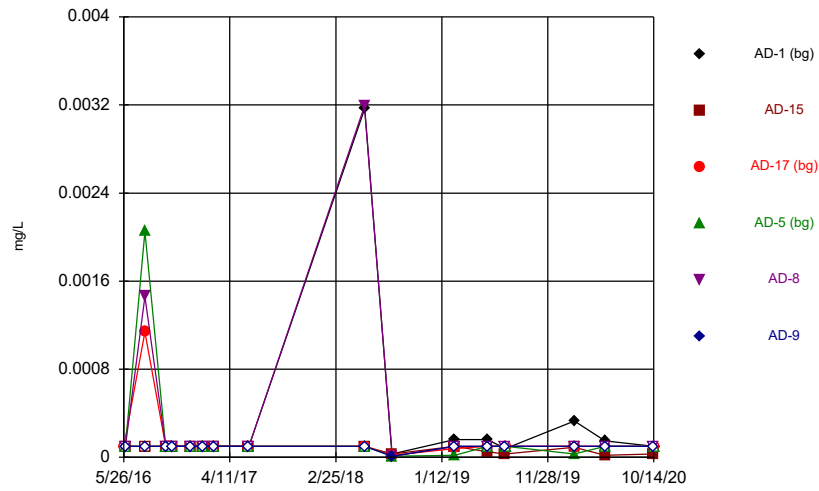
Chloride, total (mg/L)

AD-8 background:1/20/2017-5/19/2020

Fluoride, total (mg/L)

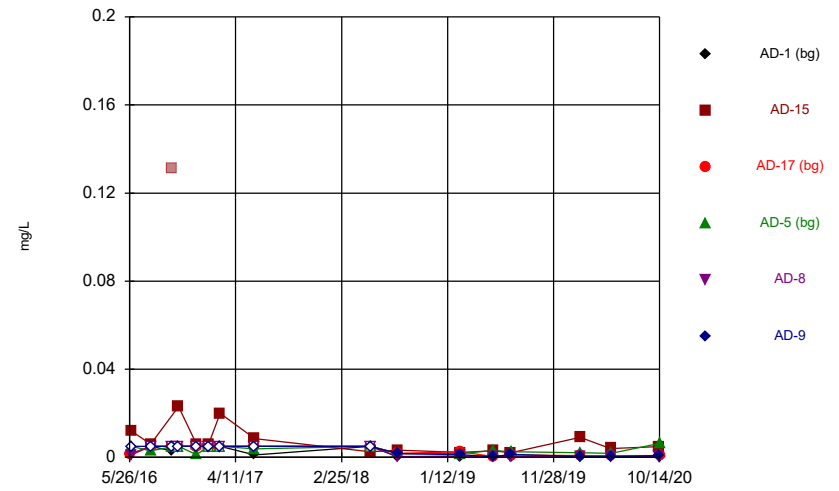
AD-17 background:1/20/2017-5/20/2020

Time Series



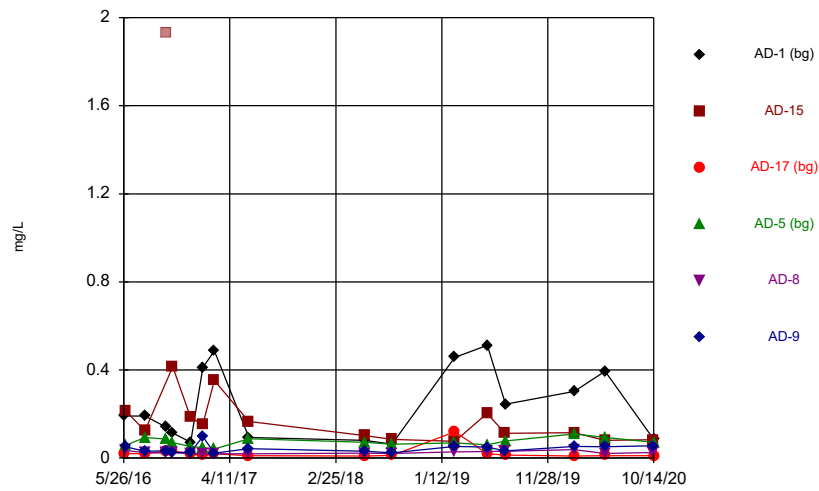
Constituent: Antimony, total Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



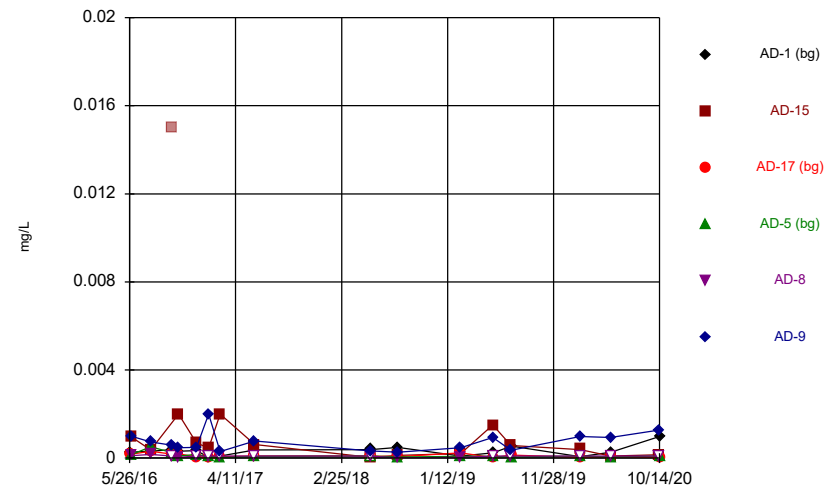
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



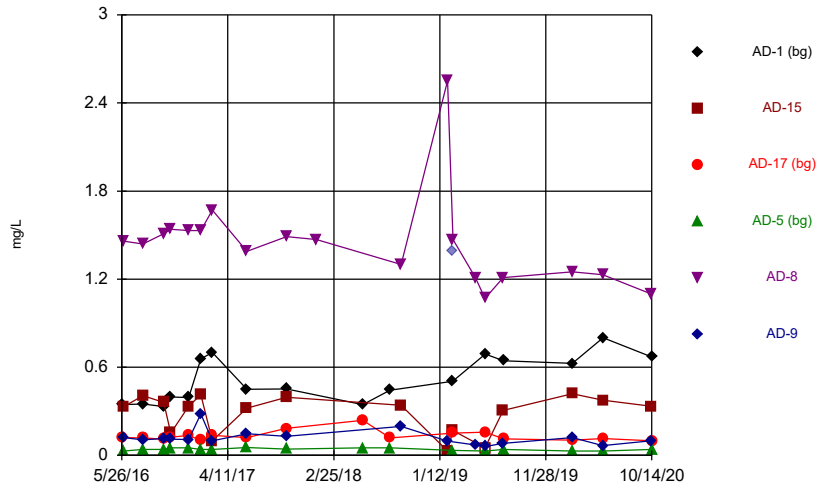
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



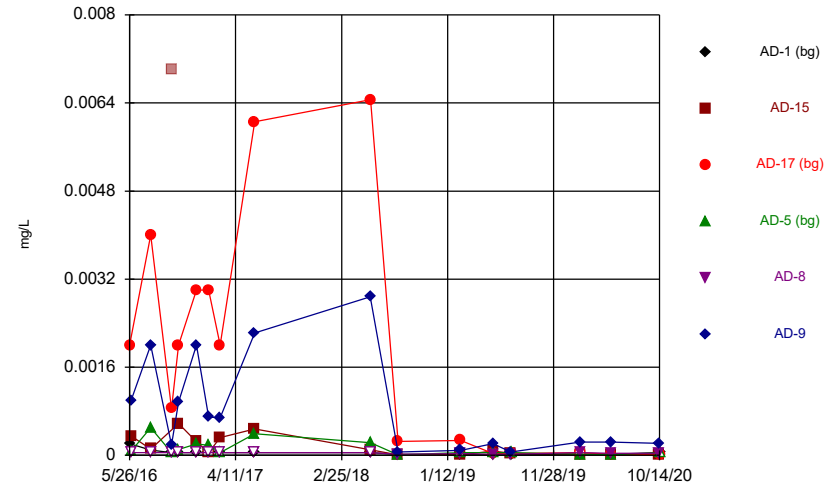
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



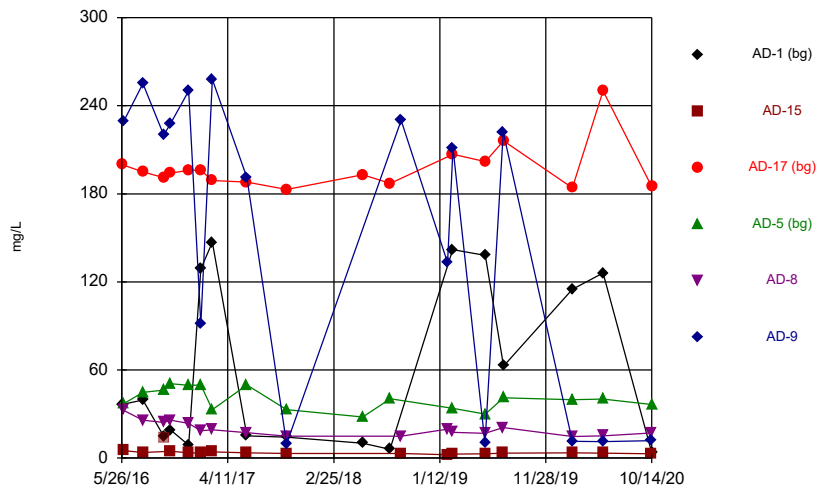
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



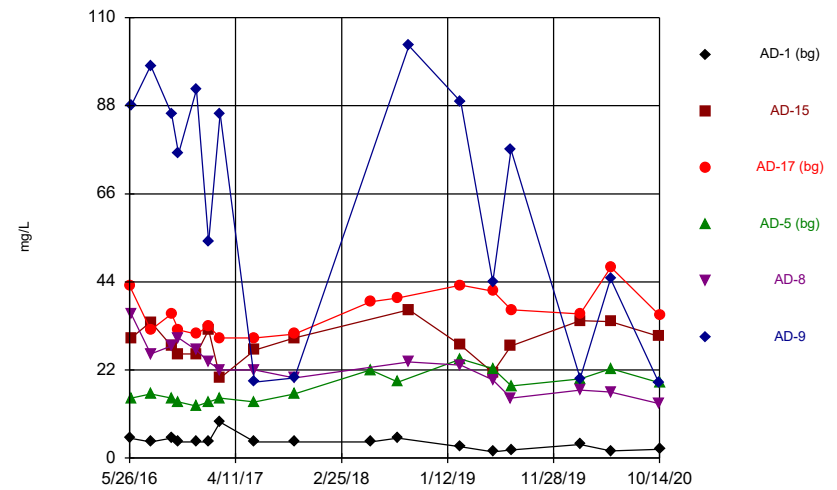
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Time Series



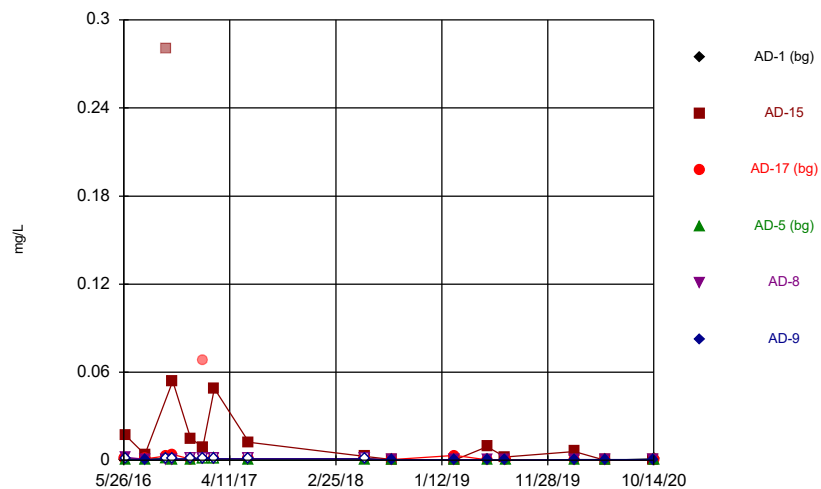
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



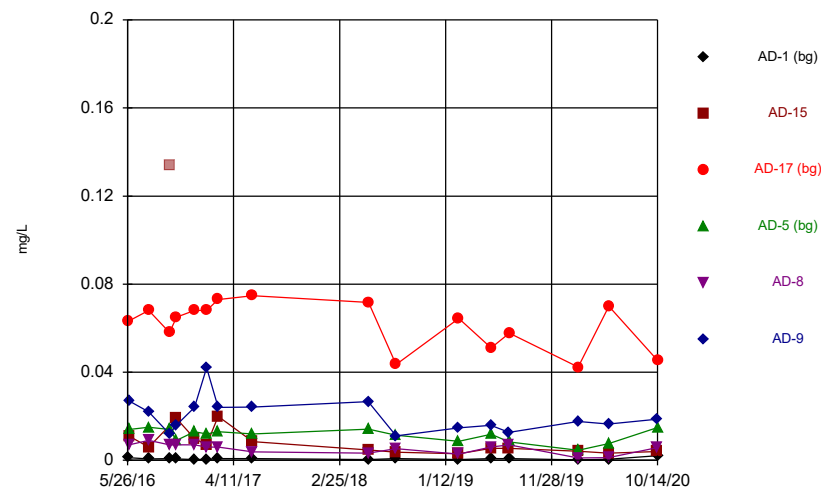
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



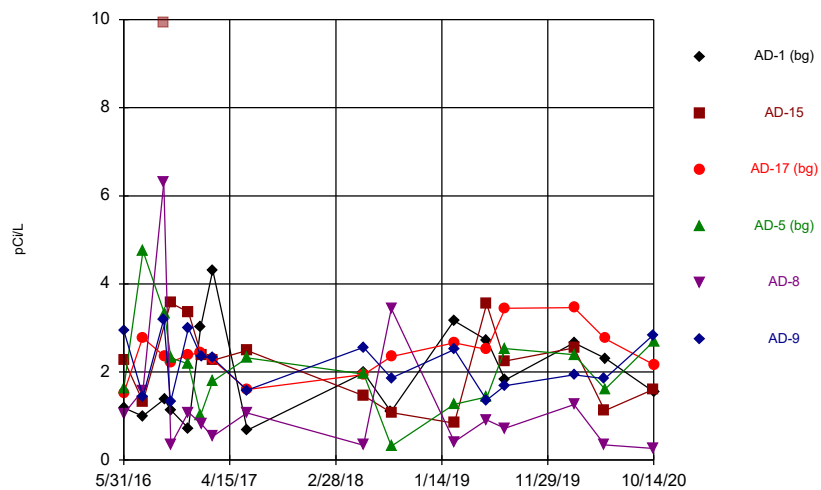
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



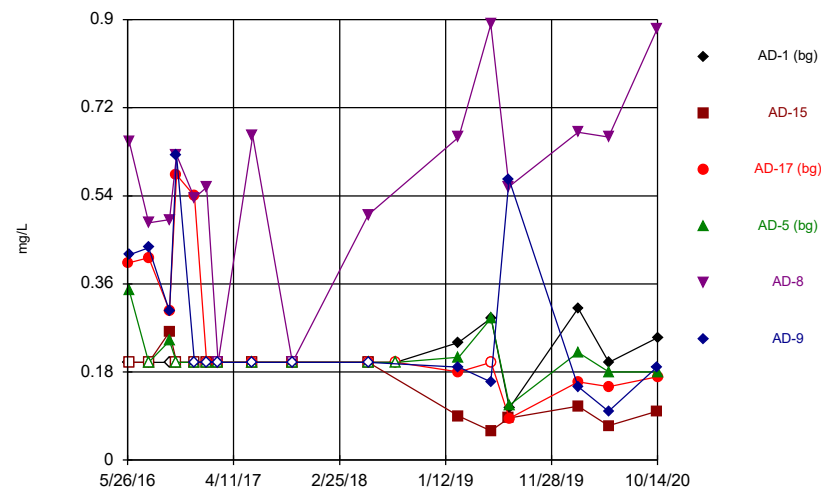
Constituent: Cobalt, total Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



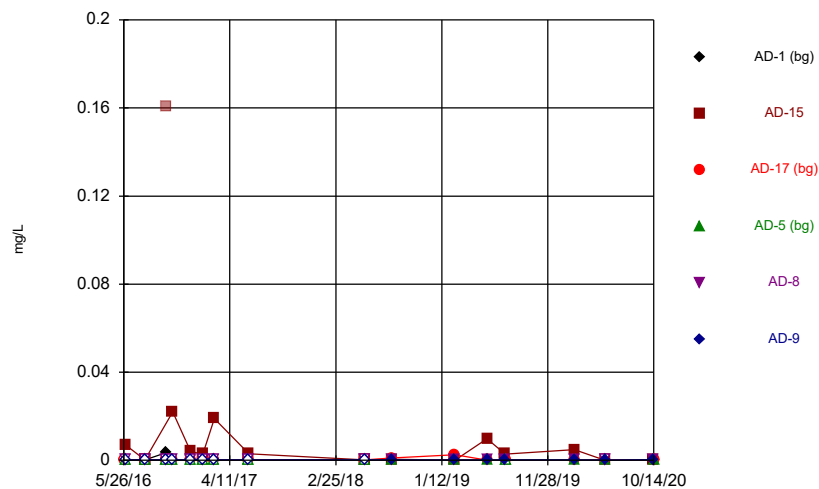
Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



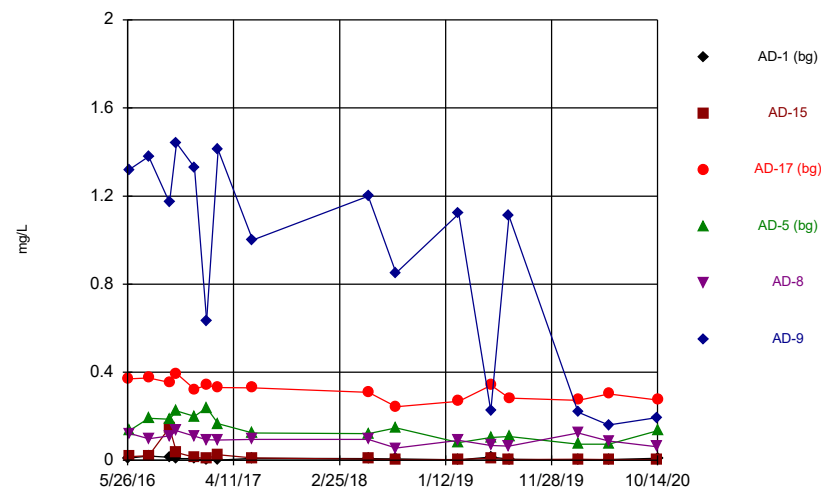
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series

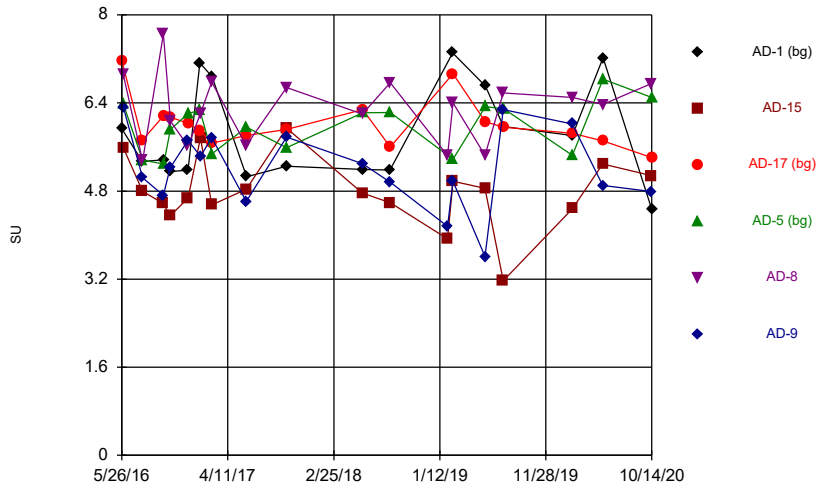


Constituent: Lead, total Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



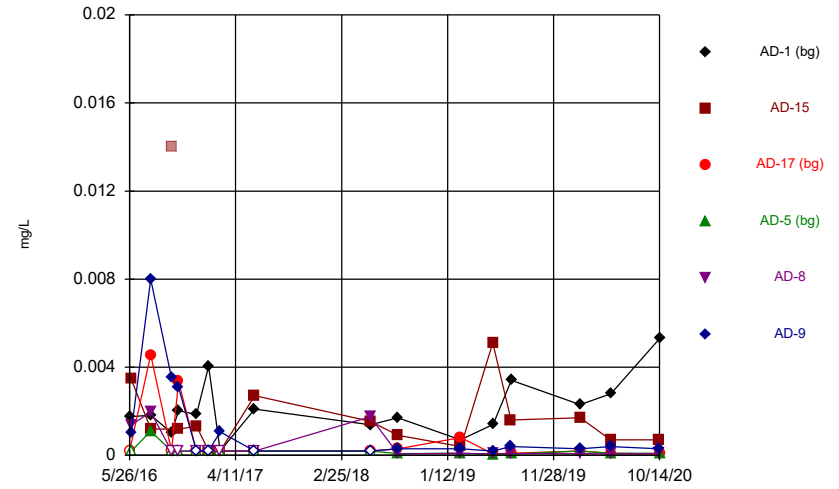
Time Series



Constituent: pH, field Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

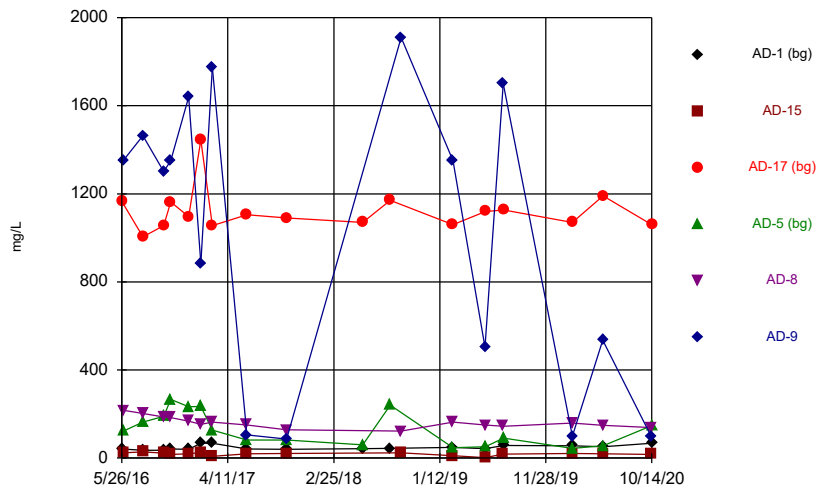
Hollow symbols indicate censored values.

Time Series



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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

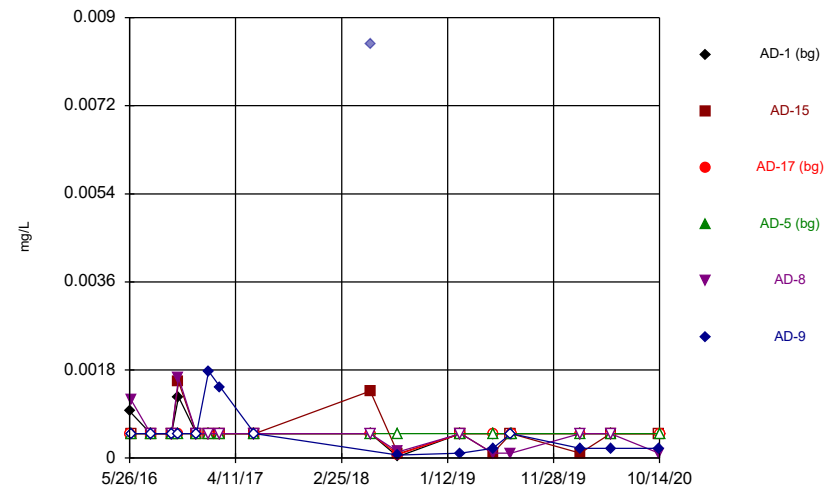
Time Series



Constituent: Sulfate, total Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

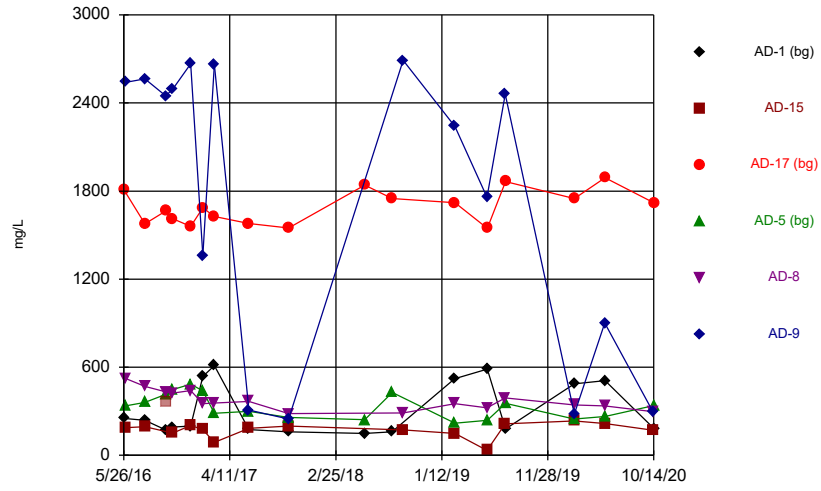
Hollow symbols indicate censored values.

Time Series



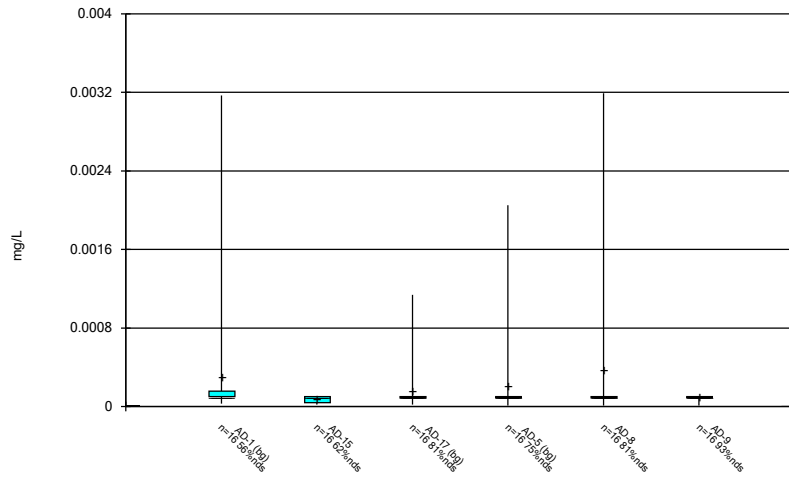
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



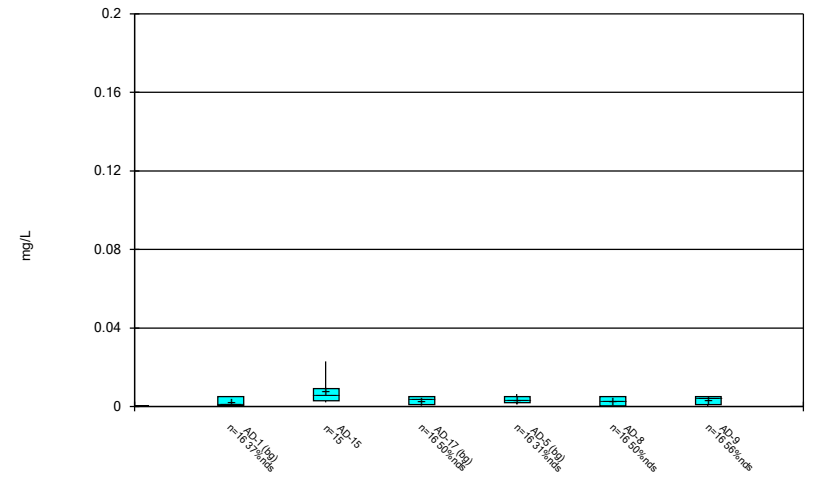
Constituent: Total Dissolved Solids Analysis Run 1/4/2021 10:01 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



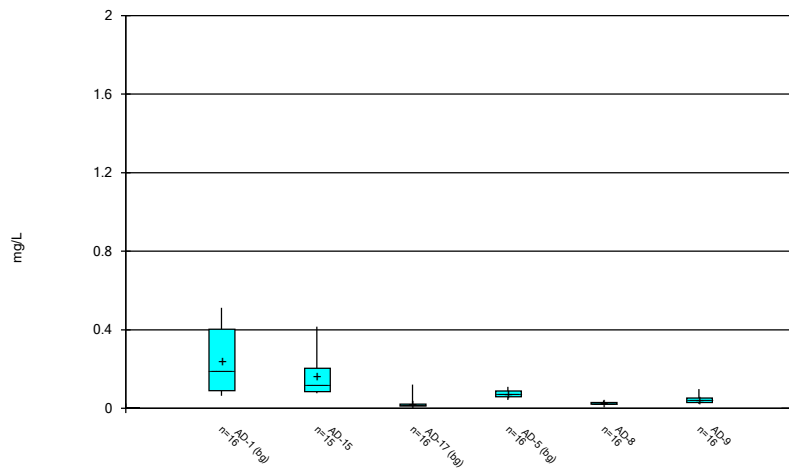
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Box & Whiskers Plot



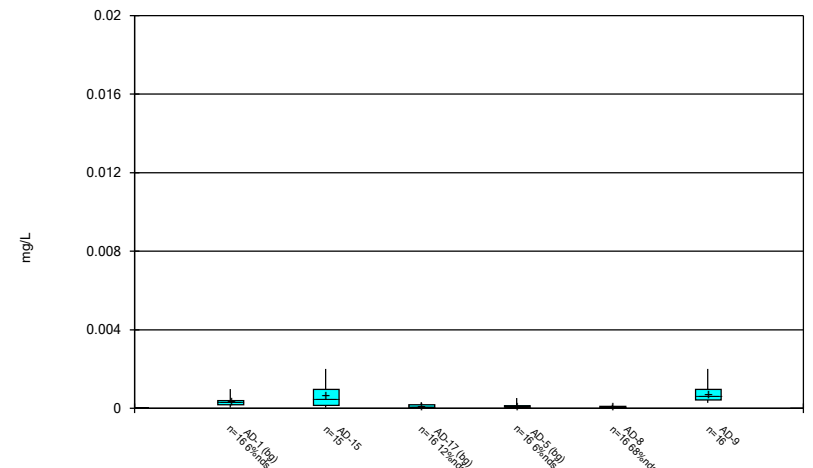
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



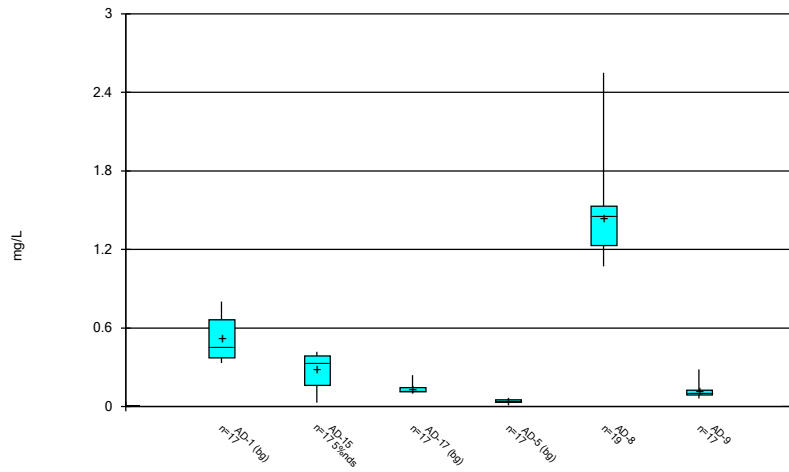
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



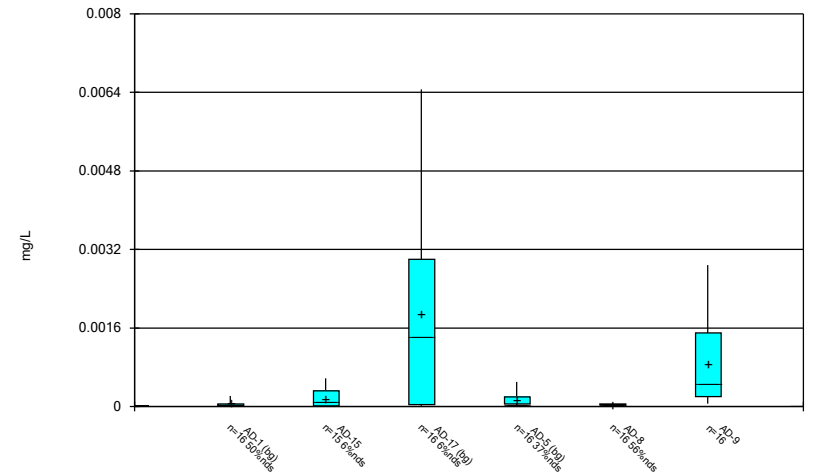
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



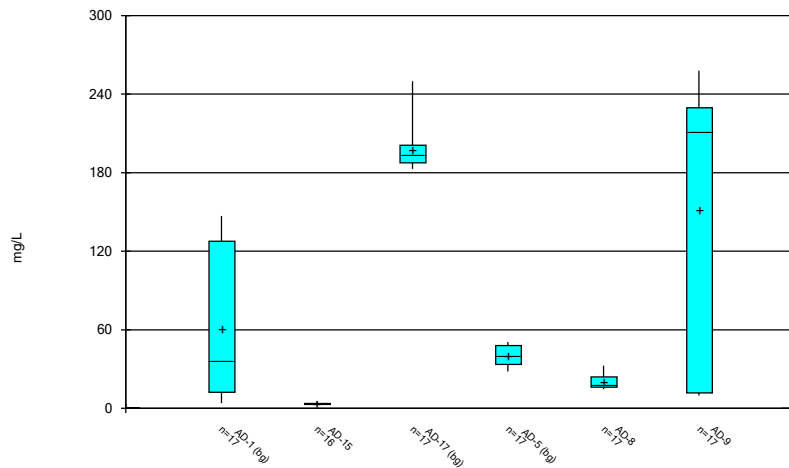
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



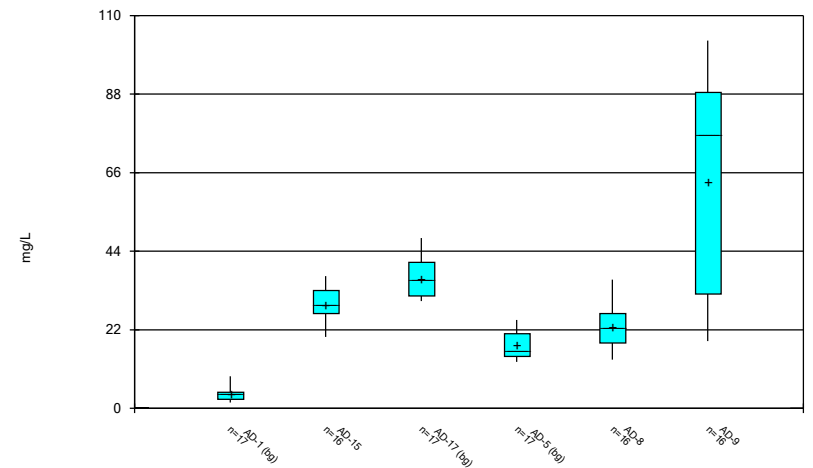
Constituent: Cadmium, total Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



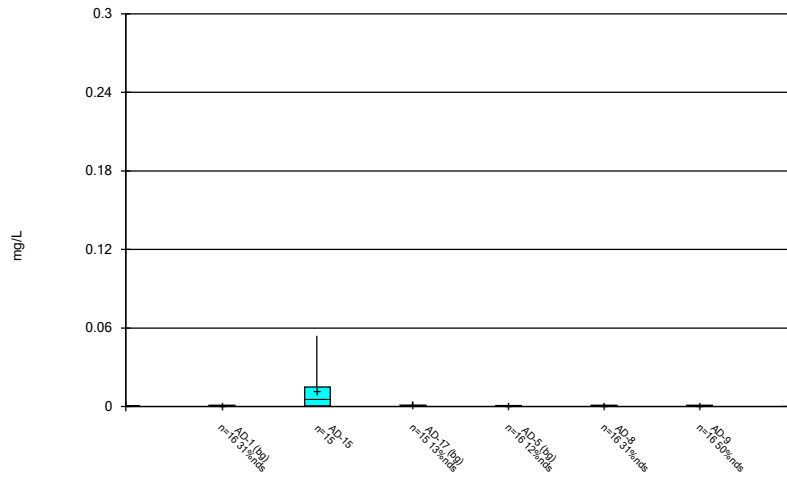
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



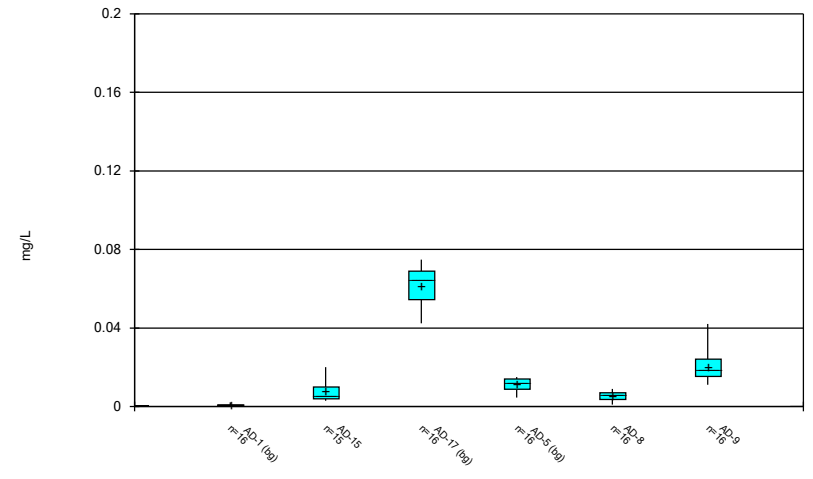
Constituent: Chloride, total Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



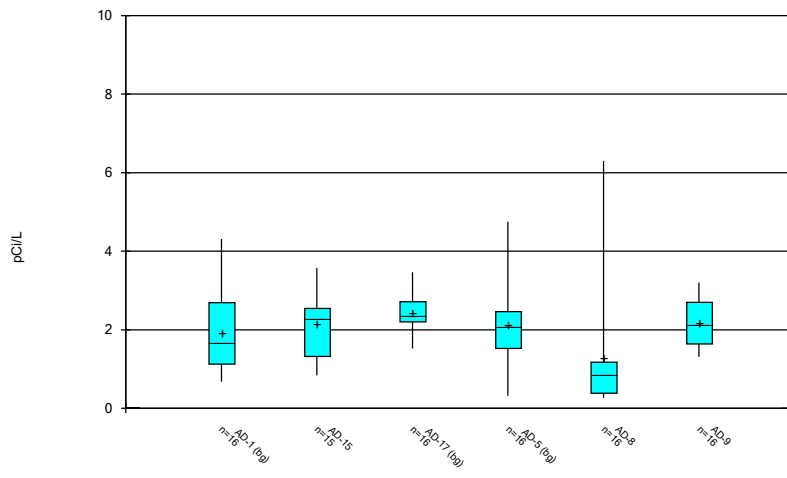
Constituent: Chromium, total Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



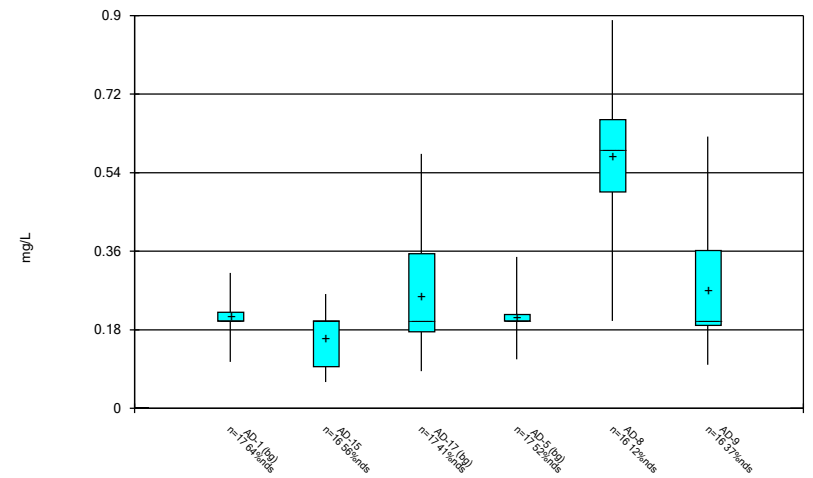
Constituent: Cobalt, total Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



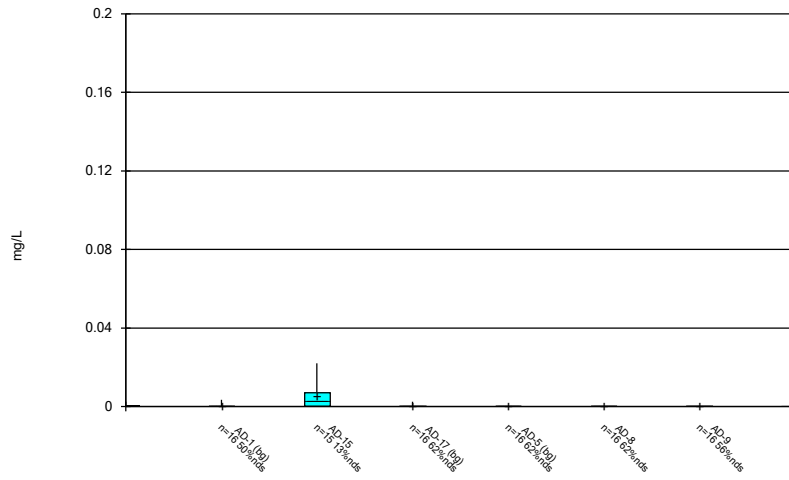
Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



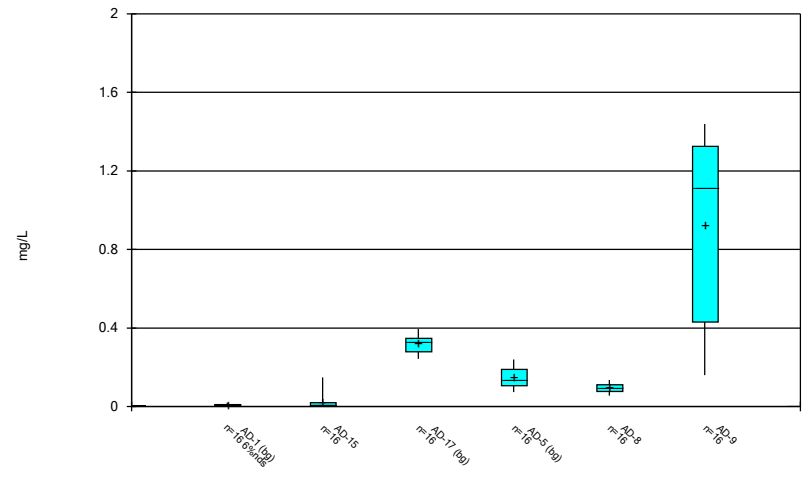
Constituent: Fluoride, total Analysis Run 1/4/2021 10:02 AM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



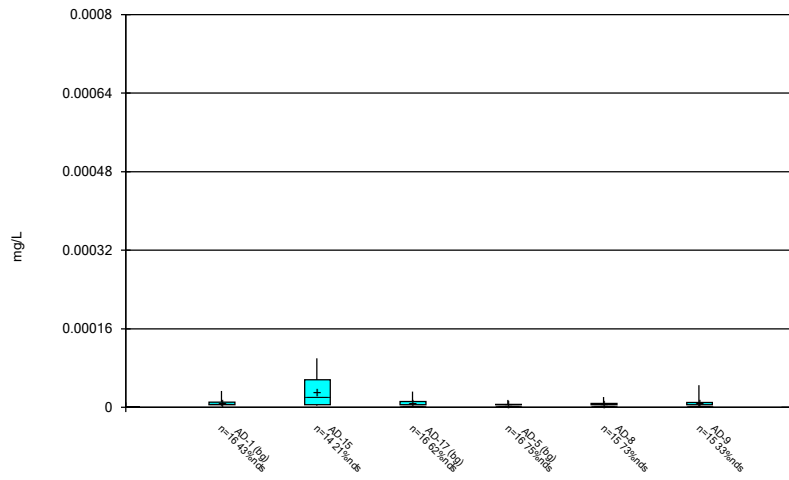
Constituent: Lead, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



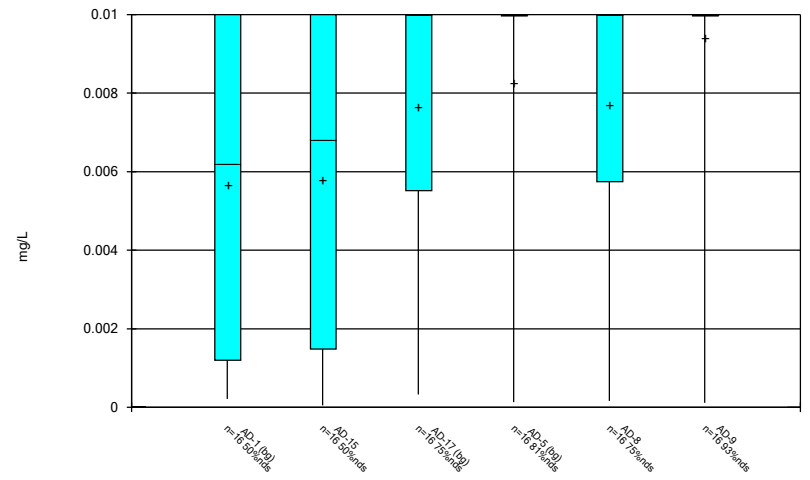
Constituent: Lithium, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



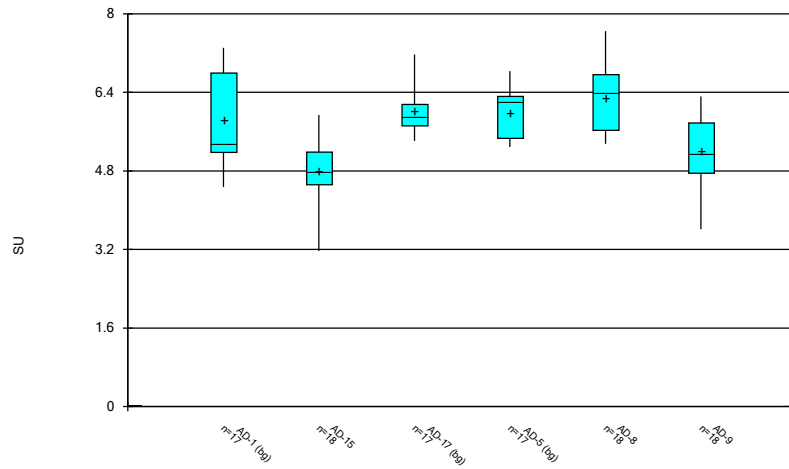
Constituent: Mercury, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



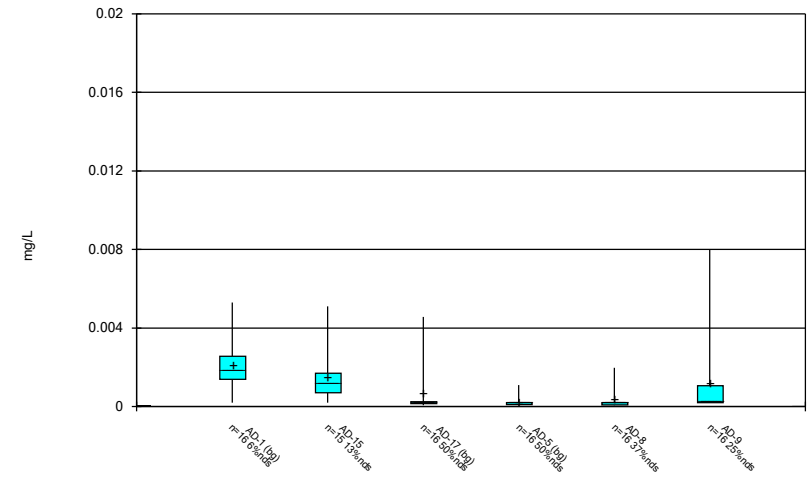
Constituent: Molybdenum, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



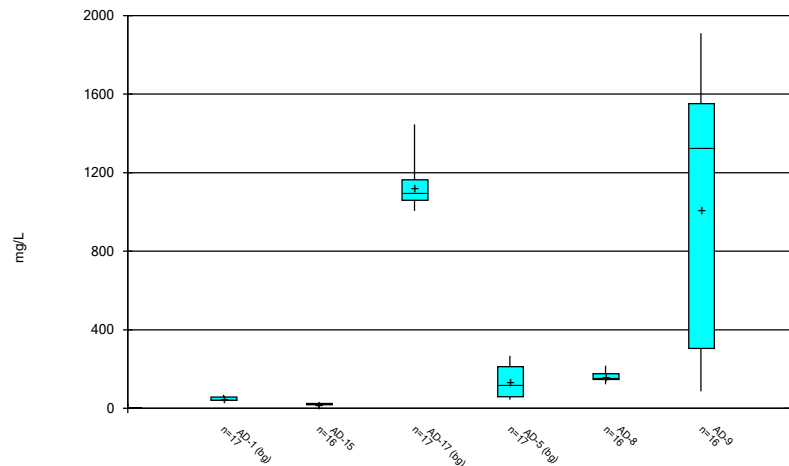
Constituent: pH, field Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



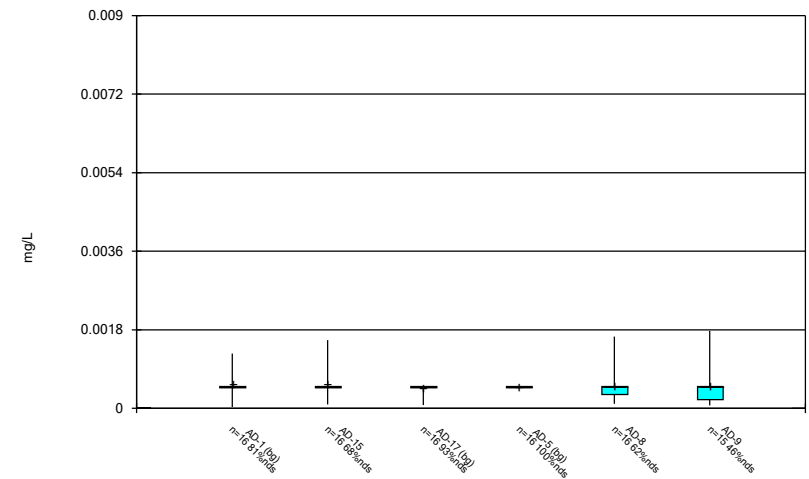
Constituent: Selenium, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



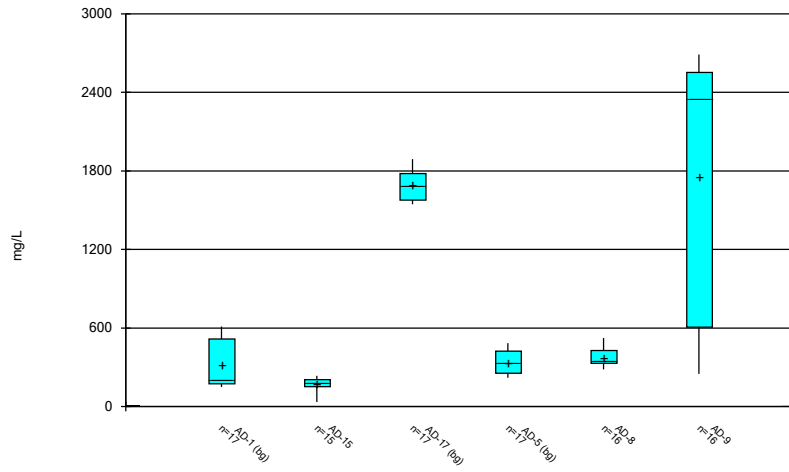
Constituent: Sulfate, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 1/4/2021 10:02 AM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/4/2021 10:02 AM

Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Outlier Summary

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 1/4/2021, 10:13 AM

AD-15 Arsenic, total (mg/L) AD-15 Barium, total (mg/L) AD-15 Beryllium, total (mg/L) AD-9 Boron, total (mg/L) AD-15 Cadmium, total (mg/L) AD-15 Calcium, total (mg/L) AD-15 Chromium, total (mg/L) AD-17 Chromium, total (mg/L) AD-15 Cobalt, total (mg/L) AD-15 Combined Radium 226 + 228 (pCi/L)

Date	AD-15 Arsenic, total (mg/L)	AD-15 Barium, total (mg/L)	AD-15 Beryllium, total (mg/L)	AD-9 Boron, total (mg/L)	AD-15 Cadmium, total (mg/L)	AD-15 Calcium, total (mg/L)	AD-15 Chromium, total (mg/L)	AD-17 Chromium, total (mg/L)	AD-15 Cobalt, total (mg/L)	AD-15 Combined Radium 226 + 228 (pCi/L)
9/29/2016										9.92 (o)
9/30/2016	0.131 (o)	1.93 (o)	0.015 (o)		0.007 (o)	13.7 (o)	0.28 (o)		0.134 (o)	
1/20/2017								0.068 (o)		
5/23/2018										
2/21/2019				1.39 (o)						

AD-15 Lead, total (mg/L) AD-15 Mercury, total (mg/L) AD-15 Selenium, total (mg/L) AD-9 Thallium, total (mg/L) AD-15 Total Dissolved Solids (mg/L)

Date	AD-15 Lead, total (mg/L)	AD-15 Mercury, total (mg/L)	AD-15 Selenium, total (mg/L)	AD-9 Thallium, total (mg/L)	AD-15 Total Dissolved Solids (mg/L)
9/29/2016					
9/30/2016	0.161 (o)	0.000707 (o)	0.014 (o)		367 (o)
1/20/2017					
5/23/2018				0.00846 (o)	
2/21/2019					

Welch's t-test/Mann-Whitney - Significant Results

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/29/2020, 11:55 AM

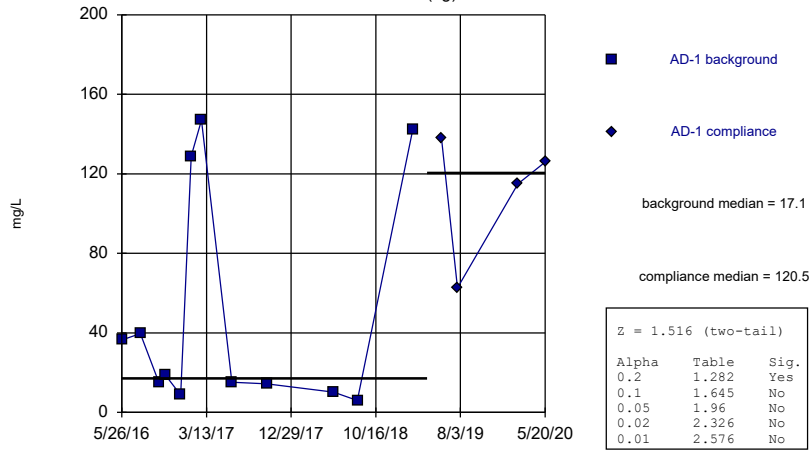
<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Sig.</u>	<u>Method</u>
Chloride, total (mg/L)	AD-1 (bg)	-2.971	Yes	Yes	Mann-W
Chloride, total (mg/L)	AD-8	-2.943	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-1 (bg)	-3.317	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-15	-3.167	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-17 (bg)	-2.595	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-5 (bg)	-2.873	Yes	Yes	Mann-W

Welch's t-test/Mann-Whitney - All Results

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/29/2020, 11:55 AM

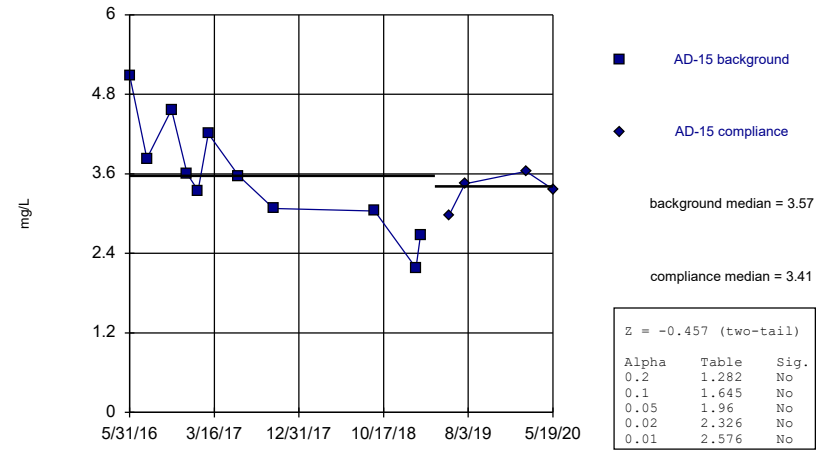
<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Sig.</u>	<u>Method</u>
Calcium, total (mg/L)	AD-1 (bg)	1.516	No	No	Mann-W
Calcium, total (mg/L)	AD-15	-0.457	No	No	Mann-W
Calcium, total (mg/L)	AD-17 (bg)	1.396	No	No	Mann-W
Calcium, total (mg/L)	AD-5 (bg)	-0.9095	No	No	Mann-W
Calcium, total (mg/L)	AD-8	-1.638	No	No	Mann-W
Calcium, total (mg/L)	AD-9	-1.88	No	No	Mann-W
Chloride, total (mg/L)	AD-1 (bg)	-2.971	Yes	Yes	Mann-W
Chloride, total (mg/L)	AD-15	0.3927	No	No	Mann-W
Chloride, total (mg/L)	AD-17 (bg)	1.581	No	No	Mann-W
Chloride, total (mg/L)	AD-5 (bg)	2.016	No	No	Mann-W
Chloride, total (mg/L)	AD-8	-2.943	Yes	Yes	Mann-W
Chloride, total (mg/L)	AD-9	-1.764	No	No	Mann-W
Fluoride, total (mg/L)	AD-1 (bg)	-3.317	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-15	-3.167	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-17 (bg)	-2.595	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-5 (bg)	-2.873	Yes	Yes	Mann-W
Fluoride, total (mg/L)	AD-8	1.046	No	No	Mann-W
Fluoride, total (mg/L)	AD-9	-2.495	No	No	Mann-W
Sulfate, total (mg/L)	AD-1 (bg)	1.644	No	No	Mann-W
Sulfate, total (mg/L)	AD-15	-1.246	No	No	Mann-W
Sulfate, total (mg/L)	AD-17 (bg)	0.8501	No	No	Mann-W
Sulfate, total (mg/L)	AD-5 (bg)	-2.245	No	No	Mann-W
Sulfate, total (mg/L)	AD-8	-1.633	No	No	Mann-W
Sulfate, total (mg/L)	AD-9	-1.111	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-1 (bg)	1.153	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-15	1.344	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-17 (bg)	1.092	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-5 (bg)	-1.516	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-8	-1.372	No	No	Mann-W
Total Dissolved Solids (mg/L)	AD-9	-1.501	No	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)
AD-1 (bg)



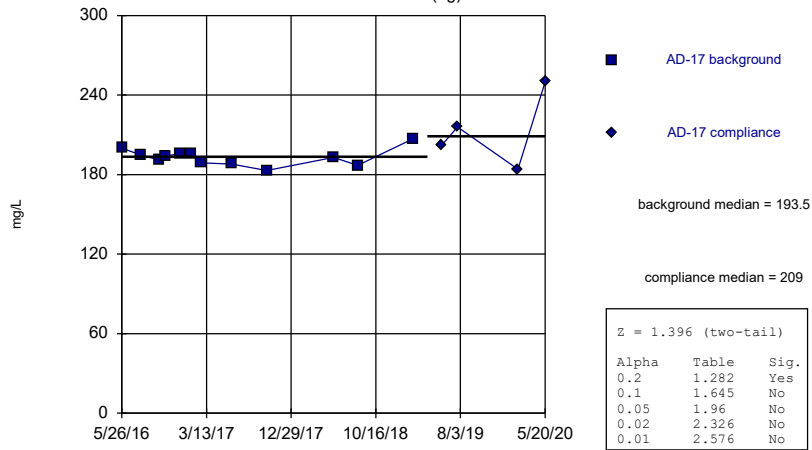
Constituent: Calcium, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-15



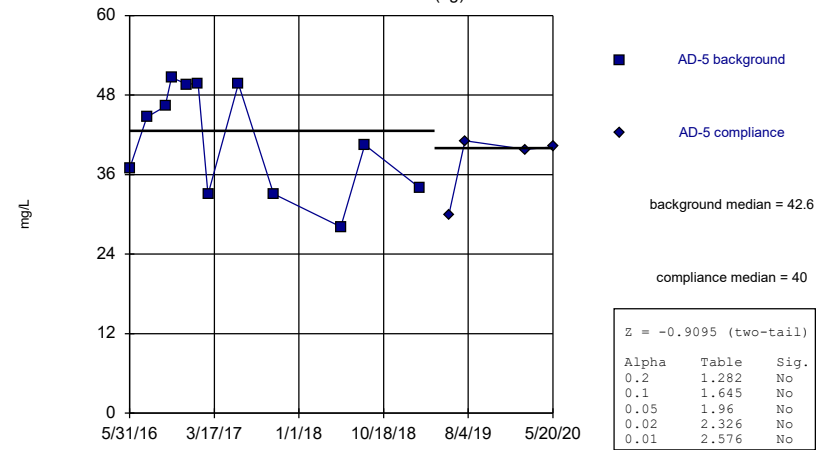
Constituent: Calcium, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-17 (bg)



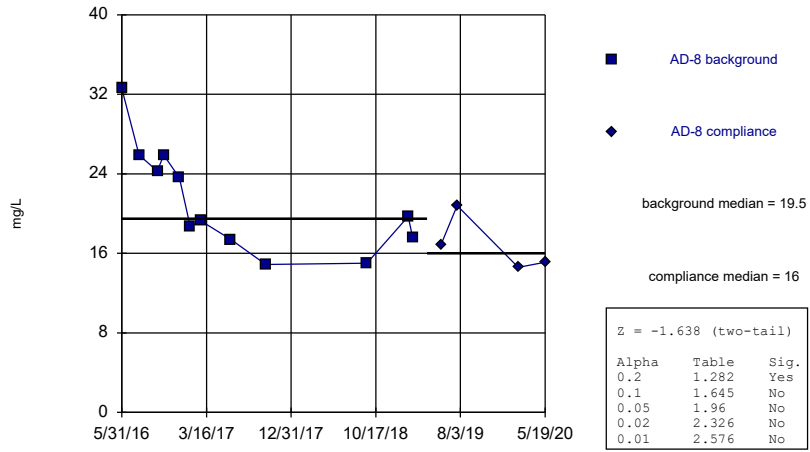
Constituent: Calcium, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-5 (bg)



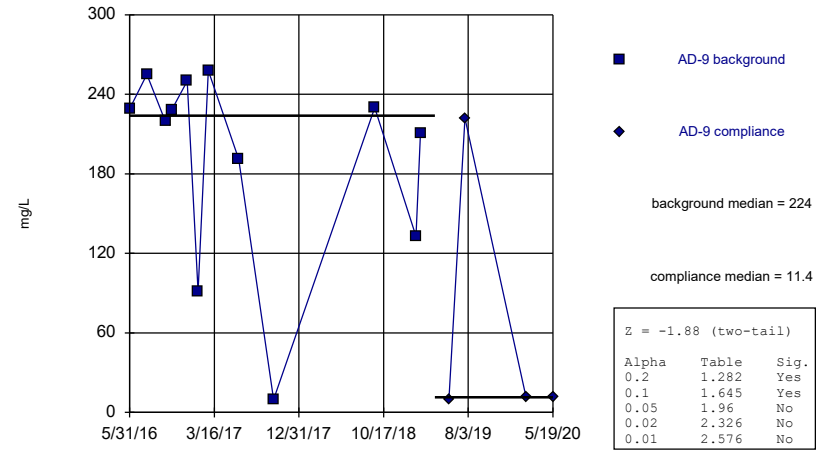
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-8



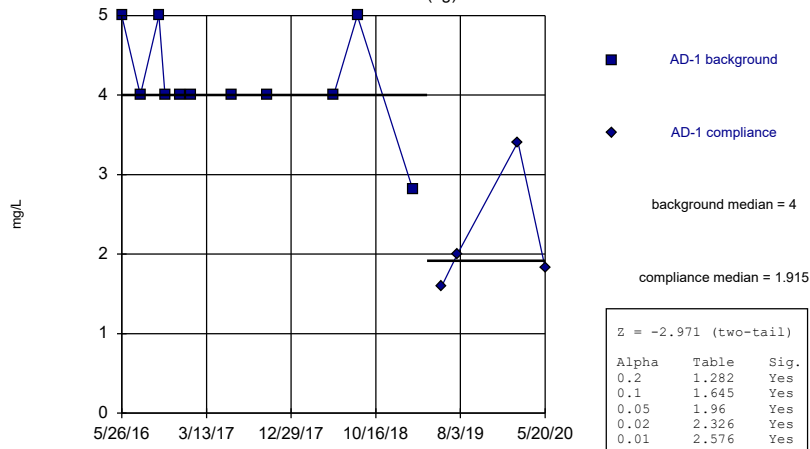
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-9



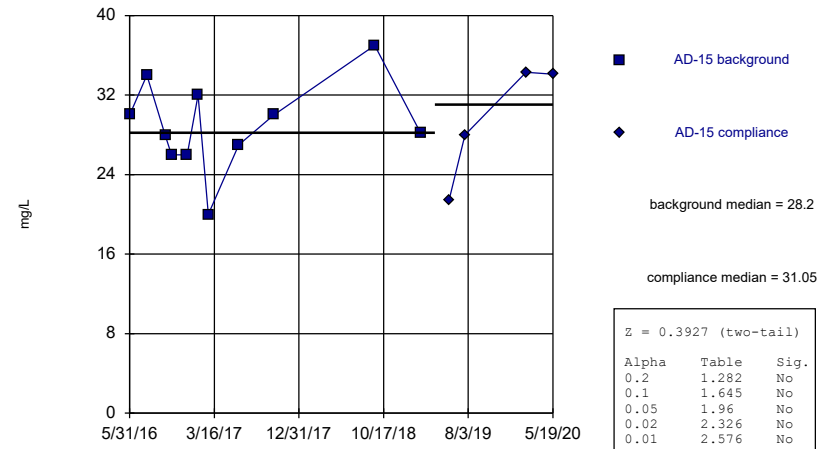
Constituent: Calcium, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-1 (bg)

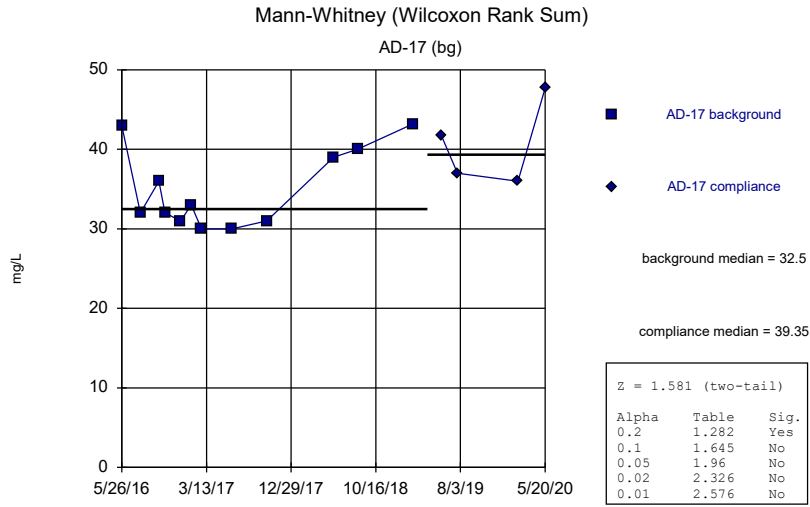


Constituent: Chloride, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

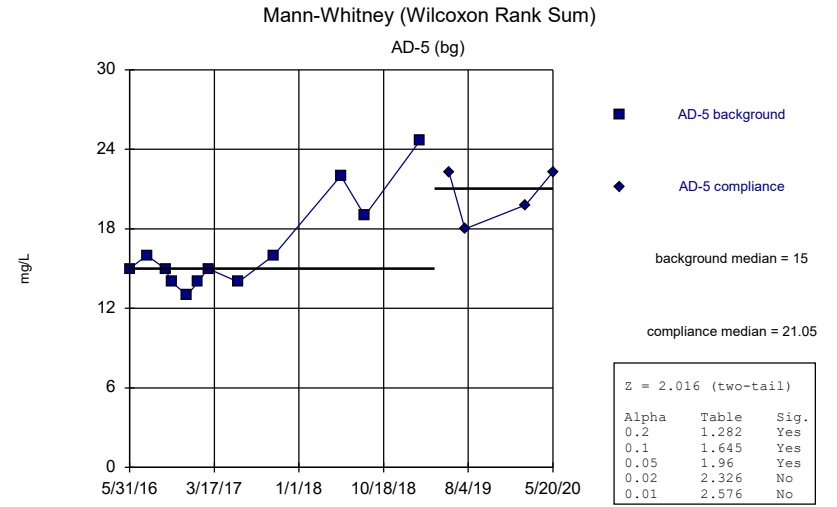
Mann-Whitney (Wilcoxon Rank Sum)
AD-15



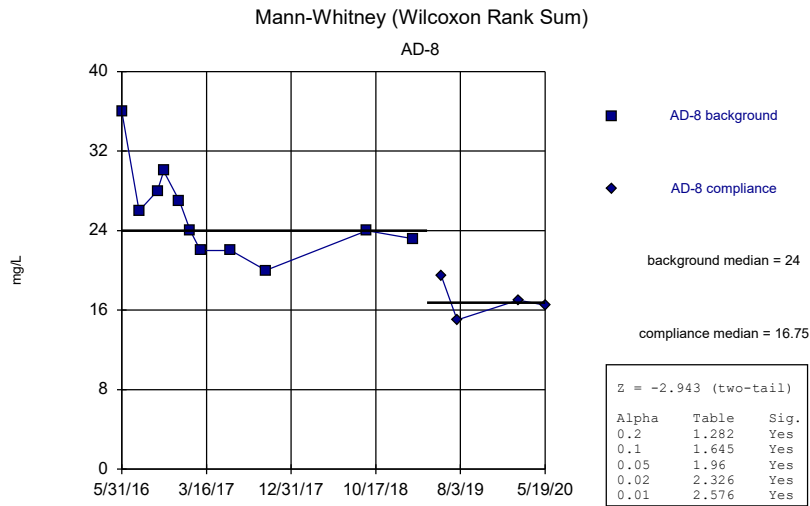
Constituent: Chloride, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP



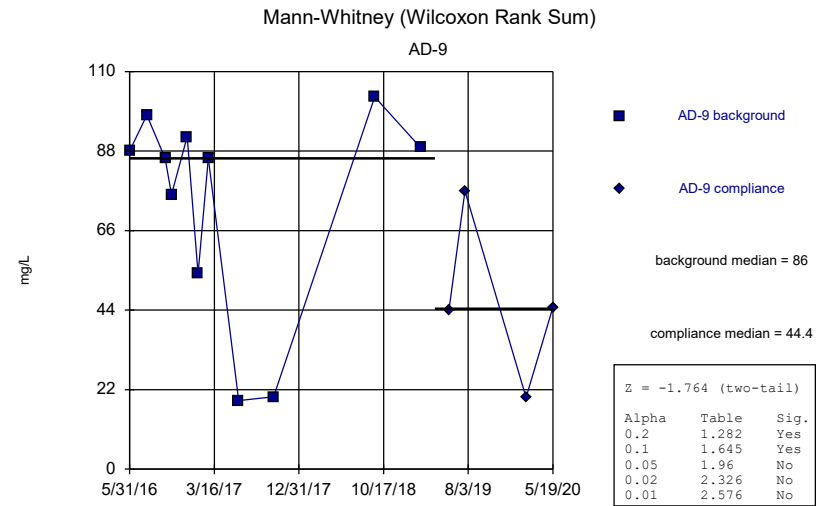
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



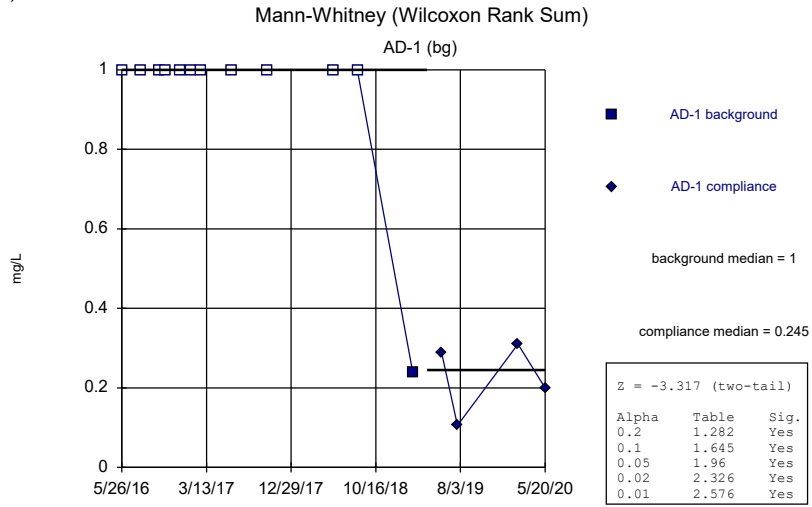
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



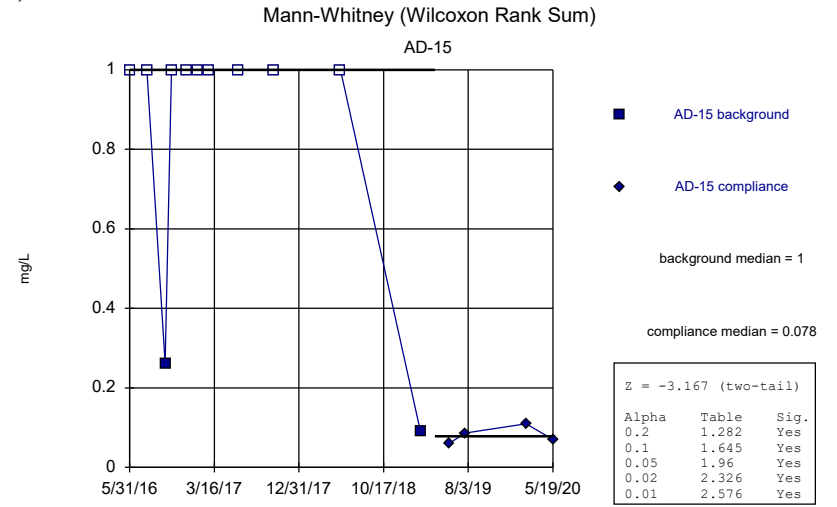
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



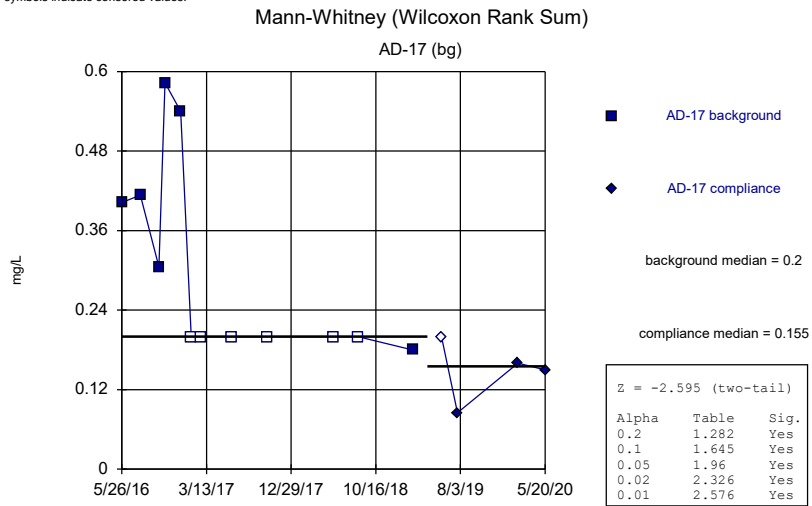
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



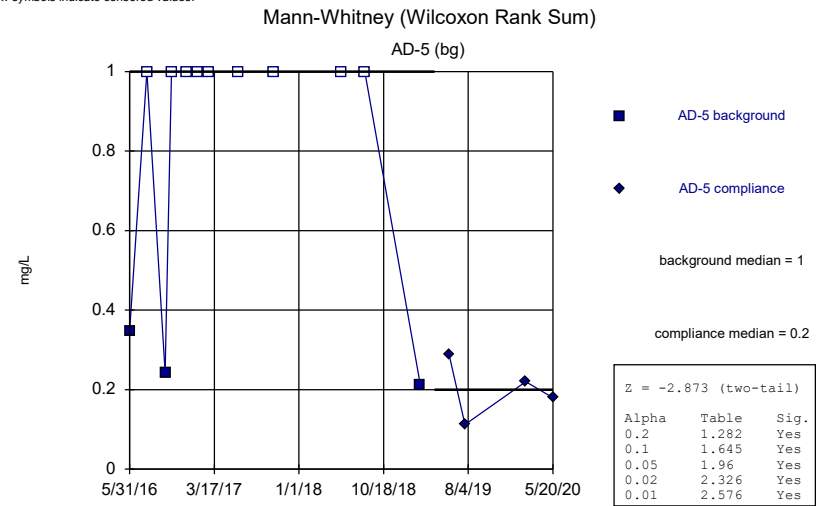
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



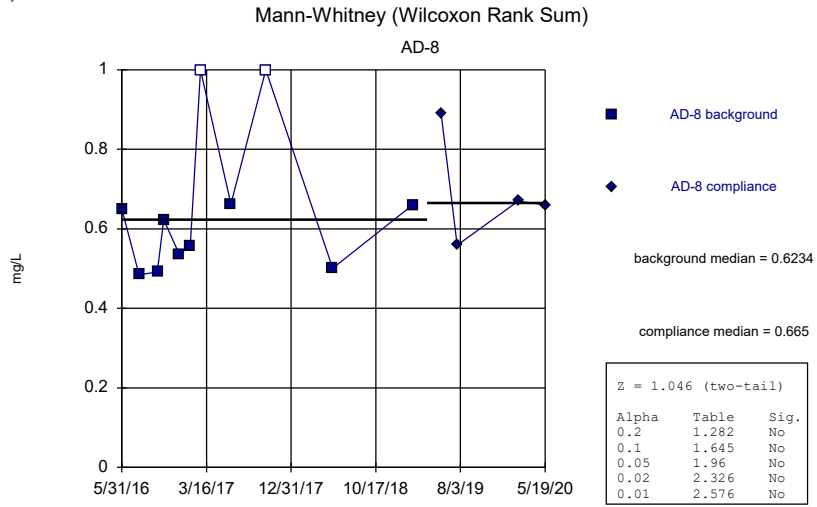
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



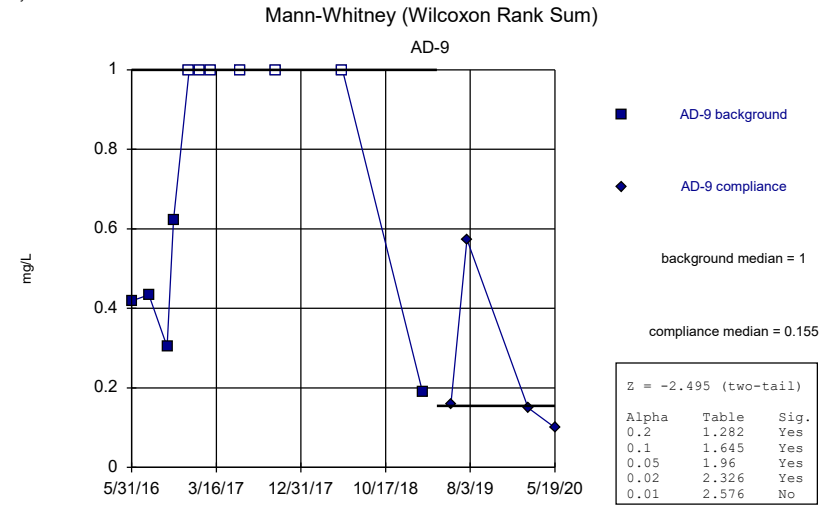
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



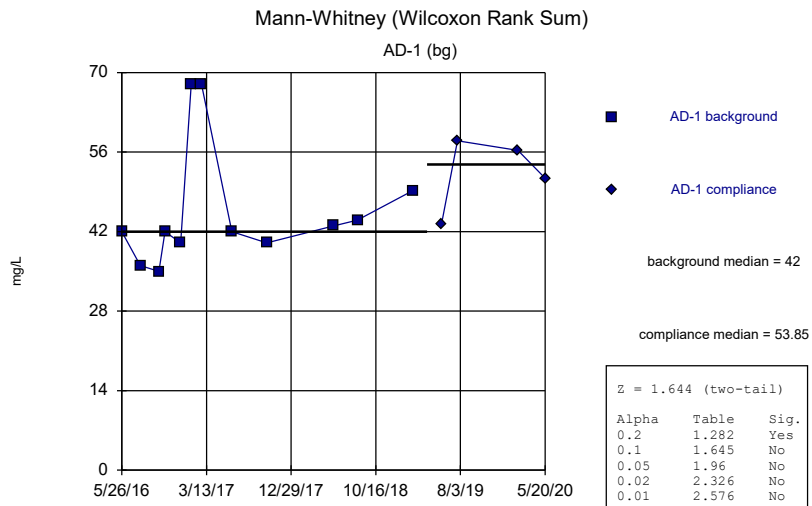
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



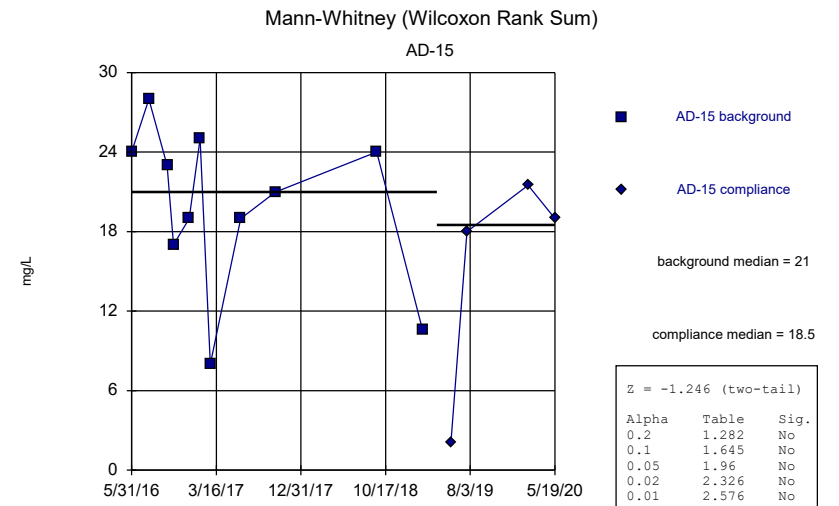
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Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Fluoride, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

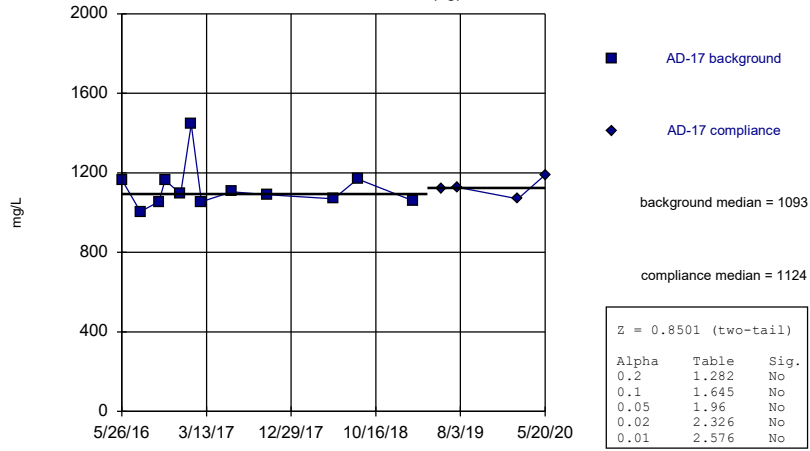


Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP



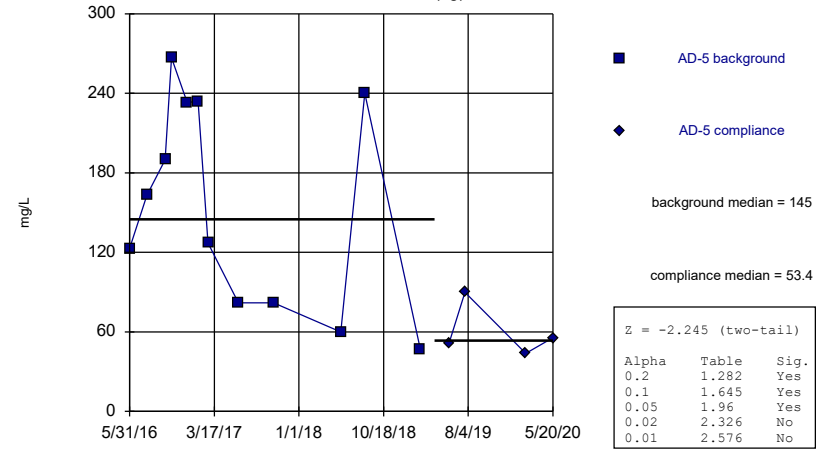
Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-17 (bg)



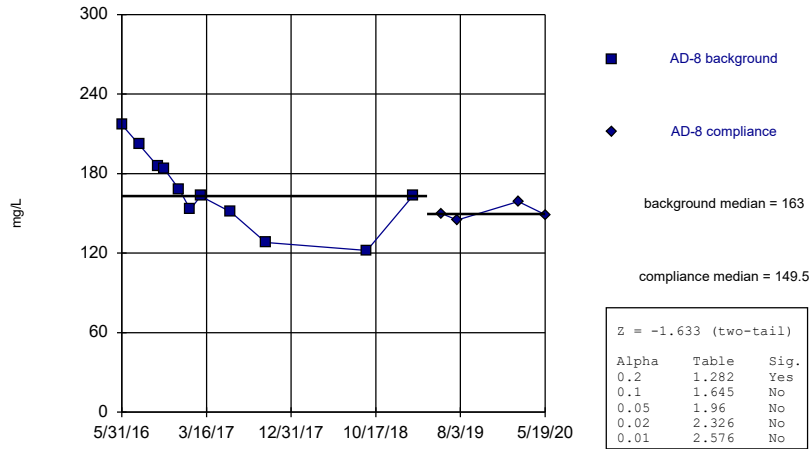
Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-5 (bg)



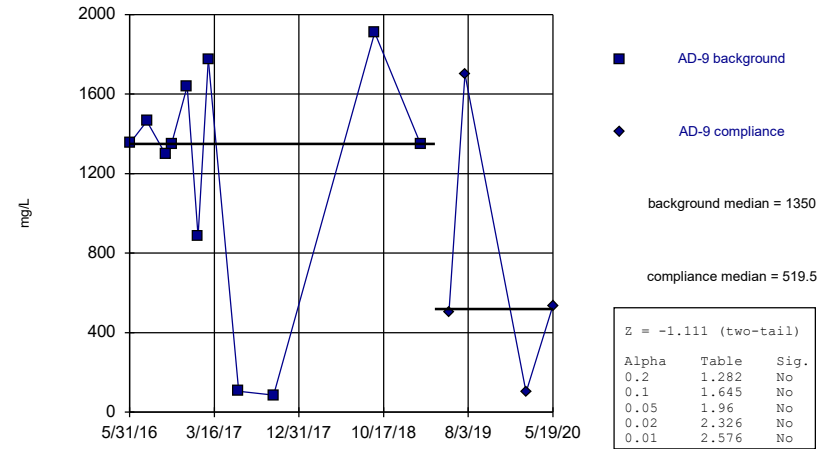
Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-8

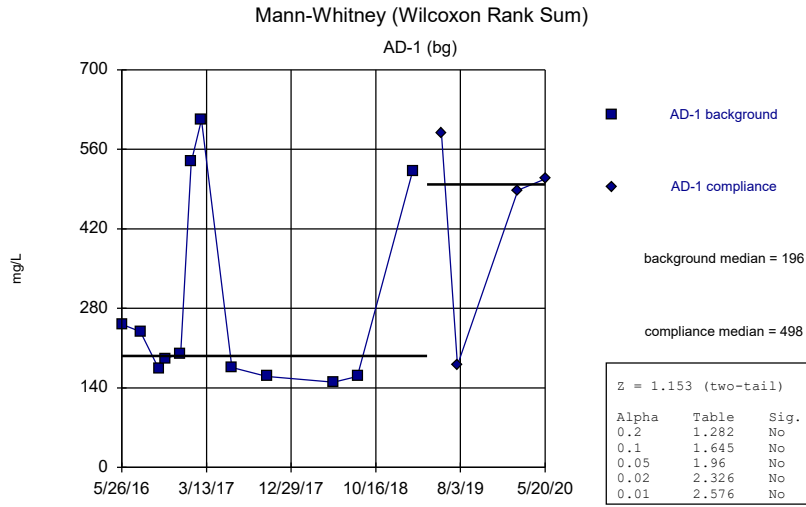


Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

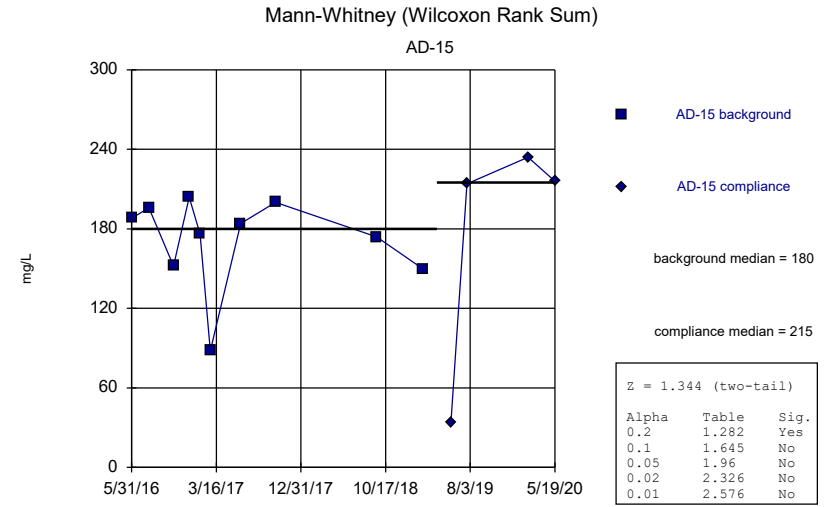
Mann-Whitney (Wilcoxon Rank Sum)
AD-9



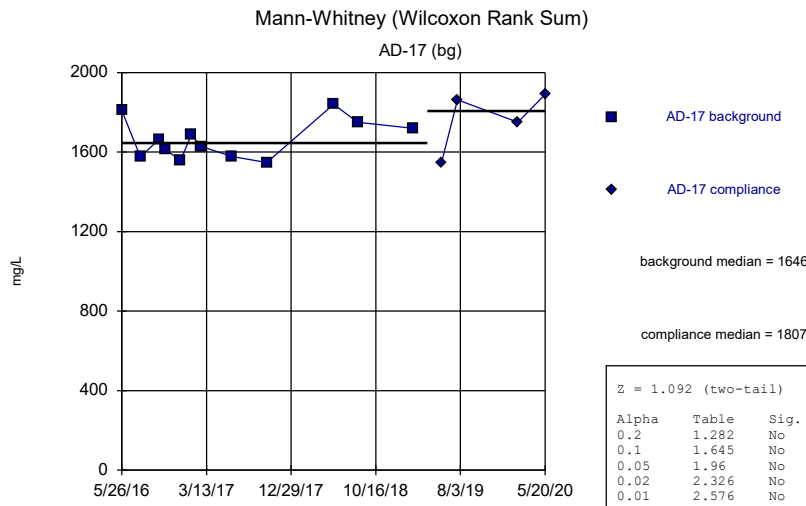
Constituent: Sulfate, total Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP



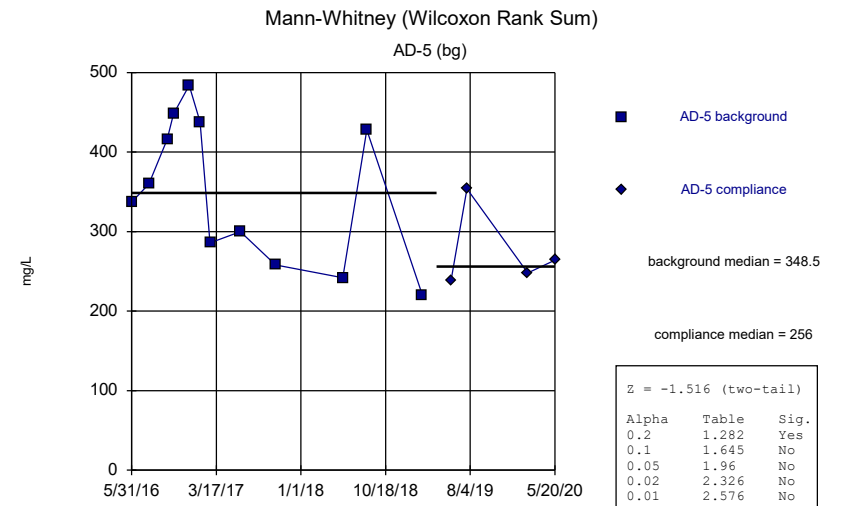
Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:53 AM View: Appendix III Intrawell
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

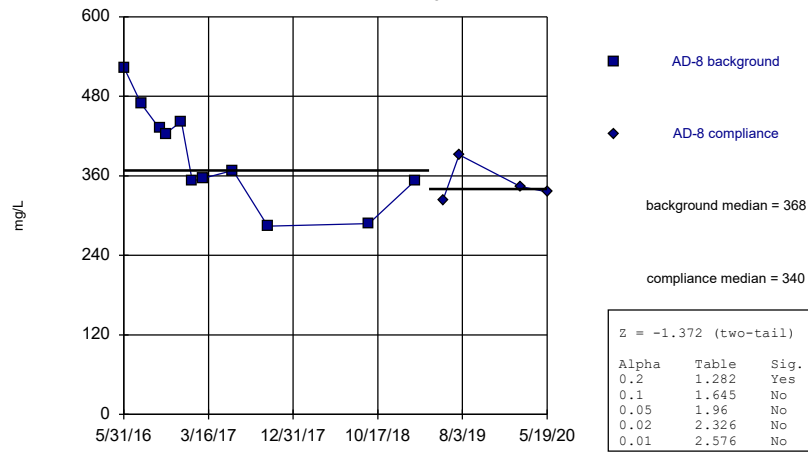


Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:54 AM View: Appendix III Intrawell
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



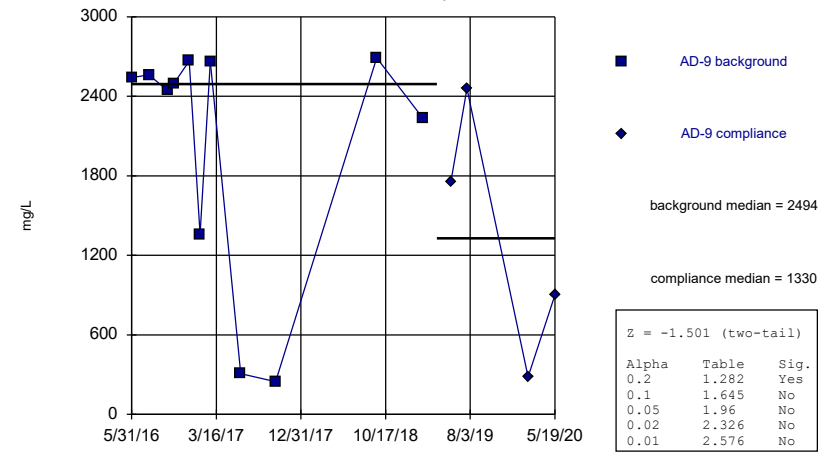
Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:54 AM View: Appendix III Intrawell
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-8



Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:54 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-9



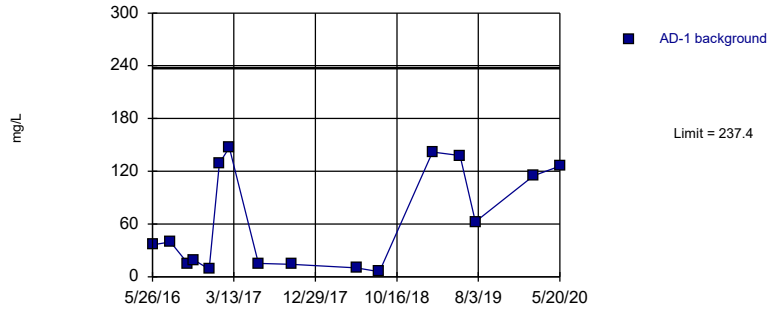
Constituent: Total Dissolved Solids Analysis Run 12/29/2020 11:54 AM View: Appendix III Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Intrawell Prediction Limits

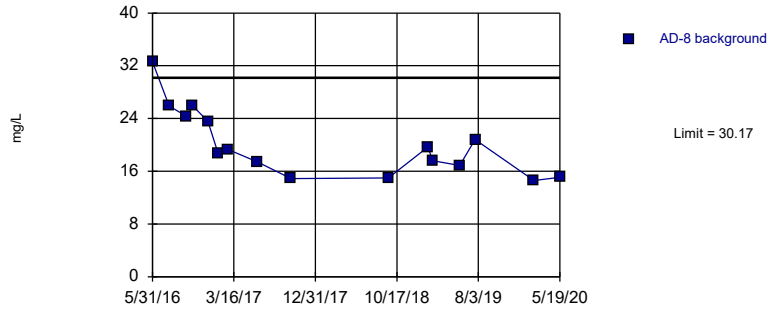
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Constituent	Well	Upper Lim.	Lower Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-1	237.4	n/a	16	3.586	1.323	0	None	x^(1/3)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-15	4.972	n/a	15	3.508	0.7301	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-17	250	n/a	16	n/a	n/a	0	n/a	n/a	0.006456	NP Intra (normality) 1 of 2
Calcium, total (mg/L)	AD-5	55.22	n/a	16	40.46	7.491	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-8	30.17	n/a	16	20.14	5.091	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-9	292.3	n/a	16	34784	25721	0	None	x^2	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-1	7.667	n/a	16	1.954	0.4137	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-15	38.62	n/a	15	29.07	4.762	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-17	47.28	n/a	16	36.41	5.517	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-5	24.81	n/a	16	17.51	3.708	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-8	27.62	n/a	10	20.32	3.261	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-9	126.7	n/a	15	66.45	30.03	0	None	No	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	AD-1	1	n/a	16	n/a	n/a	68.75	n/a	n/a	0.006456	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	AD-15	1	n/a	15	n/a	n/a	60	n/a	n/a	0.007533	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	AD-17	0.2	n/a	11	n/a	n/a	63.64	n/a	n/a	0.01276	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	AD-5	1	n/a	16	n/a	n/a	56.25	n/a	n/a	0.006456	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	AD-8	1.018	n/a	15	0.8085	0.09992	13.33	None	sqrt(x)	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	AD-9	0.7664	n/a	15	0.5493	0.1627	40	Kaplan-Meier	sqrt(x)	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-1	67.66	n/a	16	47.39	10.29	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-15	32.52	n/a	15	18.61	6.934	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-17	1445	n/a	16	n/a	n/a	0	n/a	n/a	0.006456	NP Intra (normality) 1 of 2
Sulfate, total (mg/L)	AD-5	286.7	n/a	16	130.5	79.29	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-8	214.3	n/a	15	162.7	25.75	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-9	2367	n/a	15	1070	646.4	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-1	612	n/a	16	n/a	n/a	0	n/a	n/a	0.006456	NP Intra (normality) 1 of 2
Total Dissolved Solids (mg/L)	AD-15	281.5	n/a	14	172.1	53.59	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-17	1921	n/a	16	1689	118.1	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-5	505.2	n/a	16	332.6	87.61	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-8	514.3	n/a	15	379.1	67.41	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-9	2874	n/a	15	2.6e13	2.1e13	0	None	x^4	0.002505	Param Intra 1 of 2

Prediction Limit
Intrawell Parametric, AD-1 (bg)



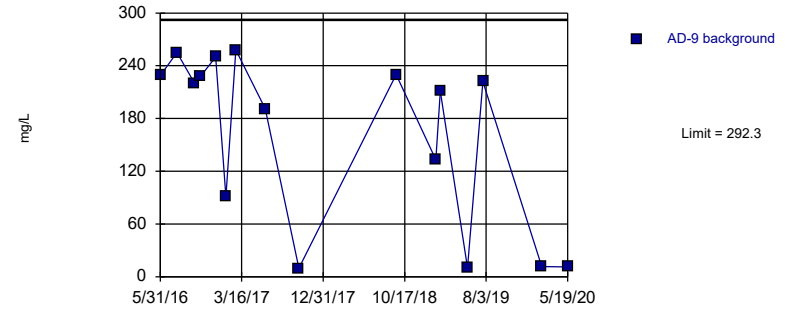
Prediction Limit
Intrawell Parametric, AD-8



Background Data Summary: Mean=20.14, Std. Dev.=5.091, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8995, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

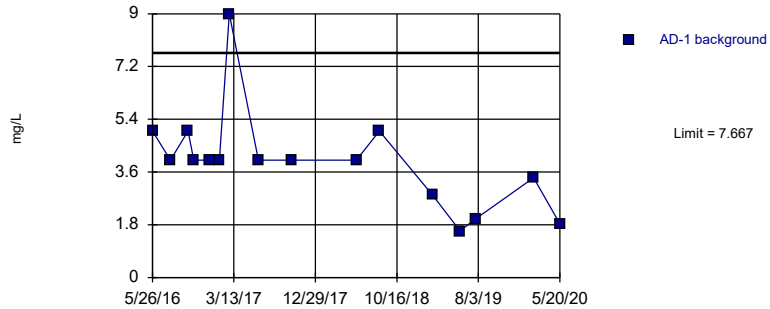
Prediction Limit
Intrawell Parametric, AD-9



Background Data Summary (based on square transformation): Mean=34784, Std. Dev.=25721, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8454, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

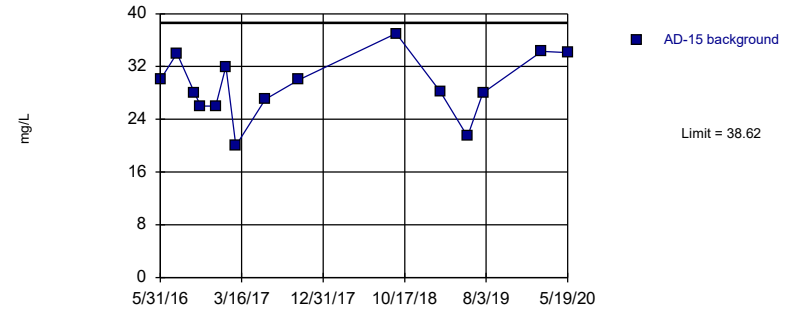
Prediction Limit
Intrawell Parametric, AD-1 (bg)



Background Data Summary (based on square root transformation): Mean=1.954, Std. Dev.=0.4137, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8847, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

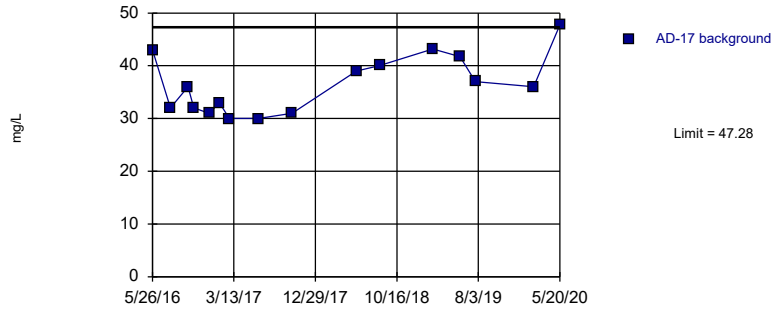
Prediction Limit
Intrawell Parametric, AD-15



Background Data Summary: Mean=29.07, Std. Dev.=4.762, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9628, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

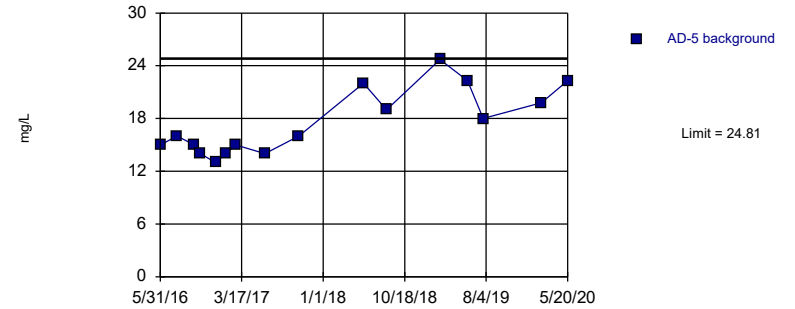
Prediction Limit
Intrawell Parametric, AD-17 (bg)



Background Data Summary: Mean=36.41, Std. Dev.=5.517, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9197, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

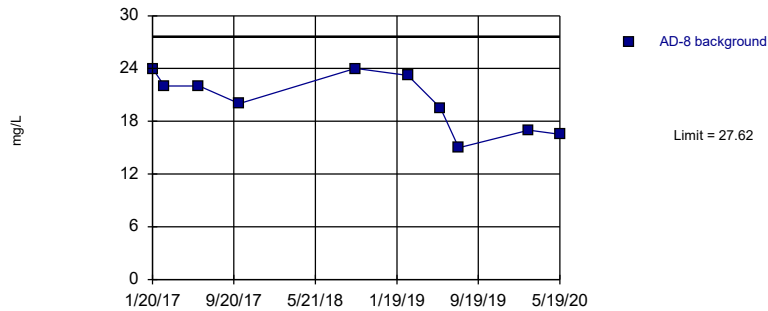
Prediction Limit
Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=17.51, Std. Dev.=3.708, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8923, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

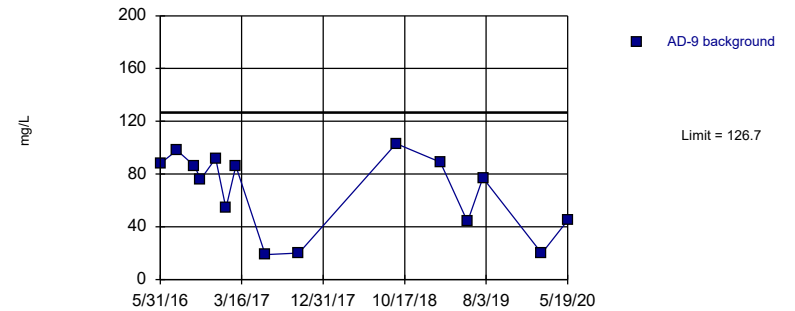
Prediction Limit
Intrawell Parametric, AD-8



Background Data Summary: Mean=20.32, Std. Dev.=3.261, n=10. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9127, critical = 0.781. Kappa = 2.238 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

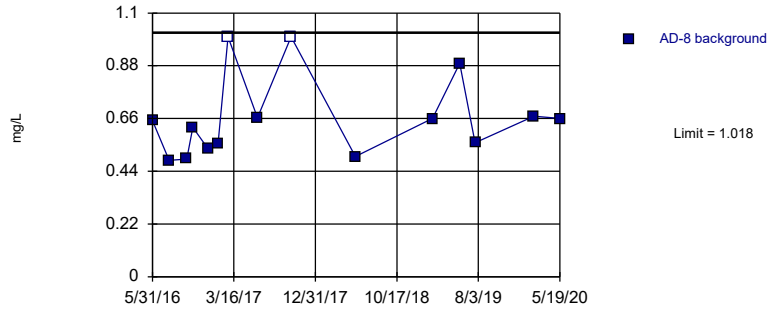
Prediction Limit
Intrawell Parametric, AD-9



Background Data Summary: Mean=66.45, Std. Dev.=30.03, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8663, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

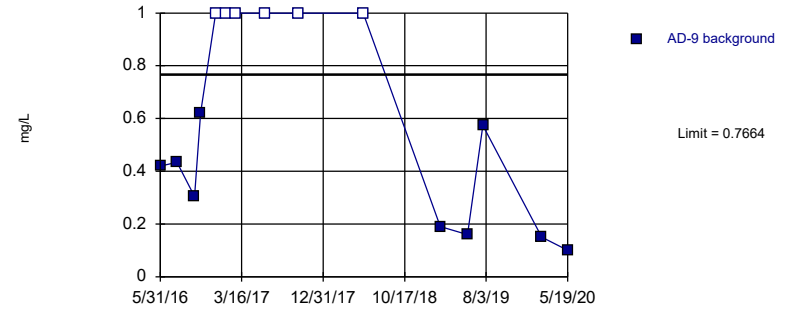
Prediction Limit
Intrawell Parametric, AD-8



Background Data Summary (based on square root transformation): Mean=0.8085, Std. Dev.=0.09992, n=15, 13.33% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8572, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

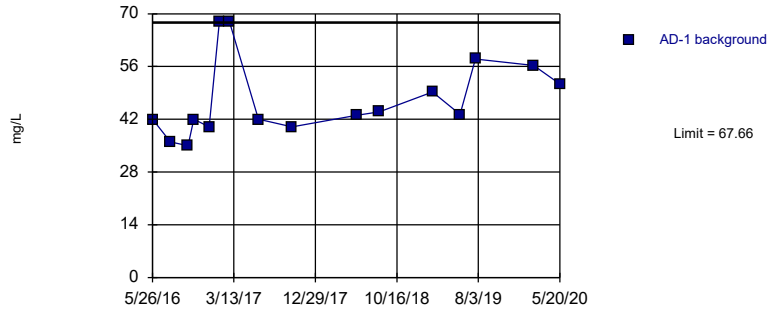
Prediction Limit
Intrawell Parametric, AD-9



Background Data Summary (based on square root transformation) (after Kaplan-Meier Adjustment): Mean=0.5493, Std. Dev.=0.1627, n=15, 40% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8499, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

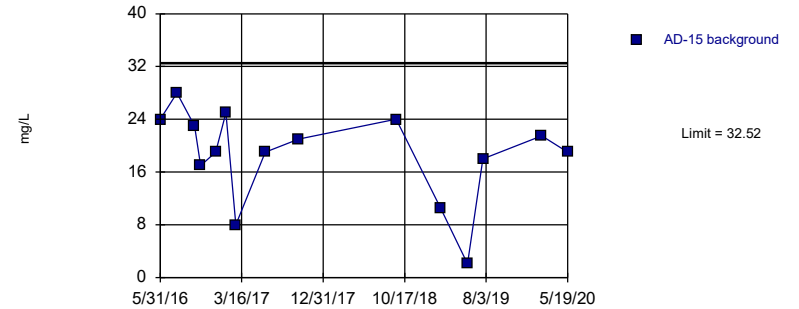
Prediction Limit
Intrawell Parametric, AD-1 (bg)



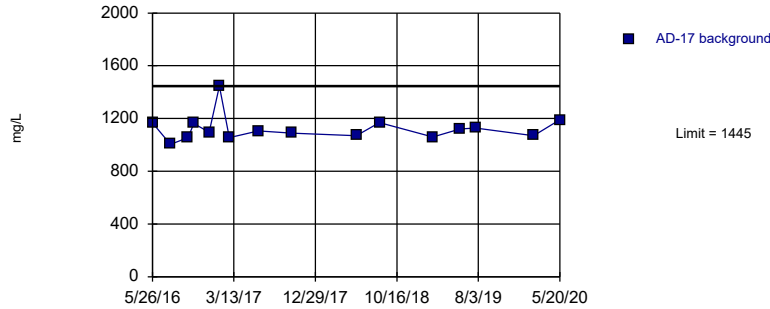
Background Data Summary: Mean=47.39, Std. Dev.=10.29, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8677, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Prediction Limit
Intrawell Parametric, AD-15



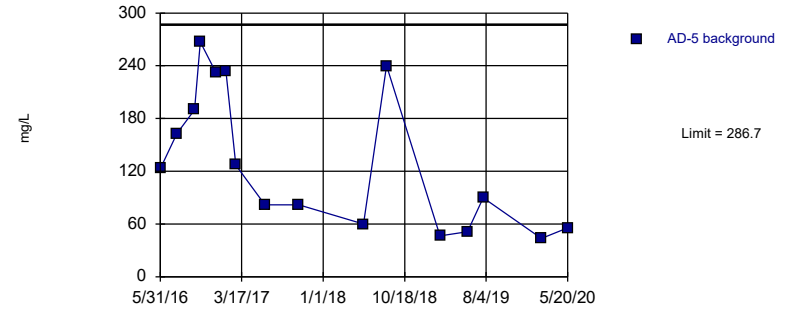
Prediction Limit
Intrawell Non-parametric, AD-17 (bg)



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 16 background values. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

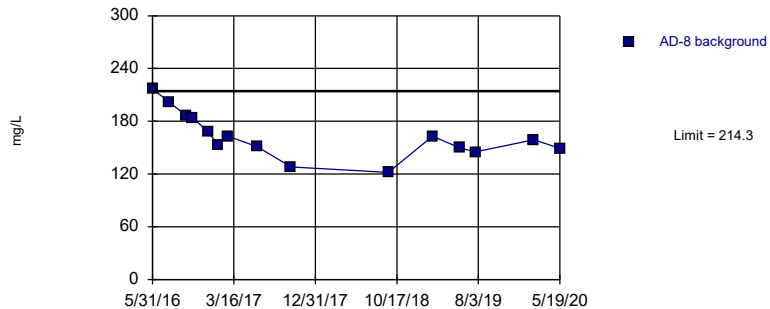
Prediction Limit
Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=130.5, Std. Dev.=79.29, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

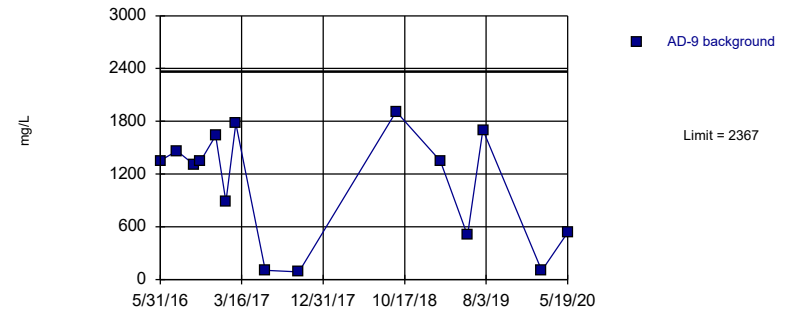
Prediction Limit
Intrawell Parametric, AD-8



Background Data Summary: Mean=162.7, Std. Dev.=25.75, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.954, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

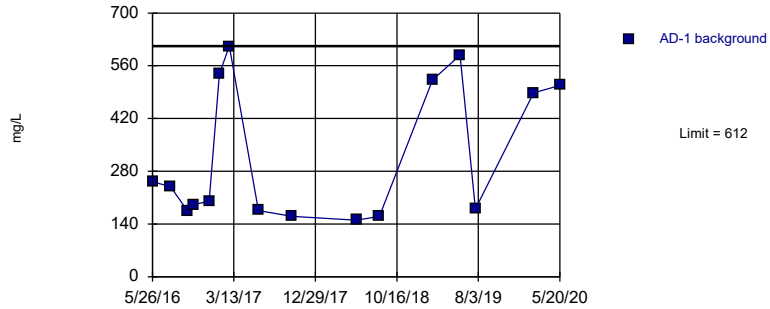
Prediction Limit
Intrawell Parametric, AD-9



Background Data Summary: Mean=1070, Std. Dev.=646.4, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8834, critical = 0.835. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate,

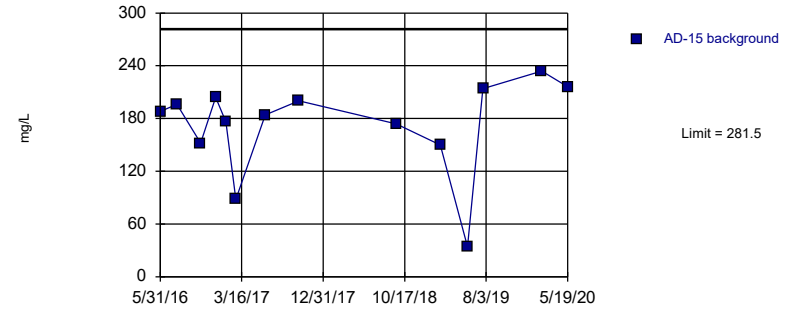
Prediction Limit
Intrawell Non-parametric, AD-1 (bg)



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 16 background values. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

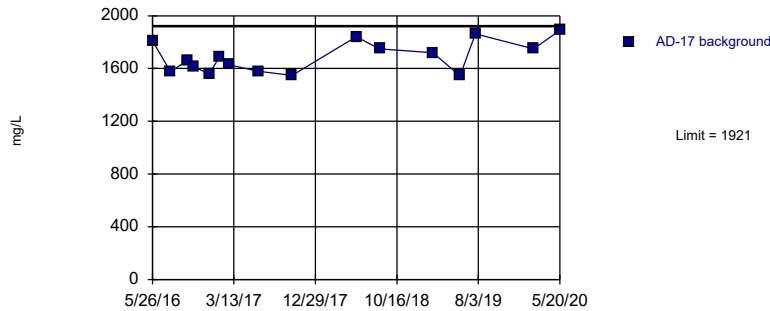
Prediction Limit
Intrawell Parametric, AD-15



Background Data Summary: Mean=172.1, Std. Dev.=53.59, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8428, critical = 0.825. Kappa = 2.041 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

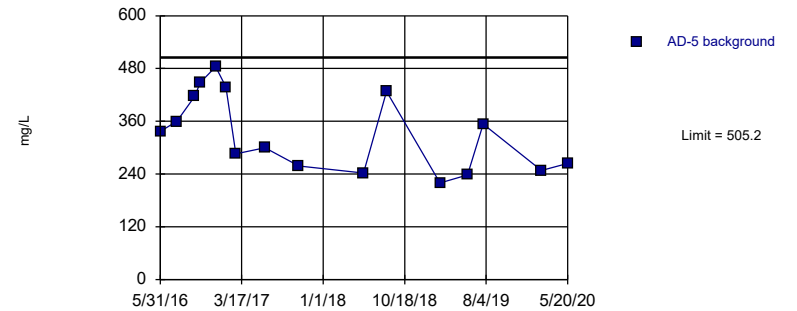
Prediction Limit
Intrawell Parametric, AD-17 (bg)



Background Data Summary: Mean=1689, Std. Dev.=118.1, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9189, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

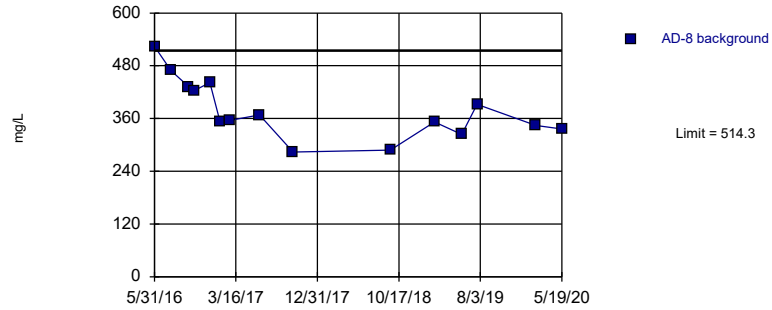
Prediction Limit
Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=332.6, Std. Dev.=87.61, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9126, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/4/2021 4:59 PM View: PL's Intrawell
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Prediction Limit
Intrawell Parametric, AD-8



Trend Test Summary - Significant Results

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/29/2020, 4:29 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-1 (bg)	0.07968	72	63	Yes	17	0	n/a	n/a	0.01	NP

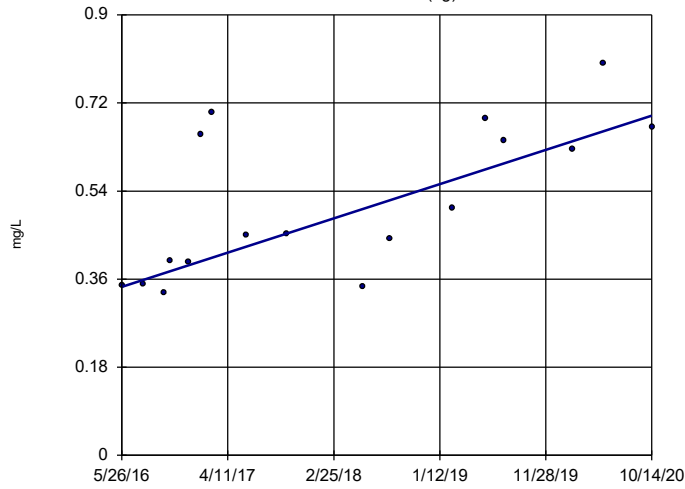
Trend Test Summary - All Results

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/29/2020, 4:29 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-1 (bg)	0.07968	72	63	Yes	17	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-17 (bg)	-0.001855	-14	-63	No	17	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-5 (bg)	0	-22	-63	No	17	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-1 (bg)	0.02079	7	63	No	17	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-17 (bg)	-0.09386	-42	-63	No	17	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-5 (bg)	0.124	44	63	No	17	0	n/a	n/a	0.01	NP

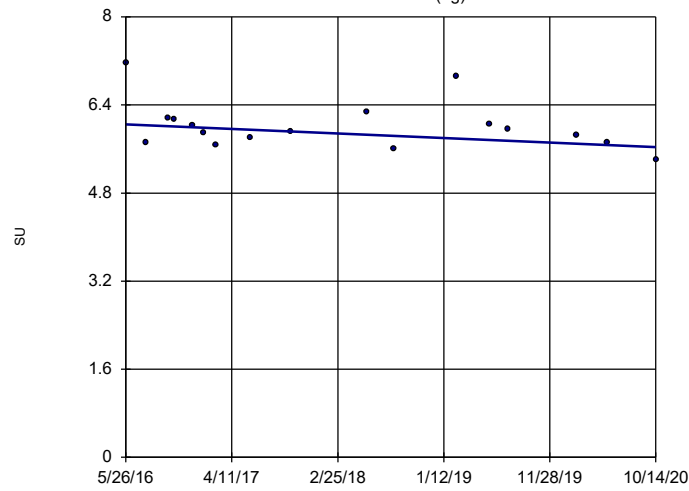
Sen's Slope Estimator

AD-1 (bg)



Sen's Slope Estimator

AD-17 (bg)

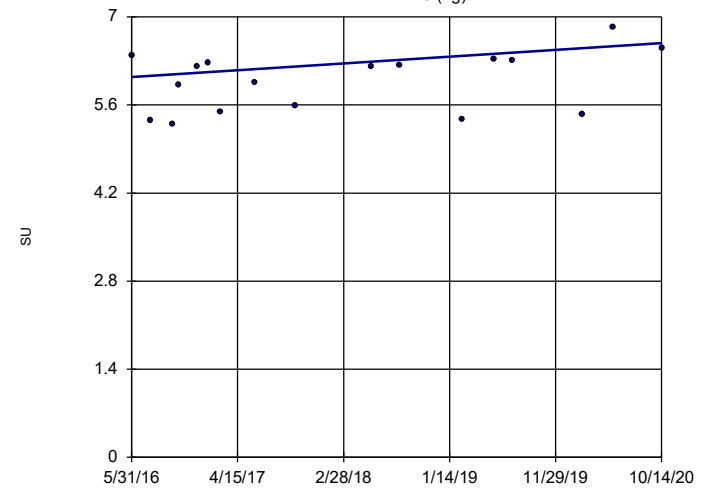


n = 17
Slope = -0.09386
units per year.
Mann-Kendall
statistic = -42
critical = -63
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: pH, field Analysis Run 12/29/2020 4:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Sen's Slope Estimator

AD-5 (bg)



n = 17
Slope = 0.124
units per year.
Mann-Kendall
statistic = 44
critical = 63
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: pH, field Analysis Run 12/29/2020 4:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Interwell Prediction Limits

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 1/4/2021, 10:12 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg	NBg	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	0.862	n/a	n/a	3 future	n/a	51	-1.991	1.069	0	None	ln(x)	0.002505	Param Inter 1 of 2	
pH, field (SU)	n/a	7.028	4.861	n/a	3 future	n/a	51	5.945	0.6286	0	None	No	0.001253	Param Inter 1 of 2	

Upper Tolerance Limits

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/15/2020, 3:23 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Bg N	Std. Dev.	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00317	n/a	n/a	n/a	48	n/a	70.83	n/a	0.08526	NP Inter(normal...
Arsenic, total (mg/L)	n/a	0.00628	n/a	n/a	n/a	48	n/a	39.58	n/a	0.08526	NP Inter(normal...
Barium, total (mg/L)	n/a	0.6453	n/a	n/a	n/a	48	1.132	0	ln(x)	0.05	Inter
Beryllium, total (mg/L)	n/a	0.0007729	n/a	n/a	n/a	48	0.01767	8.333	x^(1/3)	0.05	Inter
Cadmium, total (mg/L)	n/a	0.00646	n/a	n/a	n/a	48	n/a	31.25	n/a	0.08526	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.004	n/a	n/a	n/a	47	n/a	19.15	n/a	0.08974	NP Inter(normal...
Cobalt, total (mg/L)	n/a	0.0748	n/a	n/a	n/a	48	n/a	0	n/a	0.08526	NP Inter(normal...
Combined Radium 226 + 228 (pCi/L)	n/a	4.007	n/a	n/a	n/a	48	0.895	0	No	0.05	Inter
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	n/a	51	n/a	52.94	n/a	0.0731	NP Inter(normal...
Lead, total (mg/L)	n/a	0.003384	n/a	n/a	n/a	48	n/a	58.33	n/a	0.08526	NP Inter(normal...
Lithium, total (mg/L)	n/a	0.394	n/a	n/a	n/a	48	n/a	2.083	n/a	0.08526	NP Inter(normal...
Mercury, total (mg/L)	n/a	0.000033	n/a	n/a	n/a	48	n/a	60.42	n/a	0.08526	NP Inter(normal...
Molybdenum, total (mg/L)	n/a	0.00243	n/a	n/a	n/a	48	n/a	68.75	n/a	0.08526	NP Inter(normal...
Selenium, total (mg/L)	n/a	0.0053	n/a	n/a	n/a	48	n/a	35.42	n/a	0.08526	NP Inter(normal...
Thallium, total (mg/L)	n/a	0.001251	n/a	n/a	n/a	48	n/a	91.67	n/a	0.08526	NP Inter(NDs)

Confidence Interval Summary Table - Significant Results

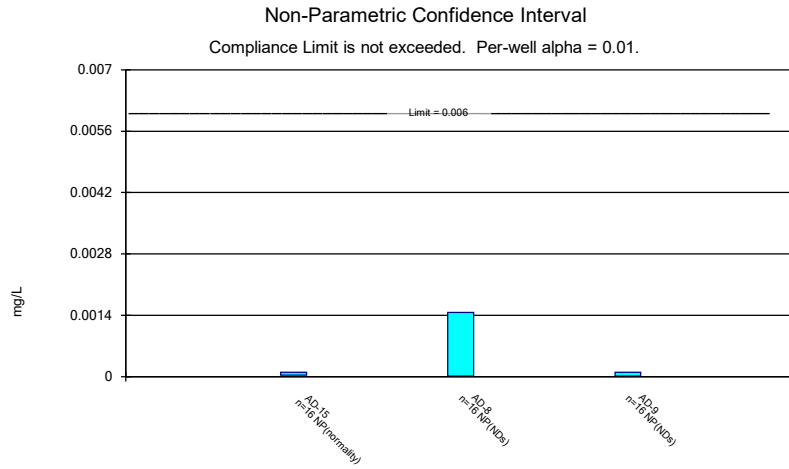
Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/15/2020, 3:27 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Lithium, total (mg/L)	AD-9	1.248	0.7577	0.39	Yes	16	0	x^2	0.01	Param.

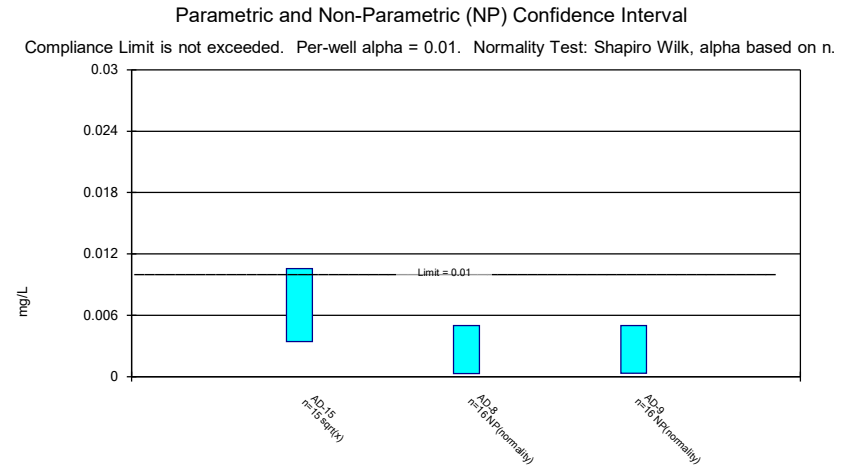
Confidence Interval Summary Table - All Results

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/15/2020, 3:27 PM

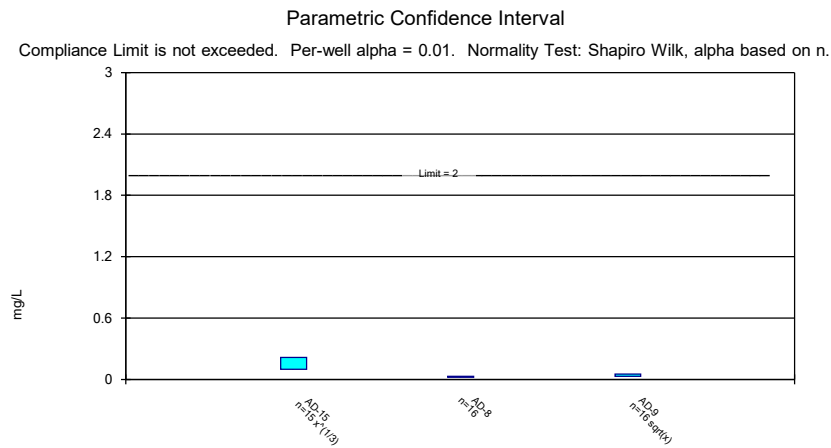
Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	AD-15	0.0001	0.00003	0.006	No	16	62.5	No	0.01	NP (normality)
Antimony, total (mg/L)	AD-8	0.001461	0.00001	0.006	No	16	81.25	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-9	0.0001	0.00001	0.006	No	16	93.75	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-15	0.01057	0.003434	0.01	No	15	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	AD-8	0.005	0.00031	0.01	No	16	50	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-9	0.005	0.00033	0.01	No	16	56.25	No	0.01	NP (normality)
Barium, total (mg/L)	AD-15	0.2129	0.1001	2	No	15	0	x^(1/3)	0.01	Param.
Barium, total (mg/L)	AD-8	0.02906	0.02152	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	AD-9	0.05266	0.03035	2	No	16	0	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-15	0.0009893	0.000217	0.004	No	15	0	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-8	0.0001145	0.00003	0.004	No	16	68.75	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-9	0.0009747	0.0004503	0.004	No	16	0	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-15	0.0003346	0.00003696	0.0065	No	15	6.667	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-8	0.001	0.00003	0.0065	No	16	56.25	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-9	0.001243	0.0002337	0.0065	No	16	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-15	0.01807	0.001732	0.1	No	15	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-8	0.001	0.00009	0.1	No	16	31.25	No	0.01	NP (Cohens/xfrm)
Chromium, total (mg/L)	AD-9	0.001	0.000313	0.1	No	16	50	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-15	0.01011	0.004245	0.075	No	15	0	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	AD-8	0.006812	0.003849	0.075	No	16	0	No	0.01	Param.
Cobalt, total (mg/L)	AD-9	0.02467	0.01529	0.075	No	16	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-15	2.747	1.536	5	No	15	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-8	1.484	0.4811	5	No	16	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-9	2.579	1.766	5	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	AD-15	1	0.086	4	No	16	56.25	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-8	0.7698	0.5618	4	No	16	12.5	ln(x)	0.01	Param.
Fluoride, total (mg/L)	AD-9	1	0.16	4	No	16	37.5	No	0.01	NP (normality)
Lead, total (mg/L)	AD-15	0.007625	0.0006935	0.015	No	15	13.33	sqrt(x)	0.01	Param.
Lead, total (mg/L)	AD-8	0.000223	0.00007	0.015	No	16	62.5	No	0.01	NP (normality)
Lead, total (mg/L)	AD-9	0.0002	0.00008	0.015	No	16	56.25	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-15	0.01984	0.005011	0.39	No	16	0	ln(x)	0.01	Param.
Lithium, total (mg/L)	AD-8	0.1091	0.07877	0.39	No	16	0	No	0.01	Param.
Lithium, total (mg/L)	AD-9	1.248	0.7577	0.39	Yes	16	0	x^2	0.01	Param.
Mercury, total (mg/L)	AD-15	0.000058	0.000005	0.002	No	14	21.43	No	0.01	NP (Cohens/xfrm)
Mercury, total (mg/L)	AD-8	0.00000859	0.000005	0.002	No	15	73.33	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-9	0.0000194	0.000003	0.002	No	15	33.33	No	0.01	NP (Cohens/xfrm)
Molybdenum, total (mg/L)	AD-15	0.00332	0.0005868	0.1	No	16	50	No	0.01	NP (normality)
Molybdenum, total (mg/L)	AD-8	0.002	0.001013	0.1	No	16	75	No	0.01	NP (normality)
Molybdenum, total (mg/L)	AD-9	0.002	0.00011	0.1	No	16	93.75	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-15	0.003041	0.001015	0.05	No	15	13.33	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-8	0.005	0.00007	0.05	No	16	37.5	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-9	0.005	0.0003	0.05	No	16	25	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-15	0.00137	0.0001	0.002	No	16	68.75	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-8	0.001185	0.000129	0.002	No	16	62.5	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-9	0.001453	0.0001	0.002	No	15	46.67	No	0.01	NP (Cohens/xfrm)



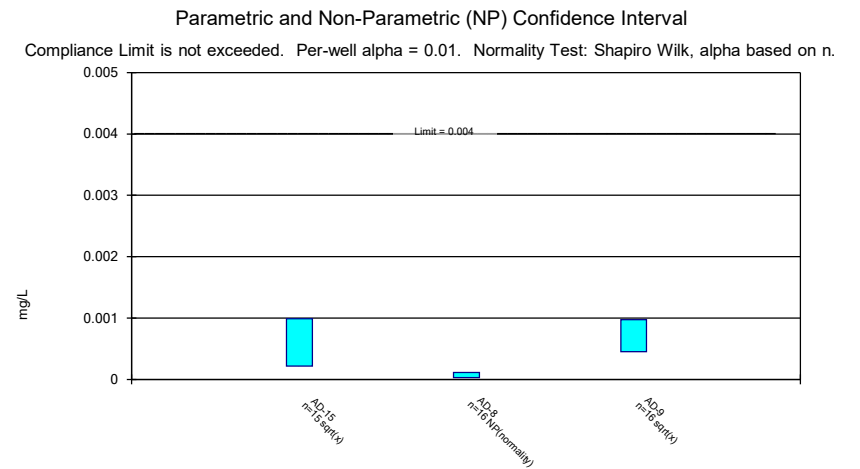
Constituent: Antimony, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Arsenic, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



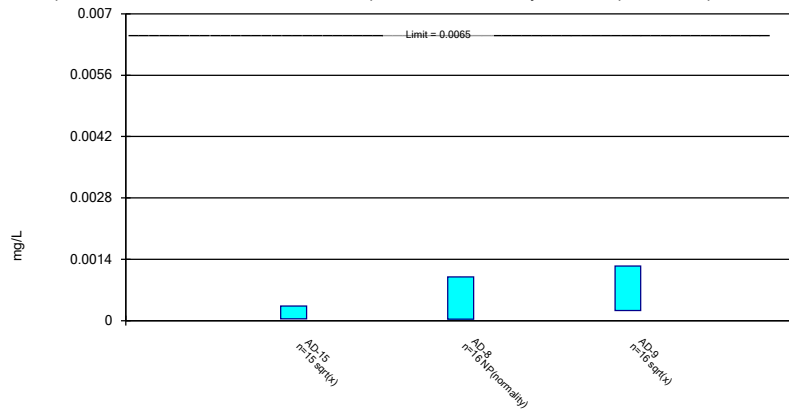
Constituent: Barium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Beryllium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

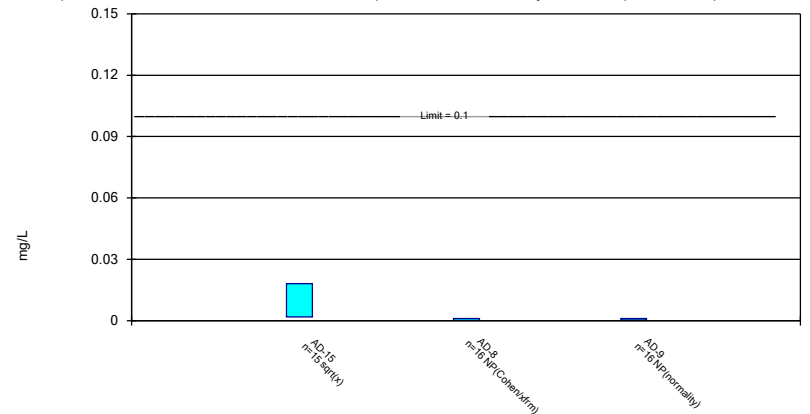
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Constituent: Cadmium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

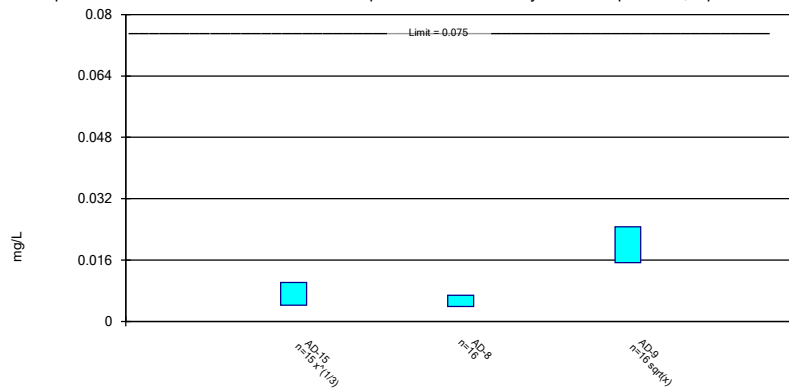
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Constituent: Chromium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

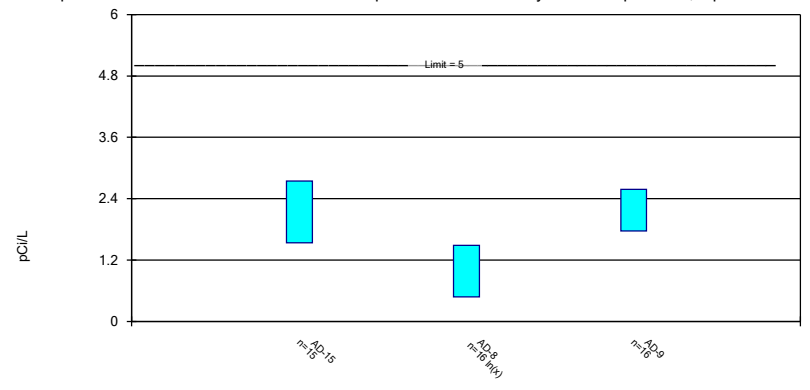
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

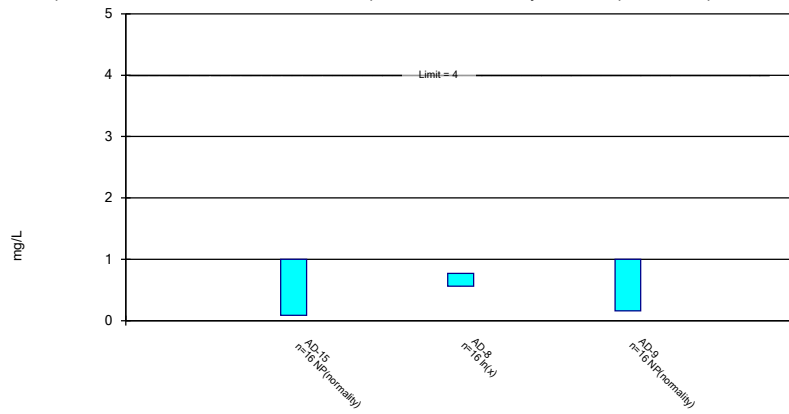
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Constituent: Combined Radium 226 + 228 Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

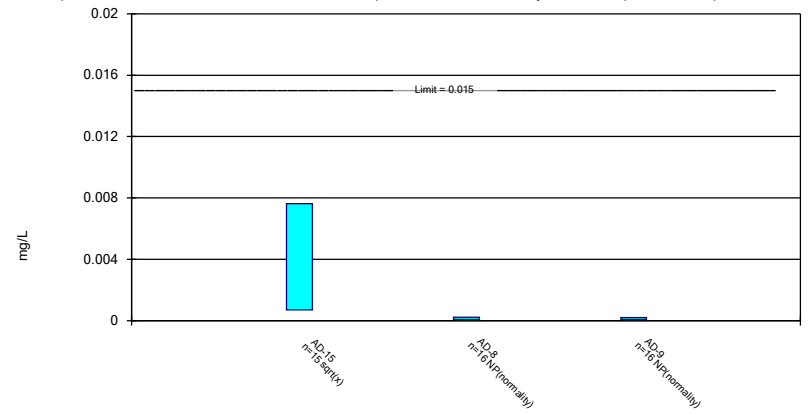
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

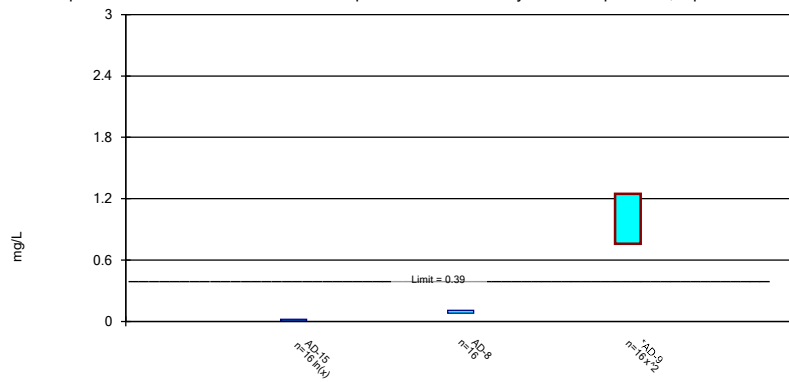
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

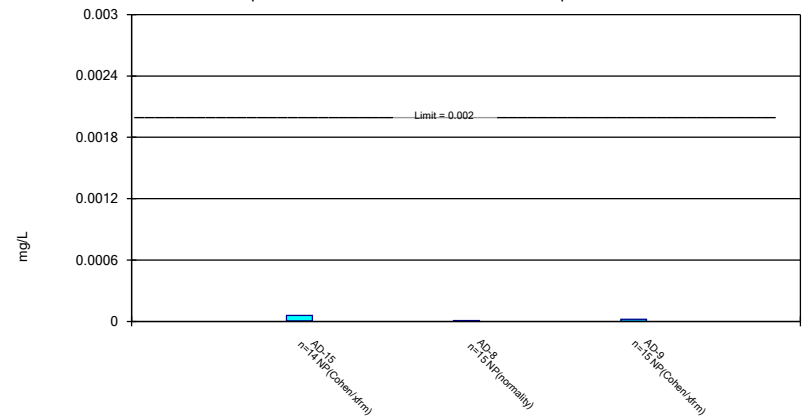
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Non-Parametric Confidence Interval

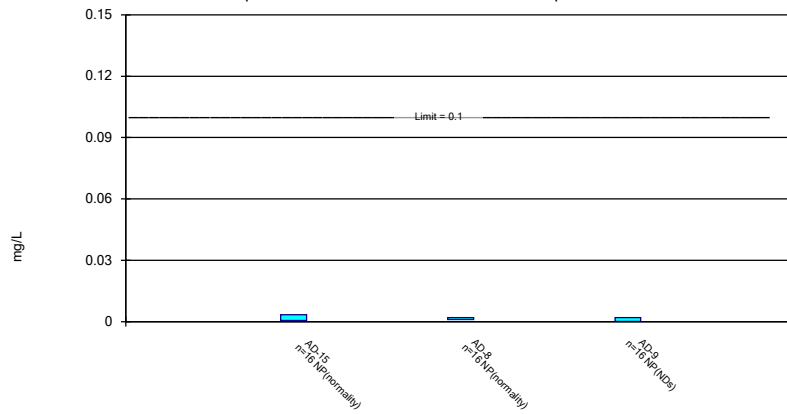
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Non-Parametric Confidence Interval

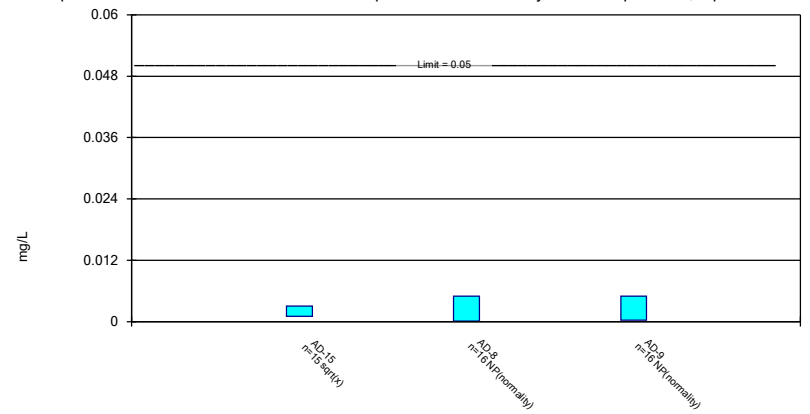
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

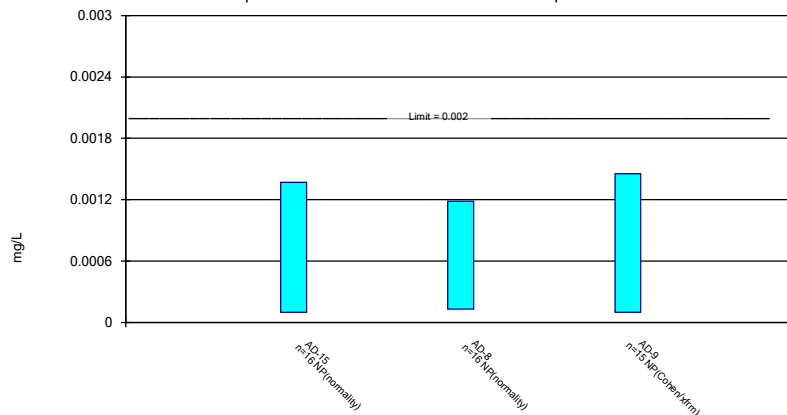
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Thallium, total Analysis Run 12/15/2020 3:26 PM View: Appendix IV
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

STATISTICAL ANALYSIS SUMMARY PRIMARY BOTTOM ASH POND

**J. Robert Welsh Plant
Pittsburg, Texas**

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by



engineers | scientists | innovators

941 Chatham Lane
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September 29, 2021

CHA8500

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Attachment B	Statistical Analysis Output

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
PBAP	Primary Bottom Ash Pond
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
UTL	Upper Tolerance Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule"), groundwater monitoring has been conducted at the Primary Bottom Ash Pond (PBAP), an existing CCR unit at the Welsh Power Plant located in Pittsburg, Texas.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron at the PBAP. An alternative source was not identified at the time, so the PBAP entered assessment monitoring. Groundwater protection standards (GWPS) were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. Two assessment monitoring events were conducted at the PBAP in February and June 2021 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

Groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact data usability.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at an SSL above previously established GWPS. No SSLs were identified; however, concentrations of Appendix III parameters remained above background. Thus, the unit will remain in assessment monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A. The statistical analysis and certification of the selected methods were completed within 90 days of obtaining the data.

SECTION 2

PRIMARY BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, two sets of samples (February 2021 and June 2021) were collected for analysis from each upgradient and downgradient well to meet the requirements of § 352.951(a). Samples from the June 2021 event were analyzed for all Appendix III and Appendix IV parameters, whereas samples from the February 2021 event were analyzed for all Appendix IV and select Appendix III parameters only. A summary of data collected during these assessment monitoring events may be found in Table 1.

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program (NELAP). Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks (LRBs), continuing calibration verification (CCV) samples, and laboratory fortified blanks (LFBs).

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.30 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Time series plots and results for all completed statistical tests are provided in Attachment B. The data obtained in February and June 2021 were screened for potential outliers. No outliers were identified for this event.

2.2.1 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B. The calculated confidence limits were compared to the GWPSs provided in Table 2. The GWPSs were established as either the greater value of the background concentration calculated during a previous statistical analysis (Geosyntec, 2021) or the maximum contaminant level (MCL).

No SSLs were identified at the PBAP.

2.2.2 Evaluation of Potential Appendix III SSIs

A review of the Appendix III results was also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations. Data collected during the June 2021 assessment monitoring event from each compliance well were compared to previously established prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.700 mg/L at AD-8 (1.10 mg/L).
- The reported pH values were below the interwell lower prediction limit (LPL) of 4.8 SU mg/L at AD-9 (4.4 SU) and AD-15 (4.4 SU).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the initial (June 2021) sample was above the UPL or below the LPL. Based on these results, the boron and pH concentrations appear to be above or below the appropriate background concentrations and the unit will remain assessment monitoring.

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the February and June 2021 data. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. No SSLs were identified.

The Appendix III results were evaluated to assess whether concentrations of Appendix III parameters exceeded background levels. Boron concentrations exceeded and pH values were below background levels at select downgradient wells.

Based on this evaluation, the PBAP CCR unit will remain in assessment monitoring.

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2021. Statistical Analysis Summary – Primary Bottom Ash Pond, J. Robert Welsh Plant. February 11, 2021.

TABLES

**Table 1 - Groundwater Data Summary
Welsh Plant - Primary Bottom Ash Pond**

Well ID		AD-1		AD-5		AD-8		AD-9		AD-15		AD-17	
Well Classification		Background		Background		Compliance		Compliance		Compliance		Background	
Parameter	Unit	2/23/2021	6/2/2021	2/23/2021	6/2/2021	2/23/2021	6/1/2021	2/23/2021	6/1/2021	2/23/2021	6/1/2021	2/23/2021	6/2/2021
Antimony	µg/L	0.24	0.18	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.74	0.66	2.06	1.72	0.31	0.37	0.27	0.21	1.39	3.04	0.61	0.84
Barium	µg/L	338	349	68.3	49.3	24.2	47.9	54.9	51.6	72.4	76.9	10.6	10.9
Beryllium	µg/L	0.136	0.088	0.03 J	0.018 J	0.5 U	0.01 J	1.51	1.15	0.190	0.138	0.03 J	0.066
Boron	mg/L	0.617	0.786	0.03 J	0.027 J	1.18	1.10	0.219	0.221	0.03 J	0.213	0.098	0.124
Cadmium	µg/L	0.03 J	0.01 J	0.05 U	0.02 U	0.03 J	0.029	0.33	0.353	0.02 J	0.015 J	0.03 J	0.026
Calcium	mg/L	113	97.1	30.9	24.4	14.8	15.3	11.6	12.5	2.30	3.0	168	233
Chloride	mg/L	-	2.26	-	19.6	-	14.8	-	16.7	-	28.4	-	44.9
Chromium	µg/L	0.338	0.32	0.1 J	0.26	0.1 J	0.28	0.373	0.59	0.1 J	0.31	0.1 J	0.38
Cobalt	µg/L	0.477	0.474	6.31	10.5	0.899	1.04	21.7	20.6	2.61	2.73	41.1	72.9
Combined Radium	pCi/L	1.737	2.15	1.397	2.47	0.544	0.69	1.557	1.74	1.021	1.45	1.433	2.4
Fluoride	mg/L	0.31	0.30	0.23	0.21	0.69	0.73	0.21	0.19	0.08	0.10	0.17	0.31
Lead	µg/L	0.852	0.09 J	0.2 U	0.2 U	0.06 J	0.07 J	0.1 J	0.08 J	0.08 J	0.2 U	0.08 J	0.09 J
Lithium	mg/L	0.00155	0.00052	0.0705	0.0764	0.104	0.0818	0.189	0.141	0.00167	0.00330	0.249	0.311
Mercury	µg/L	0.005 U	0.002 J	0.005 U	0.005 U	0.005 U	0.005 U	0.003 J	0.003 J	0.005 U	0.005 U	0.005 U	0.005 U
Molybdenum	µg/L	1 J	4.8	2 U	0.1 J	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U	2 U	0.2 J
Selenium	µg/L	2.5	1.26	0.03 J	0.5 U	0.2 U	0.5 U	0.4	0.31 J	0.2	0.43 J	0.04 J	0.5 U
Sulfate	mg/L	-	61.4	-	53.8	-	162	-	118	-	11.4	-	1,210
Thallium	µg/L	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U	0.05 J	0.2 J	0.22	0.5 U	0.05 J	0.5 U	0.2 U
Total Dissolved Solids	mg/L	-	400	-	220	-	330	-	300	-	150	-	1,890
pH	SU	6.6	6.2	6.0	5.8	6.1	5.3	4.7	4.4	4.4	4.4	5.6	5.7

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.

J: Estimated value. Parameter was detected in concentrations below the reporting limit.

-: Not analyzed

**Table 2: Appendix IV Groundwater Protection Standards
Welsh Plant - Primary Bottom Ash Pond**

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006	0.0032	0.006
Arsenic, Total (mg/L)	0.01	0.006	0.01
Barium, Total (mg/L)	2	0.64	2
Beryllium, Total (mg/L)	0.004	0.00077	0.004
Cadmium, Total (mg/L)	0.005	0.0065	0.0065
Chromium, Total (mg/L)	0.1	0.004	0.1
Cobalt, Total (mg/L)	n/a	0.075	0.075
Combined Radium, Total (pCi/L)	5	4.01	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.003	0.003
Lithium, Total (mg/L)	n/a	0.394	0.394
Mercury, Total (mg/L)	0.002	0.000033	0.002
Molybdenum, Total (mg/L)	n/a	0.0024	0.0024
Selenium, Total (mg/L)	0.05	0.005	0.05
Thallium, Total (mg/L)	0.002	0.0013	0.002

Notes:

MCL = Maximum Contaminant Level

GWPS = Groundwater Protection Standard

Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Grey cells indicate the GWPS is based on the calculated UTL, which is either higher than the MCL or an MCL does not exist.

**Table 3: Appendix III Data Evaluation
Welsh Plant - Primary Bottom Ash Pond**

Analyte	Unit	Description	AD-8	AD-9	AD-15
			6/1/2021	6/1/2021	6/1/2021
Boron	mg/L	Interwell Background Value (UPL)	0.700		
		Analytical Result	1.10	0.221	0.213
Calcium	mg/L	Intrawell Background Value (UPL)	32.4	299	5.40
		Analytical Result	15.3	12.5	3.0
Chloride	mg/L	Intrawell Background Value (UPL)	35.5	138	38.8
		Analytical Result	14.8	16.7	28.4
Fluoride	mg/L	Intrawell Background Value (UPL)	0.737	1.00	1.00
		Analytical Result	0.73	0.19	0.10
pH	SU	Interwell Background Value (UPL)	7.0		
		Interwell Background Value (LPL)	4.8		
		Analytical Result	5.3	4.4	4.4
Sulfate	mg/L	Intrawell Background Value (UPL)	230	2,530	33.2
		Analytical Result	162	118	11.4
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	553	3,070	249
		Analytical Result	330	300	150

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Welsh Primary Bottom Ash Pond CCR management area and that the requirements of § 352.931(a) have been met.

DAVID ANTHONY MILLER
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

112498
License Number

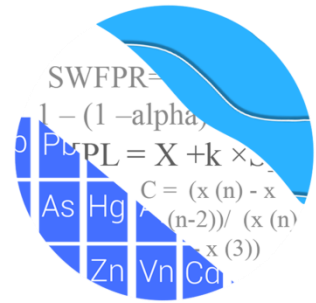
TEXAS
Licensing State

10.04.21
Date



ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



August 30, 2021

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
941 Chatham Lane, #103
Columbus, OH 43221

Re: Welsh PBAP – June 2021 Semi-Annual Assessment Monitoring Report

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of groundwater data for the June 2021 Assessment Monitoring report for American Electric Power Inc.'s Welsh PBAP. The analysis complies with the Texas Commission of Environmental Quality Rule 30 TAC 352 as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at the site for the Coal Combustion Residual (CCR) program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** AD-1, AD-5, and AD-17
- **Downgradient wells:** AD-8, AD-9, and AD-15

Data were sent electronically, and the statistical analysis was reviewed by Kristina Rayner, Groundwater Statistician and Founder of Groundwater Stats Consulting (GSC). The analysis was conducted according to the Statistical Analysis Plan prepared by GSC and approved by Dr. Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC.

The CCR Assessment Monitoring program consists of the following constituents:

- **Appendix IV** (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

Time series plots for Appendix IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). For all constituents, a substitution of the most recent reporting limit is used for non-detect data. While the reporting limits may vary from well to well, a single reporting limit substitution is used across all wells for a given parameter in the time series plots since the wells are plotted as a group.

The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells. Values previously identified and flagged as outliers may be seen in the Outlier Summary following this letter (Figure C) and are plotted in a lighter font and disconnected symbol on the time series graphs. Note that the measured concentrations of most metals for the September 30, 2016 sample event at well AD-15 are very high compared to the rest of the observations and resulted from elevated turbidity levels of >1000 mg/L. These values were flagged as outliers as they do not represent the population at this well.

Summary of Statistical Methods – Appendix IV Parameters

Parametric tolerance limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are non-detects, a nonparametric test is utilized. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (USEPA, 2009), data are analyzed using either parametric or non-parametric prediction limits as appropriate.

- No statistical analyses are required on wells and analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the most recent practical quantification limit (PQL) as reported by the laboratory.

- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric tolerance limits are used on data containing greater than 50% non-detects.

Background Update – Conducted in January 2021

Outlier Analysis

Prior to evaluating Appendix IV parameters, background (upgradient) data through October 2020 were evaluated with visual screening for any new potential outliers or extreme trending patterns that would lead to artificially elevated statistical limits. High outliers are also 'cautiously' flagged in the downgradient wells when they are clearly much different from the rest of the data. This is intended to be a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals; although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean. No new values were flagged as outliers for Appendix IV parameters during the background update. A list of flagged values follows this report (Figure C).

Tolerance Limits

Interwell upper tolerance limits were used to calculate the site-specific background limits from all available pooled upgradient well data for Appendix IV parameters through October 2020 (Figure D). Parametric tolerance limits are used when data follow a normal or transformed-normal distribution and use a target of 95% confidence and 95% coverage. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were used. The background limits were then used when determining the groundwater protection standard (GWPS) (Figure E). GWPS will be updated during Fall 2021.

Evaluation of Appendix IV Parameters – June 2021

Confidence intervals were constructed with data through June 2021 on downgradient wells for each of the Appendix IV parameters using the highest limit of the MCL, or background limit as the GWPS as discussed above (Figure F). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. As discussed earlier, for all constituents, a substitution of the most recent reporting limit is used for non-detect data, based on the wells selected, which generally gives the most conservative limit in each case. For confidence intervals, a single reporting limit substitution is used across downgradient wells for a given parameter. No exceedances were noted for any of the well/constituent pairs. A summary of the confidence interval results follows this letter.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Welsh PBAP. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

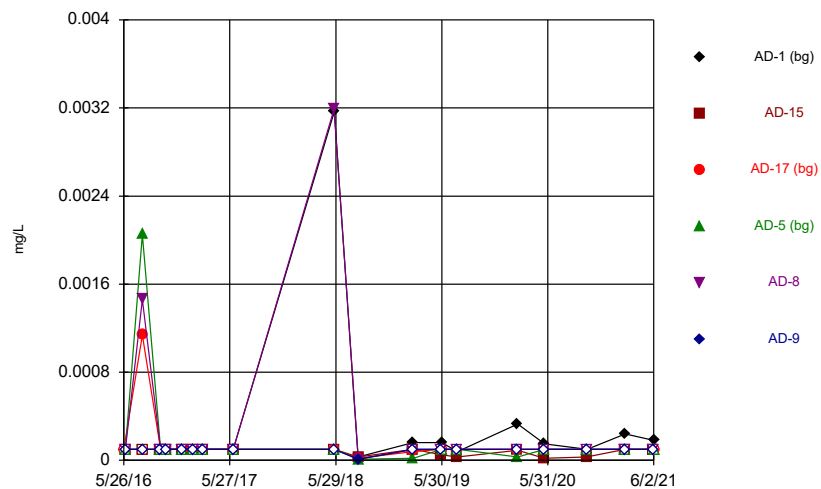


Andrew Collins
Project Manager



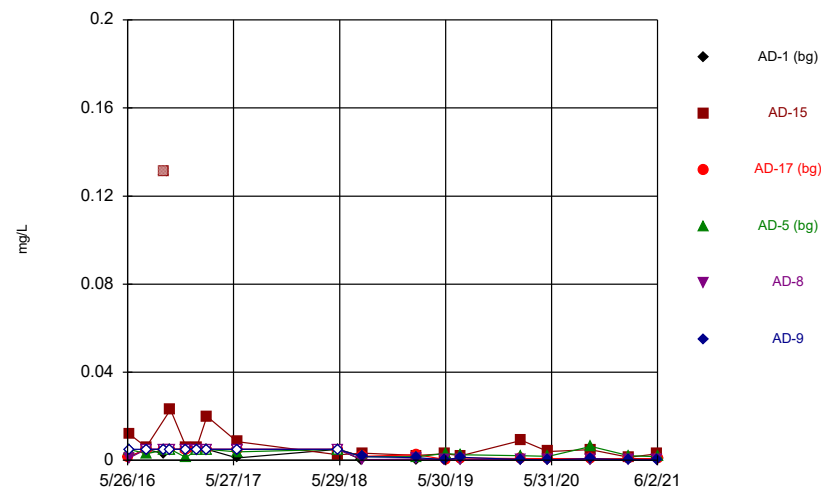
Kristina Rayner
Groundwater Statistician

Time Series



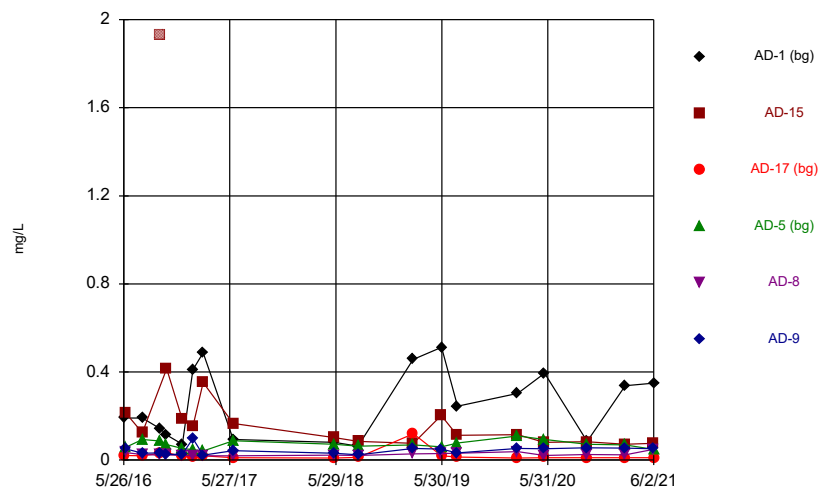
Constituent: Antimony, total Analysis Run 7/22/2021 1:24 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



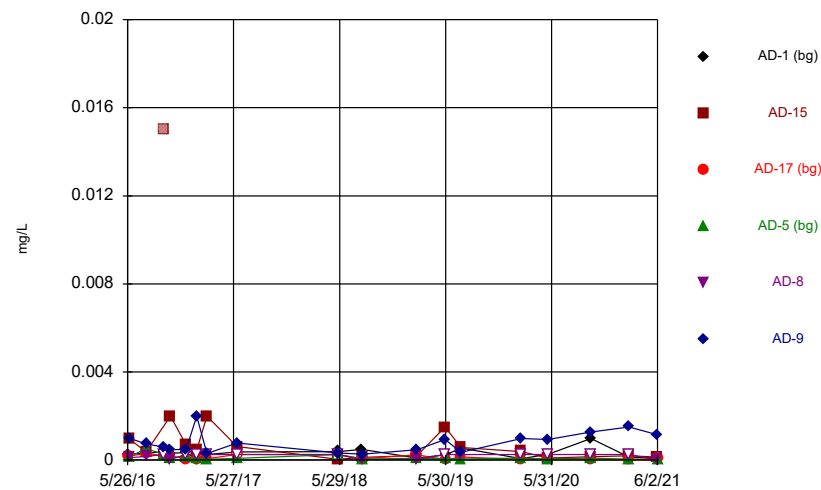
Constituent: Arsenic, total Analysis Run 7/22/2021 1:24 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



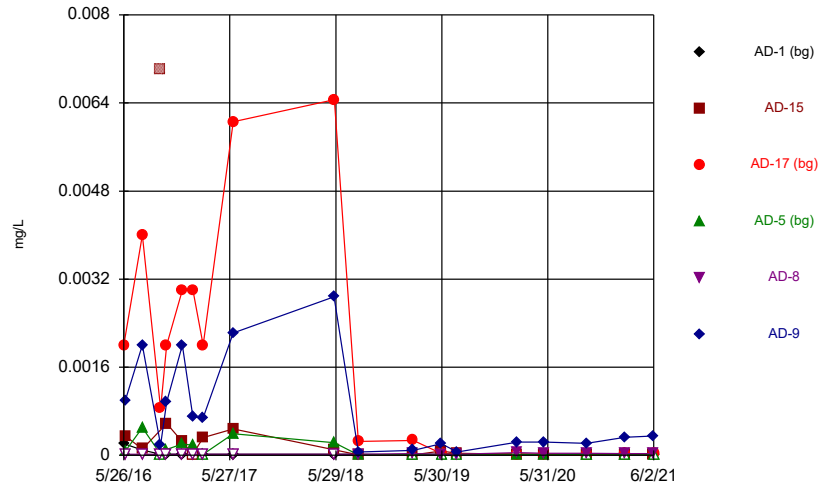
Constituent: Barium, total Analysis Run 7/22/2021 1:24 PM
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Time Series



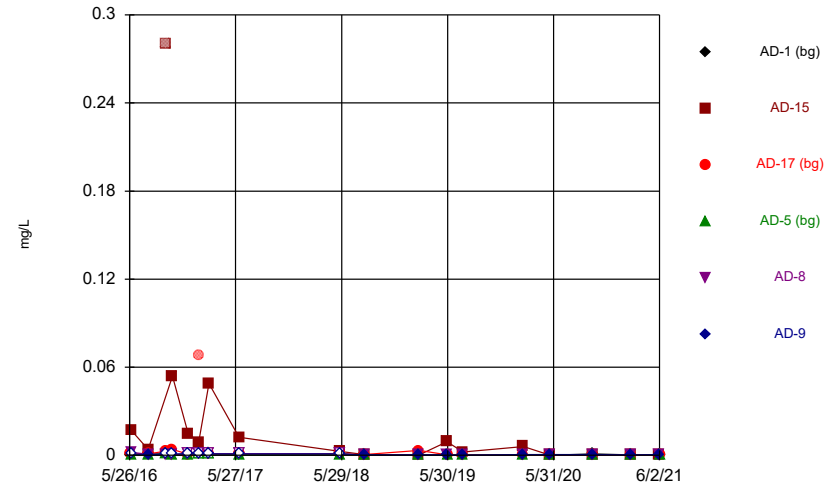
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Time Series



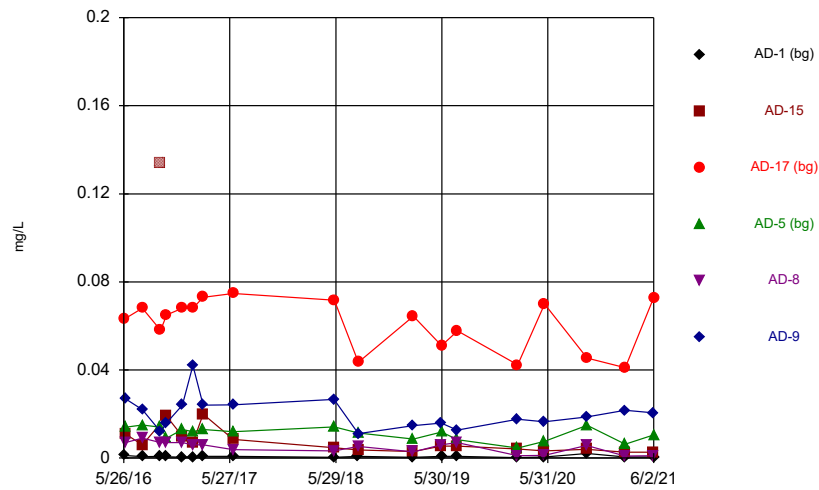
Constituent: Cadmium, total Analysis Run 7/22/2021 1:24 PM
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Time Series



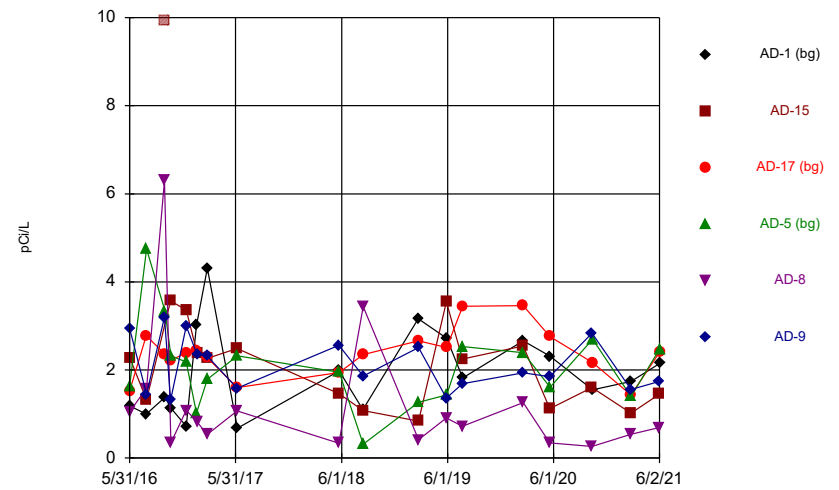
Constituent: Chromium, total Analysis Run 7/22/2021 1:24 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



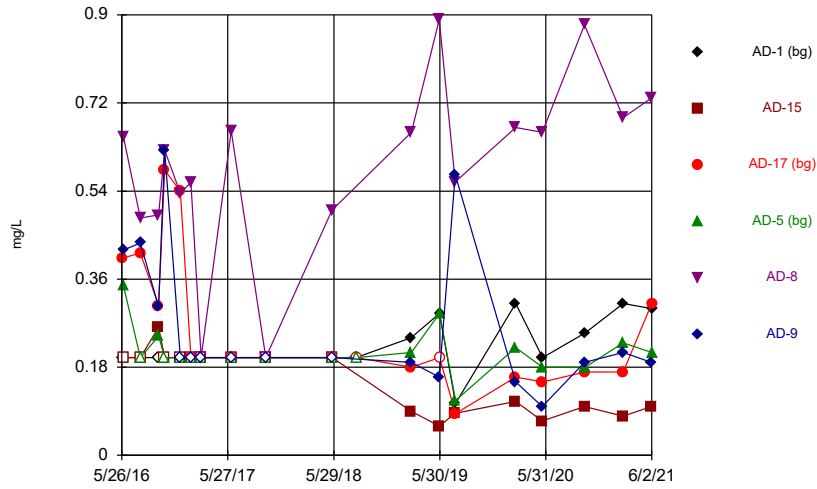
Constituent: Cobalt, total Analysis Run 7/22/2021 1:24 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series

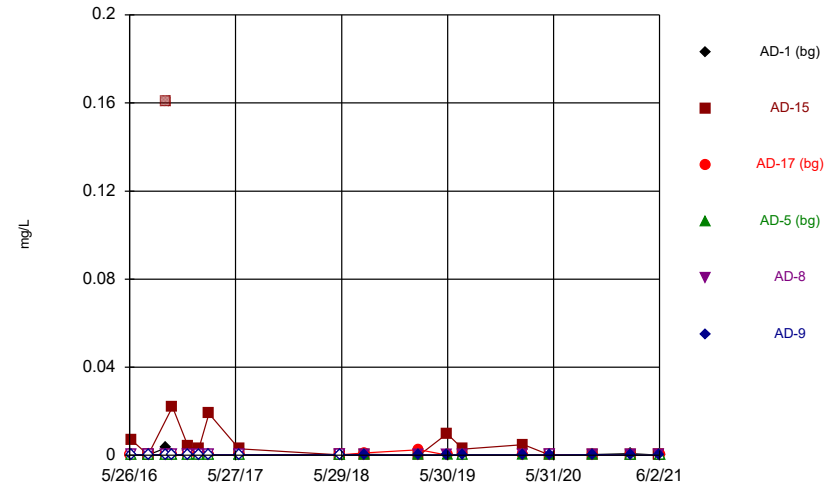


Constituent: Combined Radium 226 + 228 Analysis Run 7/22/2021 1:24 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

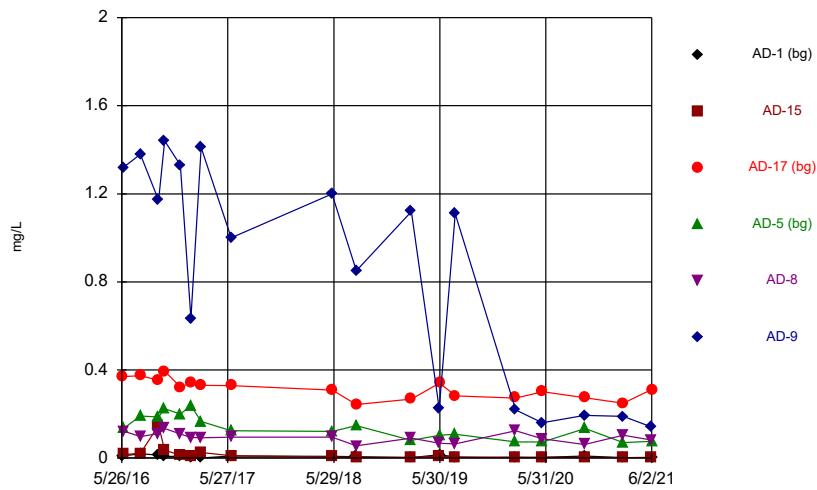
Time Series



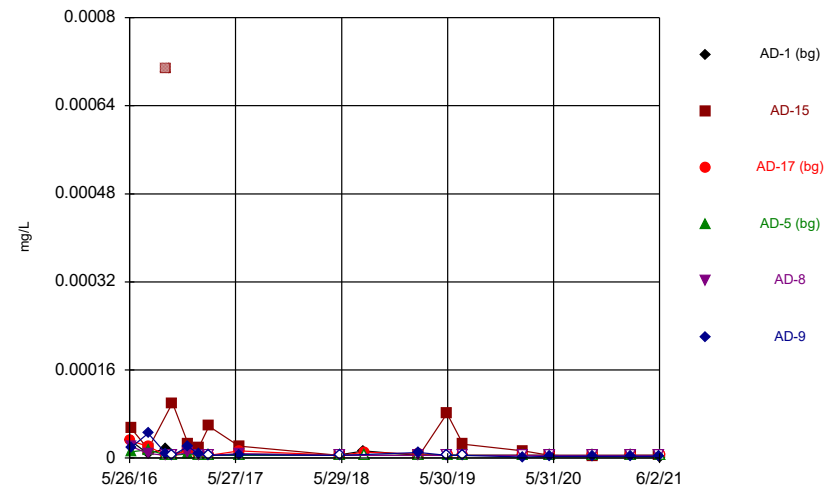
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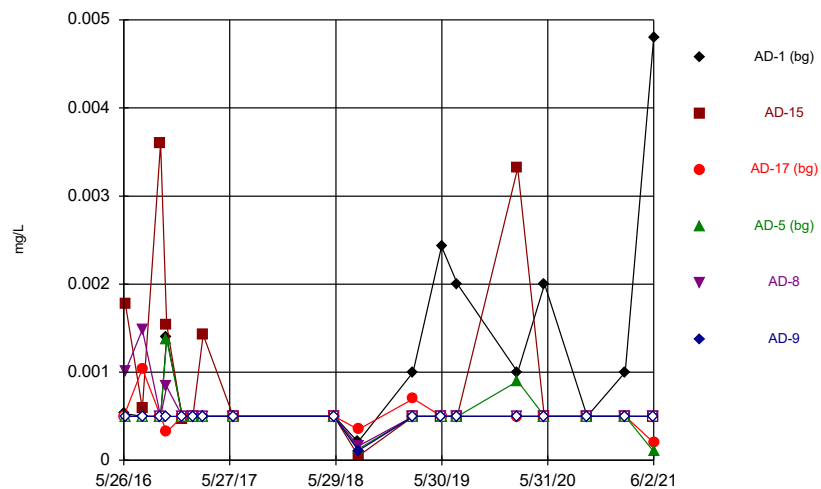
Time Series



Time Series

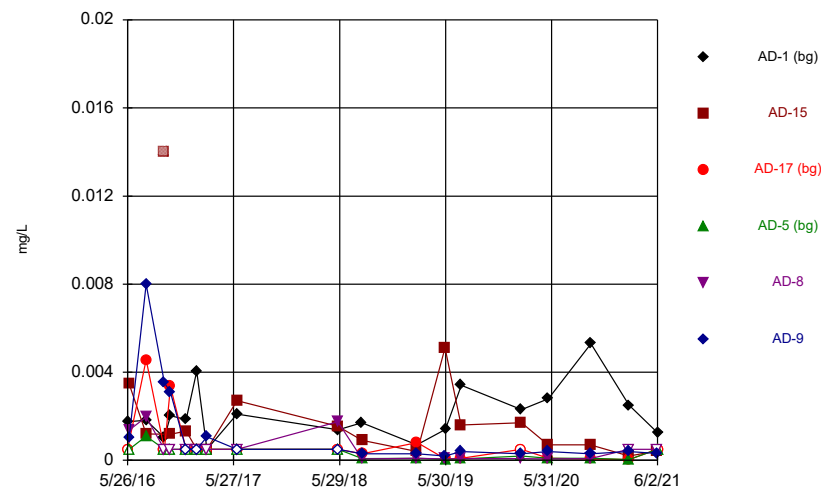


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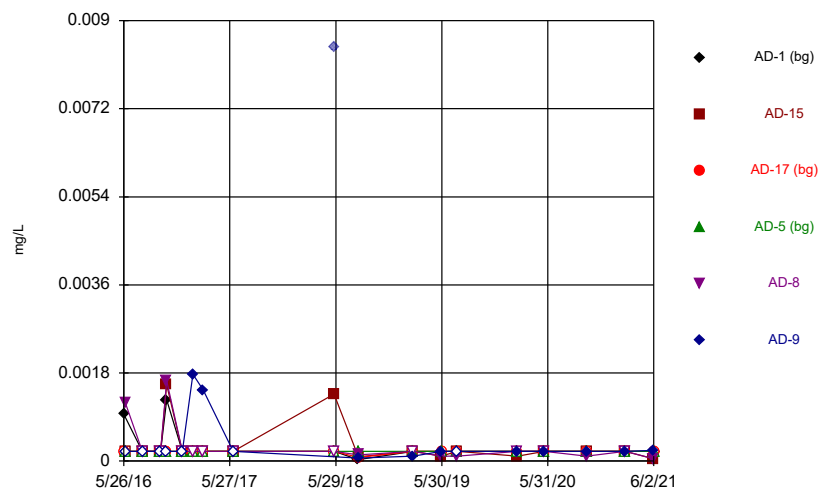
Constituent: Molybdenum, total Analysis Run 7/22/2021 1:24 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



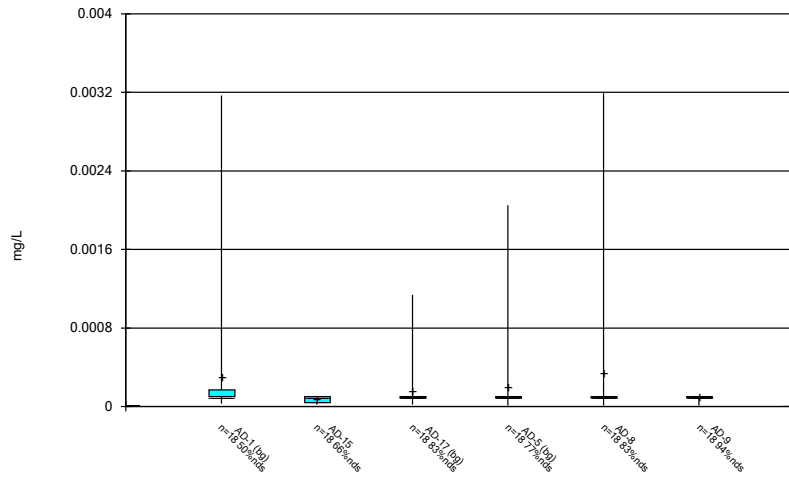
Constituent: Selenium, total Analysis Run 7/22/2021 1:24 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Time Series



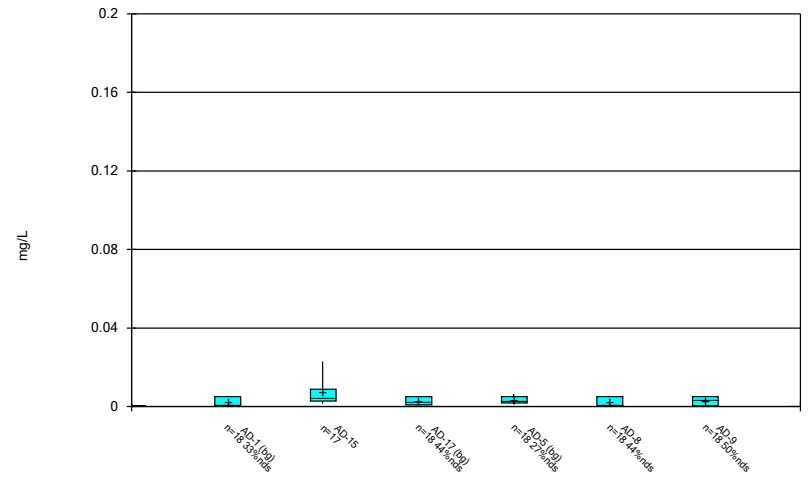
Constituent: Thallium, total Analysis Run 7/22/2021 1:24 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



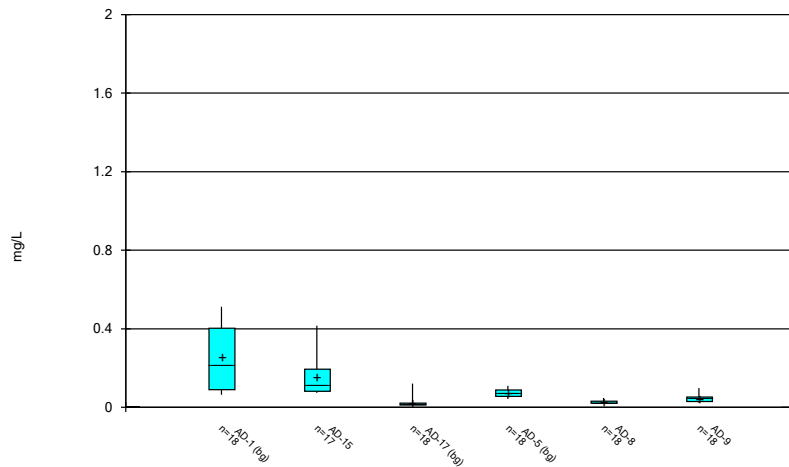
Constituent: Antimony, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



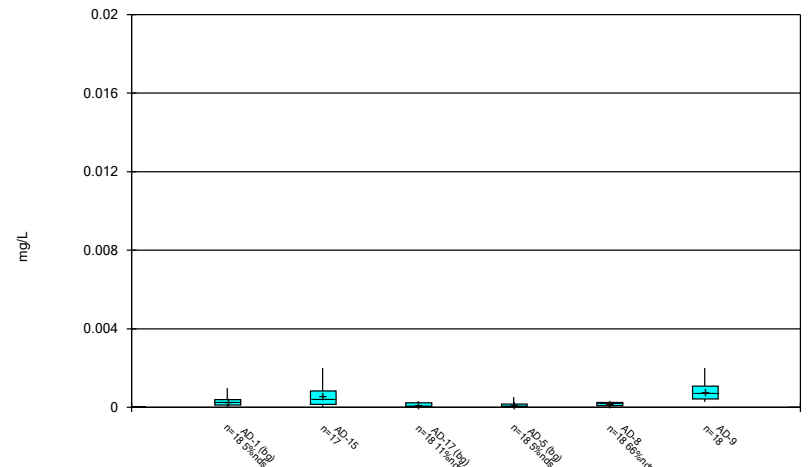
Constituent: Arsenic, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



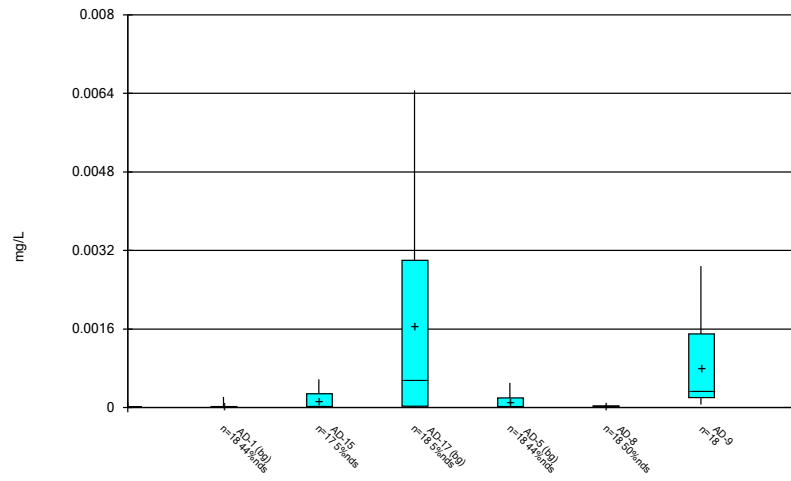
Constituent: Barium, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



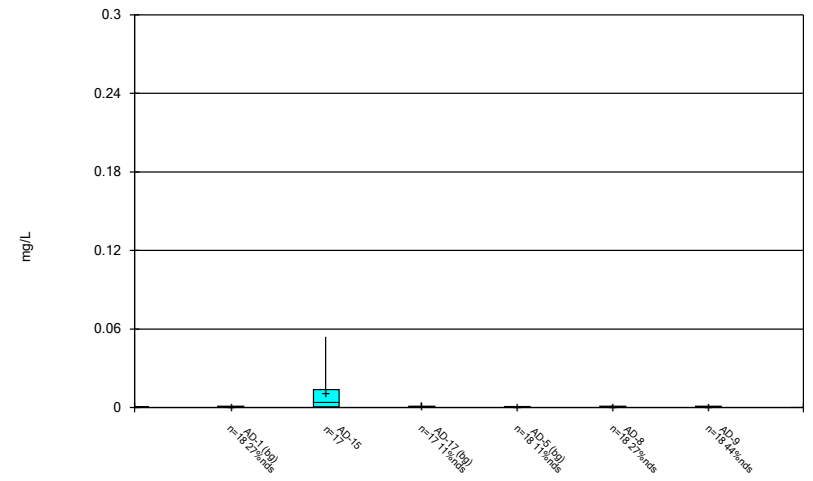
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Box & Whiskers Plot



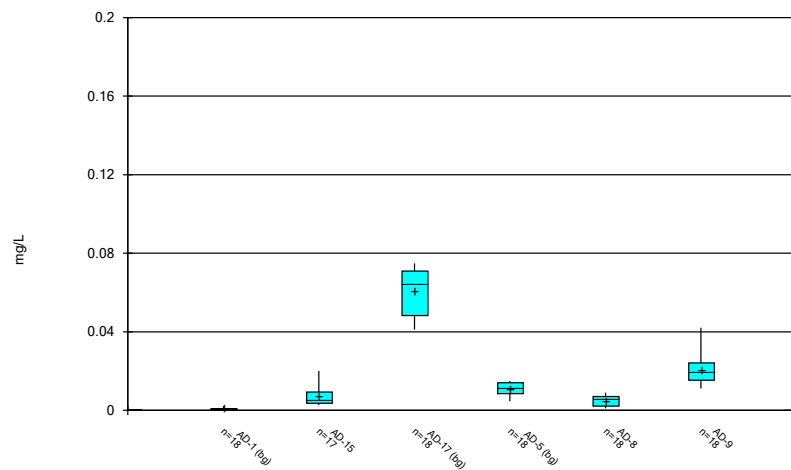
Constituent: Cadmium, total Analysis Run 7/22/2021 1:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



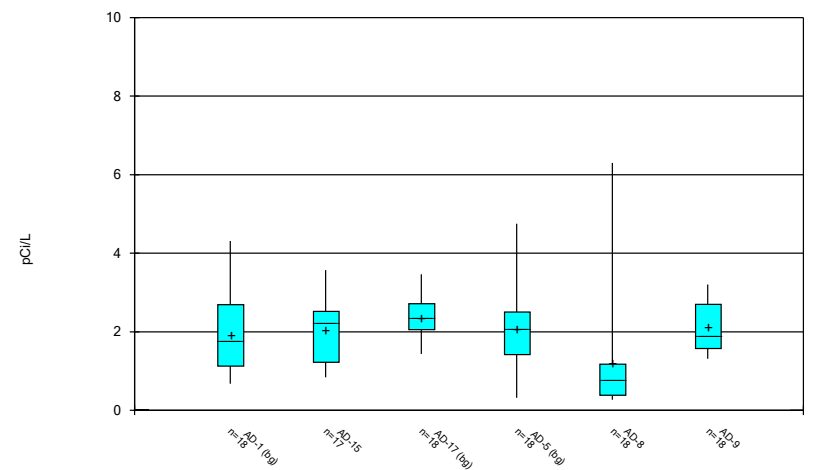
Constituent: Chromium, total Analysis Run 7/22/2021 1:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



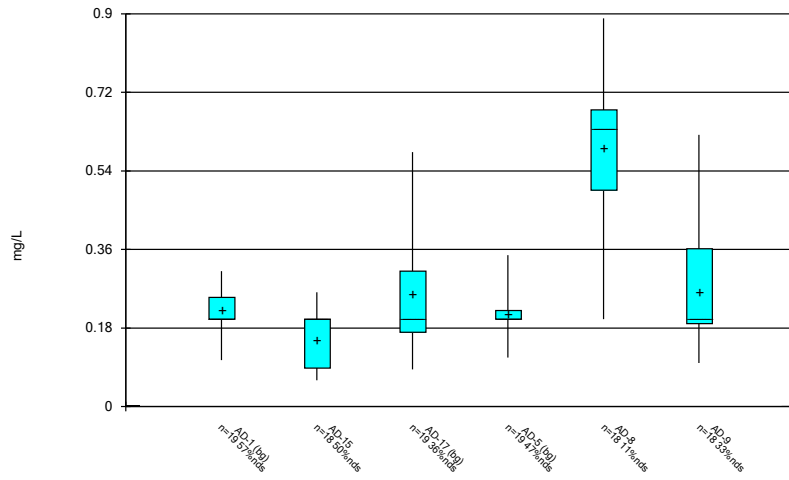
Constituent: Cobalt, total Analysis Run 7/22/2021 1:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



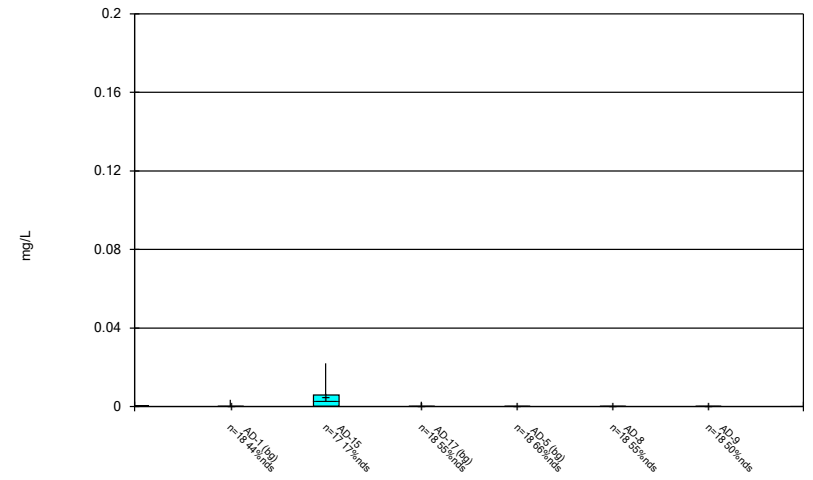
Constituent: Combined Radium 226 + 228 Analysis Run 7/22/2021 1:28 PM
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



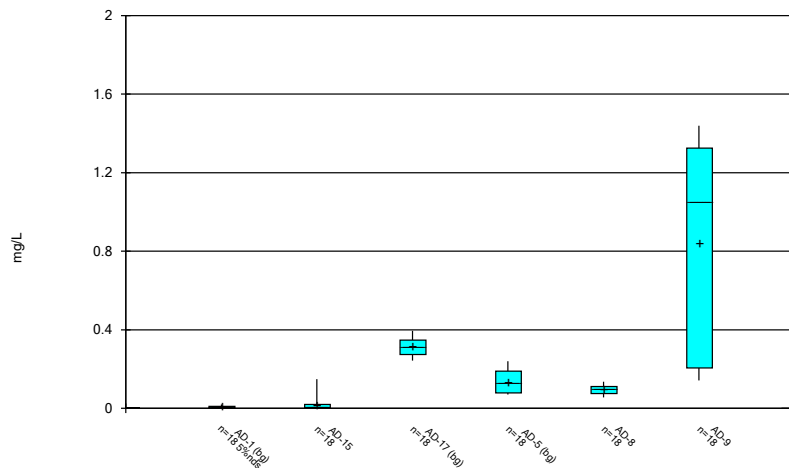
Constituent: Fluoride, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



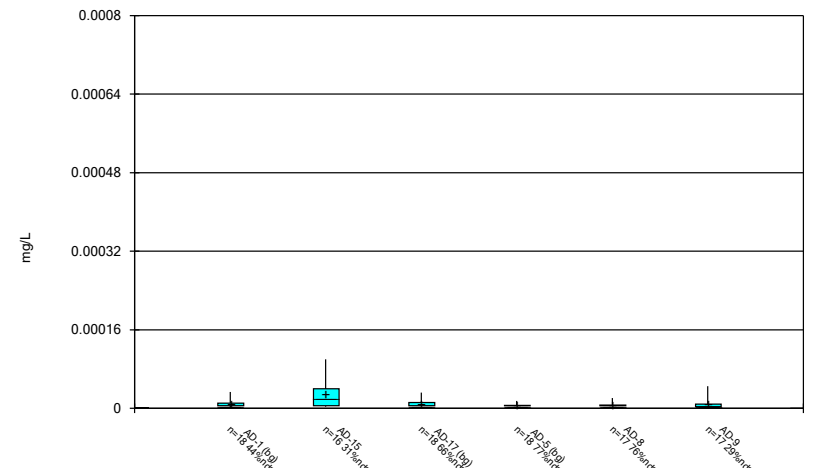
Constituent: Lead, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



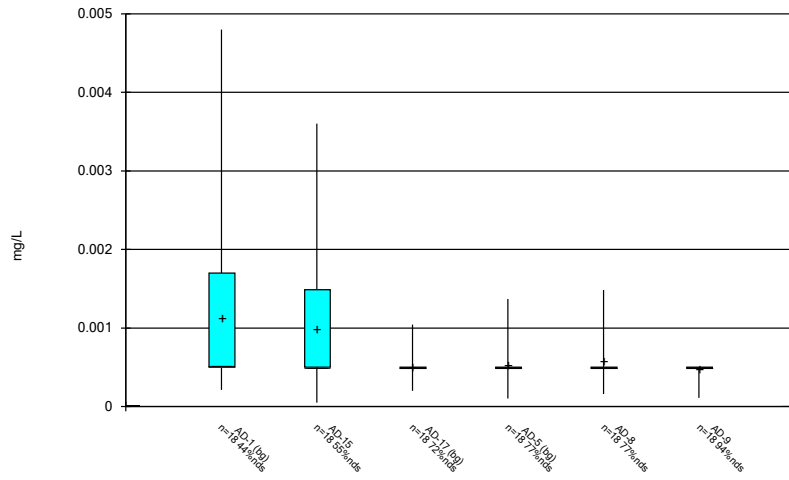
Constituent: Lithium, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



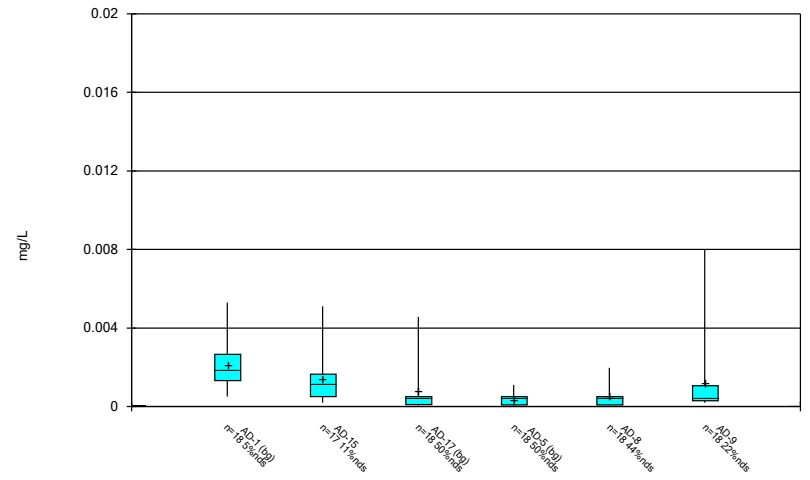
Constituent: Mercury, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



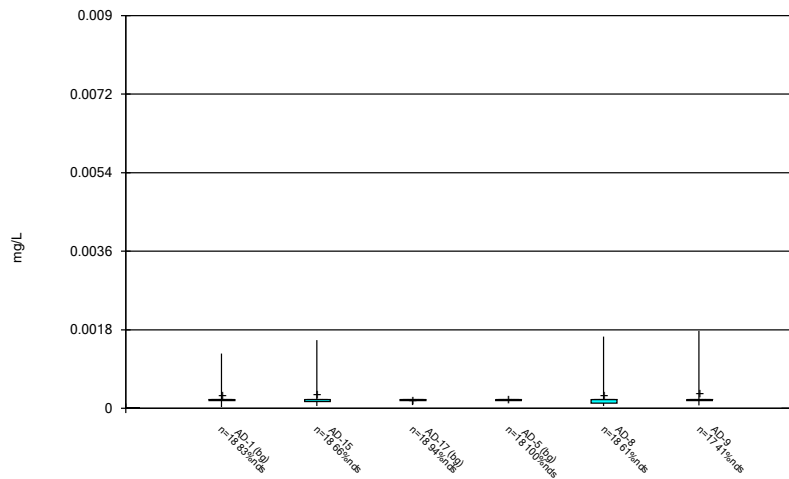
Constituent: Molybdenum, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 7/22/2021 1:28 PM
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Outlier Summary

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 7/22/2021, 1:36 PM

	AD-15 Arsenic, total (mg/L)	AD-15 Barium, total (mg/L)	AD-15 Beryllium, total (mg/L)	AD-15 Cadmium, total (mg/L)	AD-15 Chromium, total (mg/L)	AD-17 Chromium, total (mg/L)	AD-15 Cobalt, total (mg/L)	AD-15 Combined Radium 226 + 228 (pCi/L)	AD-15 Lead, total (mg/L)	AD-15 Mercury, total (mg/L)
9/29/2016							9.92 (o)			
9/30/2016	0.131 (o)	1.93 (o)	0.015 (o)	0.007 (o)	0.28 (o)		0.134 (o)		0.161 (o)	0.000707 (o)
1/20/2017						0.068 (o)				
5/23/2018										

	AD-15 Selenium, total (mg/L)	AD-9 Thallium, total (mg/L)
9/29/2016		
9/30/2016	0.014 (o)	
1/20/2017		
5/23/2018		0.00846 (o)

Upper Tolerance Limits

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 12/15/2020, 3:23 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Bg N	Std. Dev.	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00317	n/a	n/a	n/a	48	n/a	70.83	n/a	0.08526	NP Inter(normal...
Arsenic, total (mg/L)	n/a	0.00628	n/a	n/a	n/a	48	n/a	39.58	n/a	0.08526	NP Inter(normal...
Barium, total (mg/L)	n/a	0.6453	n/a	n/a	n/a	48	1.132	0	ln(x)	0.05	Inter
Beryllium, total (mg/L)	n/a	0.0007729	n/a	n/a	n/a	48	0.01767	8.333	x^(1/3)	0.05	Inter
Cadmium, total (mg/L)	n/a	0.00646	n/a	n/a	n/a	48	n/a	31.25	n/a	0.08526	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.004	n/a	n/a	n/a	47	n/a	19.15	n/a	0.08974	NP Inter(normal...
Cobalt, total (mg/L)	n/a	0.0748	n/a	n/a	n/a	48	n/a	0	n/a	0.08526	NP Inter(normal...
Combined Radium 226 + 228 (pCi/L)	n/a	4.007	n/a	n/a	n/a	48	0.895	0	No	0.05	Inter
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	n/a	51	n/a	52.94	n/a	0.0731	NP Inter(normal...
Lead, total (mg/L)	n/a	0.003384	n/a	n/a	n/a	48	n/a	58.33	n/a	0.08526	NP Inter(normal...
Lithium, total (mg/L)	n/a	0.394	n/a	n/a	n/a	48	n/a	2.083	n/a	0.08526	NP Inter(normal...
Mercury, total (mg/L)	n/a	0.000033	n/a	n/a	n/a	48	n/a	60.42	n/a	0.08526	NP Inter(normal...
Molybdenum, total (mg/L)	n/a	0.00243	n/a	n/a	n/a	48	n/a	68.75	n/a	0.08526	NP Inter(normal...
Selenium, total (mg/L)	n/a	0.0053	n/a	n/a	n/a	48	n/a	35.42	n/a	0.08526	NP Inter(normal...
Thallium, total (mg/L)	n/a	0.001251	n/a	n/a	n/a	48	n/a	91.67	n/a	0.08526	NP Inter(NDs)

WELSH PBAP GWPS			
Constituent Name	MCL	Background Limit	GWPS
Antimony, Total (mg/L)	0.006	0.0032	0.006
Arsenic, Total (mg/L)	0.01	0.0063	0.01
Barium, Total (mg/L)	2	0.65	2
Beryllium, Total (mg/L)	0.004	0.00077	0.004
Cadmium, Total (mg/L)	0.005	0.0065	0.0065
Chromium, Total (mg/L)	0.1	0.004	0.1
Cobalt, Total (mg/L)	n/a	0.075	0.075
Combined Radium, Total (pCi/L)	5	4.01	5
Fluoride, Total (mg/L)	4	0.58	4
Lead, Total (mg/L)	n/a	0.0034	0.0034
Lithium, Total (mg/L)	n/a	0.39	0.39
Mercury, Total (mg/L)	0.002	0.000033	0.002
Molybdenum, Total (mg/L)	n/a	0.0024	0.0024
Selenium, Total (mg/L)	0.05	0.0053	0.05
Thallium, Total (mg/L)	0.002	0.0013	0.002

**Grey cell indicates background is higher than MCL*

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

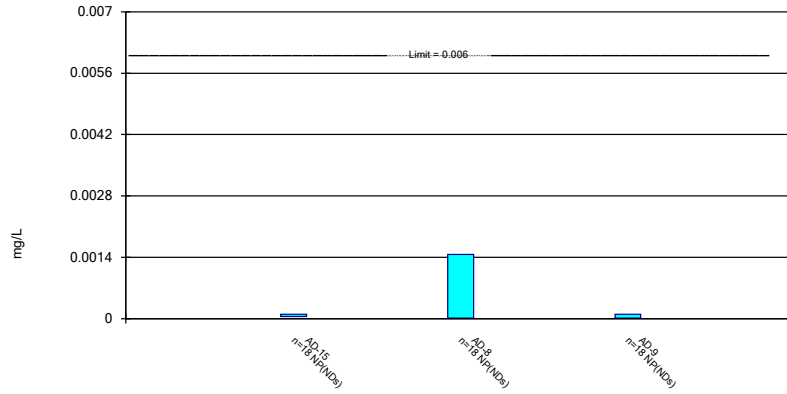
Confidence Intervals - All Results (No Significant)

Welsh PBAP Client: Geosyntec Data: Welsh PBAP Printed 8/27/2021, 12:55 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-15	0.0001	0.00005	0.006	No	18	0.00008056	0.00003152	66.67	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-8	0.001461	0.00001	0.006	No	18	0.0003423	0.0007804	83.33	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-9	0.0001	0.00001	0.006	No	18	0.000095	0.00002121	94.44	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-15	0.009024	0.00314	0.01	No	17	0.006883	0.006213	0	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-8	0.005	0.00031	0.01	No	18	0.002473	0.002332	44.44	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-9	0.005	0.00027	0.01	No	18	0.002846	0.002252	50	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-15	0.1854	0.09469	2	No	17	0.154	0.09856	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-8	0.02991	0.02195	2	No	18	0.02649	0.007631	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-9	0.05229	0.03237	2	No	18	0.04363	0.01817	0	None	x^(1/3)	0.01	Param.
Beryllium, total (mg/L)	AD-15	0.0008658	0.0002054	0.004	No	17	0.0006152	0.0006398	0	None	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-8	0.0005	0.00003	0.004	No	18	0.0003535	0.0002163	66.67	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	AD-9	0.001091	0.0005253	0.004	No	18	0.0008081	0.0004675	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-15	0.0001916	0.00002454	0.0065	No	17	0.0002	0.0002739	5.882	None	ln(x)	0.01	Param.
Cadmium, total (mg/L)	AD-8	0.001	0.000029	0.0065	No	18	0.0005155	0.0004986	50	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-9	0.001036	0.0002328	0.0065	No	18	0.0008016	0.0008752	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	AD-15	0.01302	0.001165	0.1	No	17	0.01072	0.01632	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	AD-8	0.0005198	0.0001281	0.1	No	18	0.0005812	0.0005173	27.78	Kaplan-Meier	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-9	0.001	0.000346	0.1	No	18	0.000669	0.0003196	44.44	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-15	0.008547	0.003879	0.075	No	17	0.007078	0.00529	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-8	0.006604	0.00397	0.075	No	18	0.004846	0.002563	0	None	x^2	0.01	Param.
Cobalt, total (mg/L)	AD-9	0.0242	0.01595	0.075	No	18	0.02041	0.007305	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-15	2.593	1.476	5	No	17	2.035	0.8915	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-8	1.34	0.4962	5	No	18	1.207	1.465	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-9	2.485	1.744	5	No	18	2.114	0.6118	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-15	1	0.086	4	No	18	0.5532	0.4616	50	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-8	0.7703	0.5797	4	No	18	0.6803	0.1632	11.11	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-9	1	0.19	4	No	18	0.5302	0.3697	33.33	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-15	0.004329	0.0003779	0.0034	No	17	0.004533	0.006644	17.65	Kaplan-Meier	ln(x)	0.01	Param.
Lead, total (mg/L)	AD-8	0.0002	0.00007	0.0034	No	18	0.0001501	0.00006819	55.56	Kaplan-Meier	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-9	0.0002	0.00008	0.0034	No	18	0.0001784	0.00007286	50	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-15	0.01656	0.004353	0.39	No	18	0.01798	0.03397	0	None	ln(x)	0.01	Param.
Lithium, total (mg/L)	AD-8	0.1073	0.08037	0.39	No	18	0.09382	0.02223	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-9	1.33	0.194	0.39	No	18	0.8384	0.5123	0	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-15	0.00003733	0.000007934	0.002	No	16	0.00002767	0.0000298	31.25	Kaplan-Meier	x^(1/3)	0.01	Param.
Mercury, total (mg/L)	AD-8	0.000008	0.000005	0.002	No	17	0.000006629	0.000004027	76.47	Kaplan-Meier	No	0.01	NP (NDs)
Mercury, total (mg/L)	AD-9	0.00001079	0.000003131	0.002	No	17	0.000009129	0.00001073	29.41	Kaplan-Meier	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-15	0.001546	0.0004635	0.0024	No	18	0.0009872	0.001003	55.56	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-8	0.0008389	0.00016	0.0024	No	18	0.0005831	0.0002803	77.78	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-9	0.0005	0.00011	0.0024	No	18	0.0004783	0.00009192	94.44	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-15	0.001951	0.0006408	0.05	No	17	0.00142	0.001278	11.76	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-8	0.00137	0.00008	0.05	No	18	0.0005346	0.0005786	44.44	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-9	0.00106	0.0003	0.05	No	18	0.001202	0.001943	22.22	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-15	0.00137	0.0001	0.002	No	18	0.000515	0.0003886	66.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-8	0.001185	0.000129	0.002	No	18	0.0004893	0.0003907	61.11	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-9	0.0003426	0.0000809	0.002	No	17	0.0004771	0.0004614	41.18	Kaplan-Meier	ln(x)	0.01	Param.

Non-Parametric Confidence Interval

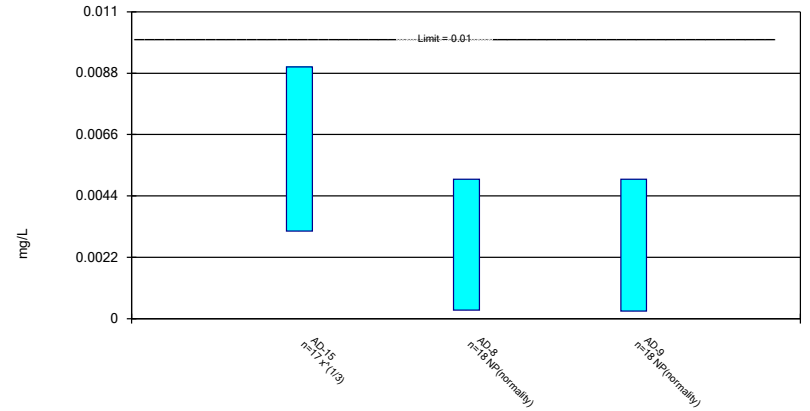
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

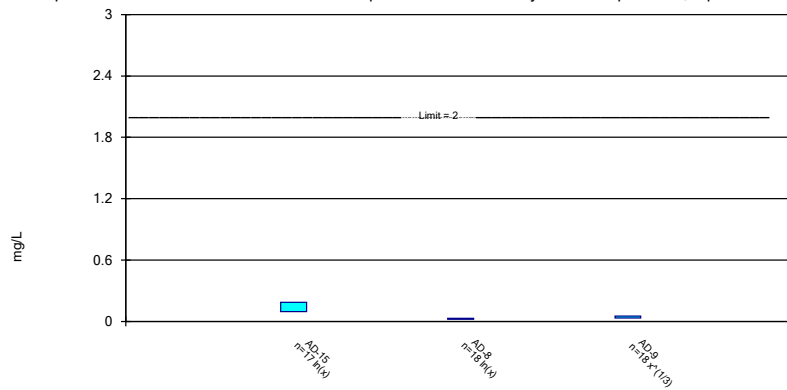
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 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

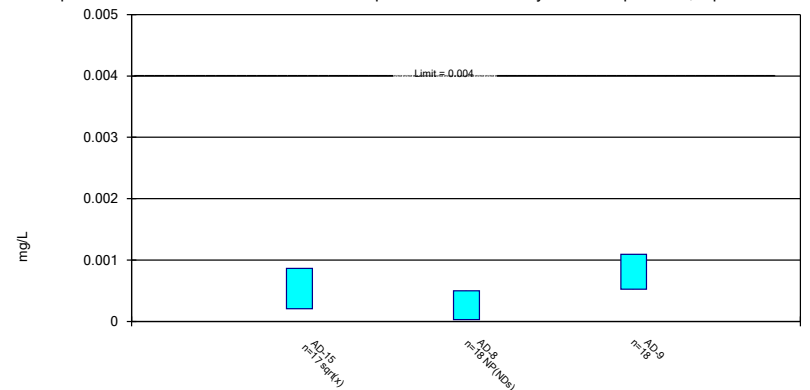
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Parametric and Non-Parametric (NP) Confidence Interval

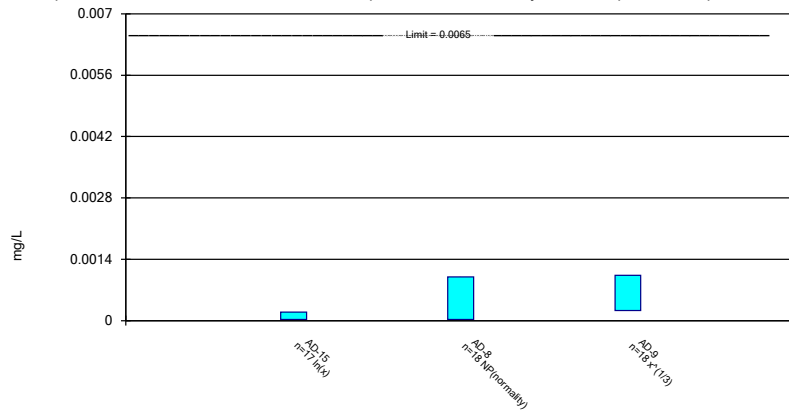
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

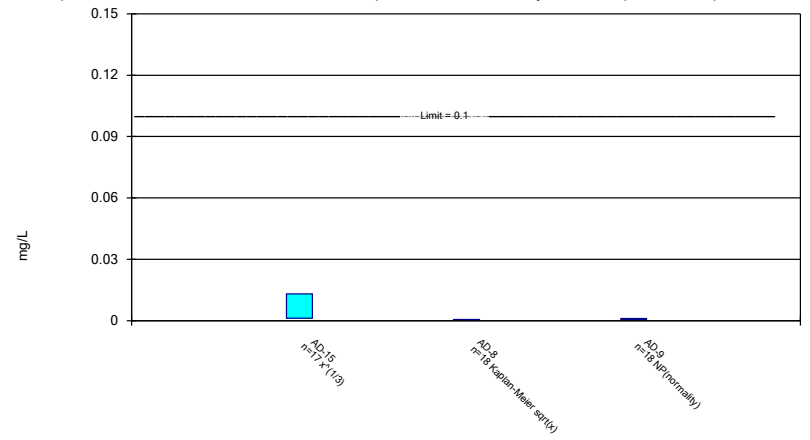
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Constituent: Cadmium, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
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Parametric and Non-Parametric (NP) Confidence Interval

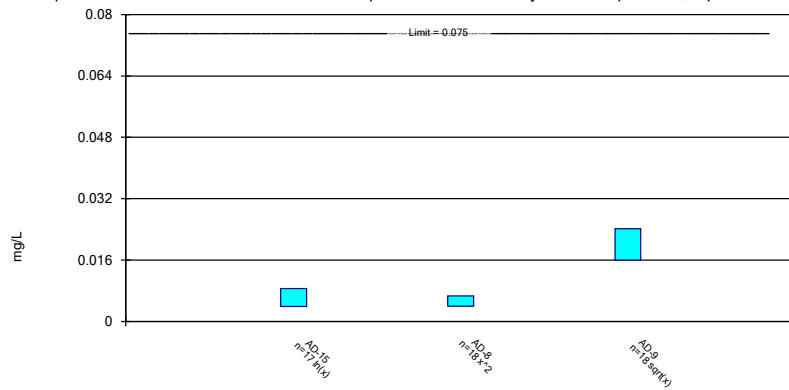
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 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

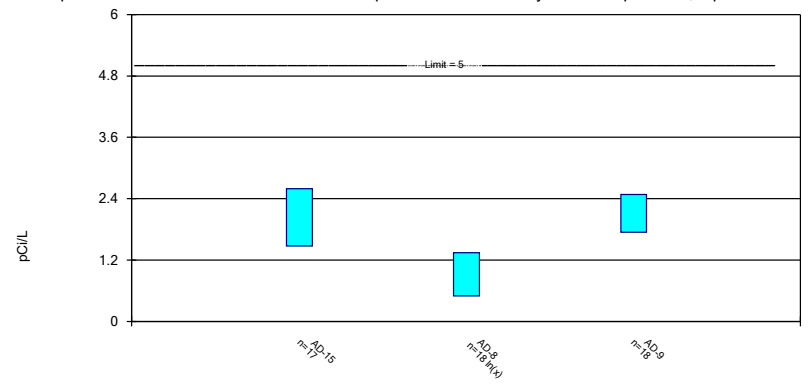
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Constituent: Cobalt, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric Confidence Interval

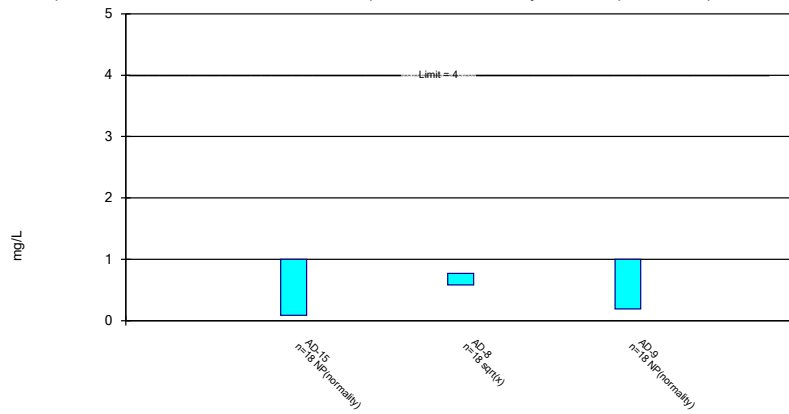
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

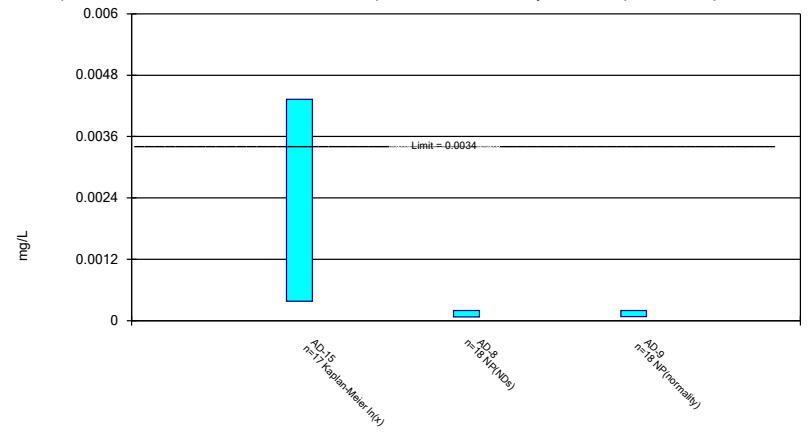
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Constituent: Fluoride, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

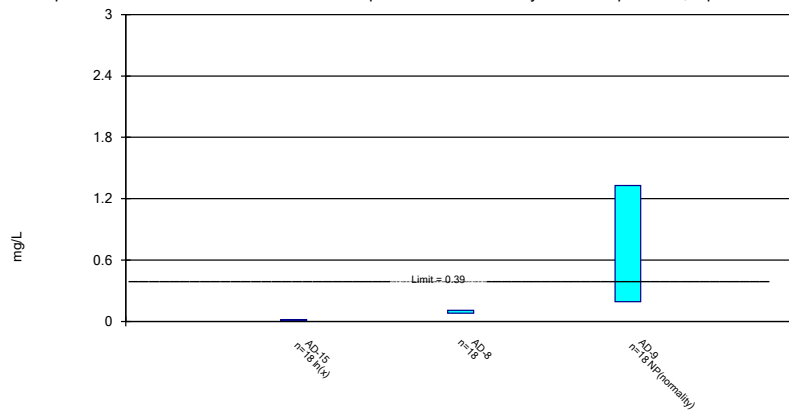
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Constituent: Lead, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

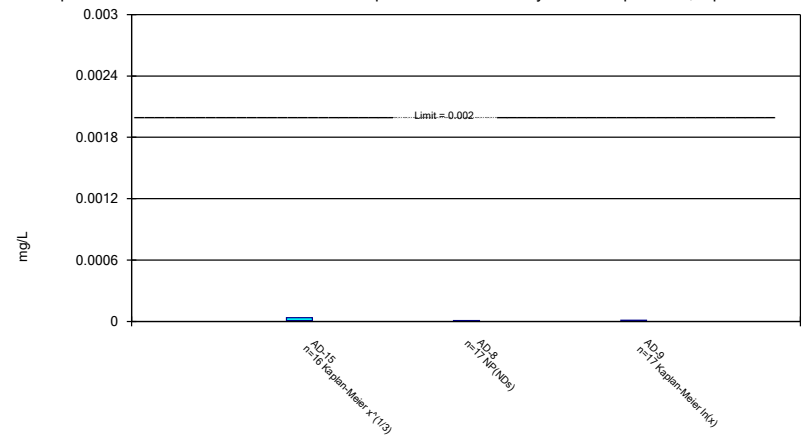
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



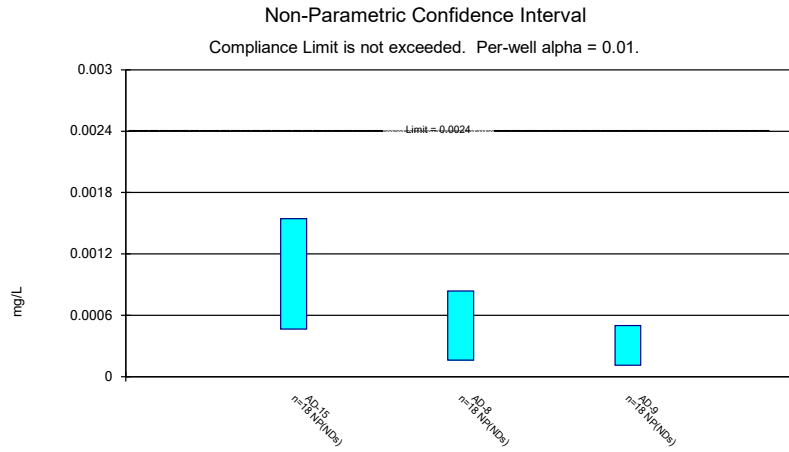
Constituent: Lithium, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
Welsh PBAP Client: Geosyntec Data: Welsh PBAP

Parametric and Non-Parametric (NP) Confidence Interval

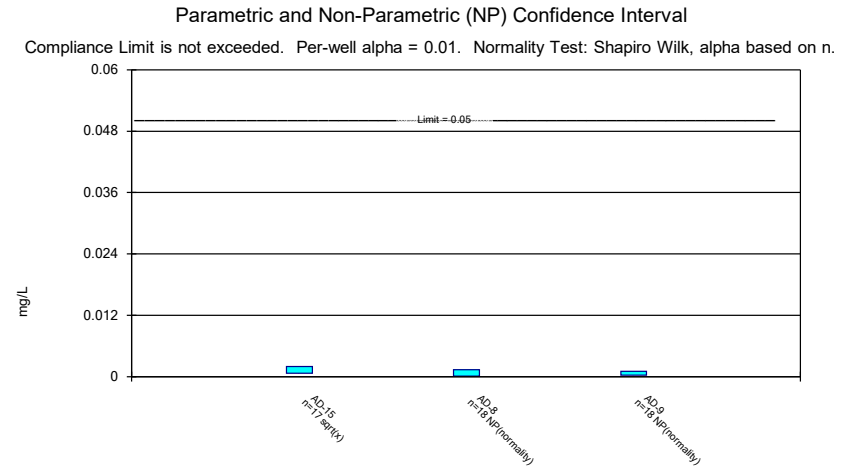
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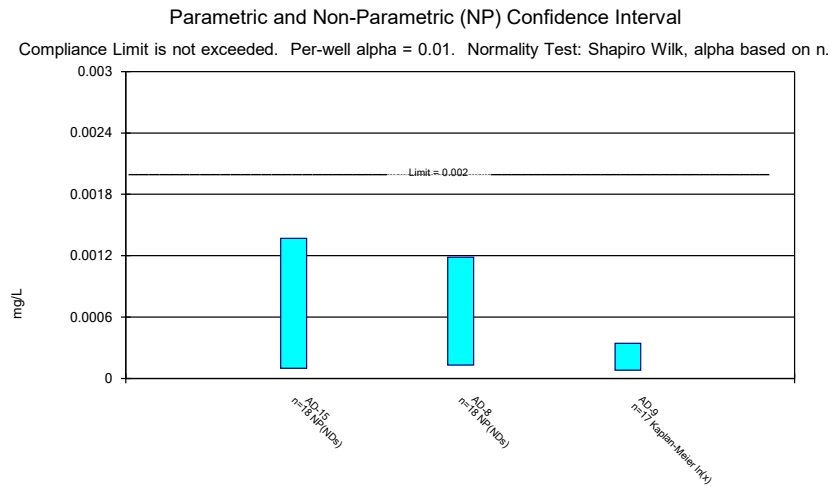
Constituent: Mercury, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Molybdenum, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Selenium, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP



Constituent: Thallium, total Analysis Run 8/27/2021 12:53 PM View: Confidence Intervals
 Welsh PBAP Client: Geosyntec Data: Welsh PBAP

APPENDIX 3

Alternate source demonstrations are included in this appendix. Alternate sources are sources or reasons that explain that statistically significant increases over background or statistically significant levels above the groundwater protection standard are not attributable to the CCR unit.



Alternative Source Demonstration – Lithium Primary Bottom Ash Pond

**J. Robert Welsh Power Plant
1187 County Road 4865
Pittsburg, Titus County, Texas**

April 22, 2021

Alternative Source Demonstration – Lithium Primary Bottom Ash Pond

J. Robert Welsh Power Plant
1187 County Road 4865
Pittsburg, Titus County, Texas

April 22, 2021

Prepared By:

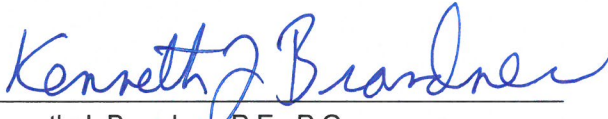
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Prepared For:

American Electric Power Corporation

Our Ref:

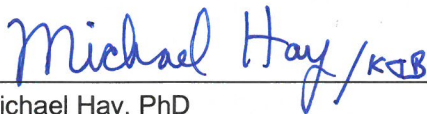
30080141



Kenneth J. Brandner, P.E., P.G.
Geological Engineer



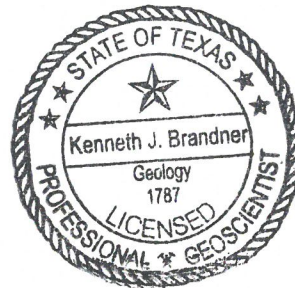
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Senior Geologist



Michael Hay, PhD
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Appendices

Appendix A. Monitoring Well Completion Diagrams – 2019 Monitoring Wells

Appendix B. Springs of Texas Reference

Acronyms and Abbreviations

amsl	above mean sea level
Arcadis	Arcadis U.S., Inc.
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
EPRI	Electric Power Research Institute
ft	feet
GWPS	groundwater protection standard
LCL	lower confidence limit
MCL	maximum contaminant limit
mg/kg	milligram per kilogram
mg/L	milligram per liter
PBAP	Primary Bottom Ash Pond
SPLP	Synthetic Precipitation Leaching Procedure
SSI	statistically significant increase
SSL	statistically significant level
USDA	United States Department of Agriculture
USGS	United States Geologic Survey

1 Introduction

This Alternate Source Demonstration (ASD) report has been prepared on behalf of American Electric Power Corporation for lithium detected in groundwater at hydraulically downgradient monitoring well AD-9 at the Primary Bottom Ash Pond (PBAP) at the J. Robert Welsh Plant site located in Titus County, Texas. This ASD report was prepared in accordance with the Coal Combustion Residual (CCR) Rule (the Rule) specified in 40 Code of Federal Regulations (CFR) §257 and based on recommendations provided in the Electric Power Research Institute “Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites” (Electric Power Research Institute [EPRI] 2017). As part of the Rule, CCR facility owners are required to conduct detection and assessment monitoring of “Appendix III” and “Appendix IV” constituents, respectively, to ensure compliance with applicable groundwater standards (described further below). Because the monitored constituents also have natural sources and can be influenced by sampling methodology implementation, the Rule allows owners or operators to evaluate and demonstrate whether a source other than the CCR unit caused a statistically significant increase (SSI) over background levels for an Appendix III constituent or at statistically significant levels (SSLs) over groundwater protection standards for an Appendix IV constituent, such as natural variation in groundwater quality or sampling methodology error.

The owner or operator must complete the written ASD within 90 days of identifying the SSI or SSL and include the certification from a qualified professional engineer to verify the accuracy of the information in the report. An SSL was identified for lithium at monitoring well AD-9 as detailed in the February 11, 2021 report entitled “Statistical Analysis Summary, Primary Bottom Ash Pond” (Geosyntec 2021). Therefore, this ASD report was prepared by Arcadis U.S., Inc. (Arcadis) on behalf of American Electric Power Corporation within the 90-day period and has been certified by a qualified professional engineer.

1.1 Facility History

The J. Robert Welsh Plant is located within southern Titus County, approximately eight miles northeast of Pittsburg, Texas, and approximately two miles northwest of Cason, Texas (**Figure 1-1**). The Plant began operations in 1977 with three coal-fired generating units (Units 1, 2, and 3). Currently, only Units 1 and 3 are operational. Throughout the life of the Plant, CCR materials (fly ash, bottom ash, economizer ash) have been generated. These byproducts were stored in the PBAP and in the adjacent Landfill that were constructed in the late 1970s. In 2000, the 22-acre Bottom Ash Storage Pond (BASP) was installed south of the Landfill. The BASP was constructed with a 60-mil high-density polyethylene liner (**Figure 1-2**).

Presently bottom ash and economizer ash from the Plant are sluiced to the PBAP. Solids settle as the clear liquids flowed through a drainage canal into the clear water pond (a non-CCR unit). Solids (bottom ash and economizer ash) in the PBAP were dredged and sluiced into the BASP. Marketable ash material from the PBAP is also temporarily stored in the western two thirds of the Landfill for processing, then loaded into trucks and sold for beneficial reuse (highway road base, etc.). AEP ceased operation of the BASP on April 6, 2021 and initiated closure of the BASP.

2 Physical Setting

2.1 Regional Topography

The elevation at the Site ranges from approximately 300 feet (ft) above mean sea level (amsl) at Swauano Creek downstream of the Welsh Reservoir, to 360 ft amsl at a topographically high ridge at the west end of the Landfill. The PBAP is in a topographically low area that had been an un-named intermittent tributary of Swauano Creek prior to development of the Site. The Landfill is approximately 40 acres in size and is located in a topographically higher area directly south of the PBAP. The Bottom Ash Storage Pond is approximately 22 acres in size and in a topographically higher area directly south of the Landfill.

A topographically high ridge is present directly northwest of the Site where offsite monitoring wells AD-22 and AD-23 were installed along the FM 1735 right-of-way during June 2019. Ground surface elevation at these offsite monitoring wells ranges from approximately 361 ft amsl at AD-22 to 369 ft amsl at AD-23.

2.2 Geology and Soils

2.2.1 Regional and Local Geology

The Site area is located within the West Gulf Coastal Plain. Cretaceous formations crop out in belts that extend in a northeasterly direction parallel to the Gulf of Mexico, and dip gently to the southeast. The Site, including all three CCR Units (PBAP, Landfill, Bottom Ash Storage Pond), is located along the outcrop of the Eocene-age Reklaw Formation, which consists of very fine to fine grained sand and clay (Flawn 1966). The Reklaw Formation attains a thickness of approximately 110 ft in Titus County, and is underlain by the Eocene-age Carrizo Sand which consists of fine to coarse sand, silt, and clay (United States Geologic Survey [USGS] 1965). In the topographically low areas underlying the Welsh Reservoir to the east of the PBAP, Quaternary alluvial sediments associated with Swauano Creek are present (Flawn 1966).

All of the CCR monitoring wells at the Site are completed in the Reklaw Formation. The two offsite monitoring wells (AD-22, AD-23) west of the Site are completed in the overlying Queen City Formation. Monitoring well locations are shown on **Figure 2-1**.

As shown on the regional geologic map and legend (**Figure 2-2A** and **Figure 2-2B**), the Reklaw Formation outcrop (Er) at the Site is relatively narrow (less than 1 mile in width). The Reklaw Formation is overlain by the Eocene-age Queen City Formation, which outcrops in topographically higher areas west of the Site, including the area where monitoring wells AD-22 and AD-23 are located. The Queen City Formation consists of fine to medium grained sand, shale, silt, and impure lignite, and attains a thickness of approximately 210 ft in Titus County (USGS 1965). The Queen City Formation also contains ironstone concretions (Flawn 1966).

2.2.2 Regional and Local Soil Composition

Information gathered from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Services soil data provides a detailed inventory of the regional soils and their characteristics, including the widespread distribution of clay-bearing soils, that support data collected at the Site from soil borings and groundwater

monitoring well locations. Two main named soil layers are present in the Pittsburgh, TX, area in the vicinity of the Site:

- Norfolk sandy loam
- Susquehanna fine sandy loam

Both soils are similar in the uppermost 1.5 ft of material, generally grayish in color and containing fine sand, silt, and clay. However, the subsoils of both units have subtle differences from one another and are described herein. Observations from soil borings at the Site are consistent with the characteristics of one or both of these soil units, as described in the USDA Natural Resources Conservation Services document.

The Norfolk sandy loam is a widely distributed soil unit that is uniformly developed in the lowland areas and is derived from weathering Eocene-aged deposits. It is a generally porous soil, allowing infiltrating water to migrate downward toward the water table. The soil layer is generally yellowish-gray in color, however the subsoil at greater depths is characterized by increased clay content and a mottled red and yellow appearance. As noted in the USDA soil descriptions, the soil and subsoils of the Norfolk sandy loam may be broken down into the grain size distributions presented in **Table 2-1**.

The Susquehanna fine sandy loam is also widely distributed and generally resembles the Norfolk sandy loam at the surface. Subsoils of the Susquehanna contain a greater component of clay, and likely contain increased iron content, as evidenced by observed iron concretions and iron crust formation within the subsoil. This soil is often mottled in appearance, ranging from red and yellow to a reddish brown or gray. Despite the greater clay content, the soil and subsoil is not impervious to infiltrating water that migrates toward the water table. As noted in the USDA soil descriptions, the soil and subsoils of the Susquehanna fine sandy loam may be broken down into the grain size distributions presented in **Table 2-2**.

These soil descriptions are important for the understanding of contributing sources of key constituents, such as lithium to the groundwater system. Lithium can occur in soils through natural weathering processes and the development of clay minerals. In particular, lithium can be incorporated into the structure of clays in the smectite group through cation substitution, which is further influenced by the presence of iron within the clay structure (Drever 2002; Stucki 2005). The widespread distribution of clay deposits in the native soils in and near the Site and the propensity for clays to contain trace constituents of potential concern supports the potential for natural sources of lithium.

Geologic cross-sections were generated to evaluate the stratigraphy in the area of the PBAP. The lines of geologic cross-section are shown on **Figure 2-3** and the cross-section details for cross-sections A-A' through E-E' are shown on **Figures 2-4** through **2-8**, respectively. As shown on **Figure 2-4**, an unsaturated brown to gray clay and sandy clay stratum is present in the area of the PBAP from the surface to a depth of approximately 20 ft below ground surface. The clay stratum is underlain by a saturated fine to medium grained clayey and silty sand stratum with an average thickness of approximately 10 ft and is consistent with the soils of the Susquehanna fine sandy loam deposits. As discussed below in Section 2.3.2, this saturated sand stratum is the uppermost water-bearing unit in the area of the PBAP. This sand stratum is underlain by an unsaturated gray to black silty clay stratum that locally serves as a lower confining layer (aquiclude) for the uppermost water-bearing unit.

As shown on **Figures 2-2A** and **2-4**, the Queen City Formation outcrops in the topographically high area to the northwest of the Site. The geologic contact between the Queen City Formation, in which offsite monitoring wells AD-22 and AD-23 are completed, and the Reklaw Formation, in which the CCR monitoring wells are completed, is located near an elevation of 340 ft amsl as shown on **Figure 2-4**. The Queen City Formation directly west of the

Site consists predominantly of clayey sand, and the underlying Reklaw Formation consists of interbedded sand, silt, and clay strata.

2.3 Hydrology and Water Quality

2.3.1 Regional Hydrology and Water Quality

The Reklaw Formation, which outcrops at the Site, and the overlying Queen City Formation, which outcrops west of the Site, are part of the Cypress Aquifer, which also includes the underlying Carrizo Sand and Wilcox Formation (USGS 1965). As shown on **Figure 2-9**, the Cypress Aquifer is approximately 900 ft thick in the Site area, and the base of fresh water in the Cypress Aquifer is approximately 800 ft below ground surface.

Regional groundwater characteristics are presented in Texas Water Commission Bulletin 6517 “*Ground-Water Resources of Camp, Franklin, Morris, and Titus Counties, Texas, Texas*” (USGS 1965). All of the regional aquifer units are combined in this document, and considered as one interconnected unit, referred to as the “Cypress aquifer”. This singular aquifer unit, composed of all water bearing units of similar character, was divided into three zones based on water quality characteristics of each zone rather than lithology. The following three zones were identified, in order of increasing relative depth:

- Zone A: characterized by minimal iron content and low pH, ranging from 4.5 to 6.5.
- Zone B: characterized by increased dissolved iron content and pH ranging from 5.0 to 7.0
- Zone C: characterized by iron concentrations of less than 0.3 milligrams per liter (mg/L) and neutral to alkaline pH (7.0 to 8.0)

Groundwater at the Site is generally assumed to be influenced by groundwater from Zones A and B. As described in USGS, 1965, Zones A and B can be more simply described as:

- Zone A: zone of oxidation and acidic groundwater
- Zone B: intermediate zone

The dissolved iron content in the A and B zones (ranging from non-detect to greater than 10 mg/L; USGS 1965) is likely influenced by iron present in the soils and sediments, which are described in Section 2.2. Slow recharge rates and transmissive properties of these zones contributes to longer residence times whereby the infiltrating groundwater may react with soil and sediments, allowing for the oxidation of sulfides to generate sulfate and mobilizing ferrous iron into solution. In addition, groundwater from several wells completed in shallow (less than 60 ft in depth) sediments contained sulfate concentrations above 1,000 mg/L. Sulfate concentrations observed at the Site are consistent with the range of data for other similar depth wells in the four-county area (USGS 1965).

Additional regional groundwater information is provided in the 107th Annual Meeting of the Texas Academy of Science abstract titled “Natural Sources of Poor Water Quality in Streams of East Texas” (Ledger et. al. 2004). This study characterized surface water streams associated with the regional groundwater in the Eocene-aged Reklaw Formation as acidic with high concentrations of sulfate, and arsenic concentrations greater than 0.01 mg/L.

An observed decline in surface water quality was also noted if springs from the Reklaw Formation discharge to surface water bodies. Abundant sulfur is noted in the Reklaw formation and sediments undergo acid-sulfate weathering, as evidenced in the red-stained soils and sulfate concentrations of greater than 1,000 mg/L (Ledger et. al. 2004). In streams associated with the Reklaw Formation, sulfate levels may exceed 1,000 mg/L.

2.3.2 Local Hydrology

Groundwater flow direction at the Site is generally from west to east, following surface topography towards the Welsh Reservoir. Groundwater elevations and well construction information from monitoring wells completed in the uppermost water-bearing unit at the Site are summarized on **Table 2-3**. Depth to groundwater in the monitoring wells in the area of the PBAP ranges from approximately 10 to 15 ft below ground surface.

Figure 2-10 is a current potentiometric surface map for the uppermost water-bearing unit at the Site based on October 14, 2020 water level data. As shown on **Figure 2-10**, shallow groundwater flow direction in the area of the CCR Units is in a general easterly direction toward the Welsh Reservoir at an average hydraulic gradient of approximately 0.005 foot per foot. Shallow groundwater flow direction in the area of monitoring wells AD-22 and AD-23, which are completed in the Queen City Formation, is southeasterly toward the CCR monitoring wells, which are completed in the Reklaw Formation. The groundwater flow direction and downward vertical gradient indicates shallow groundwater in the Queen City Formation likely is hydraulically connected to the underlying Reklaw Formation. This is consistent with Texas Water Commission Bulletin 6517 description of the Cypress Aquifer: “The Wilcox Group and the Carrizo Sand, Reklaw Formation, and Queen City Sand of the Claiborne Group have similar hydrologic properties and are the principal source of freshwater in the four-county area. The units probably are interconnected hydraulically and they function as single aquifer” (USGS 1965). **Figure 2-11** is a regional hydrologic cross section of the site area.

The hydraulic conductivity of the uppermost water-bearing unit at the Site was determined by conducting aquifer tests. A constant-rate pumping test was conducted at monitoring well AD-6 on September 21, 2017. Based on the AD-6 pumping test data, the hydraulic conductivity for the uppermost water-bearing unit was calculated at 0.05 ft per day (1.83×10^{-5} centimeters per second).

To provide a broader understanding of the hydraulic conductivity distribution across the Site, bail down slug tests were performed in October 2018 on a total of 5 wells; 1 up gradient well (AD-17) and 4 down gradient wells (AD-6, AD-9, AD-13 and AD-19) on October 30 and 31, 2018. These wells are all screened in the uppermost water-bearing unit and were chosen based on their distribution across the Site. The hydraulic conductivity estimates from the five monitoring wells tested ranged from 0.15 ft per day (AD-6) to 2.0 ft per day (AD-13). The overall mean hydraulic conductivity estimate was 0.84 ft per day, while the overall geometric mean was 0.60 ft per day.

2.4 Surface Water

The Site is located directly west of Swauano Creek, which was dammed near the southern end of the Site during plant development to form the Welsh Reservoir. The PBAP normal operating water level is near the weir box which has a bottom elevation of 325 ft amsl. The surface water elevation of the Welsh Reservoir, located east of the PBAP, is maintained at approximately 320 ft amsl. The Welsh Reservoir is likely a gaining surface water feature because groundwater elevations at the Site are generally higher than the normal stage elevation of the Welsh Reservoir (approximately 320 ft amsl) as shown on **Figure 2-10**.

There are no current or historic gauging stations on Swauano Creek; however, there was a historic gauging station on adjacent Boggy Creek, which has a drainage basin area of 72 square miles versus 21.2 square miles for Swauano Creek. The average annual flow of the Boggy Creek gauging station during the driest year on record (1956) was 10.65 cubic feet per second, which corresponds to a flow of approximately 3 cubic feet per second for Swauano Creek.

3 Detection and Assessment Monitoring Statistical Evaluation

3.1 General

The groundwater monitoring network for the uppermost water-bearing unit at the PBAP consists of three upgradient monitoring wells (AD-1, AD-5, AD-17) and three downgradient monitoring wells (AD-8, AD-9, AD-15; **Figure 2-1**). Additional details regarding the groundwater monitoring network are provided in the August 22, 2017 report entitled “*Primary Bottom Ash Pond – CCR Groundwater Monitoring Well Network Evaluation*” (Arcadis 2017).

3.2 Detection Monitoring Results

Detection monitoring at the Site involves collection of groundwater samples from the groundwater monitoring network upgradient and downgradient monitoring wells for analyses of Appendix III CCR constituents, which includes boron, calcium, chloride, fluoride, sulfate, pH, and total dissolved solids. Following the baseline monitoring program, which included a minimum collection of eight independent samples from each of the background and downgradient wells that are part of the certified monitoring network, the first round of Detection Monitoring was conducted. Based on detection monitoring conducted at the PBAP in 2017 and 2018, an SSI over the background concentration was calculated for boron in AD-8 (Geosyntec 2019c). Because of the SSIs noted for boron in groundwater samples from AD-8, an Alternate Source Demonstration was completed which did not identify an alternate source for the boron SSI (Geosyntec 2018).

3.3 Assessment Monitoring Results

Groundwater protection standards (GWPSs) were established for the Appendix IV parameters in accordance with 40 CFR Part 257.95(h). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or regional screening level for each Appendix IV parameter.

Confidence intervals were calculated for Appendix IV parameters at the compliance wells (AD-8, AD-9, AD-15) to assess whether Appendix IV parameters were present at an SSL above the GWPS. An SSL was identified for lithium in October 2020 groundwater sample data since the Lower Confidence Limit (LCL) for lithium exceeded the GWPS of 0.394 mg/L at AD-9 (0.758 mg/L), despite no observed SSIs in Appendix III parameters for this well (Geosyntec 2021). Additional details regarding the statistical evaluations of the groundwater monitoring data are provided in the February 11, 2021 report entitled “*Statistical Analysis Summary, Primary Bottom Ash Pond*” (Geosyntec 2021).

Because the native soils have the potential to be a natural source of lithium in the regional and local groundwater and soil composition, ASD reports were prepared in February 2019, September 2019, March 2020, and October 2020 to provide additional information on the sources and distribution of lithium SSLs previously identified in groundwater at PBAP monitoring well AD-9 (Arcadis 2019a, Arcadis 2019b, Arcadis 2020a, Arcadis 2020b). The conclusions from the ASDs indicated several lines of evidence demonstrating the lithium concentration in groundwater at AD-9 is from naturally occurring sources (ASD Type V), with some additional contributions from

Alternative Source Demonstration – Lithium Primary Bottom Ash Pond

sampling methodology error (ASD Type I). This ASD report updates the previous reports based on the recently collected Site-specific groundwater data as described in Section 4.

4 Soil and Groundwater Analytical Data Evaluation

4.1 General

In addition to the detection and assessment monitoring groundwater sampling events conducted at the PBAP in 2017, 2018, 2019, and 2020 for statistical evaluation, a comprehensive site-wide groundwater sampling event was conducted by Arcadis during May 2018, and an offsite soil and groundwater sampling event was conducted by Arcadis during June 2019 to evaluate alternate potential sources of lithium detected in downgradient monitoring well AD-9. The May 2018 evaluation included the following tasks:

- Collection of groundwater samples from the PBAP upgradient monitoring wells (AD-1, AD-5, AD-17), the PBAP downgradient monitoring wells (AD-8, AD-9, AD-15), and other monitoring wells in the area completed in the uppermost water-bearing unit, including upgradient monitoring well AD-18; side gradient monitoring wells MW-9, MW-10, and Temp-1; and downgradient monitoring wells AD-3, AD-4c, AD-10, AD-11, AD-13, AD-14, AD-16R, and AD-19.
- Collection of soil samples from eight soil borings (Temp-1, SB-2 through SB-8) around the perimeter of the CCR units at the site.
- Collection of three CCR material samples from the PBAP (Sample IDs: Ash-1, Ash-2, Ash-3) and one CCR material sample from the HDPE-lined Bottom Ash Storage Pond (Sample ID: Ash-4) for analysis of total metals, pore water concentrations, and leachate water using the Synthetic Precipitation Leaching Procedure (SPLP) (**Table 4-1**).

The June 2019 evaluation included the following tasks:

- Installation of two offsite monitoring wells (AD-22, AD-23) in the Queen City Formation northwest (hydraulically upgradient) of the Site. Monitoring well completion diagrams are provided in **Appendix A**.
- Collection of soil and groundwater samples from the Queen City Formation monitoring wells for Appendix III and Appendix IV parameter analyses.

Additionally, two sentinel downgradient monitoring wells (AD-20, AD-21) were installed in the uppermost water-bearing unit (Reklaw Formation) near the shoreline of the Welsh Reservoir east (hydraulically downgradient) of the CCR units during October 2018.

4.2 Soil and Groundwater Analytical Data Evaluation

4.2.1 Soil Evaluation

The soil evaluation results demonstrate a correlation between lithium and iron in soil. Boring logs from Site area monitoring locations highlight similarities with observations provided in the county-wide soil survey reports. For example, boring locations SB-04 (adjacent to AD-5), SB-05 (adjacent to AD-8), AD-22, and AD-23 contain a greater content of the reddish-brown clay subsoils as noted in the Susquehanna fine sandy loam, which directly overlie the water table in these locations. The reddish-brown color generally denotes the presence of iron in these locations, which can be either incorporated directly into the clay mineral structure (e.g. smectite), or as a secondary mineral (e.g. iron hydroxide) that is also present in the aquifer matrix (Stucki 2005). The role of iron incorporated into the clay structure is important to localized geochemical processes, such as cation exchange,

redox conditions, and hydrophilic properties, which can influence weathering characteristics and the mobility of trace constituents (i.e. lithium) in groundwater (Stucki 2005). Specifically, in the event that geochemical conditions are or become conducive to iron dissolution (e.g., if conditions become microbially/geochemically reducing), then the mobilization of iron associated with soil can result in the co-mobilization of trace constituents.

As shown on **Table 4-1** and **Figure 4-1**, the highest concentrations of lithium in soil were detected from 3 to 5 feet below ground surface in hydraulically upgradient and offsite Queen City Formation monitoring well AD-22 (up to 18 milligrams per kilogram [mg/kg]), and onsite Reklaw Formation soil boring SB-4 (13.6 mg/kg) located adjacent to monitoring well AD-5 which is hydraulically upgradient (northwest) of the PBAP. This upgradient (background) data indicates lithium concentrations in soil in the area of the PBAP are naturally occurring and not the result of impacts from CCR materials. This is one line of evidence that the lithium detected in groundwater at monitoring well AD-9 is from a naturally occurring source, and not the CCR unit. As shown on **Table 4-1** and **Figure 4-2**, the highest iron concentrations in soil are from soil borings AD-22 and AD-23 (17,600 to 85,500 mg/kg) which are located in the Queen City Formation upgradient of the Site; SB-4 (AD-5; 10,400 mg/kg), located in the Reklaw Formation upgradient (northwest) of the PBAP; and soil boring SB-8 (AD-3; 11,000 mg/kg), located in the Reklaw Formation over 1,000 ft south (side gradient) of the PBAP. **Figure 4-3** shows an apparent correlation between the iron and lithium content in the coal ash, upgradient locations, and downgradient locations. However, SPLP and pore water results from the coal ash samples show that the iron and lithium present in the coal ash is not in a mobile (leachable) form. Therefore, it is more likely that the regional groundwater interaction with naturally occurring lithium and iron in soil is responsible for the observed lithium concentrations and variability across the Site. As detailed below in Section 4.2.2, iron and lithium concentrations in groundwater at the Site show a similar distribution to iron and lithium concentrations in soil, indicating naturally occurring sources for iron and lithium.

4.2.2 Groundwater Evaluation

Groundwater analytical results for the PBAP, the landfill, and the bottom ash storage pond are summarized on **Tables 4-2, 4-3, and 4-4**, respectively. As shown on **Figure 4-4**, the highest lithium concentrations in the most recent (October 2020) groundwater samples are at monitoring wells AD-17 (0.274 mg/L) and AD-18 (1.65 mg/L), which are west (upgradient) relative to the PBAP. These data indicate lithium concentrations in groundwater in the area of the PBAP are from a source other than the PBAP.

As shown on **Figure 4-5**, iron concentrations in groundwater are also elevated upgradient (west) relative to the PBAP. **Figure 4-6** shows the relationship of total iron concentrations to lithium concentrations in upgradient, side-gradient, and downgradient monitoring wells for 2020 compared to dissolved iron and lithium collected in 2018. These results demonstrate a clear correlation between aqueous iron and lithium, with higher lithium concentrations associated with elevated iron. The greatest concentrations of both iron and lithium are observed in the upgradient monitoring wells AD-17 and AD-18. As identified in **Table 4-1** and noted on **Figure 4-8**, SPLP leachate and pore water analyzed from coal ash samples contain lithium in concentrations below detection, or at very low concentrations less than 0.02 mg/L. These data indicate lithium concentrations in groundwater in the area of the PBAP are from a source other than the PBAP. Additionally, the most recent data is included on a lithium concentration versus time graph provided as **Figure 4-7**. Lithium concentrations in AD-9 show a decreasing trend during 2020 relative to 2016 through 2019 groundwater data, which corresponds to lower turbidity in those samples. As shown, the lithium concentration in groundwater at AD-18 is consistent and higher than lithium concentrations in the downgradient PBAP monitoring wells. Lithium concentrations in groundwater at AD-17 are also higher than downgradient PBAP monitoring wells. In addition, coal ash pore water lithium concentrations are plotted at an average concentration of 0.015 mg/L. As shown, upgradient lithium

concentrations are higher than the coal ash pore water samples and support that lithium groundwater concentrations in the area of the PBAP are from a source other than the PBAP.

Lithium groundwater concentrations at monitoring well AD-9 were further evaluated with respect to coal ash pore water samples. The coal ash pore water samples exhibit lower concentrations of lithium, as well as lower concentrations of sulfate and chloride (Appendix III constituents typically associated with coal ash), suggesting the groundwater signature at AD-9 is not associated with coal ash influence (**Figure 4-8** and **4-9**). This is further supported by the fact that boron, which is present in coal ash pore water at concentrations greater than 0.6 mg/L, is higher in the coal ash pore water than at AD-9, whereas lithium is not (**Figure 4-8**). If for example the coal ash water samples collected were not completely representative of true ash leachate (e.g., if they were diluted relative to more representative water emanating from the bottom of the PBAP), then a higher signature would also be expected for boron at AD-9 if it were influenced by PBAP leachate. Concentration ratios of boron, lithium, sulfate, and chloride (constituents which are anticipated to travel with limited attenuation in groundwater) are therefore not consistent with coal ash influence. Similarly, the chloride concentration was compared to lithium concentrations over time in AD-9 (**Figure 4-9**). As shown, there is a general correlation with lithium and chloride concentrations over time that may be related to seasonal variation, weather variability, and/or sampling methodology. Since naturally-occurring lithium in the soil is likely controlled by ion exchange, it would be expected that lithium concentrations would be higher in waters with greater TDS or ionic strength releasing lithium from the soil.

As discussed above in Section 2.2.1, the Queen City Formation, which overlies the Reklaw Formation, is located directly west of the Site. Therefore, groundwater from the Queen City Formation west (upgradient) of the CCR units may be the source of lithium and iron detected in soils and groundwater in the area of the CCR units. As discussed above in Section 2.3.1, elevated naturally occurring iron is documented in the Cypress Aquifer, and as discussed above in Section 2.2.1, the Queen City Formation contains naturally-occurring iron concretions and correspondingly high iron concentrations in soil samples.

Another line of evidence the lithium detected in groundwater in the area of the PBAP is from a naturally occurring source is provided in the 2002 Publication “Springs of Texas” (Gunnar Brune 1981). The Springs of Texas publication states “*Hynson Springs, also known as Marshall, Noonday Camp, and Iron Springs, are six kilometers north of Hallsville. They became very popular as a health resort about 1851. The waters are highly mineralized, containing much iron, sulfur, aluminum, and lithium. Originally there were said to be over 100 springs flowing from the Queen City Formation.*” This spring, which contains naturally-occurring lithium, is located approximately 35 miles southeast of the Site. A copy of this reference is provided in **Appendix B**.

When reviewing historical and recent datasets, a broad relationship was noted between trace metal chemistry and turbidity. Where turbidity values were greatest, greater concentrations of selected CCR monitored constituents were also observed (e.g. arsenic and cadmium) and in some cases, in exceedance of Federal MCLs. As a result, low-flow sampling methodology was employed to reduce the amount of turbidity in the groundwater sample.

A comprehensive groundwater sampling event was conducted at the Site by Arcadis during May 2018 using low-flow methodology. A clean stainless steel low-flow sampling pump with new, well-dedicated polyethylene piping was slowly lowered into the mid-point of the water column at each monitoring well, and groundwater was then pumped at a low flow rate of less than 0.1 liters per minute until the produced water was visually clear. The turbidity of the produced water was measured using calibrated field instruments during well development, and groundwater samples were not collected until the turbidity measurements declined and stabilized. Once low-flow groundwater sampling techniques were properly followed by Arcadis during May 2018, water quality results indicated concentrations of selected constituents to be much less than previously reported and did not exceed

criteria. Therefore, it was determined that the sediment disturbances generated during well purging and improper (turbid) groundwater sampling were contributing to the Federal MCL groundwater exceedances. Specifically, since CCR Rule monitoring requires analysis of unfiltered samples, the results suggest that the exceedances were associated with constituents present in undissolved suspended solid particulates rather than in a dissolved form, on a location by location basis. The May 2018 groundwater analytical results are most representative of groundwater quality at the Site because proper low-flow sampling protocols were adhered to and sediment contributions to the analytical results were minimized.

5 Summary and Conclusions

This ASD has been prepared in consultation with the Electric Power Research Institute “Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites”. The following lines of evidence indicate the SSL related to the lithium concentration in groundwater at AD-9 is from naturally occurring sources (ASD Type V), with some additional contributions from sampling methodology error (ASD Type I):

- An SSI was confirmed for boron within monitoring well AD-8 followed by a failed Alternate Source Demonstration for boron, triggering the assessment monitoring program for the PBAP. Under the assessment monitoring program, an SSL was identified for lithium since the LCL for lithium exceeded the GWPS of 0.394 mg/L at AD-9 (0.758 mg/L), despite no observed SSIs in Appendix III parameters for this well (Geosyntec 2021). SSIs would be expected for Appendix III parameters at AD-9 if there was a CCR unit source for the lithium exceedance of the SSL, indicating that there may be an alternate source of lithium. This is a key line of evidence that the PBAP is not the source of elevated lithium concentrations in soil at the Site.
- As demonstrated in this ASD report, iron and lithium are associated in the sediments and in groundwater. The subsoils at the Site, particularly the Susquehanna fine sandy loam, contain naturally occurring high clay content. The role of iron incorporated into the clay structure is important to localized geochemical processes, such as cation exchange, redox conditions, and hydrophilic properties, which can influence weathering characteristics and the mobility of trace constituents (i.e., lithium) in groundwater (Stucki 2005). This is a supporting line of evidence.
- The highest lithium concentrations in the soil samples collected during the Arcadis May 2018 and June 2019 investigations was from background soil samples (AD-22, 3-5 ft depth; SB-4, 27 ft depth) located upgradient (northwest) of the PBAP. This is a key line of evidence that the PBAP is not the source of elevated lithium concentrations in soil at the Site.
- Leachate and pore water analyzed from coal ash samples contain lithium in concentrations below detection, or at very low concentrations less than 0.02 mg/L. Comparisons with other potential CCR constituents (chloride, sulfate, and boron) further demonstrate that ion ratios are not consistent with lithium impacts by coal ash at AD-9. This data indicates lithium concentrations in groundwater in the area of the PBAP are from a source other than the PBAP. This is a key line of evidence.
- The highest lithium concentration in groundwater samples collected during the Arcadis May 2018 investigation was from an upgradient (background) monitoring well (AD-18) located west of the PBAP. Lithium concentrations in the most recent groundwater samples (October 2020) remain highest at upgradient (background) monitoring wells AD-17 and AD-18. This is a key line of evidence that the PBAP is not the source of elevated lithium concentrations in groundwater at the Site.
- Iron and lithium concentrations in soil and groundwater at the Site show a similar distribution, indicating there is likely a common source for these metals. The 1965 USGS publication “*Ground-Water Resources of Camp, Franklin, Morris and Titus Counties, Texas*” documents naturally occurring high iron concentrations within zones of the Cypress Aquifer, in which the monitoring wells at the Site are completed. The University of Texas at Austin Bureau of Economic Geology 1966 publication “*Geologic Atlas of Texas, Texarkana Sheet*” documents naturally occurring iron concretions in the Queen City Formation, which outcrops directly west (upgradient) of the PBAP. This is a supporting line of evidence.
- The 1981 Gunnar Brune publication “*Springs of Texas*” documents naturally occurring elevated lithium in groundwater in the Queen City Formation at Hynson Springs, which is approximately 35 miles from the Site.

The publication states “*Hynson Springs, also known as Marshall, Noonday Camp, and Iron Springs, are six kilometers north of Hallsville. They became very popular as a health resort about 1851. The waters are highly mineralized, containing much iron, sulfur, aluminum, and lithium. Originally there were said to be over 100 springs flowing from Queen City sand*”. This publication, along with soil and groundwater analytical data at the Site, supports the conclusion that the primary source of lithium in groundwater at the PBAP is from the Queen City Formation, which outcrops directly west (upgradient) of the PBAP. This is a key line of evidence.

- As summarized on **Tables 4-2** through **4-4**, elevated turbidity (>10 nephelometric turbidity units) was present in many of the groundwater samples collected at the Site. Metals concentrations were generally lower during the May 2018 Arcadis groundwater sampling event when proper low-flow sampling techniques were utilized and turbidity was low. Lithium concentrations in AD-9 show a decreasing trend during 2020 relative to 2016 through 2019 groundwater samples, which corresponds to lower turbidity in those samples. Effective well development and proper low flow sampling techniques minimize the potential for groundwater analyses to be unrepresentative of formation groundwater. This is a supporting line of evidence.
- This ASD report provides a strong demonstration of naturally occurring sources of lithium in groundwater (ASD Type V) as supported by five key lines of evidence and three supporting lines of evidence.

6 Professional Engineer's Certification

I, Kenneth J. Brandner, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the site, the alternate source demonstration for lithium at the Primary Bottom Ash Pond meets the requirements of 40 CFR Part 257.95.

Kenneth J. Brandner

Printed Name of Registered Professional Engineer

Kenneth J. Brandner

Signature



69586

Registration No.

Texas

Registration State

4-22-21

Date

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Tables

Table 2-1
Grain Size Distribution in Soil and Subsoil of the
Norfolk Sandy Loam
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Grain Size	Soil	Subsoil
Fine Gravel	0.0%	0.0%
Coarse Sand	0.2%	0.1%
Medium Sand	0.4%	0.3%
Fine Sand	29.4%	29.9%
Very Fine Sand	37.9%	24.0%
Silt	25.9%	25.1%
Clay	5.9%	20.2%

Table 2-2
Grain Size Distribution in Soil and Subsoil of the
Susquehanna Fine Sandy Loam
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Grain Size	Soil	Subsoil
Fine Gravel	0.4%	0.0%
Coarse Sand	0.7%	0.2%
Medium Sand	0.9%	0.8%
Fine Sand	53.4%	36.6%
Very Fine Sand	16.0%	10.8%
Silt	21.2%	19.0%
Clay	7.2%	32.8%

Table 2-3
Well Construction and Water Level Data - CCR Units
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well ID	Latitude	Longitude	Ground Surface Elevation	Top of Casing Elevation	Borehole Depth ft. bls	Date Installed	Screen Material	Well Diameter inches	Top of Screen		Bottom of Screen		6/7/2011	12/6/2011	5/2/2012	11/1/2012	5/14/2013	11/19/2013	5/12/2014	11/16/2014	5/12/2015	3/4/2016	5/26/2016	7/27/2016	10/19/2016	12/12/2016	1/17/2017	2/23/2017	10/6/2017	5/15/2018	10/29/2018	6/19/2019	7/24/2019	2/17/2020	5/20/2020	10/14/2020		
									Depth ft. bls	Elevation ft. msl	Depth ft. bls	Elevation ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl
Monitoring Wells																																						
AD-1 (c)	33° 02' 48"	94° 50' 47"	355.57	357.57	25.0	1/11/01	Sch. 40 PVC	2	15.0	340.57	25.0	330.57	338.46	334.92	337.88	337.18	337.43	336.73	338.03	337.64	340.82	342.83	344.89	342.89	341.23	340.58	341.18	339.74	337.70	340.57	339.10	345.37	343.95	341.88	344.09	340.56		
AD-2 (c)	33° 02' 37"	94° 50' 44"	344.16	346.16	25.0	4/26/01	Sch. 40 PVC	2	15.0	329.16	25.0	319.16	330.16	329.07	330.00	329.26	329.83	329.70	330.09	329.69	332.56	332.32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-3 (c)	33° 02' 38"	94° 50' 37"	331.10	333.10	17.0	4/26/01	Sch. 40 PVC	2	7.0	324.10	17.0	314.10	323.81	323.19	323.99	323.29	323.77	323.98	324.12	323.28	325.58	325.12	324.59	323.70	323.47	323.78	325.04	324.92	323.24	324.30	324.15	325.42	324.72	---	325.38	323.57		
AD-4 (c)	33° 02' 43"	94° 50' 33"	340.61	342.61	30.0	4/26/01	Sch. 40 PVC	2	19.0	321.61	29.0	311.61	324.81	324.84	324.62	324.40	324.74	325.52	325.44	325.13	327.00	326.90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-4a (a)	33.04527	94.84258	340.19	342.85	30.0	9/22/09	Sch. 40 PVC	2	20.0	320.19	30.0	310.19	325.01	324.19	325.24	322.90	324.86	324.68	325.64	325.34	327.19	327.12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-4b (a)	33.04531	94.84230	329.55	333.23	15.0	9/23/09	Sch. 40 PVC	2	5.0	324.55	15.0	314.55	324.35	324.32	324.50	324.30	324.30	325.21	325.22	324.90	326.58	326.67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-4c (a)	33.04507	94.84244	329.15	333.28	15.0	9/23/09	Sch. 40 PVC	2	5.0	324.15	15.0	314.15	324.18	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.19	325.89	324.01	323.76	325.07	326.39	324.89	324.20	324.95	325.62	325.98	324.73	---	326.20	324.19		
AD-5 (c)	33° 03' 13"	94° 51' 00"	349.00	351.00	30.0	1/11/01	Sch. 40 PVC	2	20.0	329.00	30.0	319.00	336.34	336.58	336.82	336.99	336.78	336.47	336.80	336.01	339.07	338.04	337.62	337.24	337.74	337.01	338.34	336.17	337.40	337.25	336.98	337.18	336.89	338.56	337.79	337.35		
AD-6 (a)	33.05235	94.84757	343.31	346.33	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.31	33.0	310.31	333.04	333.02	332.83	333.02	333.11	332.81	333.11	332.81	333.38	334.00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-7 (a)	33.05257	94.84219	347.86	350.82	38.0	9/24/09	Sch. 40 PVC	2	28.0	319.86	38.0	309.86	334.32	334.12	334.19	334.20	334.13	334.58	333.77	333.98	334.09	333.61	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-8 (a)	33.05187	94.84026	337.53	340.01	29.0	9/21/09	Sch. 40 PVC	2	16.0	321.53	26.0	311.53	325.41	324.09	325.69	325.15	325.79	325.75	325.98	325.77	326.05	325.70	325.68	325.05	325.29	325.92	326.76	324.27	326.12	325.63	326.36	326.17	325.80	326.04	326.32	325.36		
AD-9 (a)	33.04995	94.84196	340.32	343.09	35.0	9/21/09	Sch. 40 PVC	2	20.0	320.32	35.0	305.32	328.46	328.53	328.63	328.44	328.74	329.38	NM	330.18	329.98	329.74	329.28	329.53	328.92	329.31	330.50	328.05	329.47	329.40	329.98	330.01	329.57	329.58	329.75	328.60		
AD-10 (a)	33.04881	94.84047	340.23	343.01	35.0	9/22/09	Sch. 40 PVC	2	20.0	320.23	35.0	305.23	323.44	322.55	323.27	323.35	323.51	323.76	323.57	323.88	323.95	323.55	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-11 (a)	33.04824	94.84177	339.61	342.18	20.0	9/22/09	Sch. 40 PVC	2	10.0	329.61	20.0	319.61	327.99	328.37	327.82	327.93	327.94	328.13	328.20	327.97	328.96	328.13	328.39	328.14	327.87	328.20	328.90	328.25	327.85	327.61	327.83	328.72	327.97	328.10	328.33	327.49		
AD-12 (a)	33.04901	94.84977	366.27	369.33	30.0	9/24/09	Sch. 40 PVC	2	20.0	346.27	30.0	336.27	348.30	348.29	349.86	349.56	349.99	349.65	349.89	350.01	350.65	350.39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-13 (a)	33.04918	94.84275	344.12	347.00	20.0	9/22/09	Sch. 40 PVC	2	6.0	338.12	16.0	328.12	332.36	332.24	333.09	332.26	332.68	333.25	333.35	332.01	337.58	334.76	334.54	332.93	332.39	332.84	334.54	331.83	331.42	331.83	331.52	332.98	332.23	333.38	333.29	330.97		
AD-14 (a)	33.04715	94.84256	342.32	345.43	19.0	9/22/09	Sch. 40 PVC	2	8.0	334.32	18.0	324.32	330.40	329.80	331.67	330.34	330.94	331.69	332.12	330.17	336.63	334.83	334.51	331.71	330.94	330.79	332.63	330.87	329.91	330.76	330.52	333.94	331.85	333.44	333.97	330.04		
AD-15 (a)	33° 03' 04"	94° 50' 27"	340.21	343.29	46.0	12/12/15	Sch. 40 PVC	2	25.5	314.71	45.5	294.71	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
AD-16 (a)	33° 02' 49"	94° 50' 29"	350.86	353.97	21.0	12/10/15	Sch. 40 PVC	2	11.0	339.86	21.0	329.86	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-16R (a)	33° 02' 49"	94° 50' 28.9"	350.55	353.49	27.0	4/12/17	Sch. 40 PVC	2	12.0	338.55	27.0	323.55	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
AD-17 (a)	33° 02' 57"	94° 51' 06"	353.99	357.10	40.0	12/10/15	Sch. 40 PVC	2	24.0	329.99	39.0	314.99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-18 (a)	33° 03' 03"	94° 51' 03"	346.17	349.28	29.0	12/11/15	Sch. 40 PVC	2	14.0	332.17	29.0	317.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-19	33.047201°	94.839694°	323.58	326.35	15.0	5/8/18	Sch. 40 PVC	2	5.0	318.58	15.0	308.58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-20	33° 02' 45.6"	94° 50' 22.8"	324.85	327.65	20.0	10/23/18	Sch. 40 PVC	2	4.0	320.85	19.0	305.85	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-21	33° 02' 49.6"	94° 50' 20"	322.04	325.29	20.0	10/23/18	Sch. 40 PVC	2	3.5	318.54	18.5	303.54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-22	33° 03' 35"	94° 51' 09"	360.94	360.22	20.0	6/18/19	Sch. 40 PVC	2	5.0	355.94	20.0	340.94	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
AD-23	33° 03' 56"	94° 51' 08"	369.37	368.82	20.0	6/18/19	Sch. 40 PVC	2	5.0	364.37	20.0	349.37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Piezometers																																						
B-2 (b)	33° 03.078'	94° 50.449'	339.7	339.7	50.0	10/28/09	Sch. 40 PVC	2	10.0	329.70	20.0	319.70	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM		
B-4 (b)	33° 03.011'	94° 50.462'	340.6	340.6	50.0	10/27/09	Sch. 40 PVC	2	8.0	332.60	18.0	322.60	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
B-5 (b)	33° 02.964'	94° 50.428'	340.0	340.0	50.0	10/27/09	Sch. 40 PVC	2	10.0	330.00	20.0	320.00	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
B-6 (b)	33° 02.912'	94° 50.462'	340.1	340.1	50.0	10/28/09	Sch. 40 PVC	2	12.0	328.10	22.0	318.10	NM	NM																								

Table 4-1
Soil and Coal Ash Sample Analytical Results (mg/kg) - CCR Units
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas

Sample ID	Date Sampled	Sample Depth (feet)	Units	Appendix III Parameters										Appendix IV Parameters											
				Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)	Iron	Manganese
Soil Samples																									
Temp-1	5/8/18	15'	mg/kg	14.3	43.3	15	<1	5.0	93	<0.25	1.77	16.8	<0.05	<0.05	5.22	0.28	1.77	0.104	0.004	1.18	<0.25	1.26	0.273	<12.5	5.4
SB-2	5/10/18	22'	mg/kg	11.9	35.8	13	2	3.9	878	<0.25	<0.25	18.3	0.08	<0.05	3.53	0.551	3.98	0.08	0.005	0.287	0.684	<0.25	0.159	890	4.46
(AD-17)																									
SB-3	5/10/18	30'	mg/kg	3.05	90.2	94	1	3.8	1,194	<0.25	3.83	13.6	<0.05	0.132	9.21	0.649	4.22	0.322	0.009	1.64	<0.25	<0.25	0.593	3,960	6.87
(AD-18)																									
SB-4	5/9/18	5'	mg/kg	(FOC = 0.00723 g/g)			---	4.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
(AD-5)		27'	mg/kg	7.76	634	8	1	6.4	724	<0.25	1.81	20.4	0.115	0.417	6.73	4.76	3.2	13.6	0.006	0.561	0.536	<0.25	0.657	10,400	65.5
(Background)		27'	mg/kg	(FOC = 0.00688 g/g)																					
SB-5	5/9/18	19'	mg/kg	5.45	655	16	3	7.2	69	<0.25	1.11	8.53	0.109	0.241	3.75	3.58	2.96	10.5	0.044	0.313	0.297	<0.25	0.216	6,210	35.5
(AD-8)																									
SB-6	5/9/18	21'	mg/kg	5.33	397	20	2	7.8	116	<0.25	1.11	17.9	0.09	0.24	3.5	3.37	2.67	10.3	0.051	0.299	0.471	<0.25	2.502	5,970	38.4
(AD-9)																									
SB-7	5/9/18	13'	mg/kg	8.11	1,360	19	<1	5.0	198	<0.25	10.1	65	0.154	0.356	6.87	3.21	3.14	5.3	0.004	1.39	<0.25	<0.25	0.262	9,220	28.4
(AD-13)																									
SB-8	5/9/18	12'	mg/kg	16.6	6,150	13	1	5.2	24	<0.25	3.3	213	0.409	0.452	8.22	4.13	9.05	4.63	0.013	0.488	<0.25	<0.25	0.433	11,000	25.4
(AD-3)																									
AD-20	10/23/18	15-17	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-21	10/23/18	15-17	mg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AD-22	6/18/19	3-5	mg/kg	16.7	110	---	---	4.84	---	<0.25	8.43	136	0.544	0.935	29.9	13	18.9	18	0.053	0.711	1.81	<0.25	---	25,800	---
		6-8	mg/kg	10.2	18.7	---	---	4.1	---	<0.25	20.9	30.4	0.246	0.723	17.7	9.65	8.95	2.9	0.009	0.446	1.08	<0.25	---	22,500	---
		11-13	mg/kg	8.83	219	---	---	4.26	---	<0.25	5.96	77.1	0.293	0.571	16.5	8.75	6.57	4.4	0.045	0.536	0.885	<0.25	---	17,600	---
AD-23	6/18/19	3-5	mg/kg	32.7	115	---	---	4.64	---	<0.25	14.1	45.5	0.805	3.23	49	30.8	11	7.74	0.035	1.14	4.27	<0.25	---	85,500	---
		5-7	mg/kg	10.2	22.7	---	---	4.25	---	<0.25	6.3	31.7	0.288	0.775	19	9.74	8.56	4.83	0.014	0.378	1.12	<0.25	---	22,700	---
		10-12	mg/kg	9.16	200	---	---	4.21	---	<0.25	4.13	28.3	0.288	0.613	23.9	8.19	7.03	3.41	0.015	1.03	0.635	<0.25	---	18,500	---
Coal Ash Samples																									
Ash-1	5/10/18	1-2'	mg/kg	34.4	33,800	30.5	8.21	7.1	219	<0.877	14.6	607	1.02	0.464	31.8	5.55	16.9	11.6	0.0473	2.66	2.27	<0.54	2.92	37,500	139
			SPLP: mg/L	0.594	30.2	---	---	---	---	<0.00344	<0.00411	0.284	<0.000333	<0.000164	0.00273	<0.000553	<0.00285	<0.0086	<0.0000653	0.0176	<0.00363	<0.00287	0.0991	<0.0305	<0.00267
			Pore Water: mg/L	0.643	113	20.1	1.86	7.4	6.6	<0.00344	0.0095	3.43	<0.000333	<0.000164	0.00396	<0.000553	<0.00285	0.0123	<0.0000653	0.00484	<0.00363	<0.00287	0.755	---	0.357
Ash-2	5/10/18	1-2'	mg/kg	92.6	96,000	53.8	11.2	7.3	293	<1.56	19.4	2,760	1.64	1.56	41.2	9.63	24.5	15.5	0.0967	2.08	5.25	<0.957	2.32	18,300	365
			SPLP: mg/L	0.526	24.1	---	---	---	---	<0.00344	<0.00411	0.192	<0.000333	<0.000164	0.00222	<0.000553	<0.00285	<0.0086	<0.0000653	0.0165	<0.00363	<0.00287	0.112	<0.0305	<0.00267
			Pore Water: mg/L	0.772	143	20.4	0.28	7.6	8.73	<0.00344	0.0106	3.99	<0.000333	<0.000164	0.00196	<0.000553	0.00346	0.0173	<0.0000653	0.00428	<0.00363	<0.00287	0.508	---	0.376
Ash-3	5/10/18	1-2'	mg/kg	29	14,300	11.5	10.7	7.4	152	<0.687	11.8	766	0.845	0.394	19.2	5.77	12.2	6.87	0.0403	1.79	1.44	<0.423	1.754	21,100	110
			SPLP: mg/L	0.958	19.8	---	---	---	---	<0.00344	<0.00411	0.0315	<0.000333	<0.000164	0.00389	<0.000553	<0.00285	<0.0086	<0.0000653	0.0222	<0.00363	<0.00287	<0.256	0.471	<0.00267
			Pore Water: mg/L	1.000	103	13.0	0.998	7.6	51.1	<0.00344	0.0108	1.54	<0.000333	<0.000164	0.00110	<0.000553	<0.00285	<0.0086	<0.0000653	0.0111	<0.00363	<0.00287	0.594	---	0.715
Ash-4	5/10/18	1-2'	mg/kg	281	106,000	27.6	1.34	10.5	961	<0.757	9.72	3,390	2.23	1.06	35.1	16.2	16.3	20.4	0.0340	2.21	1.30	<0.466	3.18	24,200	177
			SPLP: mg/L	1.3	25.1	---	---	---	---	<0.00344	<0.00411	0.0216	<0.000333	<0.000164	0.00329	<0.000553	<0.00285	<0.0086	<0.0000653	<0.00281	<0.00363	<0.00287	<0.407	<0.0305	<0.00267
			Pore Water: mg/L	4.75	63.5	28.8	0.697	10.8	381	<0.00344	0.00745	0.217	<0.000333	<0.000164	0.00225	0.00093	<0.00285	<0.0086	<0.0000653	0.0798	<0.00363	<0.00287	0.259	---	0.00814

NOTES:
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
FOC = Fraction organic carbon (Walkley Black)
--- = Not analyzed
SPLP = Synthetic precipitation leaching procedure (concentrations shown in milligrams per liter)
Total concentrations (mg/kg) shown in normal font, SPLP and Pore Water concentrations (mg/L) shown in italics.
Radium concentrations for soil shown in pCi/gram. SPLP concentrations shown in pCi/gram per liter.

Table 4-2
Groundwater Sampling Analytical Results (mg/L) - Primary Bottom Ash Pond
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well	Date Sampled	Appendix III Parameters									Appendix IV Parameters															
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)	Iron	Manganese	
Background (Upgradient) Wells																										
AD-1	05/26/16	0.346	36.5	5	<1	5.93	--	42	252	<0.005	<0.005	0.191	<0.001	<0.001	<0.001	<0.005	<0.005	0.010	0.000033	<0.005	<0.005	<0.002	1.18	--	--	
	07/27/16	0.350	39.6	4	<1	5.93	--	36	239	<0.005	<0.005	0.191	<0.001	<0.001	<0.001	<0.005	<0.005	0.019	<0.000025	<0.005	<0.005	<0.002	0.9952	--	--	
	09/29/16	0.332	15	5	<1	5.37	--	35	173	<0.005	<0.005	0.141	<0.001	<0.001	0.005	<0.005	<0.005	0.014	<0.000025	<0.005	<0.005	<0.002	1.38	--	--	
	10/19/16	0.398	19.1	4	<1	5.15	--	42	192	<0.005	<0.005	0.114	<0.001	<0.001	<0.001	<0.005	<0.005	0.008	<0.000025	<0.005	<0.005	<0.002	1.141	--	--	
	12/12/16	0.394	8.74	4	<1	5.18	--	40	200	<0.005	<0.005	0.072	<0.001	<0.001	<0.001	<0.005	<0.005	0.008	<0.000025	<0.005	<0.005	<0.002	0.719	--	--	
	01/17/17	0.656	129	4	<1	7.13	--	68	538	<0.005	<0.005	0.410	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.000025	<0.005	<0.005	<0.002	3.009	--	--	
	02/23/17	0.700	147	9	<1	6.88	--	68	612	<0.005	<0.005	0.488	<0.001	<0.001	<0.001	<0.005	<0.005	0.001	<0.000025	<0.005	<0.005	<0.002	4.309	--	--	
	06/07/17	0.449	15.1	4	<0.083	5.06	109	42	176	<0.00093	0.00114	0.09346	0.00037	<0.00007	0.00066	0.00077	<0.00068	0.00902	0.00007	<0.00029	0.0021	<0.00086	0.676	--	--	
	10/06/17	--	--	--	--	5.25	97.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	05/17/18	0.352	12.1	3	<0.083	4.82	8.4	--	174	<0.00093	<0.00105	0.08823	0.00048	<0.00007	<0.00023	0.0008	<0.00068	0.00816	<0.000005	<0.00029	<0.00099	<0.00086	0.837	0.03	0.025	
	Dissolved	0.35	12	--	--	4.82	8.4	--	--	<0.00093	<0.00105	0.08582	0.00044	<0.00007	<0.00023	0.00083	<0.00068	0.00799	<0.000005	<0.00029	0.00197	<0.00086	0.531	0.01	0.026	
	05/24/18	0.345	10.2	4	<0.083	5.19	118	43	150	0.00317 J	<0.00105	0.0799	0.00039 J	<0.00007	<0.00023	0.00035 J	<0.00068	0.00814	0.000006 J	<0.00029	0.00138 J	<0.00086	1.983	--	--	
	08/14/18	0.443	5.95	5	<0.083	5.18	102	44	160	0.00003 J	0.00021	0.063	0.000482	0.00002	0.00016	0.000797	0.000238	0.00708	0.000013 J	0.00021	0.0017	0.00003 J	1.10	--	--	
	02/20/19	0.504	142	2.82	0.24	7.31	113	49.2	522	0.00016	0.00046	0.457	0.00009 J	0.00001 J	0.000306	0.000399	0.000124	0.00155	<0.000025	0.001 J	0.0007	<0.0005	3.16	--	--	
	05/30/19	0.689	--	1.59	0.29	--	61.3	43.3	588	0.00016	0.00060	0.512	0.000244	0.00001 J	0.0001 J	0.000756	0.000197	<0.009	<0.000005	0.00243	0.0014	<0.0001	--	0.099	0.0625	
	07/24/19	0.644	62.7	2	0.106 J	5.97	52.1	58	180	0.00008 J	0.00039	0.245	0.00054	0.00002 J	0.0001 J	0.000789	0.0001 J	0.00557	<0.000005	0.002 J	0.0034	<0.0001	1.819	--	--	
	02/17/20	0.626	115	3.41	0.31	5.81	29.4	56.3	488	0.00033	0.00049	0.303	0.00007 J	0.00002 J	0.0001 J	0.00028	0.0001 J	0.00105	<0.00002	0.001 J	0.0023	<0.0001	2.665	--	--	
	05/20/20	0.801	126	1.83	0.20	7.22	0.0	51.4	508	0.00015	0.00053	0.394	0.000270	0.00002 J	0.0001 J	0.000490	0.0001 J	0.00301	<0.00002	0.002 J	0.0028	<0.0001	2.312	--	--	
	10/14/20	0.670	3.88	2.16	0.25	4.47	0.0	66.9	183	<0.0001	0.0003 J	0.0847	0.000984	<0.00005	0.0009 J	0.00212	0.0003 J	0.00932	0.00003 J	<0.002	0.0053	<0.0005	1.552	0.264	--	
	AD-5	05/31/16	0.03	36.9	15	<1	6.38	--	123	337	<0.005	<0.005	0.057	<0.001	<0.001	0.014	<0.005	0.135	<0.000025	<0.005	<0.005	<0.002	1.63	--	--	
07/28/16		0.04	44.7	16	<1	6.38	--	163	360	<0.005	<0.005	0.093	<0.001	<0.001	0.015	<0.005	0.191	<0.000025	<0.005	<0.005	<0.002	4.75	--	--		
09/29/16		0.04	46.3	15	<1	5.29	--	190	416	<0.005	<0.005	0.087	<0.001	<0.001	0.014	<0.005	0.186	<0.000025	<0.005	<0.005	<0.002	3.33	--	--		
10/20/16		0.05	50.7	14	<1	5.92	--	267	448	<0.005	<0.005	0.07	<0.001	<0.001	0.009	<0.005	0.225	<0.000025	<0.005	<0.005	<0.002	2.319	--	--		
12/13/16		0.05	49.6	13	<1	6.29	--	233	484	<0.005	<0.005	0.053	<0.001	<0.001	0.013	<0.005	0.199	<0.000025	<0.005	<0.005	<0.002	2.182	--	--		
01/17/17		0.04	49.8	14	<1	6.27	--	234	438	<0.005	<0.005	0.047	<0.001	<0.001	0.012	<0.005	0.239	<0.000025	<0.005	<0.005	<0.002	1.023	--	--		
02/23/17		0.04	33.0	15	<1	5.48	--	127	286	<0.005	<0.005	0.042	<0.001	<0.001	0.013	<0.005	0.166	<0.000025	<0.005	<0.005	<0.002	1.788	--	--		
06/07/17		0.05281	49.7	14	<0.083	5.96	867	82	300	<0.00093	0.00385	0.0877	0.00008	0.00039	0.00028	0.01193	<0.00068	0.124	<0.00029	<0.00099	<0.00086	2.32	--	--		
10/06/17		--	--	--	--	5.59	249	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
05/17/18		0.05063	30.1	21	<0.083	5.79	<100	--	248	<0.00093	<0.00105	0.07627	0.00014	0.00037	<0.00023	0.01907	<0.00068	0.118	<0.000005	<0.00029	<0.00099	<0.00086	1.495	14.4	0.45	
Dissolved		0.03752	29.1	--	--	5.79	<100	--	--	<0.00093	<0.00105	0.06865	<0.00002	<0.00007	<0.00023	0.01747	<0.00068	0.119	<0.000005	<0.00029	<0.00099	<0.00086	2.051	8.38	0.43	
05/24/18		0.05007	28.1	22	<0.083	6.22	17.8	60	242	<0.00093	<0.00105	0.07116	<0.00002	0.00023 J	0.0008 J	0.01424	<0.00068	0.121	<0.000005	<0.00029	<0.00099	<0.00086	1.946	--	--	
08/15/18		0.05	40.5	19	<0.083	6.23	57.1	240	428	0.00001 J	0.00169	0.0637	0.000055	0.000008 J	0.000072	0.0114	0.000079	0.147	<0.000005	0.00013	0.00008 J	<0.00005	0.316	--	--	
02/21/19		0.033	33.9	24.7	0.21	5.38	164	46.5	220	0.00002 J	0.00159	0.0694	0.00008 J	<0.00005	0.000432	0.00858	0.000147	0.0807	<0.000025	<0.002	0.0001 J	<0.0005	1.27	--	--	
05/30/19		0.03 J	--	22.3	0.29	--	150	51.3	238	<0.00002	0.00305	0.0605	0.00008 J	<0.00001	0.00006 J	0.0118	0.00005 J	0.104	0.000006	<0.0004	0.00005 J	<0.0001	--	23.4	0.331	
07/24/19		0.04 J	41.1	18	0.112 J	6.3	108	90	354	<0.00002	0.00248	0.0774	0.00005 J	<0.00001	0.00005 J	0.00838	<0.00005	0.108	<0.000005	<0.0004	0.00006 J	<0.0001	2.533	--	--	
02/17/20		0.03 J	39.8	19.8	0.22	5.45	422	43.7	248	0.00003 J	0.00217	0.109	0.00009 J	0.00002 J	0.000336	0.00452	0.000227	0.0732	<0.000002	0.0009 J	0.0002	<0.0001	2.393	--	--	
05/20/20		0.03 J	40.2	22.3	0.18	6.83	355	55.5	264	<0.00002	0.00178	0.0931	0.00005 J	0.00001 J	0.0001 J	0.00765	0.00007 J	0.0740	<0.000002	<0.0004	0.00009 J	<0.0001	1.612	--	--	
10/14/20		0.04 J	36.6	18.8	0.18	6.50	265	148	338	<0.00002	0.00628	0.0717	0.00009 J	<0.00001	0.00009 J	0.0149	0.00005 J	0.134	<0.000002	<0.0004	0.0001 J	<0.0001	2.7	37.4	--	
AD-17		05/26/16	0.121	200	43	<1	7.17	--	1,166	1,810	<0.005	<0.005	0.021	<0.001	0.002	0.001	0.063	<0.005	0.370	0.000032	<0.005	<0.005	<0.002	1.53	--	--
	07/27/16	0.119	195	32	<1	7.17	--	1,005	1,576	<0.005	<0.005	0.020	<0.001	0.004	0.001	0.068	<0.005	0.374	<0.000025	<0.005	<0.005	<0.002	2.78	--	--	
	09/29/16	0.111	191	36	<1	6.17	--	1,055	1,663	<0.005	<0.005	0.031	<0.001	<0.001	0.003	0.058	<0.005	0.354	<0.000025	<0.005	<0.005	<0.002	2.358	--	--	
	10/20/16	0.124	194	32	1.0	6.14	--	1,163	1,612	<0.005	<0.005	0.034	<0.001	0.002	0.004	0.065	<0.005	0.394	<0.000025	<0.005	<0.005	<0.002	2.224	--	--	

Table 4-2
Groundwater Sampling Analytical Results (mg/L) - Primary Bottom Ash Pond
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well	Date Sampled	Appendix III Parameters									Appendix IV Parameters															
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)	Iron	Manganese	
Point of Compliance Wells																										
AD-8	05/31/16	1.46	32.6	36	1	6.91	--	217	524	<0.005	<0.005	0.034	<0.001	<0.001	0.002	0.007	<0.005	0.122	<0.000025	<0.005	<0.005	<0.002	1.046	--	--	
	07/28/16	1.44	25.9	26	<1	6.91	--	202	469	<0.005	<0.005	0.026	<0.001	<0.001	<0.001	0.009	<0.005	0.098	<0.000025	<0.005	<0.005	<0.002	1.584	--	--	
	09/29/16	1.51	24.3	28	<1	7.65	--	186	432	<0.005	<0.005	0.023	<0.001	<0.001	<0.001	0.007	<0.005	0.111	<0.000025	<0.005	<0.005	<0.002	6.3	--	--	
	10/20/16	1.54	25.9	30	<1	6.07	--	184	424	<0.005	<0.005	0.024	<0.001	<0.001	<0.001	0.007	<0.005	0.135	<0.000025	<0.005	<0.005	<0.002	0.345	--	--	
	12/12/16	1.53	23.6	27	<1	5.62	--	168	442	<0.005	<0.005	0.021	<0.001	<0.001	<0.001	0.007	<0.005	0.11	<0.000025	<0.005	<0.005	<0.002	1.083	--	--	
	01/19/17	1.53	18.7	24	1	6.21	--	153	352	<0.005	<0.005	0.02	<0.001	<0.001	<0.001	0.006	<0.005	0.094	<0.000025	<0.005	<0.005	<0.002	0.823	--	--	
	02/22/17	1.67	19.3	22	<1	6.78	--	163	356	<0.005	<0.005	0.019	<0.001	<0.001	<0.001	0.006	<0.005	0.092	<0.000025	<0.005	<0.005	<0.002	0.536	--	--	
	06/06/17	1.39	17.4	22	0.6628	5.63	54	151	368	<0.00093	<0.00105	0.01908	<0.00002	<0.00007	<0.00023	0.00386	<0.00068	0.09491	0.000008	<0.00029	<0.00099	<0.00086	1.0735	--	--	
	10/05/17	--	--	--	--	6.68	41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	05/30/18	1.29	17.2	22	0.716	6.07	3.0	--	368	<0.00093	<0.00105	0.02283	0.00004	<0.00007	<0.00023	0.00521	<0.00068	0.08418	0.000009	<0.00029	<0.00099	<0.00086	1.106	0.673	0.388	
	Dissolved	1.31	17.1	--	--	6.07	3.0	--	--	<0.00093	<0.00105	0.02046	0.00002	<0.00007	<0.00023	0.00513	<0.00068	0.08356	<0.00005	<0.00029	<0.00099	<0.00086	0.5773	< 0.01	0.363	
	05/23/18	--	--	--	0.501 J	6.20	48.2	--	--	0.00319 J	<0.00105	0.02212	<0.00002	<0.00007	<0.00023	0.00319 J	<0.00068	0.0956	<0.00005	<0.00029	0.00175 J	<0.00086	0.3366	--	--	
	8/15/18 ^b	1.30	15.0	24	0.615 J	6.77	104	122	288	0.00001 J	0.00031	0.0212	0.000008 J	0.000002 J	0.00005	0.00536	0.000039	0.0555	0.000007 J	0.00016	0.00007 J	0.000129	3.44	--	--	
	02/21/19	1.47	17.6	23.2	0.660	6.40	88.2	163	352	<0.0001	0.00057	0.0281	0.00003 J	0.0000456	0.00288	0.000223	0.0911	<0.00025	<0.002	0.0001 J	<0.0005	0.417	--	--		
	05/29/19	1.07	--	19.5	0.89	--	76.4	150	324	<0.00002	0.00037	0.0303	<0.00002	0.00002 J	0.0001 J	0.00603	0.00007 J	0.067	<0.00005	<0.0004	0.00006 J	0.0001 J	--	1.07	0.457	
	07/23/19	1.21	20.8	15	0.559 J	6.58	31.4	145	392	<0.00002	0.00041	0.031	<0.00002	0.00002 J	0.00009 J	0.00707	0.00008 J	0.0641	<0.00005	<0.0004	0.00008 J	0.0001 J	0.72	--	--	
	02/17/20	1.25	14.6	17	0.67	6.50	78.4	159	344	<0.00002	0.00055	0.0389	<0.00002	0.00005 J	0.000244	0.00102	0.000102	0.0001 J	0.124	<0.00002	<0.0004	0.00008 J	<0.0001	1.257	--	--
	05/19/20	1.23	15.1	16.5	0.66	6.37	2.2	149	336	<0.00002	0.00027	0.0211	<0.00002	0.00004 J	0.0002 J	0.00117	<0.00005	0.0872	<0.00002	<0.0004	0.00007 J	<0.0001	0.344	--	--	
	10/12/20	1.10	17.2	13.6	0.88	6.75	0.0	138	298	<0.00002	0.00030	0.0259	<0.00002	0.00004 J	0.00006 J	0.00571	<0.00002	0.0615	<0.00002	<0.0004	0.00008 J	0.0001 J	0.267	0.581	--	
	AD-9	05/31/16	0.12	229	88	<1	6.32	--	1,352	2,541	<0.005	<0.005	0.051	<0.001	0.001	<0.001	0.027	<0.005	1.32	<0.000025	<0.005	<0.005	<0.002	2.95	--	--
07/28/16		0.105	255	98	<1	6.32	--	1,464	2,564	<0.005	<0.005	0.031	<0.001	0.002	<0.001	0.022	<0.005	1.38	0.000045	<0.005	0.008	<0.002	1.447	--	--	
09/29/16		0.115	220	86	<1	4.72	--	1,301	2,448	<0.005	<0.005	0.033	<0.001	<0.001	<0.001	0.012	<0.005	1.17	<0.000025	<0.005	<0.005	<0.002	3.199	--	--	
10/19/16		0.109	228	76	1	5.22	--	1,350	2,494	<0.005	<0.005	0.026	<0.001	<0.001	<0.001	0.016	<0.005	1.44	<0.000025	<0.005	<0.005	<0.002	1.311	--	--	
12/12/16		0.108	250	92	<1	5.72	--	1,639	2,667	<0.005	<0.005	0.027	<0.001	0.002	<0.001	0.024	<0.005	1.33	<0.000025	<0.005	<0.005	<0.002	3.0	--	--	
01/19/17		0.312	91.1	54	<1	5.43	--	884	1,360	<0.005	<0.005	0.098	0.002	<0.001	<0.001	0.042	<0.005	0.634	<0.000025	<0.005	<0.005	<0.002	2.349	--	--	
02/22/17		0.1	258	86	<1	5.77	--	1,774	2,662	<0.005	<0.005	0.022	<0.001	<0.001	<0.001	0.024	<0.005	1.41	<0.000025	<0.005	<0.005	<0.002	2.32	--	--	
06/06/17		0.146	191	19	<0.083	4.61	100	105	308	<0.00093	<0.00105	0.04227	0.00077	<0.00222	<0.00023	0.02416	<0.00068	1.00	0.000006	<0.00029	<0.00099	<0.00086	1.586	--	--	
10/05/17		--	--	--	--	5.78	102	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
05/16/18		0.08607	10.5	85	<0.083	4.20	<100	1,972	<0.00093	<0.00105	0.04937	0.00134	0.00023	<0.00023	0.01628	<0.00068	0.217	<0.00005	<0.00029	<0.00099	<0.00086	1.582	0.446	0.378		
Dissolved		0.07126	10.2	--	--	4.20	<100	--	--	<0.00093	<0.00105	0.04695	0.00122	0.00012	<0.00023	0.01592	<0.00068	0.204	<0.00005	<0.00029	<0.00099	<0.00086	1.549	0.166	0.369	
05/23/18		--	--	--	<0.083	5.30	44.6	--	--	<0.00093	<0.00105	0.03045	0.00032 J	0.00288	<0.00023	0.0267	<0.00068	1.20	<0.00005	<0.00029	<0.00099	0.00846	2.556	--	--	
8/15/18 ^b		0.198	230	103	<0.083	4.96	237	1,910	2,694	<0.01	0.00168	0.0242	0.000268	0.00006	0.00042	0.0111	0.000262	0.851	0.000013 J	0.00011	0.0003	0.000062	1.864	--	--	
02/21/19		1.39	211	89	0.19	4.98	115	1,350	2,240	<0.0001	0.00118	0.0524	0.000474	0.00009	0.000313	0.0148	0.00008 J	1.12	0.00001 J	<0.002	0.0003	0.0001 J	2.51	--	--	
05/29/19		0.06 J	--	44	0.16	--	27.2	503	1,758	<0.00002	0.0002	0.0497	0.000941	0.00021	0.000346	0.0159	0.00007 J	0.225	<0.00005	<0.0004	0.0002	0.0002 J	--	0.485	0.363	
07/23/19		0.081	222	77	0.5736 J	6.28	8.7	1,701	2,460	<0.00002	0.00139	0.0321	0.000361	0.00006	0.0002 J	0.0127	0.0002 J	1.11	<0.00005	<0.0004	0.0004	<0.0001	1.689	--	--	
02/17/20		0.120	11.5	19.9	0.15	6.02	6.8	100	282	<0.00002	0.00033	0.0528	0.000979	0.00024	0.000608	0.0177	0.0002 J	0.218	0.00002 J	<0.0004	0.0003	0.0002 J	1.938	--	--	
05/19/20		0.066	11.3	44.8	0.1 J	4.90	8.3	536	902	<0.00002	0.00025	0.0516	0.000933	0.00024	0.000458	0.0165	0.00007 J	0.160	0.00003 J	<0.0004	0.0004	0.0002 J	1.854	--	--	
10/12/20		0.100	11.8	18.8	0.19	4.79	0.0	100	296	<0.00002	0.00072	0.0553	0.00127	0.00022	0.000471	0.0186	0.000349	0.194	0.00003 J	<0.0004	0.0003	0.0002 J	2.838	2.67	--	
AD-15		05/31/16	0.329	5.09	30	<1	5.58	--	24	188	<0.005	0.012	0.215	<0.001	<0.001	0.017	0.011	0.007	0.017	0.000054	<0.005	<0.005	<0.002	2.28	--	--
	07/28/16	0.407	3.83	34	<1	5.58	--	28	196	<0.005	0.006	0.124	<0.001	<0.001	0.004	0.006	<0.005	0.021	<0.000025	<0.005	<0.005	<0.002	1.322	--	--	
	09/29/16	0.360	13.7	28	<1	4.57	--	23	367	<0.005	0.131	1.93	0.015	0.007	0.28	0.134	0.161	0.149	0.000707	<0.005	0.014	<0.002	9.92	--	--	
	10/19/16	0.152	4.57	26	<1	4.35	--	17	152	<0.005	0.023	0.415	0.002	<0.001	0.054	0.019	0.022	0.036	0.0001	<0.005	<0.005	<				

Table 4-2
Groundwater Sampling Analytical Results (mg/L) - Primary Bottom Ash Pond
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well	Date Sampled	Appendix III Parameters								Appendix IV Parameters																
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)	Iron	Manganese	
Supplemental Downgradient Monitoring Wells																										
AD-10	5/16/2018 <i>Dissolved</i>	0.08311 <i>0.07733</i>	15.5 15.3	40 --	<0.083 --	3.72 --	<100 --	-- --	280 --	<0.00093 <i><0.00093</i>	0.0022 <i><0.00105</i>	0.03855 <i>0.03712</i>	0.00166 <i>0.00149</i>	0.00033 <i>0.00009</i>	<0.00023 <i><0.00023</i>	0.02432 <i>0.02412</i>	<0.00068 <i><0.00068</i>	0.316 <i>0.296</i>	<0.000005 <i><0.000005</i>	<0.00029 <i><0.00029</i>	<0.00099 <i><0.00099</i>	0.00098 <i><0.00086</i>	1.704 <i>1.505</i>	0.338 <i>0.282</i>	0.25 <i>0.251</i>	
Supplemental Sidegradient Monitoring Wells																										
MW-9	5/15/2018 <i>Dissolved</i>	0.578 <i>0.556</i>	44.8 44.7	93 --	<0.083 --	4.74 --	57.4 --	-- --	780 --	0.00097 <i><0.00093</i>	<0.00105 <i><0.00105</i>	0.01661 <i>0.01588</i>	0.00021 <i>0.00015</i>	0.00019 <i>0.00036</i>	<0.00023 <i><0.00023</i>	0.03083 <i>0.03189</i>	<0.00068 <i>0.00813</i>	0.03225 <i>0.03151</i>	0.000127 <i>0.00015</i>	<0.00029 <i><0.00029</i>	<0.00099 <i><0.00099</i>	<0.00086 <i><0.00086</i>	0.779 <i>0.2578</i>	0.142 <i>< 0.01</i>	0.306 <i>0.308</i>	
MW-10	5/15/2018 <i>Dissolved</i>	0.707 <i>0.689</i>	59.3 59.8	5 --	<0.083 --	6.68 --	1.7 --	-- --	346 --	<0.00093 <i><0.00093</i>	0.00128 <i><0.00105</i>	0.08634 <i>0.08253</i>	0.00006 <i><0.00002</i>	<0.00007 <i><0.00007</i>	<0.00023 <i><0.00023</i>	0.00385 <i>0.00064</i>	<0.00068 <i><0.00068</i>	0.01001 <i>0.00924</i>	<0.000005 <i><0.000005</i>	0.00079 <i>0.00082</i>	0.01898 <i>0.01651</i>	<0.00086 <i><0.00086</i>	0.969 <i>1.026</i>	0.101 <i>< 0.01</i>	0.054 <i>0.002</i>	
EPA MCLs:																										
	MCL				4					0.006	0.01	2	0.004	0.005	0.1				0.002		0.05	0.002	5 ^e			
	Rule Specified															0.006	0.015	0.04		0.1						
	Background Limit				1					0.003	0.006	5 ^d	0.00077	0.0065 ^d	0.004	0.075 ^d	0.003	0.394 ^d	0.000033	0.002	0.005	0.001	4.00 ^e			
	Interwell Background Value(s) (UPL, LPL where applicable) AD-8, AD-9, AD-15	0.700				4.8-7.0																				
	Intrawell Background Value (UPL) AD-8		15.1	16.5	0.66				149	336																
	Intrawell Background Value (UPL) AD-9		299	138	1.00				2,530	3,070																
	Intrawell Background Value (UPL) AD-15		5.40	38.8	1.00				33.2	249																

NOTES:
 All concentration data are provided in milligrams per liter (mg/L) unless otherwise noted.
 J = Analyte was positively identified, though the quantitation was below Reporting Limit.
 MCL - Maximum contaminant level
 LPL = Lower prediction limit
 UPL = Upper prediction limit
 pCi/L = PicoCuries per liter
 -- = Not analyzed
 a = Data taken from Geosyntec "Statistical Analysis Summary, Primary Bottom Ash Pond" dated February 11, 2021*.
 b = Some inorganic analyte groundwater samples collected 9/17/18.
 c = Sample ID "AD-15 DUP" was field filtered (FF) using a 5 micron filter.
 d = Calculated Upper Tolerance Limit is higher than MCL.
 e = Data is "Combined Radium, Total".
 Denotes groundwater sample collected by ARCADIS using low-flow methods.
 Unless otherwise noted, values shown are total (unfiltered) analyses.
 Dissolved (0.45-micron lab filtered) parameter concentrations shown in italics.

Table 4-3
Groundwater Sampling Analytical Results (mg/L) - Landfill
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well	Date Sampled	Appendix III Parameters								Appendix IV Parameters														Iron	Manganese
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH (field)	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)		
Background (Upgradient) Wells																									
AD-5	05/31/16	0.03	36.9	15	<1	6.38	--	123	337	<0.005	<0.005	0.057	<0.001	<0.001	<0.001	0.014	<0.005	0.135	<0.000025	<0.005	<0.005	<0.002	1.63	--	--
	07/28/16	0.04	44.7	16	<1	6.38	--	163	360	<0.005	<0.005	0.093	<0.001	<0.001	<0.001	0.015	<0.005	0.191	<0.000025	<0.005	<0.005	<0.002	4.75	--	--
	09/29/16	0.04	46.3	15	<1	5.29	--	190	416	<0.005	<0.005	0.087	<0.001	<0.001	<0.001	0.014	<0.005	0.186	<0.000025	<0.005	<0.005	<0.002	3.33	--	--
	10/20/16	0.05	50.7	14	<1	5.92	--	267	448	<0.005	<0.005	0.07	<0.001	<0.001	<0.001	0.009	<0.005	0.225	<0.000025	<0.005	<0.005	<0.002	2.319	--	--
	12/13/16	0.05	49.6	13	<1	6.29	--	233	484	<0.005	<0.005	0.053	<0.001	<0.001	<0.001	0.013	<0.005	0.199	<0.000025	<0.005	<0.005	<0.002	2.182	--	--
	01/17/17	0.04	49.8	14	<1	6.27	--	234	438	<0.005	<0.005	0.047	<0.001	<0.001	<0.001	0.012	<0.005	0.239	<0.000025	<0.005	<0.005	<0.002	1.023	--	--
	02/23/17	0.04	33.0	15	<1	5.48	--	127	286	<0.005	<0.005	0.042	<0.001	<0.001	<0.001	0.013	<0.005	0.166	<0.000025	<0.005	<0.005	<0.002	1.788	--	--
	06/07/17	0.05281	49.7	14	<0.083	5.96	867	82	300	<0.00093	0.00385	0.0877	0.00008	0.00039	0.00028	0.01193	<0.00068	0.124	<0.000005	<0.00029	<0.00099	<0.00086	2.32	--	--
	10/06/17	--	--	--	--	5.59	249	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/17/18	0.05063	30.1	21	<0.083	5.79	<100	--	248	<0.00093	<0.00105	0.07627	0.00014	0.00037	<0.00023	0.01907	<0.00068	0.118	<0.000005	<0.00029	<0.00099	<0.00086	1.495	14.4	0.45
	Dissolved	0.03752	29.1	--	--	5.79	<100	--	--	<0.00093	<0.00105	0.06865	<0.00002	<0.00007	<0.00023	0.01747	<0.00068	0.119	<0.000005	<0.00029	<0.00099	<0.00043	2.051	8.38	0.43
	05/24/18	0.05007	28.1	22	<0.083	6.22	17.8	60	242	<0.00093	<0.00105	0.07116	<0.00002	0.00023 J	0.0008 J	0.01424	<0.00068	0.121	<0.000005	<0.00029	<0.00099	<0.00086	1.946	--	--
	08/15/18	0.05	40.5	19	<0.083	6.23	57.1	240	428	0.00001 J	0.00169	0.0637	0.000055	0.000008 J	0.000072	0.0114	0.000079	0.147	<0.000005	0.00013	0.00008 J	<0.001	0.316	--	--
	02/21/19	0.033	33.9	24.7	0.21	5.38	164	46.5	220	0.00002 J	0.00159	0.0694	0.00008 J	<0.00005	0.000432	0.00858	0.000147	0.0807	<0.000025	<0.002	0.0001 J	<0.0005	1.27	--	--
	05/30/19	0.03 J	--	22.3	0.29	--	150	51.3	238	<0.00002	0.00305	0.0605	0.00008 J	<0.00001	0.00006 J	0.0118	0.00005 J	0.104	0.000006	<0.0004	0.00005 J	<0.0001	--	23.4	0.331
	07/24/19	0.04 J	41.1	18	0.112 J	6.3	108	90	354	<0.00002	0.00248	0.0774	0.00005 J	<0.00001	0.00005 J	0.00838	<0.00005	0.108	<0.000005	<0.0004	0.00006 J	<0.0001	2.533	--	--
02/17/20	0.03 J	39.8	19.8	0.22	5.45	422	43.7	248	0.00003 J	0.00217	0.109	0.00009 J	0.00002 J	0.000336	0.00452	0.000227	0.0732	<0.000002	0.0009 J	0.0002	<0.0001	2.393	--	--	
05/20/20	0.03 J	40.2	22.3	0.18	6.83	355	55.5	264	<0.00002	0.00178	0.0931	0.00005 J	0.00001 J	0.0001 J	0.00765	0.00007 J	0.0740	<0.000002	<0.0004	0.00009 J	<0.0001	1.612	--	--	
10/14/20	0.04 J	36.6	18.8	0.18	6.50	265	148	338	<0.00002	0.00628	0.0717	0.00009 J	<0.00001	0.00009 J	0.0149	0.00005 J	0.134	<0.000002	<0.0004	0.0001 J	<0.0001	2.7	37.4	--	
AD-18 ^d	05/26/16	0.146	409	422	<1	5.1	--	5,135	10,000	<0.005	<0.005	0.012	0.014	0.003	<0.001	0.922	<0.005	2.07	0.000168	<0.005	0.006	0.003	12.58	--	--
	07/27/16	0.148	457	432	2	5.1	--	4,930	9,476	<0.005	<0.005	0.019	0.005	0.002	<0.001	0.734	<0.005	1.94	0.000091	<0.005	0.007	0.003	10.62	--	--
	09/29/16	0.156	469	637	4	5.59	--	4,632	9,569	<0.005	<0.005	0.02	0.004	<0.001	<0.001	0.666	<0.005	1.86	0.000117	<0.005	0.007	<0.002	7.05	--	--
	10/20/16	0.188	498	876	0.8664	5.7	--	5,537	9,540	<0.005	<0.005	0.021	0.002	0.001	<0.001	0.569	<0.005	2.06	0.000053	<0.005	<0.005	<0.002	5.82	--	--
	12/13/16	0.178	510	695	5	5.75	--	4,382	8,912	<0.005	<0.005	0.021	0.007	0.001	<0.001	0.641	<0.005	1.74	0.00005	<0.005	<0.005	<0.002	9.6	--	--
	01/17/17	0.050	412	159	5	4.49	--	5,414	8,562	<0.005	0.01	0.014	0.022	0.001	<0.001	0.929	<0.005	1.95	0.000224	<0.005	<0.005	0.002	22.51	--	--
	02/22/17	0.090	401	151	6	4.37	--	5,169	8,412	<0.005	<0.005	0.014	0.026	0.002	<0.001	0.961	<0.005	1.82	0.000107	<0.005	<0.005	0.00228	19.11	--	--
	06/06/17	0.125	428	304	6.53	4.27	121	5,920	9,394	<0.00093	0.00331	0.01038	0.01883	0.00303	<0.00023	0.940	<0.00068	2.15	0.000113	<0.00029	0.00212	<0.00086	16.12	--	--
	10/05/17	--	--	--	--	5.87	165	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/17/18	0.163	433	362	9.4	3.61	104.1	--	9,952	0.00224	0.00276	0.00813	0.01733	0.0036	0.00098	0.928	<0.00068	2.07	0.000043	<0.00029	0.00194	0.00144	19.95	19.7	14.1
	Dissolved	0.153	423	--	--	--	--	--	--	0.00467	0.00189	0.00748	0.01676	0.00316	<0.00023	0.898	<0.00068	2.06	0.000012	<0.00029	0.00135	0.01466	18.09	19.1	13.7
05/30/19	0.09 J	--	390	3.56	--	91.3	6,120	9,564	<0.0002	0.040	0.009 J	0.021	0.004 J	<0.004	1.130	0.00035	1.27	0.000035	<0.04	0.103	<0.01	--	11.2	7.53	
10/14/20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.65	--	--	--	--	--	43.6	--	
Background Statistical Evaluation Summary - Upper Prediction Limits:^a										0.003	0.006	5	0.00077	0.0065	0.004	0.075	0.003	0.394	0.000033	0.002	0.005	0.001	4	--	--
Point of Compliance Wells																									
AD-11	05/31/16	2.47	8.47	9	2	5.21	--	518	388	<0.005	<0.005	0.014	0.004	<0.001	0.003	0.026	<0.005	0.032	<0.000025	<0.005	<0.005	<0.002	1.77	--	--
	07/28/16	2.83	8.88	10	2	5.21	--	596	1,000	<0.005	<0.005	0.012	0.004	<0.001	<0.001	0.026	<0.005	0.047	<0.000025	<0.005	<0.005	<0.002	2.23	--	--
	09/29/16	3.4	10.7	12	2	4.08	--	683	1,065	<0.005	<0.005	0.052	0.005	<0.001	0.007	0.03	<0.005	0.047	<0.000025	<0.005	<0.005	<0.002	3.92	--	--
	10/19/16	3.77	8.78	11	<1	3.68	--	706	1,024	<0.005	<0.005	0.02	0.005	<0.001	0.002	0.027	<0.005	0.047	<0.000025	<0.005	<0.005	<0.002	2.56	--	--
	12/12/16	3.36	8.98	10	2	3.75	--	548	1,044	<0.005	<0.005	0.013	0.004	<0.001	<0.001	0.025	<0.005	0.041	<0.000025	<0.005	<0.005	<0.002	1.569	--	--
	01/17/17	2.81	10.3	11	2	4.41	--	760	1,048	<0.005	<0.005	0.013	0.004	<0.001	<0.001	0.025	<0.005	0.046	<0.000025	<0.005	<0.005	<0.002	1.082	--	--
	02/22/17	2.88	9.31	10	2	4.34	--	558	876	<0.005	<0.005	0.019	0.004	<0.001	0.002	0.024	<0.005	0.035	<0.000025	<0.005	<0.005	<0.002	1.45	--	--
	06/06/17	2.79	9.93	10	1.366	3.86	219	556	960	<0.00093	0.00123	0.01012	0.00279	0.00041	0.00032	0.02216	<0.00068	0.03654	<0.000005	<0.00029	<0.00099	<0.00086	1.902	--	--
	10/05/17	--	--	--	--	4.43	162	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/16/18	1.48	4.37	10	<0.083	3.77	75.3	558	0.00417	0.00127	0.01281	0.00148	0.00053	0.00041	0.00935	<0.00068	0.01978	<0.000005	0.00094	0.00103	<0.00086	1.264	1.35	0.063	
	Dissolved	1.45	4.28	--	--	3.77	75.3	--																	

Table 4-3
Groundwater Sampling Analytical Results (mg/L) - Landfill
AEP J. Robert Welsh Power Plant
Pittsburg, Titus County, Texas



Well	Date Sampled	Appendix III Parameters								Appendix IV Parameters														Iron	Manganese
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH (field)	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)		
AD-13 (cont.)	05/16/18	1.42	7.48	10	0.5362	4.20	1.4	532	<0.00093	<0.00105	0.0216	0.00088	0.00011	<0.00023	0.00809	<0.00068	0.02603	<0.000005	<0.00029	<0.00099	<0.00086	2.064	0.858	0.046	
	<i>Dissolved</i>	1.41	7.31	--	--	4.20	1.4	--	<0.00093	<0.00105	0.02097	0.0008	<0.00007	<0.00023	0.00784	<0.00068	0.02439	<0.000005	<0.00029	<0.00099	<0.00086	1.407	0.712	0.045	
	05/23/18	--	--	--	0.6534 J	4.52	52.7	--	<0.00093	<0.00105	0.02653	0.00087 J	<0.00007	0.00073 J	0.00937	<0.00068	0.0291	0.000008 J	<0.00029	<0.00099	<0.043	2.16	--	--	
	08/14/18	1.49	10.1	18	0.7442	4.82	131	316	620	--	0.00137	0.0169	0.000971	0.00031	0.000503	0.0131	--	0.0321	<0.000005	--	0.0017	0.000277	4.0	--	--
	05/30/19	0.477	--	3.6	0.53	--	83.6	94	196	0.00003 J	0.00032	0.0609	0.000385	0.00007	0.00031	0.00315	0.00005 J	0.009 J	<0.000005	<0.0004	0.0004	<0.0001	--	0.086	0.0141
	07/23/19	0.780	6.16	5	0.169	--	216	146	334	0.00002 J	0.00037	0.0236	0.000443	0.00009	0.000283	0.00382	0.000204	0.0175	<0.000005	<0.0004	0.0003	0.0001 J	1.748	--	--
	02/17/20	0.929	17.6	7.79	0.69	4.93	104	236	442	0.00003 J	0.00059	0.0594	0.000528	0.00012	0.000354	0.00384	0.0001 J	0.0132	0.000012	0.0005 J	0.0011	<0.0001	3.790	--	--
	05/19/20	0.936	19.2	--	--	5.49	0.0	--	--	0.00005 J	0.00053	0.0503	0.000533	0.00009	0.000261	0.00387	0.00006 J	0.0147	0.000034	0.001 J	0.0013	<0.0001	1.977	--	--
	10/12/20	1.52	8.03	18.1	0.33	4.47	0.0	278	522	<0.00002	0.00055	0.0185	0.000834	0.00017	0.000410	0.00850	0.000324	0.0480	<0.000002	<0.0004	0.0005	0.0002 J	1.546	4.02	--
	AD-14	05/31/16	1.28	2.88	4	<1	4.75	--	115	285	<0.005	<0.005	0.031	<0.001	<0.001	0.010	<0.005	0.012	0.00003	<0.005	<0.005	<0.002	0.87	--	--
07/27/16		1.14	2.51	5	<1	4.75	--	111	267	<0.005	<0.005	0.084	<0.001	<0.001	0.009	<0.005	0.024	<0.000025	<0.005	<0.005	<0.002	1.487	--	--	
09/29/16		1.14	1.19	5	<1	4.17	--	111	252	<0.005	<0.005	0.03	<0.001	<0.001	0.009	<0.005	0.015	<0.000025	<0.005	<0.005	<0.002	4.817	--	--	
10/19/16		1.25	2.48	4	<1	3.88	--	118	276	<0.005	<0.005	0.039	<0.001	0.001	<0.001	0.009	<0.005	0.014	<0.000025	<0.005	<0.005	<0.002	1.972	--	--
12/12/16		1.25	2.41	5	<1	4.11	--	101	296	<0.005	<0.005	0.047	<0.001	0.001	0.009	<0.005	0.013	0.000037	<0.005	<0.005	<0.002	1.271	--	--	
01/17/17		0.915	10.3	4	<1	6.07	--	92	254	<0.005	<0.005	0.038	<0.001	<0.001	<0.001	<0.005	0.013	<0.000025	<0.005	<0.005	<0.002	1.825	--	--	
02/22/17		1.06	9.48	4	<1	5.39	--	90	212	<0.005	<0.005	0.042	<0.001	<0.001	<0.001	<0.005	0.012	<0.000025	<0.005	<0.005	<0.002	0.512	--	--	
06/06/17		1.26	7.69	6	<0.083	4.77	167	108	256	<0.00093	<0.00105	0.04483	0.00038	0.00067	0.00127	0.00678	<0.00068	0.0127	0.000021	<0.00029	0.00261	<0.00086	1.138	--	--
10/06/17		--	--	--	--	4.57	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
05/16/18		1.61	4.67	11	<0.083	4.11	5.1	--	332	<0.00093	<0.00105	0.03161	0.00094	0.00204	<0.00023	0.01501	<0.00068	0.01638	0.000137	<0.00029	0.00221	<0.00086	1.097	0.09	0.008
<i>Dissolved</i>		1.56	4.55	--	--	4.11	5.1	--	--	<0.00093	<0.00105	0.02938	0.00094	0.00193	<0.00023	0.01476	<0.00068	0.01523	0.000149	<0.00029	0.00387	<0.00086	0.5903	0.06	0.007
05/23/18		--	--	--	<0.083	4.17	43.2	--	--	<0.00093	<0.00105	0.02817	0.00078 J	0.00161	<0.00023	0.01434	<0.00068	0.0152	0.000145	<0.00029	0.00362	<0.043	1.601	--	--
08/14/18		1.51	4.51	12	<0.083	4.27	198	204	384	--	0.00039	0.024	0.000854	0.00199	0.000276	0.0176	--	0.011	0.000181	--	0.0037	0.000242	1.5	--	--
05/29/19		1.21	--	3.65	0.19	--	20.6	122	274	<0.0001	0.0005	0.0434	0.000709	0.00087	0.0002 J	0.00774	0.0001 J	0.02 J	0.000181	<0.0002	0.0019	<0.0005	0.005 J	0.00023	--
07/23/19		1.25	9.93	8	0.162	--	21.7	171	440	<0.00002	0.00043	0.0362	0.000934	0.00249	0.000286	0.0185	0.0002	0.0155	0.000123	<0.0004	0.0027	0.0002 J	2.731	--	--
02/17/20		1.12	38.7	2	0.24	5.21	5.5	85.6	294	0.00007 J	0.00043	0.0444	0.000179	0.00020	0.0002 J	0.00232	0.00007 J	0.00630	0.000003 J	0.002 J	0.0025	0.0001 J	2.552	--	--
05/19/20		1.22	15.1	--	--	5.36	0.5	--	--	0.00003 J	0.00032	0.0353	0.000396	0.00032	0.000307	0.00381	0.0001 J	0.00875	0.000002 J	0.001 J	0.0015	<0.0001	0.778	--	--
10/12/20		1.14	9.63	8.59	0.24	4.30	0.1	246	469	<0.00002	0.00044	0.0229	0.00146	0.00321	0.000357	0.0260	0.000307	0.0195	0.000391	<0.0004	0.0020	0.0003 J	4.259	0.08 J	--
Supplemental Downgradient Monitoring Well																									
AD-10	5/16/2018	0.08311	15.5	40	<0.083	3.72	<100	--	280	<0.00093	0.0022	0.03855	0.00166	0.00033	<0.00023	0.02432	<0.00068	0.316	<0.000005	<0.00029	<0.00099	0.00098	1.704	0.338	0.25
	<i>Dissolved</i>	0.07733	15.3	--	--	--	--	--	--	<0.00093	<0.00105	0.03712	0.00149	0.00009	<0.00023	0.02412	<0.00068	0.296	<0.000005	<0.00029	<0.00099	<0.00086	1.505	0.282	0.251
Supplemental Sidegradient Monitoring Wells																									
Temp-1	5/17/2018	0.662	26.2	34	<0.083	4.90	23.8	--	556	<0.00093	<0.00105	0.07752	0.00058	<0.00007	0.00102	0.01058	<0.00068	0.01075	<0.000005	<0.00029	<0.00099	<0.00086	1.277	1.94	0.203
	<i>Dissolved</i>	0.621	24.6	--	--	--	--	--	--	<0.00093	<0.00105	0.06778	0.00042	<0.00007	<0.00023	0.00946	<0.00068	0.00986	<0.000005	<0.00029	<0.00099	0.00191	2.278	0.813	0.192
	10/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00674	--	--	--	--	--	2.77	--
AD-12	6/19/2019	0.569	34.1	44.1	0.32	6.3	40.1	131	436	<0.0001	0.00123	0.0581	0.0004 J	0.00005 J	0.0003 J	0.0126	<0.0001	0.042	<0.000002	<0.002	0.0005 J	<0.0005	2.007	25.9	--
EPA MCLs:																									
MCL					4					0.006	0.01	2	0.004	0.005	0.1				0.002		0.05	0.002	5 ^c		
Rule Specified																									
Background Limit					1					0.003	0.006	5	0.00077	0.0065	0.004	0.075	0.003	0.394	0.000033	0.002	0.005	0.001	4		
Interwell Background Value(s) (UPL, LPL where applicable) AD-8, AD-9, AD-15	0.700					4.8-7.0																			
Intrawell Background Value (UPL) AD-8		15.1	16.5	0.660				149	336																
Intrawell Background Value (UPL) AD-9		299	138	1.00				2,530	3,070																
Intrawell Background Value (UPL) AD-15		5.40	38.8	1.00				33.2	249																

NOTES:
 All concentration data are provided in milligrams per liter (mg/L) unless otherwise noted.
 J = Analyte was positively identified, though the quantitation was below Reporting Limit.
 MCL = Maximum contaminant level
 LPL = Lower prediction limit
 UPL = Upper prediction limit
 pCi/L = PicoCuries per liter
 -- = Not analyzed
 a = Data taken from Geosyntec "Statistical Analysis Summary, Primary Bottom Ash Pond" dated February 11, 2021.
 b = Calculated Upper Tolerance Limit is higher than MCL.
 c = Data is "Combined Radium, Total".
 d = AD-18 is not part of the designated CCR Monitoring Well Network and used for background understanding only
 Denotes groundwater sample collected by ARCADIS using low-flow methods.
 Unless otherwise noted, values shown are total (unfiltered) analyses.
 Dissolved (0.45-micron lab filtered) parameter concentrations shown in italics.

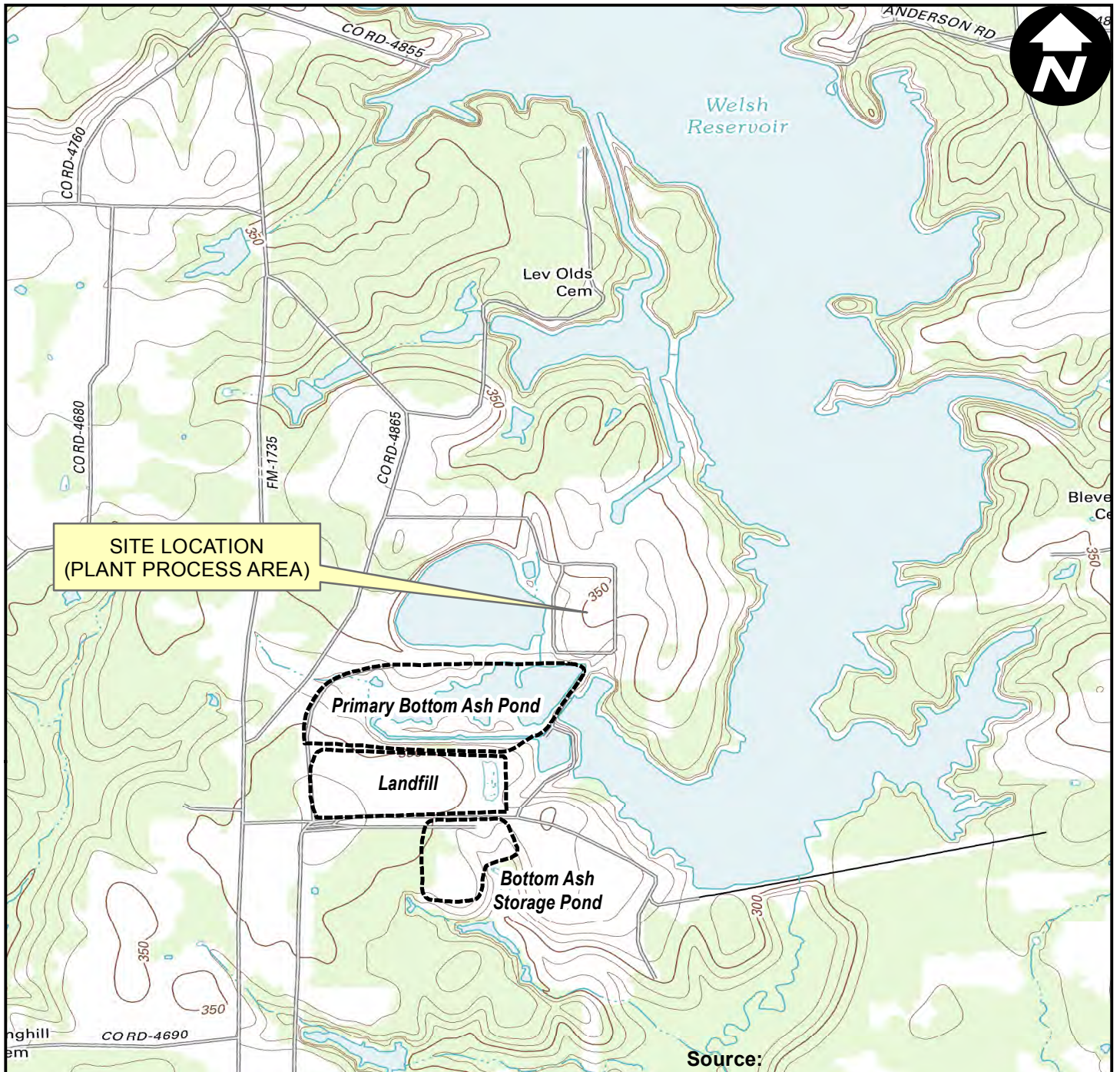
Table 4-4
 Groundwater Sampling Analytical Results (mg/L) - Bottom Ash Storage Pond
 AEP J. Robert Welsh Power Plant
 Pittsburg, Titus County, Texas



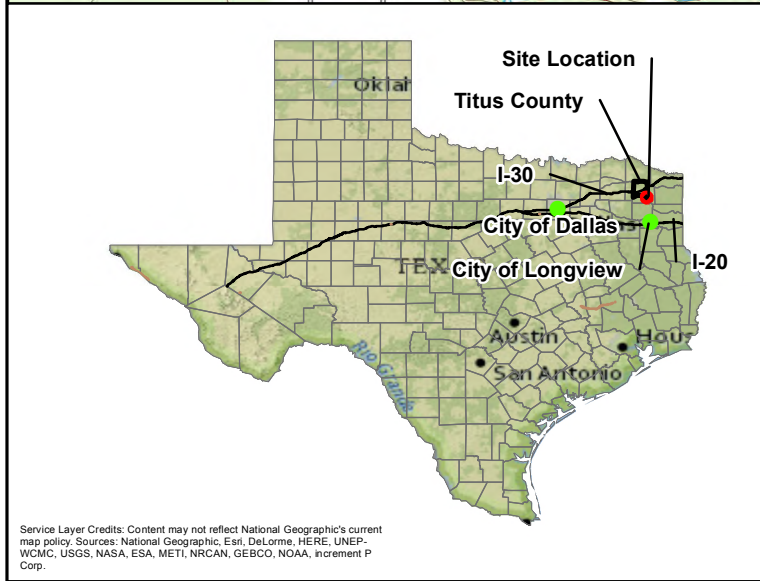
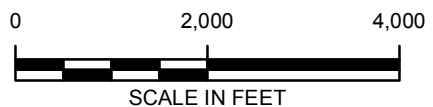
Well	Date Sampled	Appendix III Parameters									Appendix IV Parameters														
		Boron (total)	Calcium (total)	Chloride	Fluoride	pH (field)	Turbidity (field)	Sulfate	TDS	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium 226 and 228 (pCi/L)	Iron	Manganese
Background (Upgradient) Wells																									
AD-1	05/26/16	0.346	36.5	5	<1	5.93	--	42	252	<0.005	<0.005	0.191	<0.001	<0.001	<0.001	<0.005	<0.005	0.010	0.000033	<0.005	<0.005	<0.002	1.18	--	--
	07/27/16	0.350	39.6	4	<1	5.93	--	36	239	<0.005	<0.005	0.191	<0.001	<0.001	<0.001	<0.005	<0.005	0.019	<0.000025	<0.005	<0.005	<0.002	0.9952	--	--
	09/29/16	0.332	15	5	<1	5.37	--	35	173	<0.005	<0.005	0.141	<0.001	<0.001	0.005	<0.005	<0.005	0.014	<0.000025	<0.005	<0.005	<0.002	1.38	--	--
	10/19/16	0.398	19.1	4	<1	5.15	--	42	192	<0.005	<0.005	0.114	<0.001	<0.001	<0.001	<0.005	<0.005	0.008	<0.000025	<0.005	<0.005	<0.002	1.141	--	--
	12/12/16	0.394	8.74	4	<1	5.18	--	40	200	<0.005	<0.005	0.072	<0.001	<0.001	<0.001	<0.005	<0.005	0.008	<0.000025	<0.005	<0.005	<0.002	0.719	--	--
	01/17/17	0.656	129	4	<1	7.13	--	68	538	<0.005	<0.005	0.410	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.000025	<0.005	<0.005	<0.002	3.009	--	--
	02/23/17	0.700	147	9	<1	6.88	--	68	612	<0.005	<0.005	0.488	<0.001	<0.001	<0.001	<0.005	<0.005	0.001	<0.000025	<0.005	<0.005	<0.002	4.309	--	--
	06/07/17	0.449	15.1	4	<0.083	5.06	109	42	176	<0.00093	0.00114	0.09346	0.00037	<0.00007	0.00066	0.00077	<0.00068	0.00902	0.000007	<0.00029	0.0021	<0.00086	0.676	--	--
	10/06/17	--	--	--	--	5.25	97.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/17/18	0.352	12.1	3	<0.083	4.82	8.4	--	174	<0.00093	<0.00105	0.08823	0.00048	<0.00007	<0.00023	0.0008	<0.00068	0.00816	<0.000005	<0.00029	<0.00099	<0.00086	0.837	0.03	0.025
	Dissolved	0.35	12	--	--	4.82	8.4	--	--	<0.00093	<0.00105	0.08582	0.00044	<0.00007	<0.00023	0.00083	<0.00068	0.00799	<0.000005	<0.00029	0.00197	<0.00086	0.531	0.01	0.026
	05/24/18	0.345	10.2	4	<0.083	5.19	118	43	150	0.00317 J	<0.00105	0.0799	0.00039 J	<0.00007	<0.00023	0.00035 J	<0.00068	0.00814	0.000006 J	<0.00029	0.00138 J	<0.00086	1.983	--	--
	08/14/18	0.443	5.95	5	<0.083	5.18	102	44	160	0.00003 J	0.00021	0.063	0.000482	0.00002	0.00016	0.000797	0.000238	0.00708	0.000013 J	0.00021	0.0017	0.00003 J	1.10	--	--
	02/20/19	0.504	142	2.82	0.24	7.31	113	49.2	522	0.00016	0.00046	0.457	0.00009 J	0.00001 J	0.000306	0.000399	0.000124	0.00155	<0.000025	0.001 J	0.0007	<0.0005	3.16	--	--
	05/30/19	0.689	--	1.59	0.29	--	61.3	43.3	588	0.00016	0.00060	0.512	0.000244	0.00001 J	0.0001 J	0.000756	0.000197	<0.009	<0.000005	0.00243	0.0014	<0.0001	--	0.099	0.0625
	07/24/19	0.644	62.7	2	0.106 J	5.97	52.1	58	180	0.00008 J	0.00039	0.245	0.00054	0.00002 J	0.0001 J	0.000789	0.0001 J	0.00057	<0.000005	0.002 J	0.0034	<0.0001	1.819	--	--
	02/17/20	0.626	115	3.41	0.31	5.81	29.4	56.3	488	0.00033	0.00049	0.303	0.00007 J	0.00002 J	0.0001 J	0.00028	0.0001 J	0.00105	<0.000002	0.001 J	0.0023	<0.0001	2.665	--	--
05/20/20	0.801	126	1.83	0.20	7.22	0.0	51.4	508	0.00015	0.00053	0.394	0.000270	0.00002 J	0.0001 J	0.000490	0.0001 J	0.00301	<0.000002	0.002 J	0.0028	<0.0001	2.312	--	--	
10/14/20	0.670	3.88	2.16	0.25	4.47	0.0	66.9	183	<0.0001	0.0003 J	0.0847	0.000984	<0.00005	0.0009 J	0.00042	0.0003 J	0.00932	<0.00003 J	<0.002	0.0053	<0.0005	1.552	0.264	--	
AD-5	05/31/16	0.03	36.9	15	<1	6.38	--	123	337	<0.005	<0.005	0.057	<0.001	<0.001	<0.001	0.014	<0.005	0.135	<0.000025	<0.005	<0.005	<0.002	1.63	--	--
	07/28/16	0.04	44.7	16	<1	6.38	--	163	360	<0.005	<0.005	0.093	<0.001	<0.001	<0.001	0.015	<0.005	0.191	<0.000025	<0.005	<0.005	<0.002	4.75	--	--
	09/29/16	0.04	46.3	15	<1	5.29	--	190	416	<0.005	<0.005	0.087	<0.001	<0.001	<0.001	0.014	<0.005	0.186	<0.000025	<0.005	<0.005	<0.002	3.33	--	--
	10/20/16	0.05	50.7	14	<1	5.92	--	267	448	<0.005	<0.005	0.07	<0.001	<0.001	<0.001	0.009	<0.005	0.225	<0.000025	<0.005	<0.005	<0.002	2.319	--	--
	12/13/16	0.05	49.6	13	<1	6.29	--	233	484	<0.005	<0.005	0.053	<0.001	<0.001	<0.001	0.013	<0.005	0.199	<0.000025	<0.005	<0.005	<0.002	2.182	--	--
	01/17/17	0.04	49.8	14	<1	6.27	--	234	438	<0.005	<0.005	0.047	<0.001	<0.001	<0.001	0.012	<0.005	0.239	<0.000025	<0.005	<0.005	<0.002	1.023	--	--
	02/23/17	0.04	33.0	15	<1	5.48	--	127	286	<0.005	<0.005	0.042	<0.001	<0.001	<0.001	0.013	<0.005	0.166	<0.000025	<0.005	<0.005	<0.002	1.788	--	--
	06/07/17	0.05281	49.7	14	<0.083	5.96	867	82	300	<0.00093	0.00385	0.0877	0.00008	0.00039	0.00028	0.01193	<0.00068	0.124	<0.000005	<0.00029	<0.00099	<0.00086	2.32	--	--
	10/06/17	--	--	--	--	5.59	249	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	05/17/18	0.05063	30.1	21	<0.083	5.79	<100	--	248	<0.00093	<0.00105	0.07627	0.00014	0.00037	<0.00023	0.01907	<0.00068	0.118	<0.000005	<0.00029	<0.00099	<0.00086	1.495	14.4	0.45
	Dissolved	0.03752	29.1	--	--	5.79	<100	--	--	<0.00093	<0.00105	0.06865	<0.00002	<0.00007	<0.00023	0.01747	<0.00068	0.119	<0.000005	<0.00029	<0.00099	<0.00086	2.051	8.38	0.43
	05/24/18	0.05007	28.1	22	<0.083	6.22	17.8	60	242	<0.00093	<0.00105	0.07116	<0.00002	0.00023 J	0.0008 J	0.01424	<0.00068	0.121	<0.000005	<0.00029	<0.00099	<0.00086	1.946	--	--
	08/15/18	0.05	40.5	19	<0.083	6.23	57.1	240	428	0.00001 J	0.00169	0.0637	0.000055	0.000008 J	0.000072	0.0114	0.000079	0.187	<0.000005	0.00013	0.00008 J	<0.01	0.316	--	--
	02/21/19	0.033	33.9	24.7	0.21	5.38	164	46.5	220	0.00002 J	0.00159	0.0694	0.00008 J	0.0000432	0.000858	0.000147	0.0407	<0.000025	<0.002	0.0001 J	0.00005	<0.0005	1.27	--	--
	05/30/19	0.03 J	--	22.3	0.29	--	150	51.3	238	<0.00002	0.00305	0.0605	0.00008 J	<0.00001	0.00006 J	0.0118	0.00005 J	0.104	0.000006	<0.0004	0.00005 J	<0.0001	--	23.4	0.331
	07/24/19	0.04 J	41.1	18	0.112 J	6.3	108	90	354	<0.00002	0.00248	0.0774	0.00005 J	<0.00001	0.00005 J	0.00838	<0.00005	0.108	<0.000005	<0.0004	0.00006 J	<0.0001	2.533	--	--
	02/17/20	0.03 J	39.8	19.8	0.22	5.45	422	43.7	248	0.00003 J	0.00217	0.109	0.00009 J	0.00002 J	0.000336	0.00452	0.000227	0.0732	<0.000002	0.0009 J	0.0002	<0.0001	2.393	--	--
05/20/20	0.03 J	40.2	22.3	0.18	6.83	355	55.5	264	<0.00002	0.00178	0.0931	0.00005 J	0.00001 J	0.0001 J	0.00765	0.00007 J	0.0740	<0.000002	<0.0004	0.00009 J	<0.0001	1.612	--	--	
10/14/20	0.04 J	36.6	18.8	0.18	6.50	265	148	338	<0.00002	0.00628	0.0717	0.00009 J	<0.00001	0.00009 J	0.0149	0.00005 J	0.134	<0.000002	<0.0004	0.0001 J	<0.0001	2.7	37.4	--	
AD-17	05/26/16	0.121	200	43	<1	7.17	--	1,166	1,810	<0.005	<0.005	0.021	<0.001	0.002	0.001	0.063	<0.005	0.370	0.000032	<0.005	<0.005	<0.002	1.53	--	--
	07/27/16	0.119	195	32	<1	7.17	--	1,005	1,576	<0.005	<0.005	0.020	<0.001	0.004	0.001	0.068	<0.005	0.374	<0.000025	<0.005	<0.005	<0.002	2.78	--	--
	09/29/16	0.111	191	36	<1	6.17	--	1,055	1,663	<0.005	<0.005	0.031	<0.001	<0.001	0.003	0.058	<0.005	0.354	<0.000025	<0.005	<0.005	<0.002	2.358	--	--
	10/20/16	0.124	194	32	1.0	6.14	--	1,163	1,612	<0.005	<0.005	0.034	<0.001	0.002											

Figures

Figures



Source:
7.5 minute topographic quadrangle
Cason, Texas, 2013



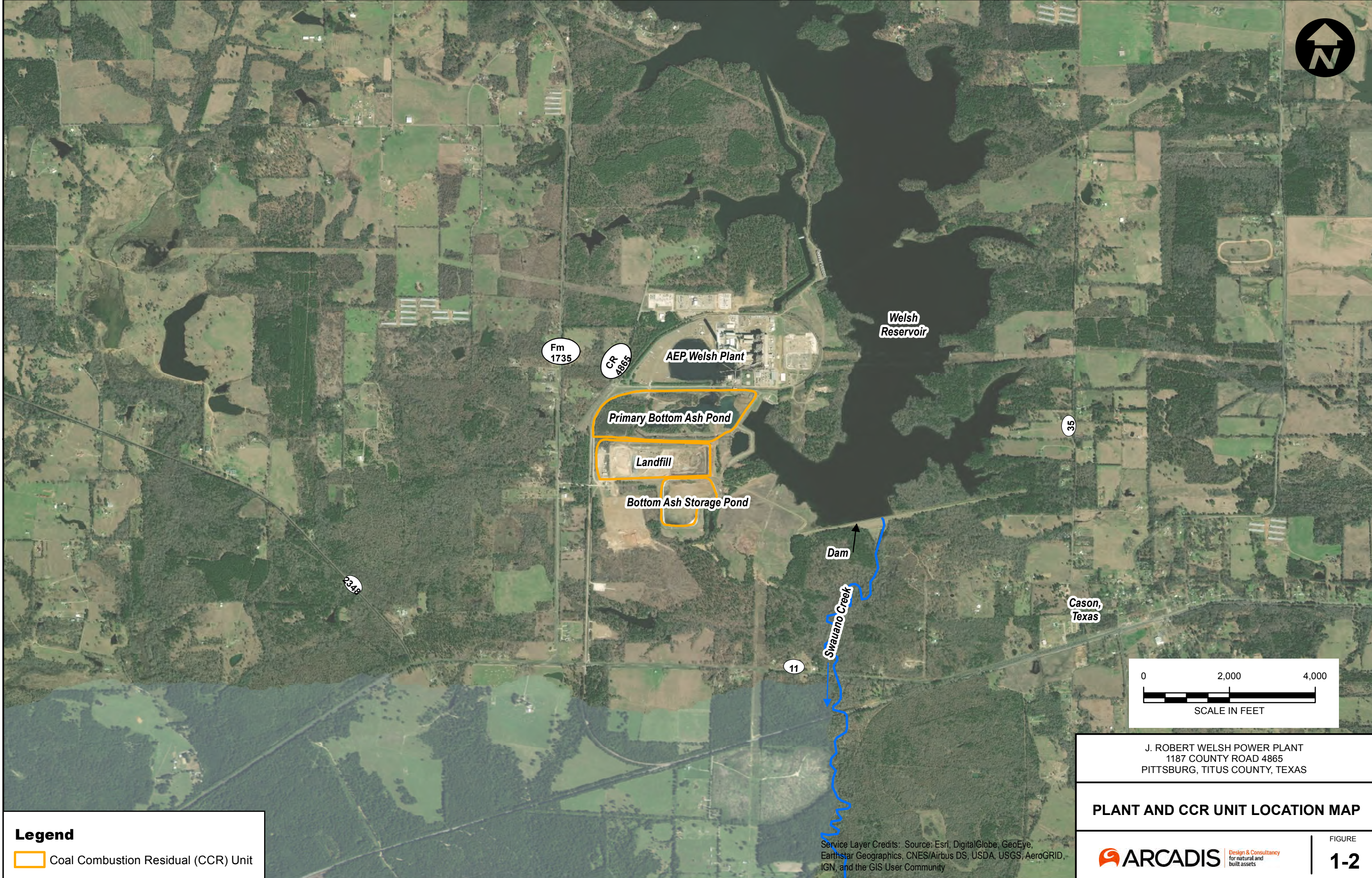
J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

SITE LOCATION MAP




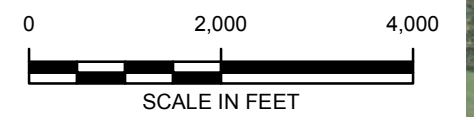
FIGURE
1-1

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Legend

 Coal Combustion Residual (CCR) Unit

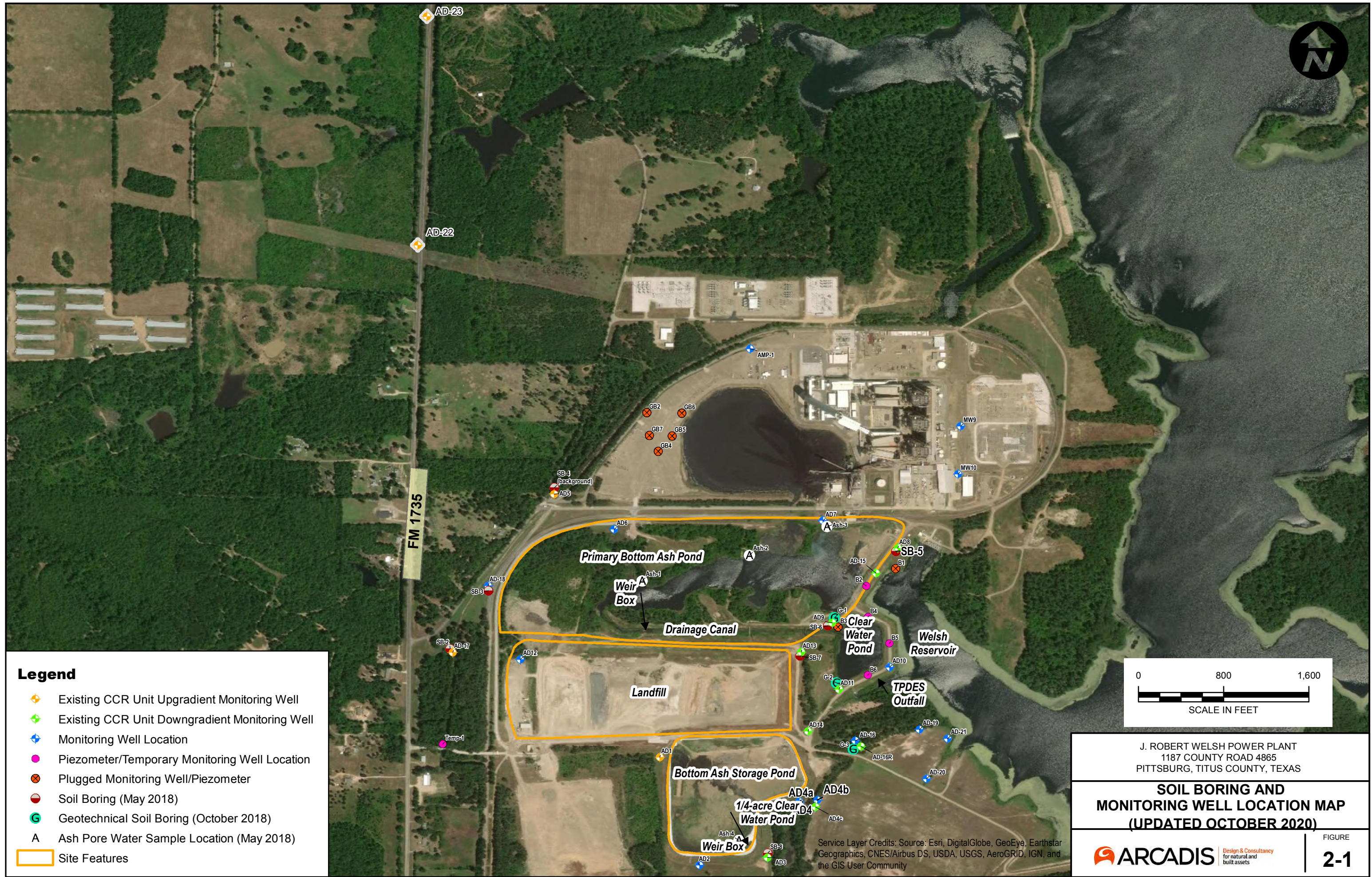


J. ROBERT WELSH POWER PLANT
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PLANT AND CCR UNIT LOCATION MAP

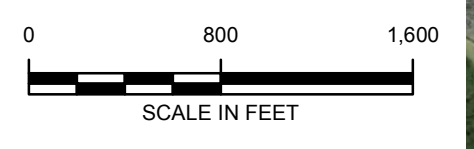
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Legend

- ◆ Existing CCR Unit Upgradient Monitoring Well
- ◆ Existing CCR Unit Downgradient Monitoring Well
- ◆ Monitoring Well Location
- Piezometer/Temporary Monitoring Well Location
- ⊗ Plugged Monitoring Well/Piezometer
- Soil Boring (May 2018)
- Geotechnical Soil Boring (October 2018)
- A Ash Pore Water Sample Location (May 2018)
- Site Features



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 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

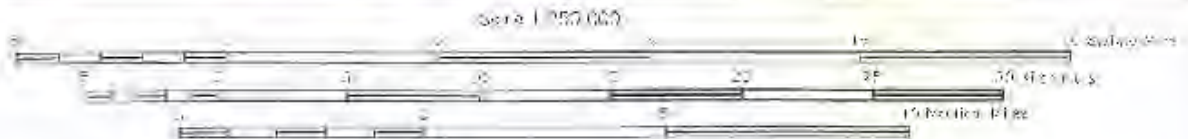
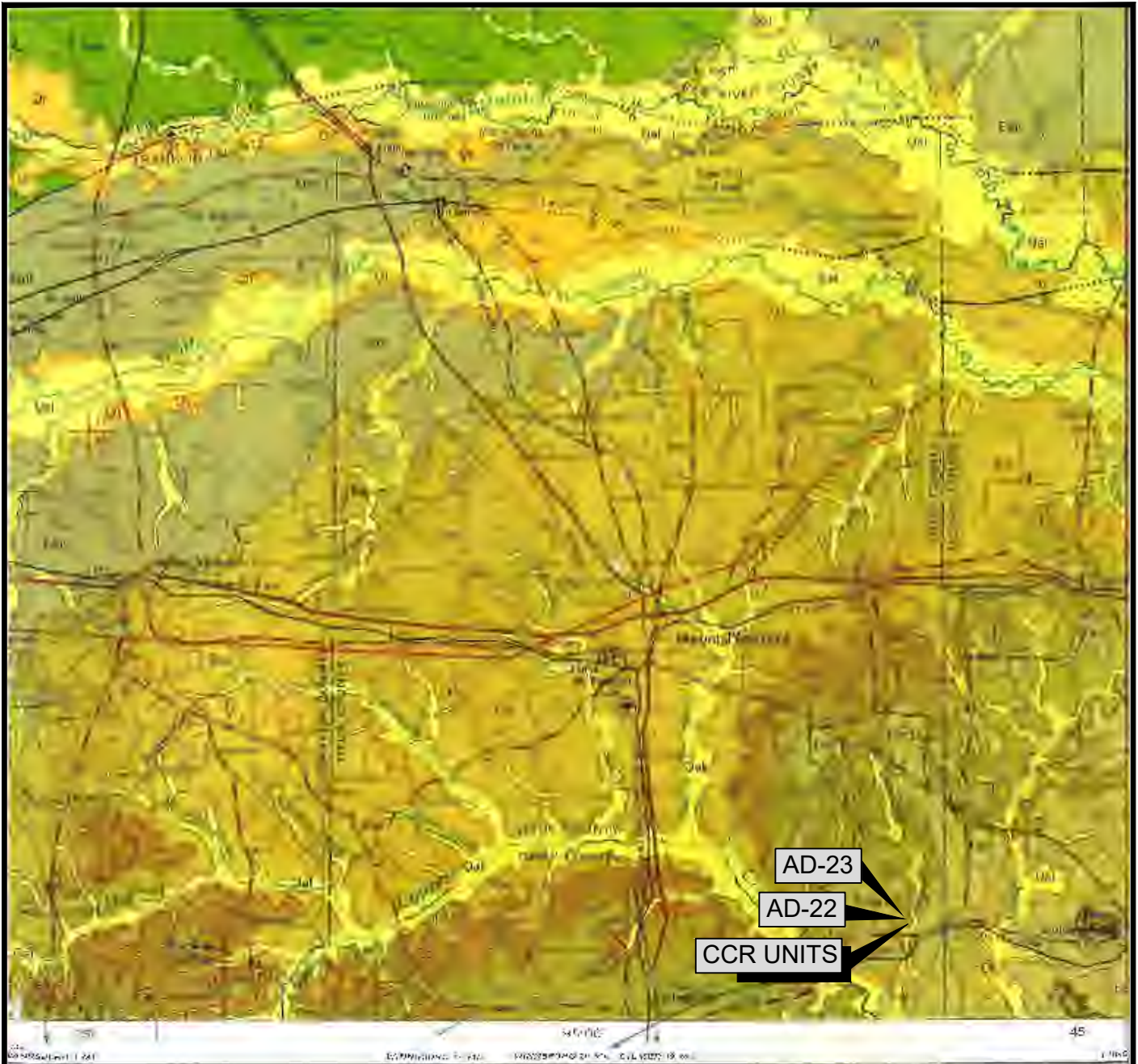
**SOIL BORING AND
 MONITORING WELL LOCATION MAP
 (UPDATED OCTOBER 2020)**

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ARCADIS Design & Consultancy for natural and built assets


FIGURE
2-1

CITY: DIV/GROUP: DB: LD: AM: PD: TM: TR: LY: ON: OFF: REF: G:\Active Projects\AEP\30034022 - Welsh Lithium ASD August 2019\Figures-Maps\Figure 2-2A Regional Geo Map.dwg LAYOUT: MODEL SAVER: 8/6/2019 9:16 AM ACADVER: 20.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 9/9/2019 10:33 AM BY: LEASE, DIANA

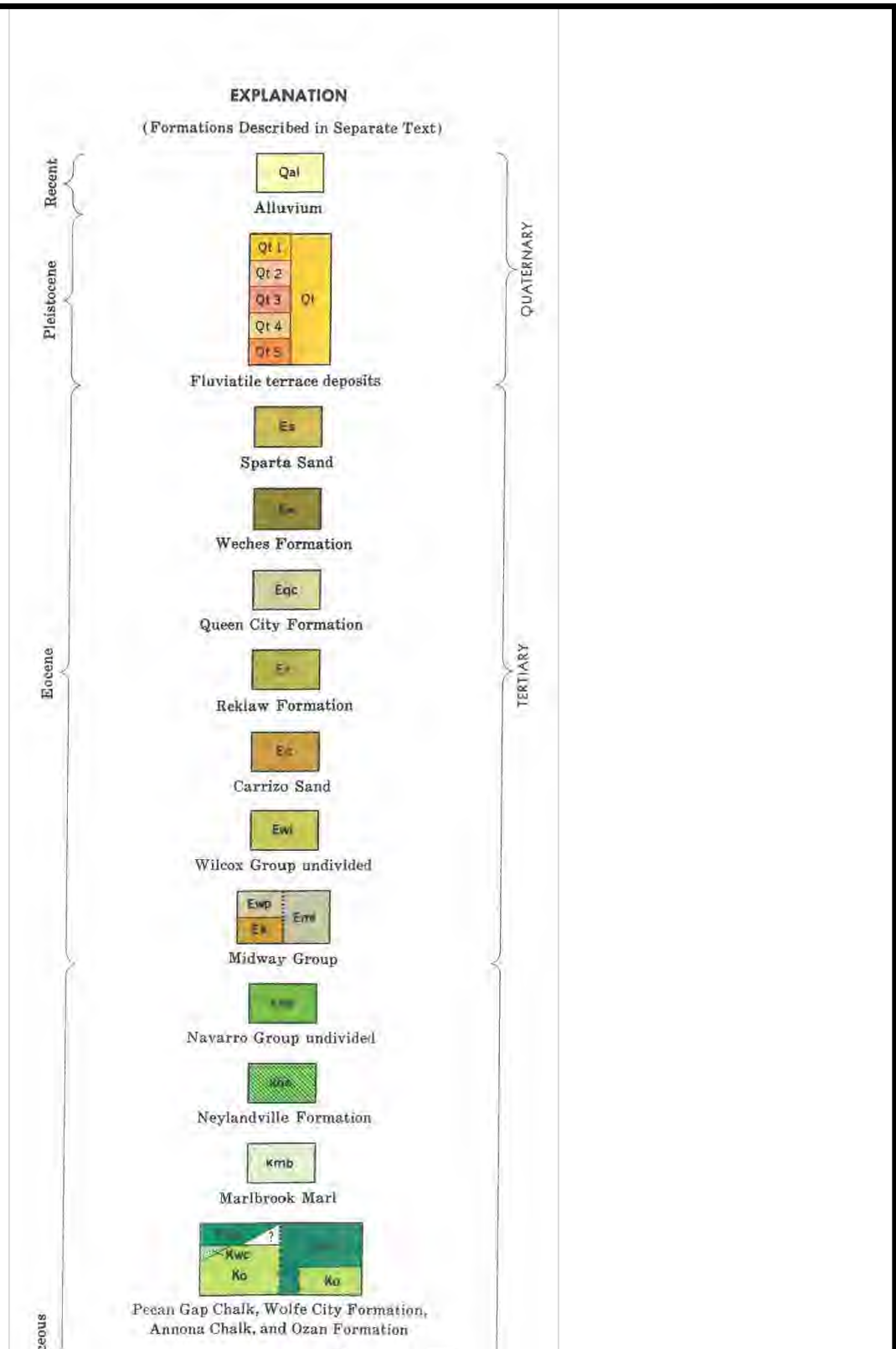


REF: "GEOLOGIC ATLAS OF TEXAS, TEXARKANA SHEET", UNIVERSITY OF TEXAS AT AUSTIN BUREAU OF ECONOMIC GEOLOGY, 1966.



J. ROBERT WELSH POWER PLANT PITTSBURG, TITUS COUNTY, TEXAS	
REGIONAL GEOLOGIC MAP	
 ARCADIS	Design & Consultancy for natural and built assets
FIGURE 2-2A	

CITY: DIV/GROUP: DB: LD: AM: PD: TM: TR: LY: ON: *OFF= *REF*
 G:\Active Projects\AEP\30034022 - Welsh Lithium ASD August 2019\Figures-Maps\Figure 2-2B Reg Geo Map Legend.dwg LAYOUT: MODEL SAVED: 8/6/2019 9:19 AM ACADVER: 20.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 9/9/2019 10:37 AM BY: LEASE, DIANA

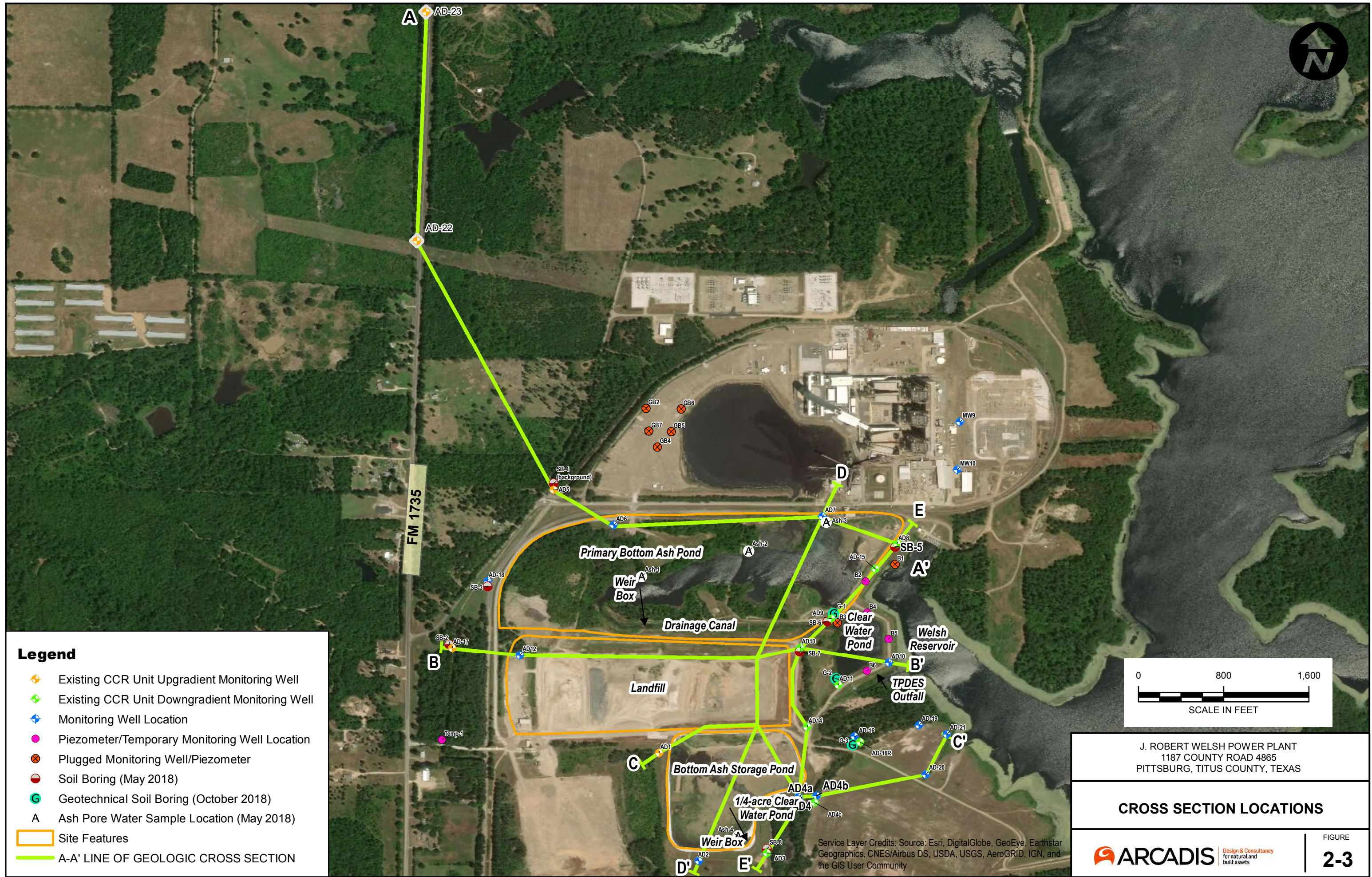


J. ROBERT WELSH POWER PLANT
 PITTSBURG, TITUS COUNTY, TEXAS

**REGIONAL
 GEOLOGIC MAP LEGEND**

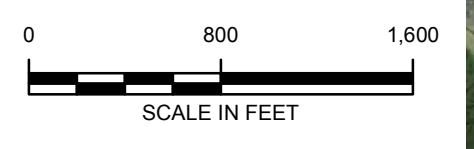


FIGURE
2-2B



Legend

- ◆ Existing CCR Unit Upgradient Monitoring Well
- ◆ Existing CCR Unit Downgradient Monitoring Well
- ◆ Monitoring Well Location
- ◆ Piezometer/Temporary Monitoring Well Location
- ⊗ Plugged Monitoring Well/Piezometer
- Soil Boring (May 2018)
- Geotechnical Soil Boring (October 2018)
- A** Ash Pore Water Sample Location (May 2018)
- Site Features
- A-A' LINE OF GEOLOGIC CROSS SECTION



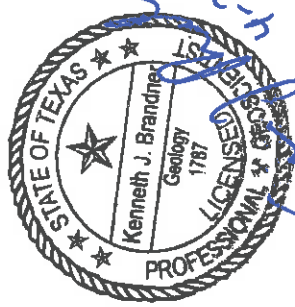
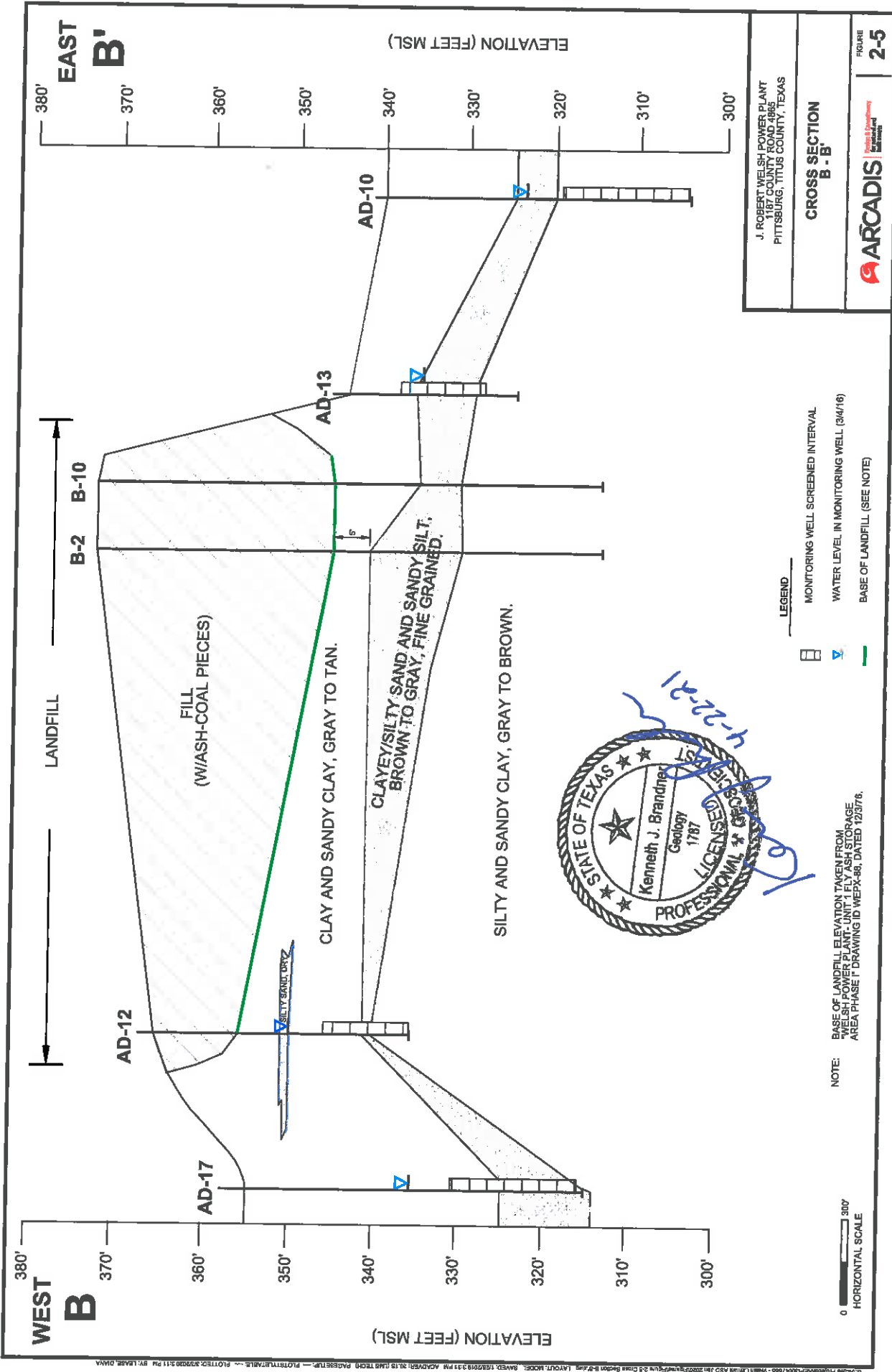
J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION LOCATIONS

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

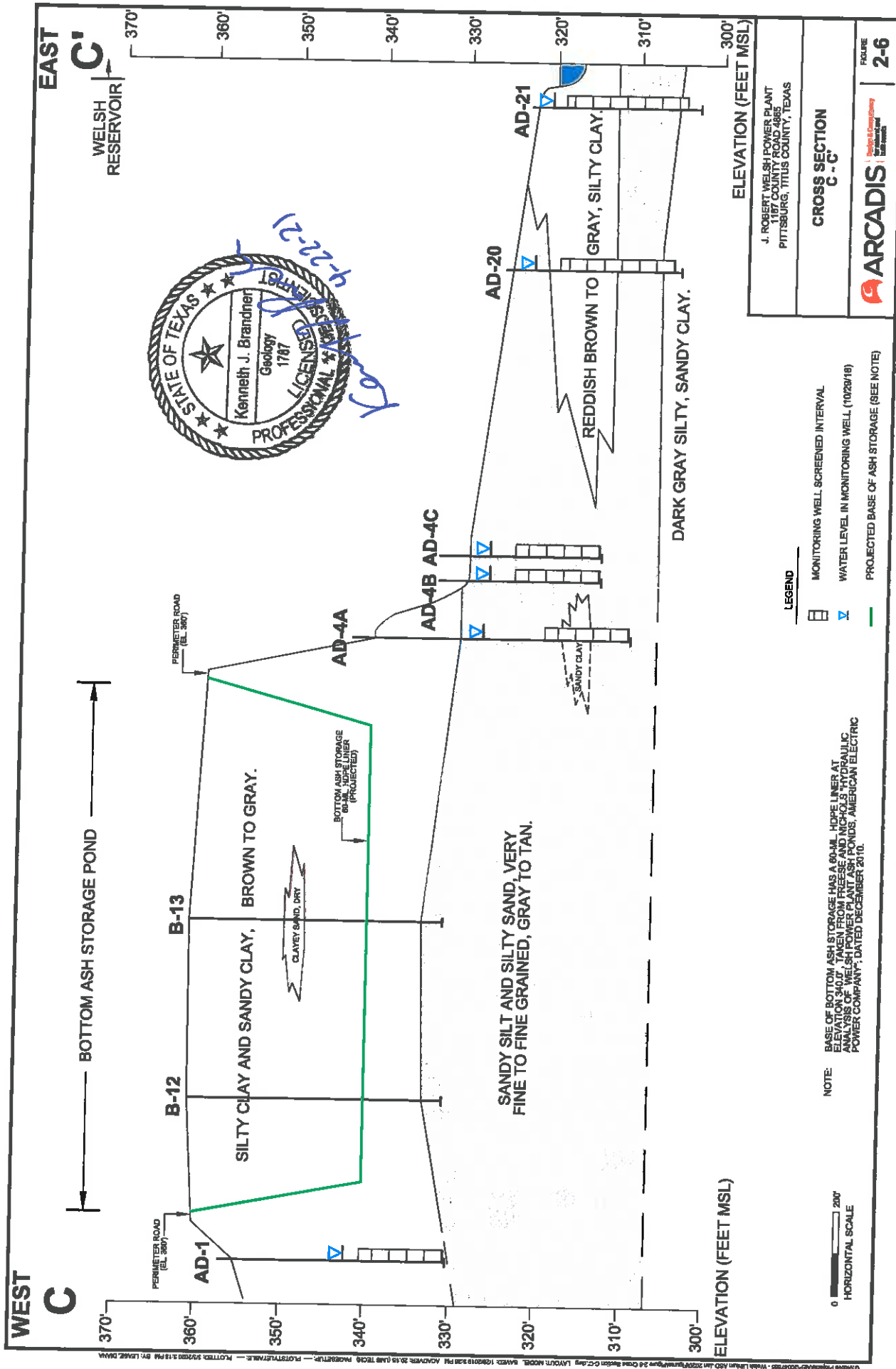
ARCADIS Design & Consultancy for natural and built assets

FIGURE **2-3**



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4-22-21
109

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J. ROBERT WELSH POWER PLANT
3107 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
C-C'

ARCADIS | Engineering & Construction

FIGURE **2-6**

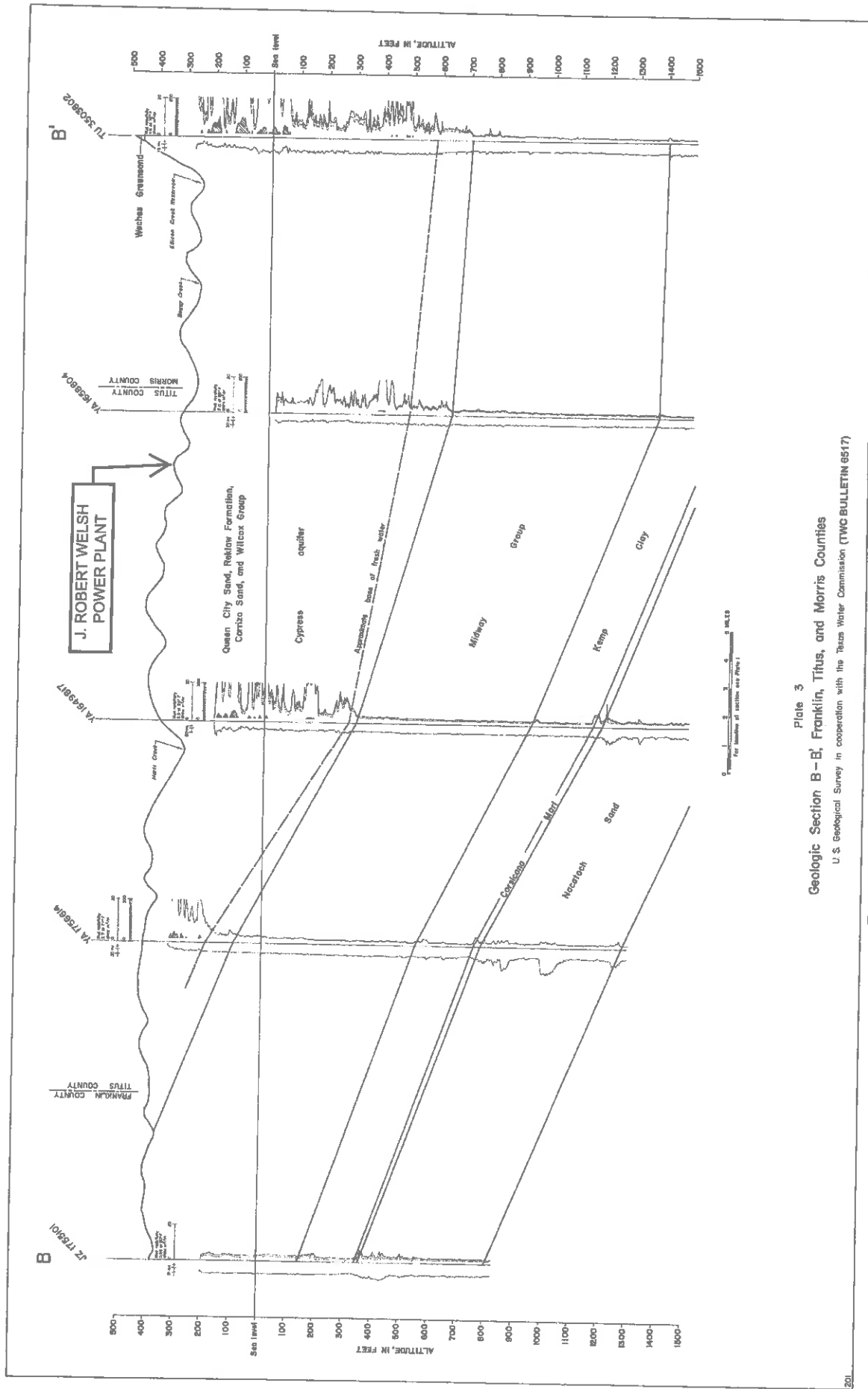
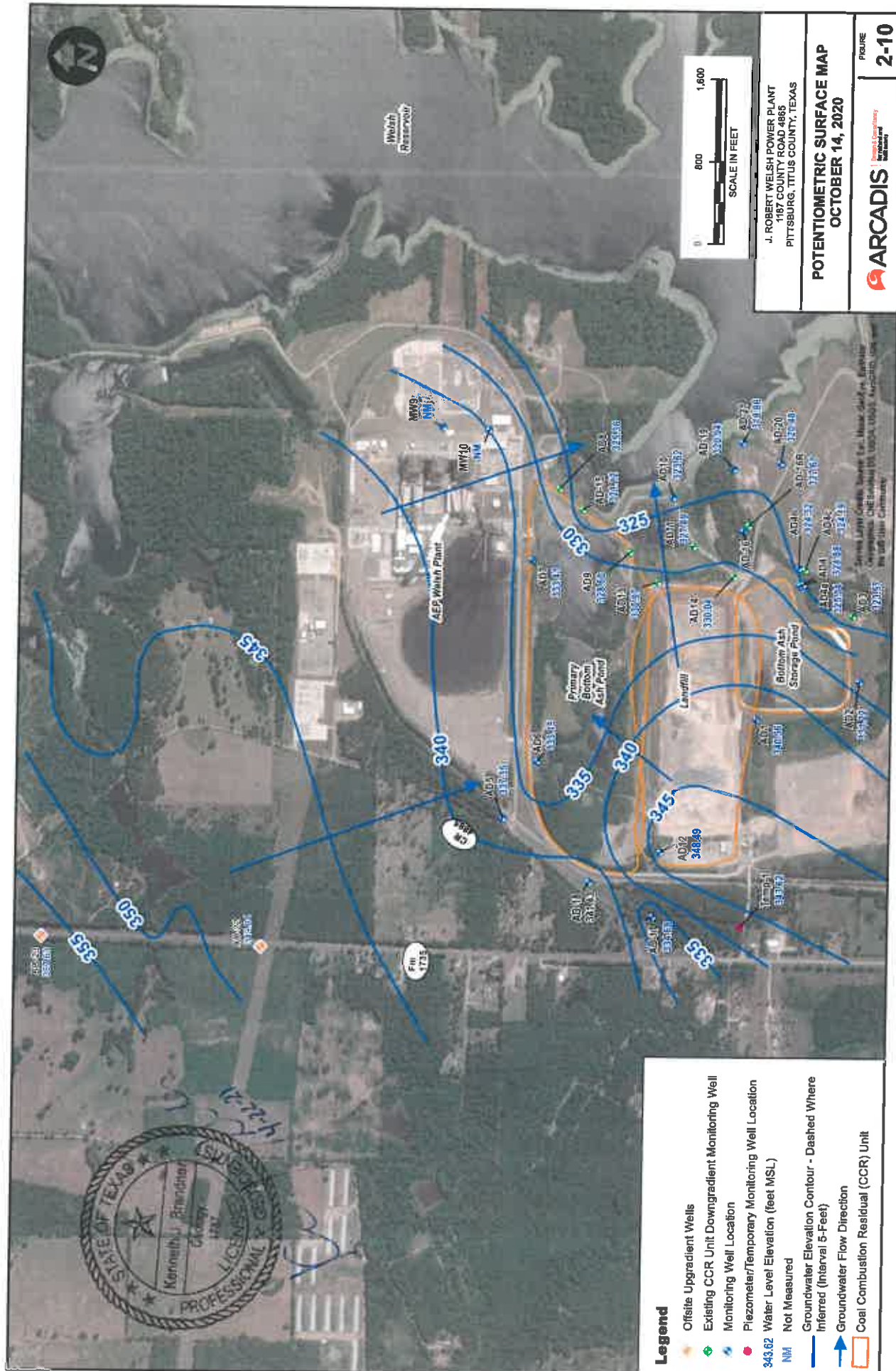


FIGURE 2-9

Plate 3
 Geologic Section B-B', Franklin, Titus, and Morris Counties
 U.S. Geological Survey in cooperation with the Texas Water Commission (TWC BULLETIN 6517)



J. ROBERT WELSH POWER PLANT
 1167 COUNTY ROAD 4866
 PITTSBURG, TITUS COUNTY, TEXAS

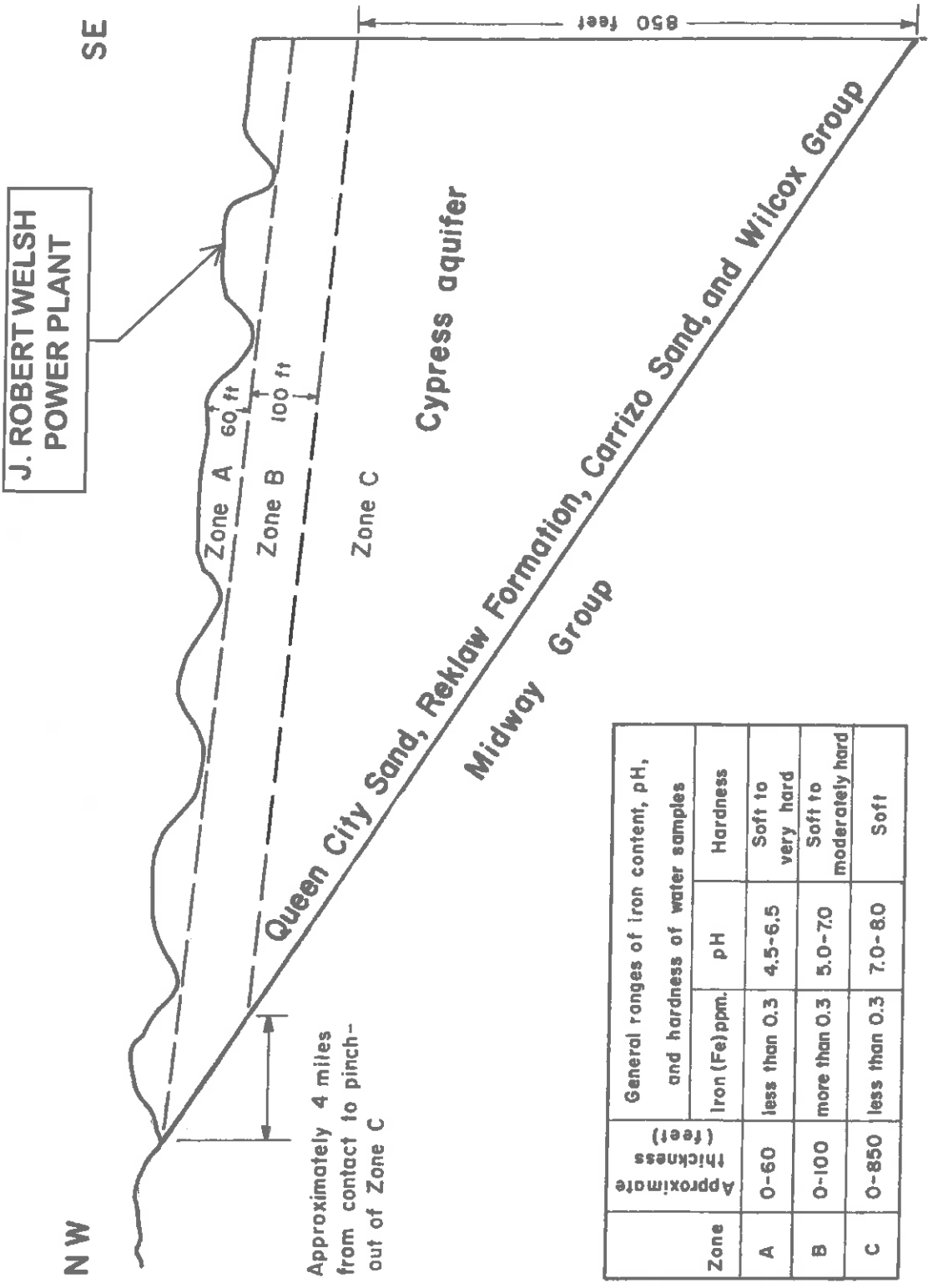
POTENTIOMETRIC SURFACE MAP
OCTOBER 14, 2020

ARCADIS Engineering & Construction

FIGURE
2-10

- Legend**
- Offsite Upgradient Wells
 - Existing CCR Unit Downgradient Monitoring Well
 - Monitoring Well Location
 - Piezometer/Temporary Monitoring Well Location
 - 343.62 Water Level Elevation (feet MSL)
 - NM Not Measured
 - Groundwater Elevation Contour - Dashed Where Inferred (Interval 5-Feet)
 - Groundwater Flow Direction
 - Coal Combustion Residual (CCR) Unit



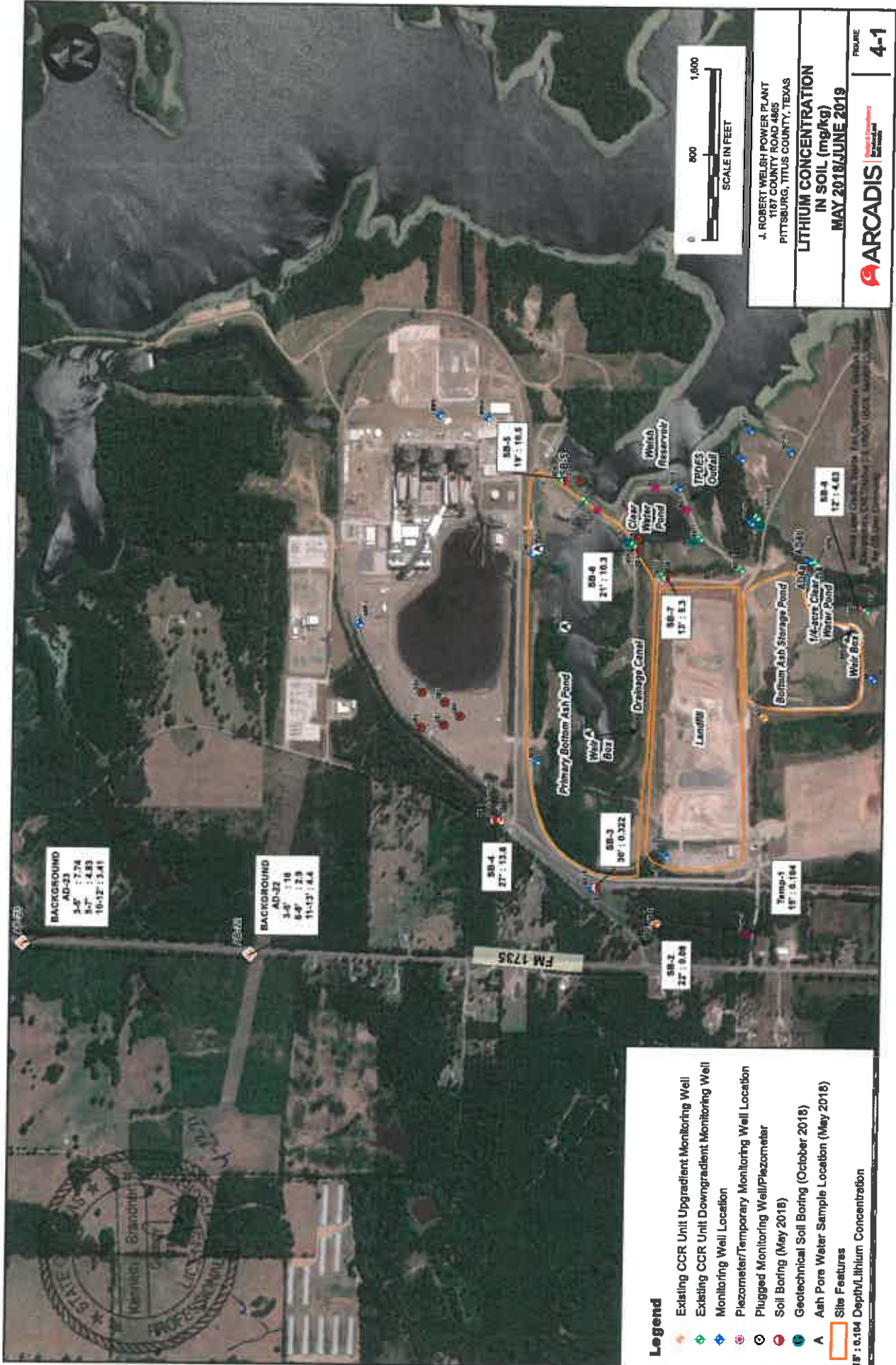


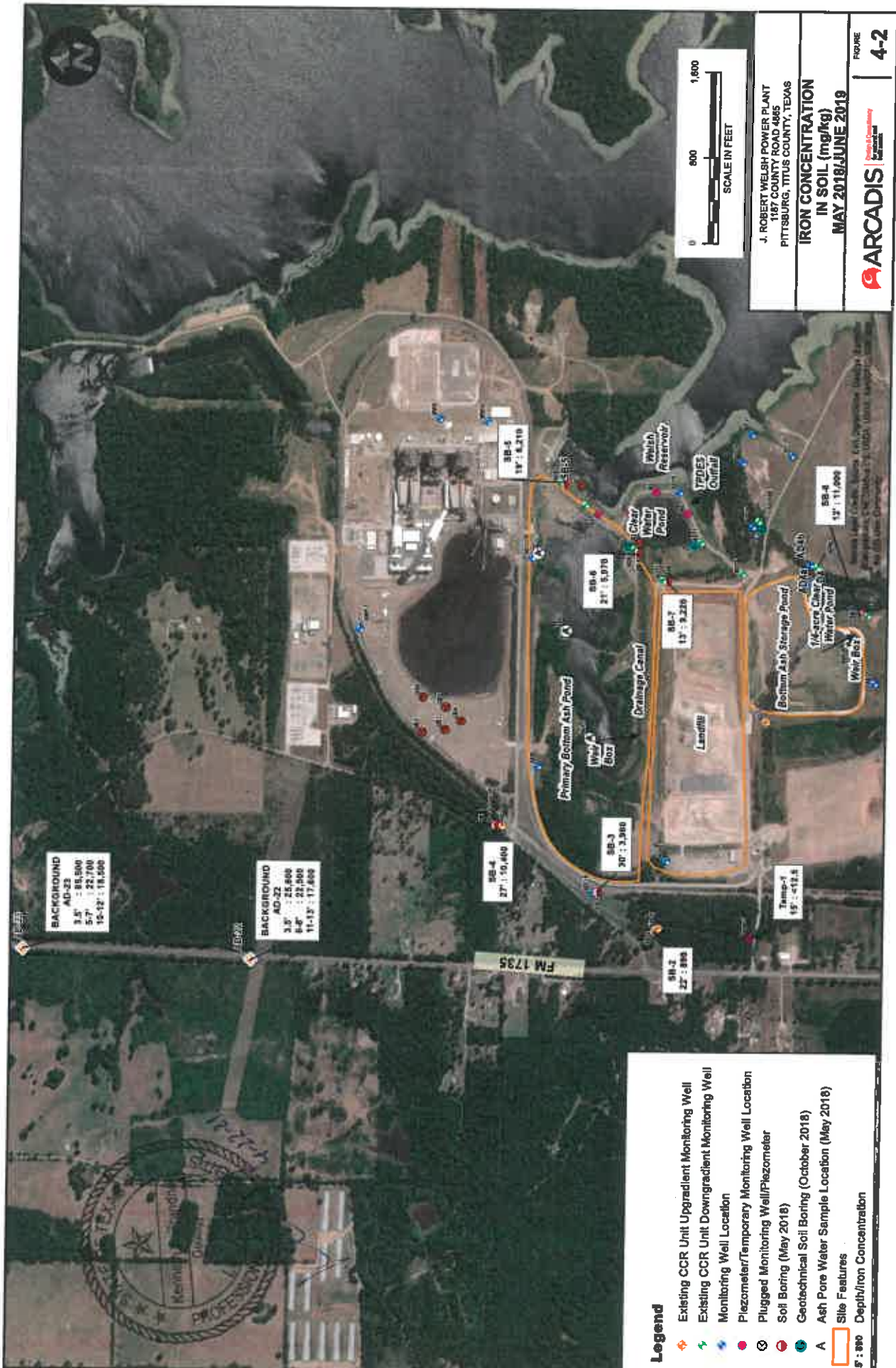
Zone	Approximate thickness (feet)	General ranges of iron content, pH, and hardness of water samples		
		Iron (Fe) ppm.	pH	Hardness
A	0-60	less than 0.3	4.5-6.5	Soft to very hard
B	0-100	more than 0.3	5.0-7.0	Soft to moderately hard
C	0-850	less than 0.3	7.0-8.0	Soft

Figure 12
Diagrammatic Section Showing Zones A, B, and C in the Cypress Aquifer

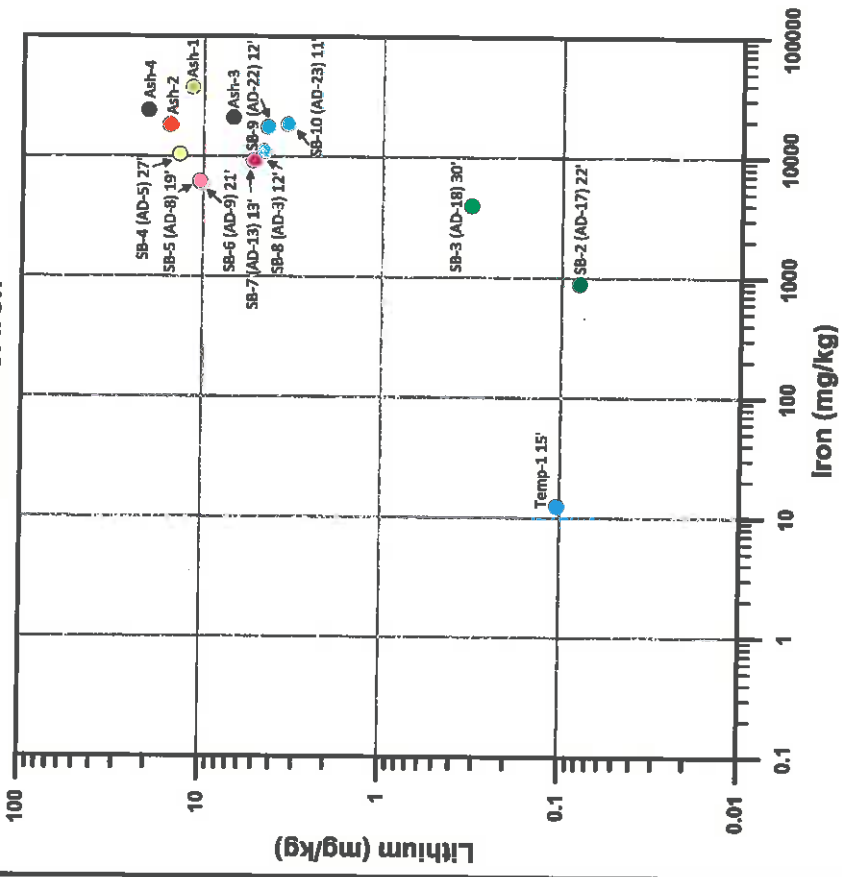
U.S. Geological Survey in cooperation with the Texas Water Commission
(TWC BULLETIN 6517)

REGIONAL HYDROLOGIC CROSS SECTION





Solid Concentration Lithium vs. Iron



- Upgradient**
- SB-2 (AD-17) 22'
 - SB-3 (AD-18) 30'
 - SB-4 (AD-5) 27' Background
 - SB-9 (AD-22) 12'
 - SB-10 (AD-23) 11'
- Downgradient**
- SB-6 (AD-9) 21'
 - SB-7 (AD-13) 13'
 - SB-8 (AD-3) 12'
 - SB-9 (AD-22) 12'
 - SB-10 (AD-23) 11'
- Supplemental Sidegradient**
- Temp-1 15'
- Coal Ash**
- Ash-1
 - Ash-2
 - Ash-3
 - Ash-4

Notes:
mg/kg - milligrams per kilogram





- Legend**
- ◆ Existing CCR Unit Upgradient Monitoring Well
 - ◆ Existing CCR Unit Downgradient Monitoring Well
 - ◆ Monitoring Well Location
 - ◆ Piezometer/Temporary Monitoring Well Location
 - ◆ Plugged Monitoring Well/Piezometer
 - ◆ Soil Boring (May 2018)
 - ◆ Geotechnical Soil Boring (October 2018)
 - ◆ Ash Pore Water Sample Location (May 2018)
 - ◆ Site Features
 - 1.27 Lithium Concentration
 - NS Not Sampled

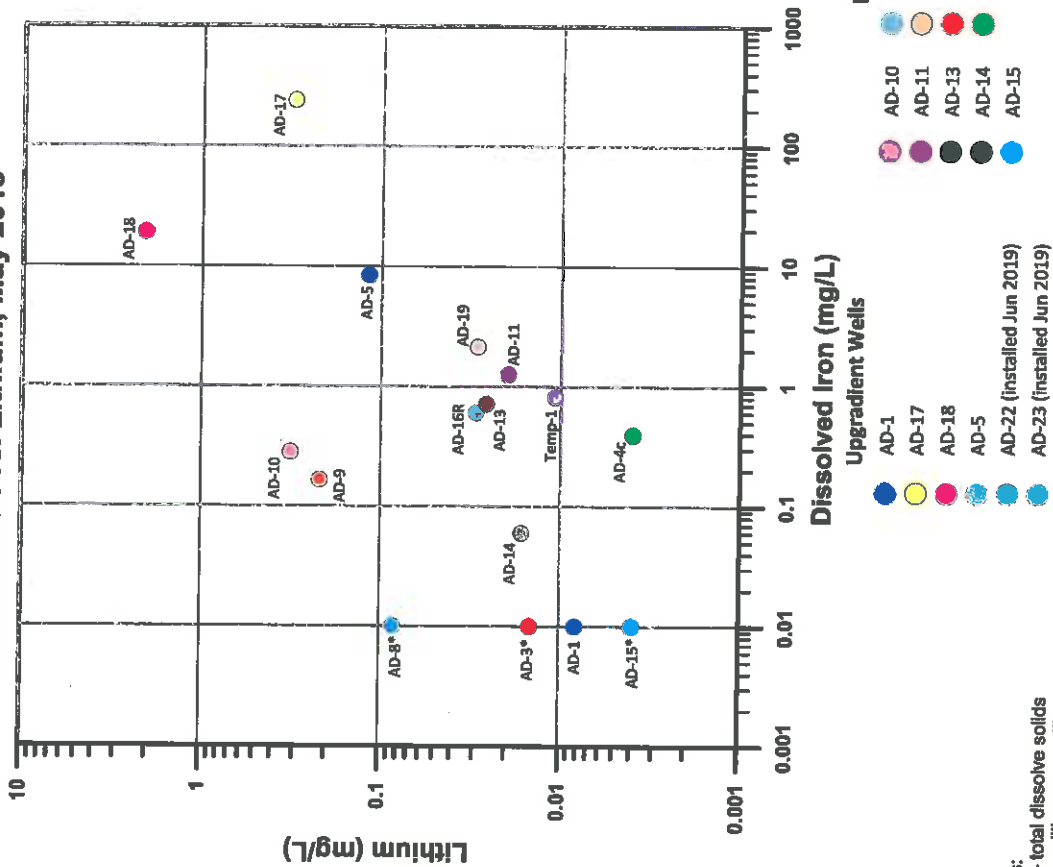
J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

**LITHIUM CONCENTRATION
 IN GROUNDWATER (mg/L)
 OCTOBER 2020**

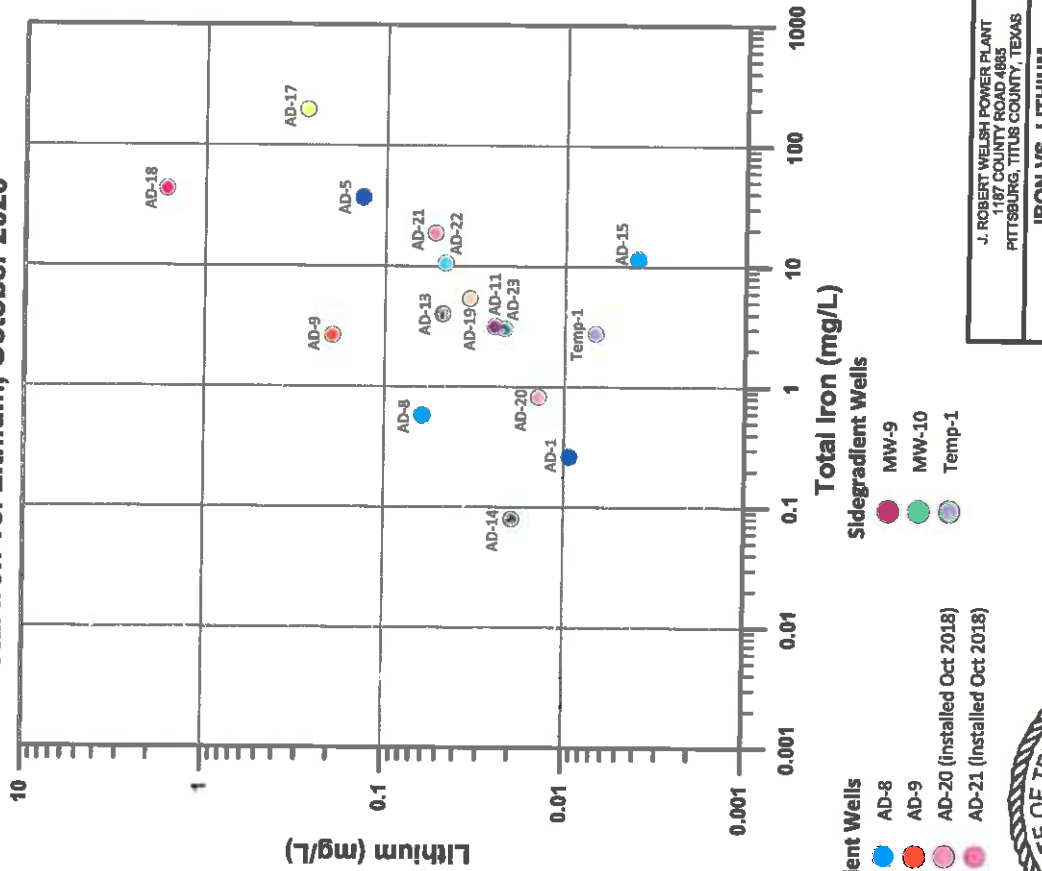
ARCADIS Power Recovery
 Solutions

FIGURE
4-4

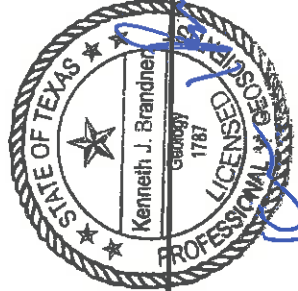
Dissolved Iron vs. Lithium, May 2018



Total Iron vs. Lithium, October 2020



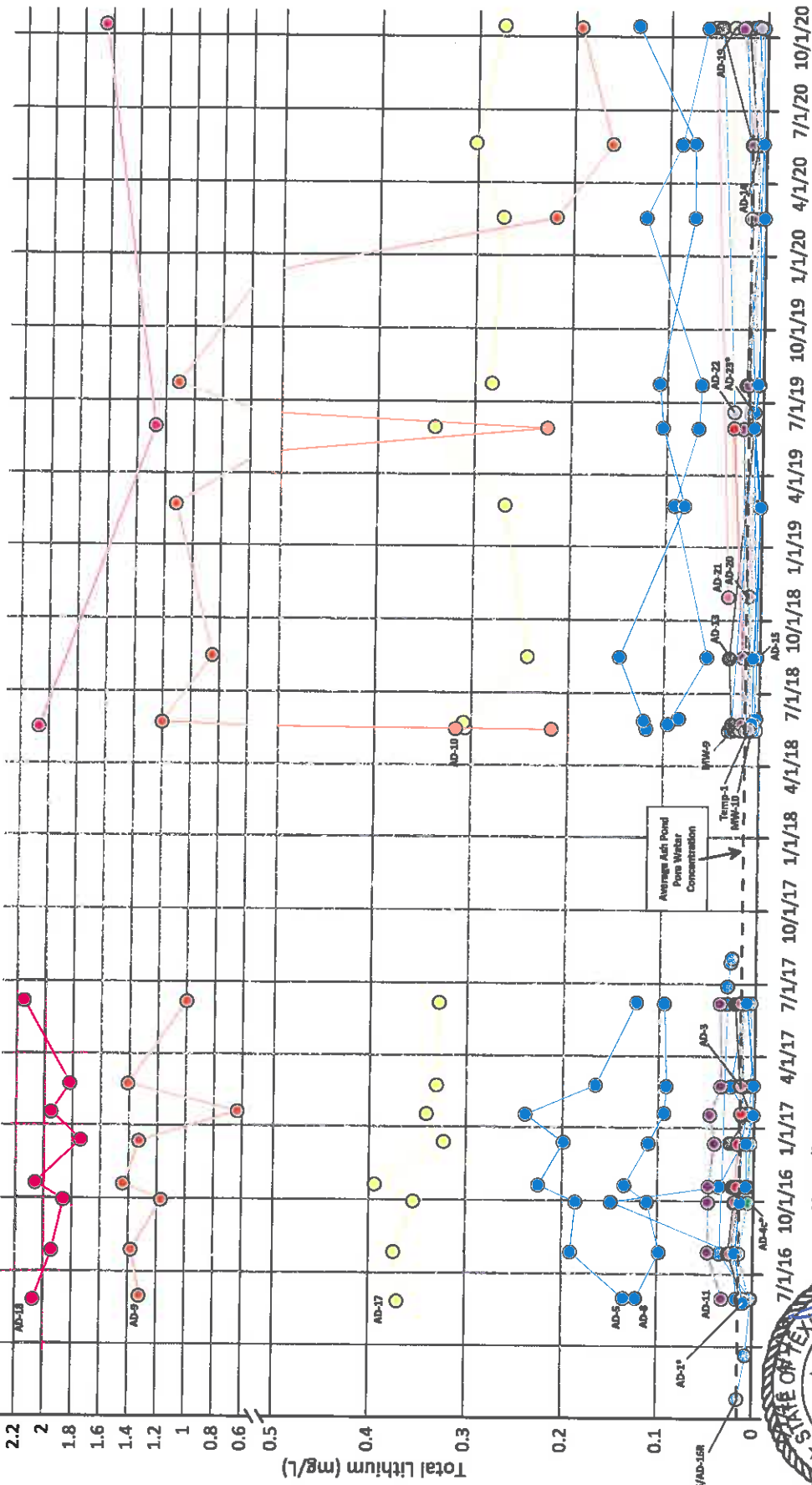
Notes:
 TDS - total dissolve solids
 mg/L - milligrams per liter
 Concentrations of iron and lithium in coal ash were below detection
 Concentrations of lithium in coal ash porewater were less than 0.02 mg/L
 AD-22 and AD-23 groundwater concentrations are total only
 *Iron was not detected, result is plotted at the reporting limit



J. ROBERT WELSH POWER PLANT
 1167 COUNTY ROAD 4895
 PITTSBURG, TITUS COUNTY, TEXAS

IRON VS. LITHIUM
 GROUNDWATER
 CONCENTRATION PLOT

ARCADIS
 Figure 4-6



J. ROBERT WELSH POWER PLANT
 1167 COUNTY ROAD 4885
 PITTSBURG, TITUS COUNTY, TEXAS

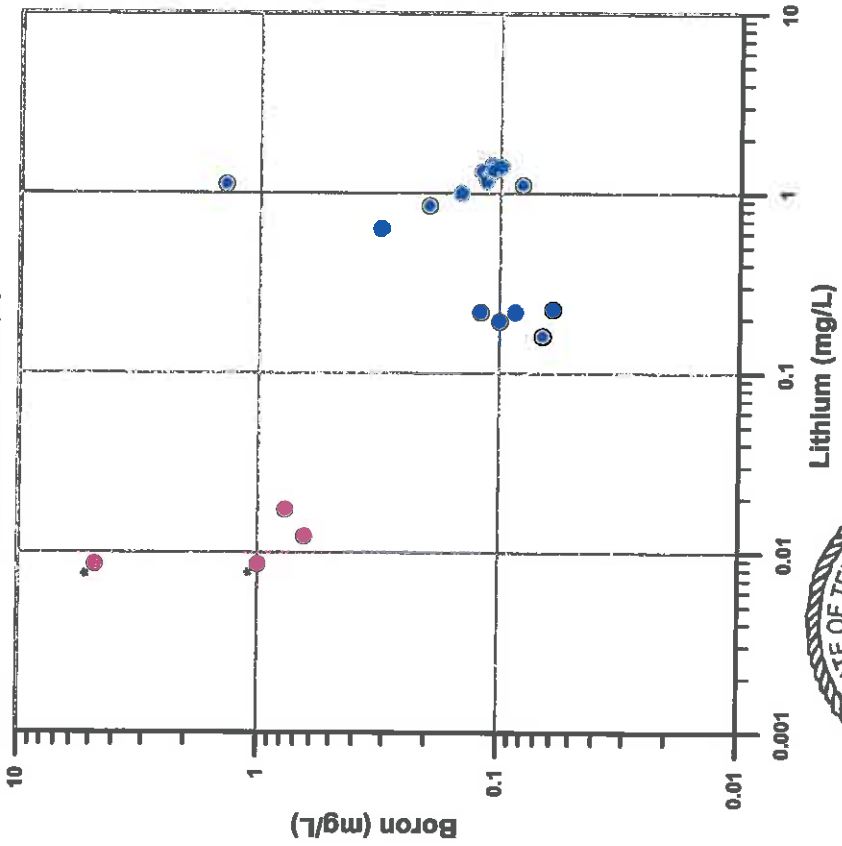
**TOTAL LITHIUM VS. TIME
 GROUNDWATER
 CONCENTRATION PLOT**

- Upgradient Wells**
- AD-1
 - AD-17
 - AD-18
 - AD-5
 - AD-22 (installed Jun 2019)
 - AD-23 (installed Jun 2019)
- Downgradient Wells**
- AD-10
 - AD-11
 - AD-13
 - AD-14
 - AD-15
 - AD-16R
 - AD-19
 - AD-3
 - AD-4c
 - AD-8
 - AD-9
 - AD-20 (installed Oct 2018)
 - AD-21 (installed Oct 2018)
- Sidegradient Wells**
- MW-9
 - MW-10
 - Temp-1

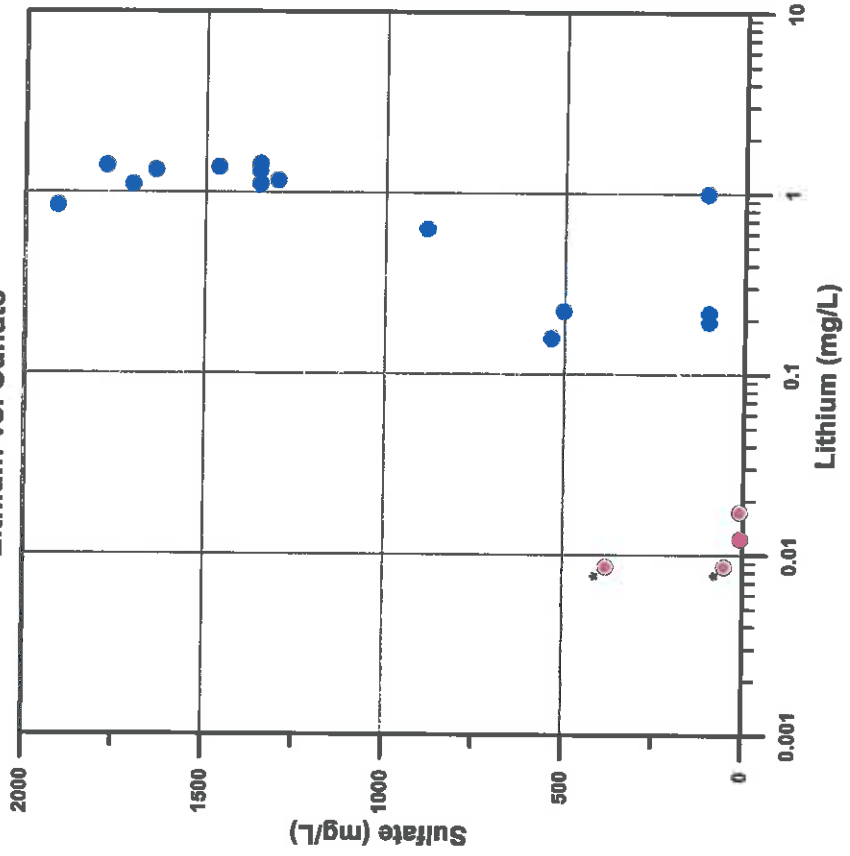


Notes:
 *When lithium was not detected, result is plotted at the reporting limit

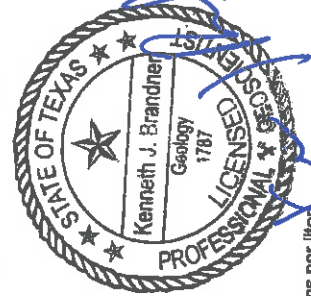
Lithium vs. Boron



Lithium vs. Sulfate



Legend
 ● AD-9
 ● Ash Pore Water



Notes:
 mg/L - milligrams per liter
 *When lithium was not detected, result is plotted at the reporting limit

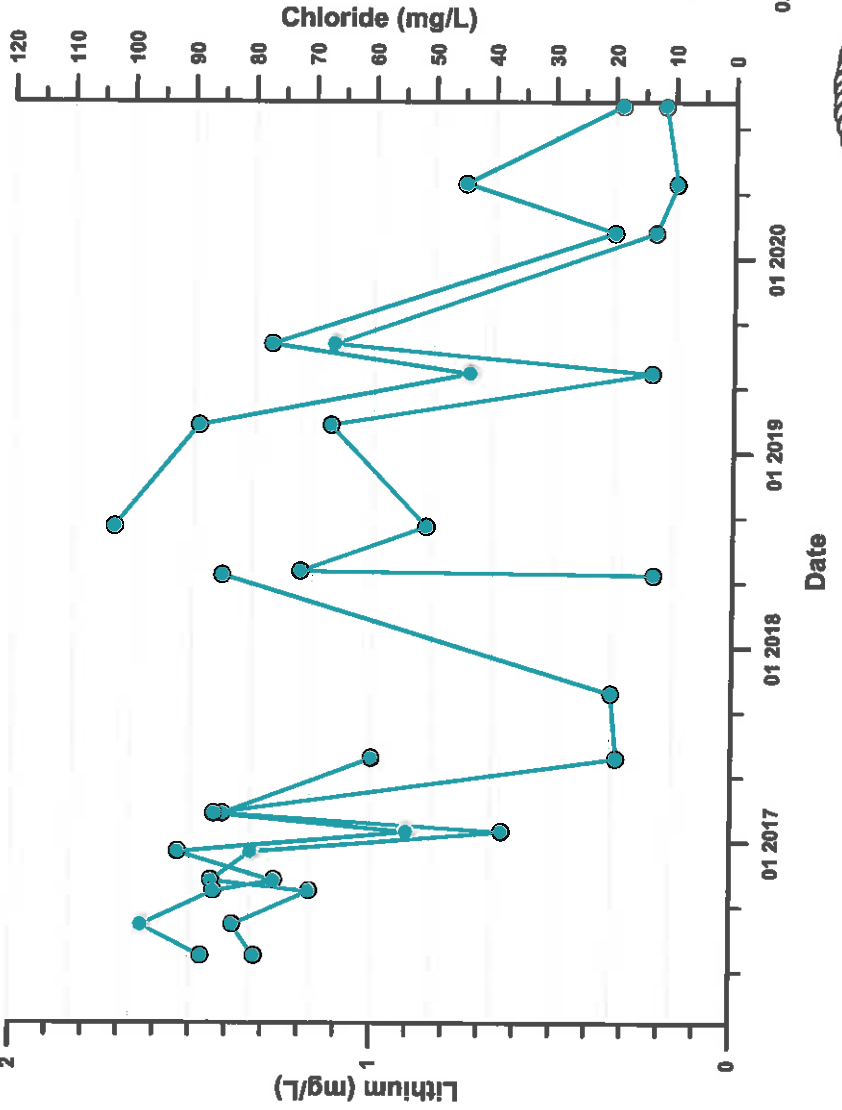
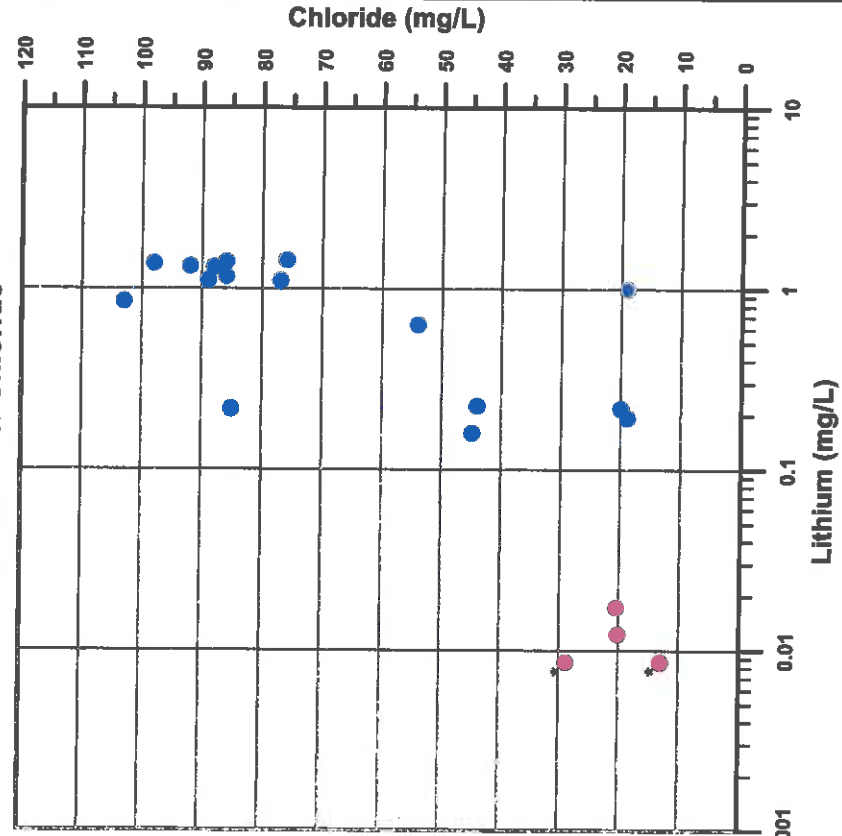
J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

**LITHIUM VS. BORON AND SULFATE
 GROUNDWATER
 CONCENTRATION PLOT**

ARCADIS Design & Consultancy
 Environment
 Infrastructure

FIGURE
4-8

Lithium vs. Chloride



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4885
PITTSBURG, TITUS COUNTY, TEXAS

LITHIUM VS. CHLORIDE
GROUNDWATER
CONCENTRATION PLOT

ARCADIS Design | Consultancy | Construction

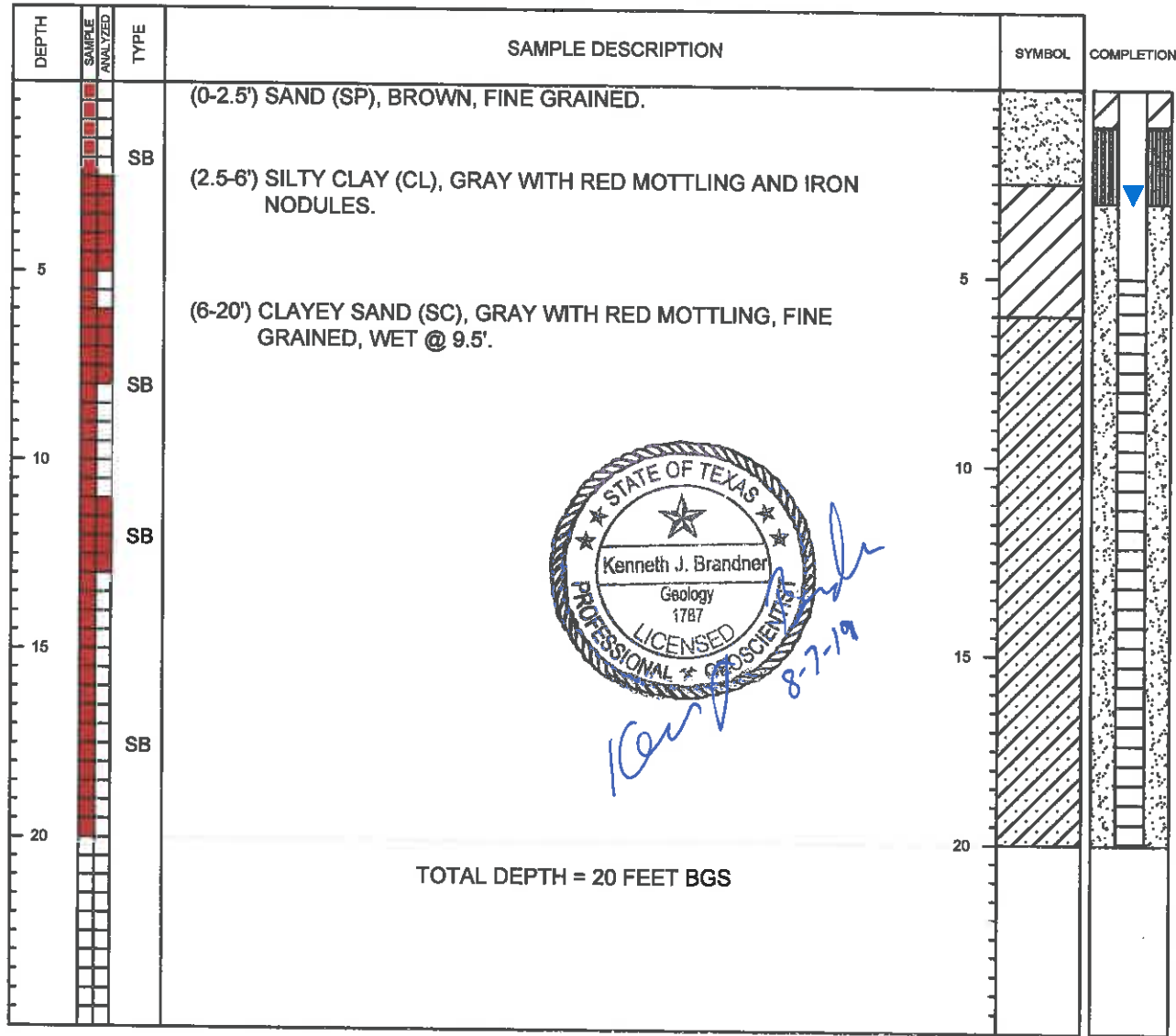
FIGURE 4-9

Notes:
mg/L - milligrams per liter
*When lithium was not detected, result is plotted at the reporting limit

Appendix A

Monitoring Well Completion Diagrams – 2019 Monitoring Wells

WELL LOG



AD-22
WELL

AEP
CLIENT

TX015976.0004
PROJECT

WELSH POWER PLANT
LOCATION

6/18/19
DATE

HSA
DRILLING METHOD

2" PVC, 0-5' BGS
CASING

5-20' BGS, 2" PVC MILL-SLOT
SCREEN

0-1' BGS
CEMENT

1-3' BGS
BENTONITE

3-20' BGS
SAND PACK

360.94' / 360.22'
GROUND ELEV. / TOP OF CASING ELEV.

- | | |
|------------------------|---------------|
| CT - CUTTINGS | ▽ HC LEVEL |
| SB - SPLIT BARREL (5') | ▲ WATER LEVEL |
| SS - SPLIT SPOON (2') | |
-
- | | |
|-------------------------|----------------------------|
| [Dotted Pattern] SAND | [Diagonal Lines] BENTONITE |
| [Horizontal Lines] SILT | [Cross-hatch] GRAVEL |
| [Diagonal Lines] CLAY | |

STATE OF TEXAS WELL REPORT for Tracking #515172

Owner:	AEP	Owner Well #:	AD-22
Address:	1187 County Road 4865 Pittsburg, TX 75686	Grid #:	16-58-4
Well Location:	FM 1735 Pittsburg, TX 75686	Latitude:	33° 03' 35" N
	In ROW along west side of FM 1735, WNW of the AEP - Welsh Plant	Longitude:	094° 51' 09" W
		Elevation:	No Data
Well County:	Titus		

Type of Work: New Well	Proposed Use: Monitor
-------------------------------	------------------------------

Drilling Start Date: **6/18/2019** Drilling End Date: **6/18/2019**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.25	0	20

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Screened**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	1	Concrete
	1	3	Bentonite
	3	20	Sand

Seal Method: **Gravity**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Surface Completion by Driller

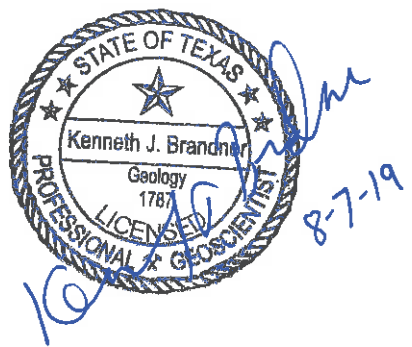
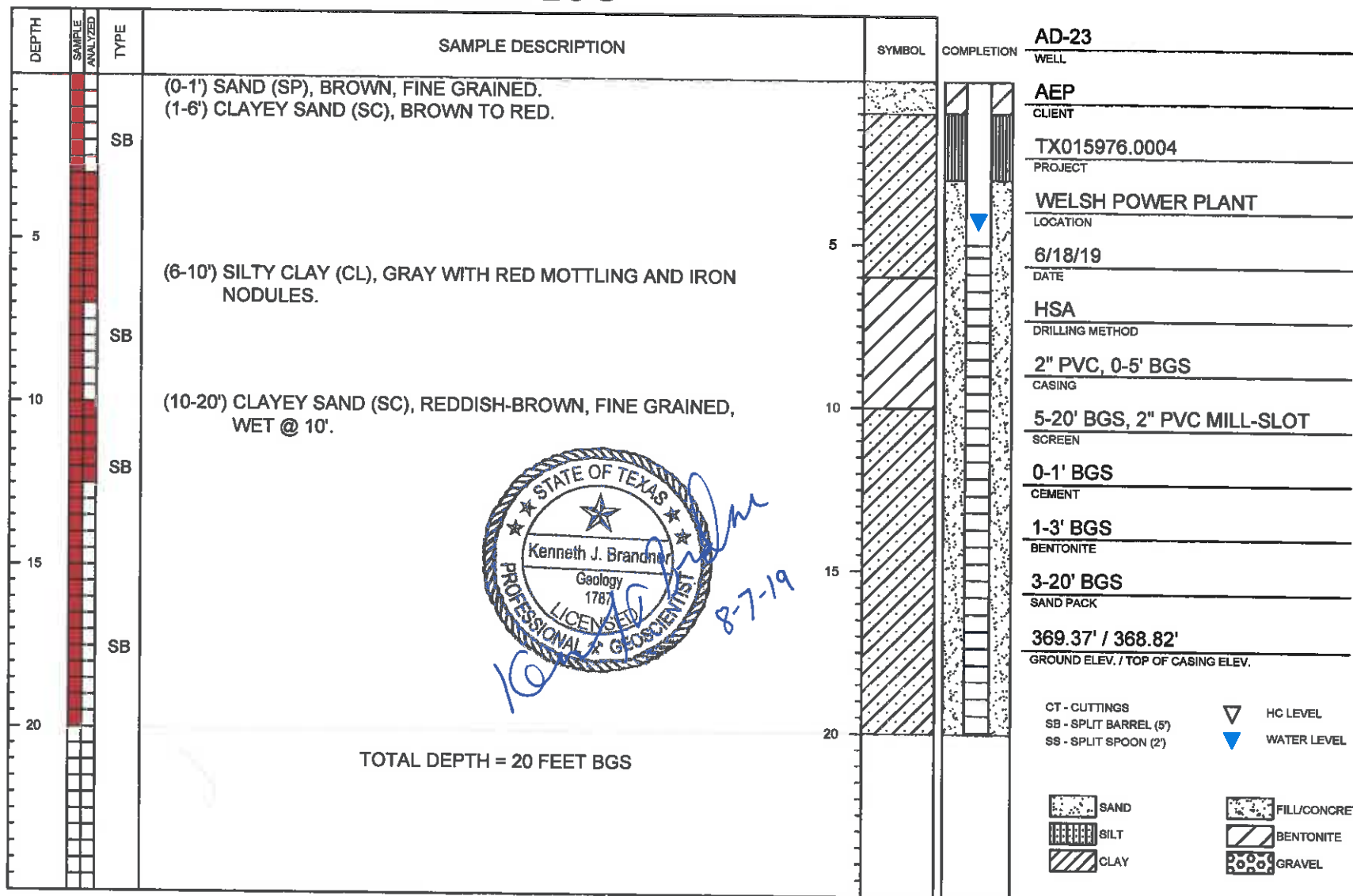
Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

WELL LOG



STATE OF TEXAS WELL REPORT for Tracking #515173

Owner: AEP Address: 1187 County Road 4865 Pittsburg, TX 75686 Well Location: FM 1735 Pittsburg, TX 75686 In ROW along west side of FM 1735, WNW of the AEP - Welsh Plant Well County: Titus	Owner Well #: AD-23 Grid #: 16-58-4 Latitude: 33° 03' 56" N Longitude: 094° 51' 08" W Elevation: No Data
--	--

Type of Work: New Well	Proposed Use: Monitor
--------------------------------------	-------------------------------------

Drilling Start Date: 6/18/2019 **Drilling End Date:** 6/18/2019

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.25	0	20

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Screened**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	
Annular Seal Data:	0	1	Concrete
	1	3	Bentonite
	3	20	Sand

Seal Method: **Gravity**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: Surface Slab Installed	Surface Completion by Driller
--	--------------------------------------

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

Appendix B

Springs of Texas Reference

Springs of Texas



VOLUME I

Gunnar Brune

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by Charles and Janet Brune
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Second edition

The paper used in this book meets the minimum requirements of the American National Standard for Permanence of Paper for Printed Library Materials, Z39.48-1984. Binding materials have been chosen for durability.



The publisher gratefully acknowledges those whose grants helped make this edition possible:

Texas Parks and Wildlife Department
Lower Colorado River Authority
Wray Charitable Trust
Save Barton Creek Association
College of Agriculture and Life Sciences,
Texas A&M University

Library of Congress Cataloging-in-Publication Data

Brune, Gunnar M., 1914-1995
Springs of Texas. Volume I/by Gunnar Brune; introduction by
Helen C. Besse.—2nd ed.
p. cm. —(Texas A&M University agriculture series ; no. 5)
Includes bibliographical references and index.
ISBN 1-58544-196-1 (cloth : alk. paper)
1. Springs-Texas I. Title. II. Texas A&M University
agriculture series ; no. 5.
GB1198.3T4 B78 2002
333.91'04'09764—dc21

2002017373

INTRODUCTION TO THE SECOND EDITION

Helen C. Besse

When Gunnar Brune self-published *Springs of Texas, Volume I*, in 1981, most of the state water planning agencies and local environmental communities either did not recognize the importance of his work or were not aware of its existence. Brune had spent the previous decade conducting research and field studies, and then writing this book that describes the physical characteristics of springs, the archeology and history of springs' use, the ecological setting of springs, and the local use and lore surrounding springs for 183 out of 254 Texas counties. Gunnar Brune died before he could complete volume II.

Gunnar Brune described many of the large springs across the state as well as innumerable small springs present along river and stream courses that provide the base flow for waterways across the state. Brune repeatedly stated in the 1981 edition of this book that many of the springs he described had failed or were failing. With the pronounced influx of population in the last twenty years and the increased agricultural and industrial activities around the state, one can only wonder how many of the more than 2,000 springs have gone dry since he described them through the 1970s.

Nevertheless, this book is even more important to-

day. Its value to water planners, elected officials, policy makers, municipal, county, and state administrators, wildlife stewards, environmentalists, and water lovers has not diminished. Springs are "the canary in the coal mine." The health of our springs reflects the health of our underground water resources and is seen in the state's surface resources as well.

In the section "The Prehistoric Setting of Springs," Brune provided a quote from another book on the beliefs that early Americans had about springs. It is appropriate to repeat those words here:

Gods and heroes were born out of springs, and ever afterward came and went between the above and below worlds through their pools. Every pueblo had sacred springs somewhere near-by. There was every reason to sanctify them - physical, as life depended upon water; spiritual, as they had natural mystery which suggested supernatural qualities; for how could it be that when water fell as rain, or as snow, and ran away, or dried up, there should be other water which came and came, secretly and sweetly, out of the ground and never failed (Horgan, 1954).

F. Halley's farm. According to Dr. John Klein, a nearby resident and writer, the Klein settlement began here in 1848. The Sellars store was at the springs. They issued from Montgomery silt with many iron concretions at about 0.72 lps on April 11, 1978. The pools, containing duckweed, pennywort, and water primrose, were home to a family of ducks and ducklings. Probably the flow formerly continued down Spring Gully past Klein cemetery, 0.6 kilometer downstream, but on this date, even after rains, the channel here was dry except for some standing water. Many wells pump nearby.

Magnolia Garden Springs (15) are four kilometers northeast of Sheldon along the San Jacinto River. At Martha Dempsey's Good Times marina several very small springs trickle from Deweyville sand, including one which flows 0.15 lps from a pipe. Near the entrance to the nearby Magnolia Gardens marina, according to Jean Manson, springs flowed until about 1923. They are quite dry now. Very small springs are said to feed Simms Lake, across the river and 0.6 kilometer farther east. This formerly popular swimming hole is now closed to the public.

At Beaumont Place northeast of Houston, near the intersection of Highways 90 and 526, is another Spring Gully. The channel is now a drainage ditch into which very small springs and seeps (14) drain from Beaumont silt and sand.

Eight kilometers west of La Porte is Willow Springs Bayou, also called Willow Springs Gully or Ditch. **Willow Springs (8)** are chiefly between North L Street and Spencer Road. On April 9, 1978, the discharge of Willow Springs Bayou at North L Street was 0.18 lps, and at Spencer Road it was 0.70 lps. Many willows still fringe the channel, along with cattails.

A third Spring Gully is located eight kilometers southwest of La Porte. Springs (9) in Beaumont silt produced a discharge of about 0.18 lps in 1978 in the gully at the Red Bluff road crossing. Cottonmouths hide here among the willows and cattails.

HARRISON COUNTY

Harrison County is endowed with numerous springs of all types, some highly mineralized and valued for their healing properties. Most appear to be flowing as strongly as ever, because there has been little demand on the groundwater reservoirs. However, water levels in the artesian sands are declining as much as 4.6 meters per year in some areas. Most of the Caddo Indian villages were located at springs. Early French and Spanish explorers, some over 400 years ago, visited many of the same springs that can be seen today.

The New Madrid earthquake of 1811 - 1812, which enlarged Caddo Lake, may have affected the flow of some springs. In general, however, the water-bearing formations were not greatly affected by the quake.

Most of the spring waters of the county issue from Eocene sands. They are usually fresh, soft, and acid, being of the sodium bicarbonate type. The iron content is often very high. Mineralized waters may also be high in aluminum and sulfate, may be slightly saline, and can be very hard. The analyses shown for 1942 in the table of Selected Chemical Analyses are probably too low in dissolved-solids content, perhaps because of high rainfall at the time the samples were collected. Most of the writer's field studies were made on January 23 - 28, 1976.

It was around **Locke Springs (1)** that the community of Marshall first appeared. In 1831 there were at least 20 springs flowing from the Reklaw sand near the intersection of Franklin and Houston Streets and up the hill toward the courthouse. In early times water was hauled from these springs in barrels to fill the cisterns on the town square. Most of the springs have now been paved over, but the remaining ones still flowed 1.4 liters per second in 1976.

Hynson Springs (10), also known as **Marshall, Noonday Camp, and Iron Springs**, are six kilometers north of Hallsville. They became very popular as a health resort about 1851. The waters are highly mineralized, containing much iron, sulfur, aluminum, and lithium. Originally there were said to be over 100 springs flowing from Queen City sand. Now not more than 20 can be found, possibly because the water table has fallen. During the Civil War the water from the springs was used in a leather-tanning factory. From 1891 to 1905 the large Hotel Randell accommodated thousands of visitors to the springs. Today there are an open-air auditorium and a number of cabins, but everything is in a sad state of disrepair. A historical marker is located at the springs. The discharge record, in liters per second, is as follows:

Jan. 28, 1942	0.13	
Jul 21, 1964	0.06	
Jan. 27, 1976	0.13 (main spring)	1.6 (all springs)

Rock Springs (7) are just east of the Rock Springs church on Highway 449 about 13 kilometers west of Marshall. This and several other springs upstream flowed 2.3 lps from the Queen City sand in 1976. The Frenchman Henri Joutel of La Salle's party may have stopped here for refreshment in 1687.

Mulberry Springs (9), nine kilometers south-southwest of Harleton, are 100 meters north of the

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Rhode Island 02818
Phone: 401 738 3887
Fax: 401 732 1686
www.arcadis.com

APPENDIX 4-NA

A summary of any transition between monitoring programs or an alternate monitoring frequency, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring

APPENDIX 5- NA

Reports documenting monitoring well plugging and abandonment or well installation are included in the appendix. or other information required to be included in the annual report such as program related notification or assessment of corrective measures.

APPENDIX 6

Field reports and analytical reports.

CCR Groundwater Monitoring Well Inspection Form

Facility: Welsh Sampling Period: Feb. 2021
 Sampling Contractor: Eagle Environmental Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-15	✓	✓	✓	✓	✓	✓	
AD-11	✓	✓	✓	✓	✓	✓	
AD-14	✓	✓	✓	✓	✓	✓	
AD-17	✓	✓	✓	✓	✓	✓	

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

CCR Groundwater Monitoring Well Inspection Form

Facility: AEP WELSH PP Sampling Period: FEBRUARY 23, 2021

Sampling Contractor: EAGLE Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-01	✓	✓	✓	✓	✓	✓	
AD-08	✓	✓	✓	✓	✓	✓	
AD-09	✓	✓	✓	✓	✓	✓	
AD-13	✓	✓	✓	✓	✓	✓	
AD-05	✓	✓	✓	✓	✓	✓	

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

CCR Groundwater Monitoring Well Inspection Form

Facility: Welsh Sampling Period: 6-1-21
 Sampling Contractor: Eagle EAV Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-15	✓	✓	✓	✓	✓	✓	
AD-11	✓	✓	✓	✓	✓	✓	high vegetation
AD-14	✓	✓	✓	✓	✓	✓	high vegetation
AD-3	✓	✓	✓	✓	✓	✓	gap in lid allows wasp to nest
AD-16R	✓	✓	✓	✓	✓	✓	overgrown
AD-17	✓	✓	✓	✓	✓	✓	
AD-2	✓	✓	✓	✓	✓	✓	overgrown 11.45
AD-7	✓	✓	✓	✓	✓	✓	16.92
AD-10	✓	✓	✓	✓	✓	✓	overgrown 19.14
AD-18	✓	✓	✓	✓	✓	✓	4.58
AD-22	✓	✓	✓	✓	✓	✓	11.13 severely overgrown
AD-23	✓	✓	✓	✓	✓	✓	100 severely severely overgrown find

hard to

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory.

Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

CCR Groundwater Monitoring Well Inspection Form

Facility: AEP WFLSH PP Sampling Period: 06/01-02/21
 Sampling Contractor: EAGLE ENVIRONMENTAL Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-13	✓	✓	✓	✓	✓	✓	
AD-09	✓	✓	✓	✓	✓	✓	
AD-08	✓	✓	✓	✓	✓	✓	
AD-05	✓	✓	✓	✓	✓	✓	
AD-01	✓	✓	✓	✓	✓	✓	
AD-04C	✓	✓	✓	✓	✓	✓	
AD-04B	✓	✓	✓	✓	✓	✓	NO LABEL 5.91
AD-04	✓	✓	✓	✓	✓	✓	15.03
AD-04A	✓	✓	✓	✓	✓	✓	NO LABEL 15.04
AD-12	✓	✓	✓	✓	✓	✓	PAD COVERED IN SOIL + OVERFLOW 18.21
AD-06	✓	✓	✓	✓	✓	✓	PAD OVERFLOW 10.37

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

CCR Groundwater Monitoring Well Inspection Form

Facility: Welsh Sampling Period: Oct. 2021
 Sampling Contractor: Eagle Env Signature: Pat Tomlin

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-14	✓	✓	✓	✓	✓	✓	
AD-11	✓	✓	✓	✓	✓	✓	
AD-9S	✓	✓	✓	✓	✓	✓	
AD-7	✓	✓	✓	✓	✓	✓	DTW - 17.54
AD-10	✓	✓	✓	✓	✓	✓	DTW - 19.63
AD-2	✓	✓	✓	✓	✓	✓	DTW - 15.07 ^{No ballards}
AD-3	✓	✓	✓	✓	✓	✓	No ballards
AD-16A	✓	✓	✓	✓	✓	✓	
AD-17	✓	✓	✓	✓	✓	✓	
AD-18	✓	✓	✓	✓	✓	✓	DTW - 9.05
AD-22	✓	✓	✓	✓	✓	✓	DTW - 10.52
AD-23	✓	✓	✓	✓	✓	✓	DTW - 10.21

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

CCR Groundwater Monitoring Well Inspection Form

Facility: WFLSH PP Sampling Period: OCTOBER 2021
 Sampling Contractor: CABLE ENVIRONMENTAL Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Housing and Pad in Good Shape	Well Properly Labeled	Comments
AD-13	✓	✓	✓	✓	✓	✓	
AD-09	✓	✓	✓	✓	✓	✓	
AD-08	✓	✓	✓	✓	✓	✓	WASPS IN LID
AD-05	✓	✓	✓	✓	✓	✓	
AD-06	✓	✓	✓	✓	✓	✓	13.70 WASPS ON LOCK
AD-12	✓	✓	✓	✓	✓	✓	21.36
AD-01	✓	✓	✓	✓	✓	✓	
AD-04C	✓	✓	✓	✓	✓	✓	
AD-04b	✓	✓	✓	✓	✓	✓	9.58
AD-04	✓	✓	✓	✓	✓	✓	18.26
AD-04a	✓	✓	✓	✓	✓	✓	18.33

Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216025

Customer: Welsh Power Station

Date Reported: 11/05/2021

Customer Sample ID: AD-8

Customer Description:

Lab Number: 216025-001

Preparation:

Date Collected: 10/19/2021 11:36

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	13.7	mg/L	2	0.04	0.02		CRJ	10/28/2021 17:08	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.90	mg/L	2	0.06	0.02		CRJ	10/28/2021 17:08	EPA 300.1 -1997, Rev. 1.0
Sulfate	139	mg/L	10	2.0	0.3		CRJ	10/28/2021 16:42	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	300	mg/L	1	50	20		SDW	10/25/2021 11:03	SM 2540C-2011

Customer Sample ID: AD-9

Customer Description:

Lab Number: 216025-002

Preparation:

Date Collected: 10/19/2021 10:17

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	31.8	mg/L	2	0.04	0.02		CRJ	10/28/2021 15:51	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.19	mg/L	2	0.06	0.02		CRJ	10/28/2021 15:51	EPA 300.1 -1997, Rev. 1.0
Sulfate	374	mg/L	25	5.0	0.8		CRJ	10/28/2021 15:26	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	700	mg/L	1	50	20		SDW	10/25/2021 11:03	SM 2540C-2011

Customer Sample ID: AD-15

Customer Description:

Lab Number: 216025-003

Preparation:

Date Collected: 10/19/2021 11:35

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	28.0	mg/L	2	0.04	0.02		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.09	mg/L	2	0.06	0.02		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0
Sulfate	10.3	mg/L	2	0.40	0.06		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	140	mg/L	1	50	20		SDW	10/25/2021 11:09	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216025

Customer: Welsh Power Station

Date Reported: 11/05/2021

Customer Sample ID: Duplicate - PBAP

Customer Description:

Lab Number: 216025-004

Preparation:

Date Collected: 10/19/2021 12:00

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	40.2	mg/L	25	0.5	0.3		CRJ	10/28/2021 13:45	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	10/28/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	522	mg/L	25	5.0	0.8		CRJ	10/28/2021 13:45	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	940	mg/L	1	50	20		SDW	10/25/2021 11:09	SM 2540C-2011

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welch</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>MGH/MSO</u>				Number of Glass Containers: _____			
Date/Time <u>10/22/21 10:50 AM</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / N or N/A Initial: <u>MSO</u> on ice / no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____							
Requested turnaround: <u>ROUTINE</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MGH 10/22/21

pH paper (circle one): MQuant.PN1.09535.0001.LOT# HC904495 [OR] Lab Rat,PN4801.LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216025 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by MGH _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-8

Customer Description:

Lab Number: 216058-001

Preparation:

Date Collected: 10/19/2021 11:36

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Barium	23.3	µg/L	1	0.20	0.05		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.01	µg/L	2	0.10	0.01	U1	GES	11/01/2021 11:26	EPA 200.8-1994, Rev. 5.4
Boron	1.10	mg/L	1	0.050	0.009		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Calcium	17.2	mg/L	1	0.3	0.1		DAM	10/29/2021 12:13	EPA 200.7-1994, Rev. 4.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cobalt	4.13	µg/L	1	0.020	0.003		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.0690	mg/L	2	0.0004	0.0001		GES	11/01/2021 11:26	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.10	0.12		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.7	%						
Radium-228	0.65	pCi/L	0.15	0.47		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	77.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-9

Customer Description:

Lab Number: 216058-002

Preparation:

Date Collected: 10/19/2021 10:17

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Barium	50.3	µg/L	1	0.20	0.05		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Beryllium	1.36	µg/L	2	0.10	0.01		GES	11/01/2021 10:34	EPA 200.8-1994, Rev. 5.4
Boron	0.226	mg/L	1	0.050	0.009		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.315	µg/L	1	0.020	0.004		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Calcium	11.9	mg/L	1	0.3	0.1		DAM	10/29/2021 12:30	EPA 200.7-1994, Rev. 4.4
Chromium	0.68	µg/L	1	0.20	0.04		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Cobalt	20.6	µg/L	1	0.020	0.003		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.184	mg/L	2	0.0004	0.0001	P3	GES	11/01/2021 10:34	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Thallium	0.23	µg/L	1	0.20	0.04		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.97	pCi/L	0.15	0.14		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	0.77	pCi/L	0.16	0.51		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	75.0	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-15

Customer Description:

Lab Number: 216058-003

Preparation:

Date Collected: 10/19/2021 11:35

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Arsenic	3.72	µg/L	1	0.10	0.03		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Barium	73.1	µg/L	1	0.20	0.05		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Beryllium	0.143	µg/L	1	0.050	0.007		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Boron	0.218	mg/L	1	0.050	0.009		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Calcium	2.7	mg/L	1	0.3	0.1		DAM	10/29/2021 12:34	EPA 200.7-1994, Rev. 4.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Cobalt	2.84	µg/L	1	0.020	0.003		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.00435	mg/L	1	0.00020	0.00005		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Selenium	0.55	µg/L	1	0.50	0.09		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Thallium	0.06	µg/L	1	0.20	0.04	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.77	pCi/L	0.12	0.12		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	106	%						
Radium-228	1.25	pCi/L	0.16	0.49		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: DUPLICATE - PBAP

Customer Description:

Lab Number: 216058-004

Preparation:

Date Collected: 10/19/2021 12:00

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Barium	47.9	µg/L	1	0.20	0.05		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Beryllium	1.36	µg/L	2	0.10	0.01		GES	11/01/2021 11:05	EPA 200.8-1994, Rev. 5.4
Boron	0.207	mg/L	1	0.050	0.009		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.289	µg/L	1	0.020	0.004		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Calcium	11.6	mg/L	1	0.3	0.1		DAM	10/29/2021 12:38	EPA 200.7-1994, Rev. 4.4
Chromium	0.72	µg/L	1	0.20	0.04		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Cobalt	19.4	µg/L	1	0.020	0.003		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.187	mg/L	2	0.0004	0.0001		GES	11/01/2021 11:05	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.22	µg/L	1	0.20	0.04		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: EQUIPMENT BLANK - PBAP

Customer Description:

Lab Number: 216058-005

Preparation:

Date Collected: 10/19/2021 11:15

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Barium	0.12	µg/L	1	0.20	0.05	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	10/29/2021 12:42	EPA 200.7-1994, Rev. 4.4
Chromium	0.22	µg/L	1	0.20	0.04		GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Cobalt	0.015	µg/L	1	0.020	0.003	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.00016	mg/L	1	0.00020	0.00005	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

U1 - Not detected at or above method detection limit (MDL).

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

P3 - The precision on the matrix spike duplicate (MSD) was above acceptance limits.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	<input type="checkbox"/> Box	<input type="checkbox"/> Bag	<input type="checkbox"/> Envelope	<input type="checkbox"/> PONY	<input type="checkbox"/> UPS	<input type="checkbox"/> FedEx	<input type="checkbox"/> USPS
				Other _____			
Plant/Customer <u>Welsh</u>			Number of Plastic Containers: <u>17</u>				
Opened By <u>Misquina</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>10/26/2021 12:00pm</u>			Number of Mercury Containers: <u>5</u>				
Were all temperatures within 0-6°C? Y/N or N/A Initial: <u>MIC</u> on ice / <input checked="" type="radio"/> no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MIC 10/26/2021

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216058 Initial & Date & Time : _____

Logged by MSJ Comments: _____

Reviewed by MIC _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-1

Customer Description:

Lab Number: 216027-001

Preparation:

Date Collected: 10/20/2021 10:34

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.21	mg/L	2	0.04	0.02		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	2	0.06	0.02		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	72.4	mg/L	2	0.40	0.06		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	12	mg/L	1	20	5	J1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	190	mg/L	1	50	20		SDW	10/25/2021 11:28	SM 2540C-2011

Customer Sample ID: AD-5

Customer Description:

Lab Number: 216027-002

Preparation:

Date Collected: 10/20/2021 09:15

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	17.4	mg/L	2	0.04	0.02		CRJ	10/29/2021 16:44	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	10/29/2021 16:44	EPA 300.1 -1997, Rev. 1.0
Sulfate	155	mg/L	10	2.0	0.3		CRJ	10/29/2021 13:45	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	51	mg/L	1	20	5		MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	370	mg/L	1	50	20		SDW	10/25/2021 11:28	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216027-003

Preparation:

Date Collected: 10/20/2021 12:02

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	37.3	mg/L	5	0.10	0.05		CRJ	10/29/2021 17:35	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.16	mg/L	5	0.15	0.05		CRJ	10/29/2021 17:35	EPA 300.1 -1997, Rev. 1.0
Sulfate	1040	mg/L	50	10	2		CRJ	10/29/2021 20:08	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	1710	mg/L	1	50	20		SDW	10/25/2021 11:33	SM 2540C-2011

Customer Sample ID: Duplicate - Background

Customer Description:

Lab Number: 216027-004

Preparation:

Date Collected: 10/20/2021 12:00

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.18	mg/L	5	0.10	0.05		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	5	0.15	0.05		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	68.9	mg/L	5	1.0	0.2		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	14	mg/L	1	20	5	J1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	200	mg/L	1	50	20		SDW	10/25/2021 11:40	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

U1 - Not detected at or above method detection limit (MDL).

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welch</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>MGH/MSO</u>				Number of Glass Containers: _____			
Date/Time <u>10/22/21 10:50 AM</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>MSO</u> on ice / no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MGH 10/22/21

pH paper (circle one): MQuant PN1 09535 0001 LOT# HC904495 [OR] Lab Rat, PN4801 LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216027 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by mgk _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-1

Customer Description:

Lab Number: 216055-001

Preparation:

Date Collected: 10/20/2021 10:34

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Barium	86.1	µg/L	1	0.20	0.05		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Beryllium	0.932	µg/L	1	0.050	0.007		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Boron	0.732	mg/L	1	0.050	0.009		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Cadmium	0.026	µg/L	1	0.020	0.004		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Calcium	4.8	mg/L	1	0.3	0.1		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Cobalt	2.44	µg/L	1	0.020	0.003		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Lithium	0.00756	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Magnesium	2.69	mg/L	1	0.10	0.02		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Potassium	1	mg/L	1	1.0	0.2		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Selenium	7.39	µg/L	1	0.50	0.09		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Sodium	32.7	mg/L	1	0.5	0.2		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.55	pCi/L	0.11	0.13	P1	ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.2	%						
Radium-228	0.44	pCi/L	0.14	0.47		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	78.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-5

Customer Description:

Lab Number: 216055-002

Preparation:

Date Collected: 10/20/2021 09:15

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Arsenic	1.44	µg/L	1	0.10	0.03		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Barium	53.2	µg/L	1	0.20	0.05		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Beryllium	0.018	µg/L	1	0.050	0.007	J1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Boron	0.038	mg/L	1	0.050	0.009	J1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Calcium	38.4	mg/L	1	0.3	0.1		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Cobalt	6.85	µg/L	1	0.020	0.003		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Lithium	0.133	mg/L	1	0.00020	0.00005	M1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Magnesium	13.3	mg/L	1	0.10	0.02		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Potassium	3.2	mg/L	1	1.0	0.2		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Sodium	33.2	mg/L	1	0.5	0.2		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.74	pCi/L	0.12	0.12		ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	1.94	pCi/L	0.22	0.68		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	73.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216055-003

Preparation:

Date Collected: 10/20/2021 12:02

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Arsenic	0.57	µg/L	1	0.10	0.03		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Barium	10.2	µg/L	1	0.20	0.05		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Beryllium	0.035	µg/L	1	0.050	0.007	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Boron	0.104	mg/L	1	0.050	0.009		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Calcium	164	mg/L	1	0.3	0.1		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Cobalt	42.9	µg/L	1	0.020	0.003		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Lithium	0.250	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Magnesium	47.4	mg/L	1	0.10	0.02		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Potassium	7.7	mg/L	1	1.0	0.2		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Sodium	29.1	mg/L	1	0.5	0.2		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.10	0.09		ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.6	%						
Radium-228	1.14	pCi/L	0.19	0.57		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	67.1	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: Duplicate - Background

Customer Description:

Lab Number: 216055-004

Preparation:

Date Collected: 10/20/2021 12:00

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Barium	87.9	µg/L	1	0.20	0.05		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Beryllium	0.935	µg/L	1	0.050	0.007		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Boron	0.725	mg/L	1	0.050	0.009		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Cadmium	0.032	µg/L	1	0.020	0.004		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Calcium	4.9	mg/L	1	0.3	0.1		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Cobalt	2.55	µg/L	1	0.020	0.003		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Lead	0.24	µg/L	1	0.20	0.05		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Lithium	0.00759	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Magnesium	2.72	mg/L	1	0.10	0.02		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Mercury	2	ng/L	1	5	2	J1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Selenium	7.99	µg/L	1	0.50	0.09		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Sodium	33.0	mg/L	1	0.5	0.2		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: Equipment Blank - Background

Customer Description:

Lab Number: 216055-005

Preparation:

Date Collected: 10/20/2021 10:42

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Cobalt	0.013	µg/L	1	0.020	0.003	J1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Lithium	0.00009	mg/L	1	0.00020	0.00005	J1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Sodium	<0.2	mg/L	1	0.5	0.2	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

U1 - Not detected at or above method detection limit (MDL).

M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>		<u>Delivery Type</u>			
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input type="radio"/> UPS
				<input type="radio"/> FedEx	<input type="radio"/> USPS
				Other _____	

Plant/Customer Welsh Number of Plastic Containers: 17

Opened By Misgina Number of Glass Containers: _____

Date/Time 10/26/2021 12:00pm Number of Mercury Containers: 5

Were all temperatures within 0-6°C? Y / N or N/A Initial: MLK on ice / no ice

1(IR Gun Ser# 200700311, Expir. 06-11-22) - If No, specify each deviation: _____

Was container in good condition? Y / N Comments _____

Was Chain of Custody received? Y / N Comments _____

Requested turnaround: _____ If RUSH, who was notified? _____

pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)
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Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MLK 10/26/2021

pH paper (circle one): MQuant.PN1.09535.0001, LOT# HC904495 [OR] Lab Rat, PN4801, LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216055 Initial & Date & Time : _____

Logged by MSG Comments: _____

Reviewed by MLK _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
T: 614-836-4221, Audinet 210-4221
F: 614-836-4168, Audinet 210-4168
<http://aepenv/labs>

Water Analysis

Location: Welsh PS

Report Date: 3/8/2021

AD-1

Sample Number: 210423-001 **Date Collected: 02/23/2021 09:47** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.31	mg/L		0.06	0.01	CRJ	03/02/2021 13:29	EPA 300.1-1997, Rev. 1.0

AD-5

Sample Number: 210423-002 **Date Collected: 02/23/2021 13:30** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.23	mg/L		0.06	0.01	CRJ	03/02/2021 13:54	EPA 300.1-1997, Rev. 1.0

AD-17

Sample Number: 210423-003 **Date Collected: 02/23/2021 12:41** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.17	mg/L		0.2	0.04	CRJ	03/02/2021 14:44	EPA 300.1-1997, Rev. 1.0

AD-8

Sample Number: 210423-004 **Date Collected: 02/23/2021 10:40** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.69	mg/L		0.06	0.01	CRJ	03/02/2021 15:35	EPA 300.1-1997, Rev. 1.0

AD-9

Sample Number: 210423-005 **Date Collected: 02/23/2021 11:31** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.21	mg/L		0.06	0.01	CRJ	03/02/2021 16:01	EPA 300.1-1997, Rev. 1.0

AD-11

Sample Number: 210423-006 **Date Collected: 02/23/2021 10:37** **Date Received: 2/25/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.52	mg/L		0.06	0.01	CRJ	03/02/2021 16:51	EPA 300.1-1997, Rev. 1.0

AD-13

Sample Number: 210423-007 Date Collected: 02/23/2021 12:17 Date Received: 2/25/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.27	mg/L		0.06	0.01	CRJ	03/02/2021 17:17	EPA 300.1-1997, Rev. 1.0

AD-14

Sample Number: 210423-008 Date Collected: 02/23/2021 11:13 Date Received: 2/25/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.20	mg/L		0.06	0.01	CRJ	03/02/2021 14:19	EPA 300.1-1997, Rev. 1.0

AD-15

Sample Number: 210423-009 Date Collected: 02/23/2021 09:59 Date Received: 2/25/2021

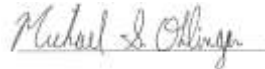
Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.08	mg/L		0.06	0.01	CRJ	03/02/2021 18:08	EPA 300.1-1997, Rev. 1.0

Duplicate

Sample Number: 210423-010 Date Collected: 02/23/2021 09:31 Date Received: 2/25/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Fluoride, F	0.20	mg/L		0.06	0.01	CRJ	03/02/2021 18:33	EPA 300.1-1997, Rev. 1.0

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit
J: Analyte was positively identified, though the quantitation was below Reporting Limit.



Michael Ohlinger, Chemist

Email msohlinger@aep.com Tel.

Fax 614-836-4168 Audinet 8-210-

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Contacts: Jonathan Barnhill (318-673-3903)
 Michael Ohlinger (614-836-4184)

Project Name: Welsh Power Plant
 Contact Name: Jill Parker-Witt
 Contact Phone: 318-673-3816

Sampler(s): Matt Hamilton/Kenny McDonald

Site Contact:	Date:	For Lab Use Only:
250 mL bottle, pH<2, HNO ₃	Three (six every 100ft) L bottles, pH<2, HNO ₃	COC/Order #: 210423
Field-filter 500 mL bottle, then pH<2, HNO ₃	250mL bottle, Cool, 0-5°C	
40 mL Glass Vial lined bottle, HCL, pH<2		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis Turnaround Time (in Calendar Days)				Sample Specific Notes:													
						250 mL bottle, pH<2, HNO ₃	Field-filter 500 mL bottle, then pH<2, HNO ₃	250mL bottle, Cool, 0-5°C	Three (six every 100ft) L bottles, pH<2, HNO ₃		40 mL Glass Vial lined bottle, HCL, pH<2												
AD-1	2/23/2021	947	G	GW	1			X															
AD-5	2/23/2021	1330	G	GW	1			X															
AD-17	2/23/2021	1241	G	GW	1			X															
AD-8	2/23/2021	1040	G	GW	1			X															
AD-9	2/23/2021	1131	G	GW	1			X															
AD-11	2/23/2021	1037	G	GW	1			X															
AD-13	2/23/2021	1217	G	GW	1			X															
AD-14	2/23/2021	1113	G	GW	1			X															
AD-15	2/23/2021	959	G	GW	1			X															
DUPLICATE	2/23/2021	931	G	GW	1			X															
						4	F4	1	4														

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other _____; F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>Eisk</i>	Date/Time: 2/24/21	Received by: <i>[Signature]</i>	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 2/25/21 1:30pm

Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u> <input checked="" type="radio"/> Cooler <input type="radio"/> Box <input type="radio"/> Bag <input type="radio"/> Envelope		<u>Delivery Type</u> PONY UPS <input checked="" type="radio"/> FedEx USPS Other _____	
Plant/Customer <u>WUSH</u>	Number of Plastic Containers: <u>10</u>		
Opened By <u>MSO</u>	Number of Glass Containers: <u>-</u>		
Date/Time <u>2/25/21 1:30pm</u>	Number of Mercury Containers: _____		
Were all temperatures within 0-6°C? Y / N or N/A Initial: _____ <u>on ice</u> no ice			
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u>) - If No, specify each deviation: _____			
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____			
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____			
Requested turnaround: _____ If RUSH, who was notified? _____			
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr) Hg-diss (pres) (48 hr)

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MSO 2/25/21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 210423 Initial & Date & Time : _____

Comments: _____

Logged by MSO _____

Reviewed by SM _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
T: 614-836-4221, Audinet 210-4221
F: 614-836-4168, Audinet 210-4168
<http://aepenv/labs>

Water Analysis

Location: Welsh PS

Report Date: 3/19/2021

AD-1

Sample Number: 210452-001

Date Collected: 02/23/2021 09:47

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.24	ug/L		0.1	0.02	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.74	ug/L		0.1	0.03	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Barium, Ba	338	ug/L		0.2	0.05	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.•The MSD is outside the acceptable limit of 75-125%.								
Beryllium, Be	0.136	ug/L		0.1	0.02	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.338	ug/L		0.2	0.04	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.477	ug/L		0.05	0.02	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.852	ug/L		0.2	0.05	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	1	ug/L	J	2	0.4	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.5	ug/L		0.2	0.03	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Boron, B	0.617	mg/L		0.05	0.02	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	113	mg/L		0.3	0.1	DAM	03/03/2021 13:02	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00155	mg/L		0.0002	0.00005	GES	03/03/2021 09:34	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	19.3	mg/L		0.1	0.02	DAM	03/03/2021 13:02	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.44	mg/L		1	0.2	DAM	03/03/2021 13:02	EPA 200.7-1994, Rev. 4.4
Sodium, Na	26.3	mg/L		0.5	0.1	DAM	03/03/2021 13:02	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	1.86	mg/L		0.01	0.002	DAM	03/03/2021 13:02	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.46	pCi/L	0.18	0.53	ttp	3/10/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.277	pCi/L	0.072	0.096	ttp	3/15/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-5

Sample Number: 210452-002

Date Collected: 02/23/2021 13:30

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Arsenic, As	2.06	ug/L		0.1	0.03	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Barium, Ba	68.3	ug/L		0.2	0.05	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.03	ug/L	J	0.1	0.02	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	6.31	ug/L		0.05	0.02	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.03	ug/L	J	0.2	0.03	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.02	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	30.9	mg/L		0.3	0.1	DAM	03/03/2021 12:36	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0705	mg/L		0.0002	0.00005	GES	03/03/2021 09:39	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.55	mg/L		0.1	0.02	DAM	03/03/2021 12:36	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.76	mg/L		1	0.2	DAM	03/03/2021 12:36	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.4	mg/L		0.5	0.1	DAM	03/03/2021 12:36	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.242	mg/L		0.01	0.002	DAM	03/03/2021 12:36	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.87	pCi/L	0.19	0.61	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.527	pCi/L	0.10	0.12	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-17

Sample Number: 210452-003

Date Collected: 02/23/2021 12:41

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.61	ug/L		0.1	0.03	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Barium, Ba	10.6	ug/L		0.2	0.05	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.03	ug/L	J	0.1	0.02	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	41.1	ug/L		0.05	0.02	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.04	ug/L	J	0.2	0.03	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Boron, B	0.098	mg/L		0.05	0.02	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	168	mg/L		0.3	0.1	DAM	03/03/2021 13:06	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.249	mg/L		0.0002	0.00005	GES	03/03/2021 09:44	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	48.9	mg/L		0.1	0.02	DAM	03/03/2021 13:06	EPA 200.7-1994, Rev. 4.4
Potassium, K	8.08	mg/L		1	0.2	DAM	03/03/2021 13:06	EPA 200.7-1994, Rev. 4.4
Sodium, Na	28.5	mg/L		0.5	0.1	DAM	03/03/2021 13:06	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	1.39	mg/L		0.01	0.002	DAM	03/03/2021 13:06	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.879	pCi/L	0.15	0.48	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.554	pCi/L	0.10	0.11	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-8

Sample Number: 210452-004

Date Collected: 02/23/2021 10:40

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.31	ug/L		0.1	0.03	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Barium, Ba	24.2	ug/L		0.2	0.05	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 10:25	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.899	ug/L		0.05	0.02	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.06	ug/L	J	0.2	0.05	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.03	ug/L	U	0.2	0.03	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Boron, B	1.18	mg/L		0.05	0.02	GES	03/03/2021 09:49	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	14.8	mg/L		0.3	0.1	DAM	03/03/2021 13:10	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.104	mg/L		0.001	0.0002	GES	03/03/2021 10:25	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.25	mg/L		0.1	0.02	DAM	03/03/2021 13:10	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.40	mg/L		1	0.2	DAM	03/03/2021 13:10	EPA 200.7-1994, Rev. 4.4
Sodium, Na	59.0	mg/L		0.5	0.1	DAM	03/03/2021 13:10	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.121	mg/L		0.01	0.002	DAM	03/03/2021 13:10	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.374	pCi/L	0.18	0.61	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.17	pCi/L	0.071	0.18	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-9

Sample Number: 210452-005

Date Collected: 02/23/2021 11:31

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.27	ug/L		0.1	0.03	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Barium, Ba	54.9	ug/L		0.2	0.05	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.51	ug/L		0.5	0.1	GES	03/03/2021 10:30	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.33	ug/L		0.05	0.01	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.373	ug/L		0.2	0.04	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	21.7	ug/L		0.05	0.02	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.003	ug/L	J	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.2	0.03	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.1	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Boron, B	0.219	mg/L		0.05	0.02	GES	03/03/2021 09:54	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	11.6	mg/L		0.3	0.1	DAM	03/03/2021 13:14	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.189	mg/L		0.001	0.0002	GES	03/03/2021 10:30	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.79	mg/L		0.1	0.02	DAM	03/03/2021 13:14	EPA 200.7-1994, Rev. 4.4
Potassium, K	3.02	mg/L		1	0.2	DAM	03/03/2021 13:14	EPA 200.7-1994, Rev. 4.4
Sodium, Na	42.5	mg/L		0.5	0.1	DAM	03/03/2021 13:14	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.165	mg/L		0.01	0.002	DAM	03/03/2021 13:14	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.18	pCi/L	0.20	0.64	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.377	pCi/L	0.089	0.12	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-11

Sample Number: 210452-006

Date Collected: 02/23/2021 10:37

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.04	ug/L	J	0.1	0.02	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.47	ug/L		0.1	0.03	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Barium, Ba	38.2	ug/L		0.2	0.05	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.515	ug/L		0.1	0.02	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.18	ug/L		0.05	0.01	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.276	ug/L		0.2	0.04	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	8.63	ug/L		0.05	0.02	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.435	ug/L		0.2	0.05	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.011	ug/L		0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Selenium, Se	1.0	ug/L		0.2	0.03	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.1	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Boron, B	1.15	mg/L		0.05	0.02	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	23.3	mg/L		0.3	0.1	DAM	03/03/2021 13:18	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0102	mg/L		0.0002	0.00005	GES	03/03/2021 09:59	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.41	mg/L		0.1	0.02	DAM	03/03/2021 13:18	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.82	mg/L		1	0.2	DAM	03/03/2021 13:18	EPA 200.7-1994, Rev. 4.4
Sodium, Na	126	mg/L		0.5	0.1	DAM	03/03/2021 13:18	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.267	mg/L		0.01	0.002	DAM	03/03/2021 13:18	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.971	pCi/L	0.15	0.46	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.327	pCi/L	0.081	0.11	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-13

Sample Number: 210452-007

Date Collected: 02/23/2021 12:17

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.06	ug/L	J	0.1	0.02	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.67	ug/L		0.1	0.03	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Barium, Ba	115	ug/L		0.2	0.05	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.04	ug/L	J	0.1	0.02	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.243	ug/L		0.2	0.04	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.717	ug/L		0.05	0.02	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.002	ug/L	J	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	2.34	ug/L		2	0.4	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.5	ug/L		0.2	0.03	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Boron, B	0.581	mg/L		0.05	0.02	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	46.4	mg/L		0.3	0.1	DAM	03/03/2021 13:22	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00302	mg/L		0.0002	0.00005	GES	03/03/2021 10:04	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	10.6	mg/L		0.1	0.02	DAM	03/03/2021 13:22	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.24	mg/L		1	0.2	DAM	03/03/2021 13:22	EPA 200.7-1994, Rev. 4.4
Sodium, Na	32.2	mg/L		0.5	0.1	DAM	03/03/2021 13:22	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.416	mg/L		0.01	0.002	DAM	03/03/2021 13:22	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.42	pCi/L	0.15	0.44	ttp	3/10/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.844	pCi/L	0.13	0.12	ttp	3/15/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-14

Sample Number: 210452-008

Date Collected: 02/23/2021 11:13

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.03	ug/L	J	0.1	0.02	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.31	ug/L		0.1	0.03	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Barium, Ba	36.5	ug/L		0.2	0.05	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.4	ug/L	J	0.5	0.1	GES	03/03/2021 11:41	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.36	ug/L		0.05	0.01	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	4.18	ug/L		0.05	0.02	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.02	ug/L	U	0.05	0.02	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Selenium, Se	1.3	ug/L		0.2	0.03	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Boron, B	1.09	mg/L		0.05	0.02	GES	03/03/2021 10:09	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	13.1	mg/L		0.3	0.1	DAM	03/03/2021 13:26	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00900	mg/L		0.001	0.0002	GES	03/03/2021 11:41	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	6.10	mg/L		0.1	0.02	DAM	03/03/2021 13:26	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	DAM	03/03/2021 13:26	EPA 200.7-1994, Rev. 4.4
Sodium, Na	34.3	mg/L		0.5	0.1	DAM	03/03/2021 13:26	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.218	mg/L		0.01	0.002	DAM	03/03/2021 13:26	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.601	pCi/L	0.19	0.63	ttp	3/10/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.431	pCi/L	0.092	0.099	ttp	3/15/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-15

Sample Number: 210452-009

Date Collected: 02/23/2021 09:59

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.39	ug/L		0.1	0.03	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Barium, Ba	72.4	ug/L		0.2	0.05	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.190	ug/L		0.1	0.02	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.01	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	2.61	ug/L		0.05	0.02	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.2	ug/L		0.2	0.03	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.02	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.30	mg/L		0.3	0.1	DAM	03/03/2021 13:30	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00167	mg/L		0.0002	0.00005	GES	03/03/2021 10:15	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	2.77	mg/L		0.1	0.02	DAM	03/03/2021 13:30	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.5	mg/L	J	1	0.2	DAM	03/03/2021 13:30	EPA 200.7-1994, Rev. 4.4
Sodium, Na	10.5	mg/L		0.5	0.1	DAM	03/03/2021 13:30	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0322	mg/L		0.01	0.002	DAM	03/03/2021 13:30	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.899	pCi/L	0.19	0.60	ttp	3/10/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.122	pCi/L	0.38	0.088	ttp	3/15/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate

Sample Number: 210452-010

Date Collected: 02/23/2021 09:31

Date Received: 3/1/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.03	ug/L	J	0.1	0.02	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.29	ug/L		0.1	0.03	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Barium, Ba	37.6	ug/L		0.2	0.05	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.•The MSD is outside the acceptable limit of 75-125%.								
Beryllium, Be	0.354	ug/L		0.1	0.02	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.36	ug/L		0.05	0.01	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	4.25	ug/L		0.05	0.02	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.•The MSD is outside the acceptable limit of 75-125%.								
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.003	ug/L	J	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Selenium, Se	1.4	ug/L		0.2	0.03	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
Boron, B	1.10	mg/L		0.05	0.02	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.•The MSD is outside the acceptable limit of 75-125%.								
Calcium, Ca	13.1	mg/L		0.3	0.1	DAM	03/03/2021 13:34	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00765	mg/L		0.0002	0.00005	GES	03/03/2021 11:46	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.•The MSD is outside the acceptable limit of 75-125%.								
Magnesium, Mg	6.09	mg/L		0.1	0.02	DAM	03/03/2021 13:34	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	DAM	03/03/2021 13:34	EPA 200.7-1994, Rev. 4.4
Sodium, Na	34.6	mg/L		0.5	0.1	DAM	03/03/2021 13:34	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.220	mg/L		0.01	0.002	DAM	03/03/2021 13:34	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Equipment Blank Background

Sample Number: **210452-011**

Date Collected: **02/23/2021 11:55**

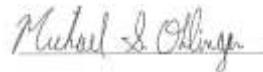
Date Received: **3/1/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Arsenic, As	< 0.03	ug/L	U	0.1	0.03	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Barium, Ba	0.09	ug/L	J	0.2	0.05	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	< 0.04	ug/L	U	0.2	0.04	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	< 0.02	ug/L	U	0.05	0.02	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/05/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.03	ug/L	U	0.2	0.03	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Boron, B	< 0.02	mg/L	U	0.05	0.02	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	DAM	03/03/2021 14:16	EPA 200.7-1994, Rev. 4.4
Lithium, Li	< 0.00005	mg/L	U	0.0002	0.00005	GES	03/03/2021 10:20	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	< 0.02	mg/L	U	0.1	0.02	DAM	03/03/2021 14:16	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	DAM	03/03/2021 14:16	EPA 200.7-1994, Rev. 4.4
Sodium, Na	< 0.1	mg/L	U	0.5	0.1	DAM	03/03/2021 14:16	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	DAM	03/03/2021 14:16	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



Michael Ohlinger, Chemist

Email msohlinger@aep.com Tel.

Fax 614-836-4168

Audinet 8-210-

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welsh</u>				Number of Plastic Containers: <u>41</u>			
Opened By <u>SM</u>				Number of Glass Containers: _____			
Date/Time <u>3-1-21 12:30</u>				Number of Mercury Containers: <u>11</u>			
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: _____ on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u>) - If No, specify each deviation: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>Rollie</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: SM 3-1-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 210452 Initial & Date & Time : _____

Logged by SM Comments: _____

Reviewed by MSO _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215112

Customer: Welsh Power Station

Date Reported: 07/02/2021

Customer Sample ID:

Customer Description:

Lab Number: 215112-001

Sampling Point: AD-1

Date Collected: 06/02/2021

Date Received: 06/04/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.26	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	61.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	400	mg/L	1	50	20		SDW	06/07/2021	SM 2540C-2011

Customer Sample ID:

Customer Description:

Lab Number: 215112-002

Sampling Point: AD-5

Date Collected: 06/02/2021

Date Received: 06/04/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	19.6	mg/L	2	0.04	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	53.8	mg/L	2	0.40	0.06		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	220	mg/L	1	50	20		SDW	06/07/2021	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215112

Customer: Welsh Power Station

Date Reported: 07/02/2021

Customer Sample ID:

Customer Description:

Lab Number: 215112-003

Sampling Point: AD-17

Date Collected: 06/02/2021

Date Received: 06/04/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	44.9	mg/L	5	0.10	0.03		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.31	mg/L	5	0.15	0.04		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1210	mg/L	50	10	2		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	1890	mg/L	2	100	40		SDW	06/07/2021	SM 2540C-2011

Customer Sample ID: Duplicate Background

Customer Description:

Lab Number: 215112-004

Sampling Point:

Date Collected: 06/02/2021

Date Received: 06/04/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.26	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	60.2	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	430	mg/L	2	100	40		SDW	06/07/2021	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215112

Customer: Welsh Power Station

Date Reported: 07/02/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in cursive script that reads "Michael S. Ohlinger". The signature is written in black ink and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215112

Customer: Welsh Power Station

Date Reported: 07/02/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215112

Customer: Welsh Power Station

Date Reported: 07/02/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welsh</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>SM</u>				Number of Glass Containers: _____			
Date/Time <u>6-4-21 12p</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>SM</u> on ice / <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: JWB 6-4-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215112 Initial & Date & Time : _____

Logged by SM Comments: _____

Reviewed by MSO _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:	Customer Description:
Lab Number: 215117-001	Sampling Point: AD-1
Date Collected: 06/02/2021 10:16	Date Received: 06/08/2021 07:24
Preparation:	

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.18	µg/L	1	0.10	0.02		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Arsenic	0.66	µg/L	1	0.10	0.03		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Barium	349	µg/L	1	0.20	0.05		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Beryllium	0.088	µg/L	1	0.050	0.007		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Boron	0.786	mg/L	1	0.050	0.009		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Cadmium	0.01	µg/L	1	0.020	0.004	J1	GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Calcium	97.1	mg/L	1	0.3	0.1		DAM	06/21/21 20:33	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Cobalt	0.474	µg/L	1	0.020	0.003		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Lithium	0.00052	mg/L	1	0.00020	0.00005		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Mercury	2	ng/L	1	5	2	J1	JAB	06/18/21 00:00	EPA 245.7 -2005, Rev. 2.0
Molybdenum	4.8	µg/L	1	0.5	0.1		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Selenium	1.26	µg/L	1	0.50	0.09		GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/21 15:06	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.36	pCi/L	0.08	0.11		TTP	06/28/21 10:21	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.9	%						
Radium-228	1.79	pCi/L	0.22	0.69		TTP	06/24/21 17:03	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	67.6	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:	Customer Description:
Lab Number: 215117-002	Sampling Point: AD-5
Date Collected: 06/02/2021 09:00	Date Received: 06/08/2021 07:24
Preparation:	

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Arsenic	1.72	µg/L	1	0.10	0.03		GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Barium	49.3	µg/L	1	0.20	0.05		GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Beryllium	0.018	µg/L	1	0.050	0.007	M1, J1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Boron	0.027	mg/L	1	0.050	0.009	J1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Calcium	24.4	mg/L	1	0.3	0.1		DAM	06/21/21 20:53	EPA 200.7-1994, Rev. 4.4
Chromium	0.26	µg/L	1	0.20	0.04		GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Cobalt	10.5	µg/L	1	0.020	0.003		GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.0764	mg/L	1	0.00020	0.00005	M1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/21 00:00	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/21 15:11	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.64	pCi/L	0.12	0.11		TTP	06/28/21 12:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	80.8	%						
Radium-228	1.83	pCi/L	0.21	0.64		TTP	06/24/21 17:03	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	66.3	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audin: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:	Customer Description:
Lab Number: 215117-003	Sampling Point: AD-17
Date Collected: 06/02/2021 12:12	Date Received: 06/08/2021 07:24
Preparation:	

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Arsenic	0.84	µg/L	1	0.10	0.03		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Barium	10.9	µg/L	1	0.20	0.05		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Beryllium	0.066	µg/L	1	0.050	0.007		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Boron	0.124	mg/L	1	0.050	0.009		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Cadmium	0.026	µg/L	1	0.020	0.004		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Calcium	233	mg/L	1	0.3	0.1		DAM	06/21/21 20:57	EPA 200.7-1994, Rev. 4.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Cobalt	72.9	µg/L	1	0.020	0.003		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Lithium	0.311	mg/L	1	0.00020	0.00005		GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/21 00:00	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/21 15:27	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.98	pCi/L	0.14	0.11		TTP	06/28/21 12:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	1.42	pCi/L	0.17	0.52		TTP	06/24/21 17:03	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	73.1	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID: Duplicate Background

Customer Description:

Lab Number: 215117-004

Sampling Point:

Date Collected: 06/02/2021 12:00

Date Received: 06/08/2021 07:24

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.19	µg/L	1	0.10	0.02		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Arsenic	0.65	µg/L	1	0.10	0.03		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Barium	356	µg/L	1	0.20	0.05		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Beryllium	0.086	µg/L	1	0.050	0.007		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Boron	0.786	mg/L	1	0.050	0.009		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Calcium	98.7	mg/L	1	0.3	0.1		DAM	06/21/21 21:01	EPA 200.7-1994, Rev. 4.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Cobalt	0.486	µg/L	1	0.020	0.003		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Lead	0.10	µg/L	1	0.20	0.05	J1	GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Lithium	0.00059	mg/L	1	0.00020	0.00005		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Mercury	2	ng/L	1	5	2	J1	JAB	06/18/21 00:00	EPA 245.7 -2005, Rev. 2.0
Molybdenum	5.0	µg/L	1	0.5	0.1		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Selenium	1.29	µg/L	1	0.50	0.09		GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/21 15:32	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID: Equipment Blank- Background

Customer Description:

Lab Number: 215117-005

Sampling Point:

Date Collected: 06/02/2021 09:50

Date Received: 06/08/2021 07:24

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Barium	0.10	µg/L	1	0.20	0.05	J1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/21/21 21:05	EPA 200.7-1994, Rev. 4.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Cobalt	0.037	µg/L	1	0.020	0.003		GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.00008	mg/L	1	0.00020	0.00005	J1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/21 00:00	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/21 15:37	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in cursive script that reads "Michael S. Ohlinger". The signature is written in black ink and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215117

Customer: Welsh Power Station

Date Reported: 07/06/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

Parkal



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u> Cooler Box Bag Envelope			<u>Delivery Type</u> PONY UPS FedEx USPS Other _____			
Plant/Customer <u>Walsh</u>			Number of Plastic Containers: <u>11</u>			
Opened By <u>SM</u>			Number of Glass Containers: _____			
Date/Time <u>6-7-21 1p</u>			Number of Mercury Containers: <u>5</u>			
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>SM</u> on ice / <u>no ice</u>						
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____						
Was container in good condition? <u>Y</u> / N Comments _____						
Was Chain of Custody received? <u>Y</u> / N Comments _____						
Requested turnaround: <u>Rollie</u> If RUSH, who was notified? _____						
pH (15 min)	Cr ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)		

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: Mark 6-8-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215117 Initial & Date & Time : _____

Logged by SM Comments: Not all samples arrived waiting for extra cooler from FedEx.

Reviewed by MBO

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
Other _____				Other _____			
Plant/Customer <u>WELSH</u>				Number of Plastic Containers: <u>6</u>			
Opened By <u>SM</u>				Number of Glass Containers: _____			
Date/Time <u>6-9-21 1:35</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>SM</u> on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>same</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: SM 6-9-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215117 Initial & Date & Time : _____

Logged by SM Comments: remaining samples

Reviewed by MEO arrived today

added to original order

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215111

Customer: Welsh Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215111-001	Sampling Point: AD-8
Date Collected: 06/01/2021	Date Received: 06/04/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	14.8	mg/L	2	0.04	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.73	mg/L	2	0.06	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	162	mg/L	10	2.0	0.3		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	330	mg/L	1	50	20		SDW	06/07/2021	SM 2540C-2011

Customer Sample ID:	Customer Description:
Lab Number: 215111-002	Sampling Point: AD-9
Date Collected: 06/01/2021	Date Received: 06/04/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	16.7	mg/L	2	0.04	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.19	mg/L	2	0.06	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	118	mg/L	25	5.0	0.8		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	300	mg/L	1	50	20		SDW	06/07/2021	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215111

Customer: Welsh Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215111-003	Sampling Point: AD-15
Date Collected: 06/01/2021	Date Received: 06/04/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	28.4	mg/L	2	0.04	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.10	mg/L	2	0.06	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	11.4	mg/L	2	0.40	0.06		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	06/07/2021	SM 2540C-2011

Customer Sample ID: Duplicate PBAP	Customer Description:
Lab Number: 215111-004	Sampling Point:
Date Collected: 06/01/2021	Date Received: 06/04/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	29.2	mg/L	2	0.04	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.11	mg/L	2	0.06	0.01		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	12.9	mg/L	2	0.40	0.06		CRJ	06/07/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	170	mg/L	2	100	40		SDW	06/07/2021	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215111

Customer: Welsh Power Station

Date Reported: 06/29/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in cursive script that reads "Michael S. Ohlinger". The signature is written in black ink and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215111

Customer: Welsh Power Station

Date Reported: 06/29/2021

Data Qualifier Legend

B1	Analyte detected in method blank (MB) at or above the method criteria.
B2	Analyte detected in initial calibration blank (ICB) at or above the method criteria.
B3	Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
B4	The interference check standard (ICS) exceeded the method criteria on this parameter.
H1	Sample was received past holding time.
H2	Sample analysis performed past holding time.
J1	Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
J2	Concentration estimated. Analyte exceeded calibration range.
L1	The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
M1	The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
M2	Analyzed by method of standard additions (MSA).
O1	The reporting limit for oil and grease is directly affected by the collected sample volume.
O2	Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
O3	Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
O4	Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
P1	The precision between duplicate results was above acceptance limits.
P2	The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
P3	The precision on the matrix spike duplicate (MSD) was above acceptance limits.
P4	The field duplicate was used as a sample duplicate.
P5	The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
Q1	Sample received in inappropriate sample container.
Q2	Sample was received damaged. The sample was recoverable.
Q3	Sample container was received damaged. Unable to recover the sample.
Q4	Sample was received outside of thermal preservation range.
Q5	Sample was received with improper chemical preservation.
Q6	Insufficient sample was received by the laboratory to perform the requested analysis.
Q7	Insufficient sample was received to meet method QC requirements.
Q8	Sample was received with head space.
Q9	Due to instrument malfunction, sample was invalidated.
Q10	Analysis was performed by a contracted laboratory. See attached report.
Q11	Sample contains free liquid.
Q12	Sample does not contain free liquid.
Q13	Sample did not ignite.
Q14	This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
R1	Surrogate recovery was outside acceptance limits.
R2	Carrier recovery was outside acceptance limits.
R3	Internal standard recovery was outside acceptance limits.
R4	The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
R5	The back calculation recovery of one or more calibration points exceeded the method criteria.
S1	Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215111

Customer: Welsh Power Station

Date Reported: 06/29/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

Chain of Custody Record

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125

Program: Coal Combustion Residuals (CCR)

Contacts: Michael Chlinger (614-836-4184)

Project Name: Welsh PBAP
Contact Name: Jill Parker-Witt
Contact Phone: (318) 673-3816

Sampler(s): Matt Hamilton Kenny McDonald



Analysis Turnaround Time (in Calendar Days)
 Routine (28 days)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials		250 mL bottle, pH<2, HNO ₃	Field-filter 500 mL bottle, then pH<2, HNO ₃	1 L bottle, Cool, 0-6°C	Three (six every 10th) L bottles, pH<2, HNO ₃	40 mL Glass Vial or 125 mL PTFE lined bottle, HCL, pH<2	Sample Specific Notes:
						B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL	TDS, F, Cl, SO ₄						
AD-8	6/1/2021	1132	G	GW	1								Routine (28 days)
AD-9	6/1/2021	1041	G	GW	1								
AD-15	6/1/2021	1012	G	GW	1								
DUPLICATE - PBAP	6/1/2021	1012	G	GW	1								

Preservation Used: 1= Ice, 2= HCl; 3= H₂SO₄; 4=HNO₃; 5=NaOH; 6= Other ; F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: 	Company: EA611	Date/Time: 06/03/21 1400	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: 	Date/Time: 6-4-21 12p

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Wells</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>SM</u>				Number of Glass Containers: _____			
Date/Time <u>6-4-21 12p</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>SM</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Rush</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: JWB 6-4-21

pH paper (circle one): MQuant,PN1.09535-0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215111 Initial & Date & Time : _____

Logged by MS Comments: _____

Reviewed by SM _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:

Customer Description:

Lab Number: 215119-001

Sampling Point: AD-8

Date Collected: 06/01/2021 11:32

Date Received: 06/08/2021 07:54

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.37	µg/L	1	0.10	0.03		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Barium	47.9	µg/L	1	0.20	0.05		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.01	µg/L	1	0.050	0.007	J1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Boron	1.10	mg/L	1	0.050	0.009		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.029	µg/L	1	0.020	0.004		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Calcium	15.3	mg/L	1	0.3	0.1		DAM	06/21/2021 21:26	EPA 200.7-1994, Rev. 4.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Cobalt	1.04	µg/L	1	0.020	0.003		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0818	mg/L	1	0.00020	0.00005		GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/10/2021 17:19	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.36	pCi/L	0.08	0.11		TTP	06/28/2021 12:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.6	%						
Radium-228	0.33	pCi/L	0.19	0.62		TTP	06/25/2021 12:25	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	66.5	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:

Customer Description:

Lab Number: 215119-002

Sampling Point: AD-9

Date Collected: 06/01/2021 10:41

Date Received: 06/08/2021 07:54

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Barium	51.6	µg/L	1	0.20	0.05		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Beryllium	1.15	µg/L	1	0.050	0.007		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Boron	0.221	mg/L	1	0.050	0.009		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.353	µg/L	1	0.020	0.004		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Calcium	12.5	mg/L	1	0.3	0.1		DAM	06/21/2021 22:12	EPA 200.7-1994, Rev. 4.4
Chromium	0.59	µg/L	1	0.20	0.04		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Cobalt	20.6	µg/L	1	0.020	0.003		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.141	mg/L	1	0.00020	0.00005		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	06/18/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.22	µg/L	1	0.20	0.04		GES	06/10/2021 17:24	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.74	pCi/L	0.12	0.12		TTP	06/28/2021 12:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	91.0	%						
Radium-228	1	pCi/L	0.18	0.55		TTP	06/25/2021 12:25	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	69.9	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID:

Customer Description:

Lab Number: 215119-003

Sampling Point: AD-15

Date Collected: 06/01/2021 10:12

Date Received: 06/08/2021 07:54

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Arsenic	3.04	µg/L	1	0.10	0.03		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Barium	76.9	µg/L	1	0.20	0.05		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Beryllium	0.138	µg/L	1	0.050	0.007		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Boron	0.213	mg/L	1	0.050	0.009		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cadmium	0.015	µg/L	1	0.020	0.004	J1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Calcium	3.0	mg/L	1	0.3	0.1		DAM	06/21/2021 22:16	EPA 200.7-1994, Rev. 4.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cobalt	2.73	µg/L	1	0.020	0.003		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Lithium	0.00330	mg/L	1	0.00020	0.00005		GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Selenium	0.43	µg/L	1	0.50	0.09	J1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/10/2021 17:30	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.91	pCi/L	0.13	0.11		TTP	06/28/2021 12:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.0	%						
Radium-228	0.54	pCi/L	0.14	0.46		TTP	06/25/2021 12:25	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID: Duplicate PBAP

Customer Description:

Lab Number: 215119-004

Sampling Point:

Date Collected: 06/01/2021 10:12

Date Received: 06/08/2021 07:54

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Arsenic	3.00	µg/L	1	0.10	0.03		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Barium	72.2	µg/L	1	0.20	0.05		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Beryllium	0.136	µg/L	1	0.050	0.007		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Boron	0.200	mg/L	1	0.050	0.009		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Calcium	2.9	mg/L	1	0.3	0.1		DAM	06/21/2021 22:20	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cobalt	2.61	µg/L	1	0.020	0.003		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Lithium	0.00318	mg/L	1	0.00020	0.00005		GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Selenium	0.44	µg/L	1	0.50	0.09	J1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/10/2021 17:35	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Customer Sample ID: Equipment Blank PBAP

Customer Description:

Lab Number: 215119-005

Sampling Point:

Date Collected: 06/01/2021 09:40

Date Received: 06/08/2021 07:54

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Barium	0.11	µg/L	1	0.20	0.05	J1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cadmium	0.005	µg/L	1	0.020	0.004	J1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/21/2021 22:24	EPA 200.7-1994, Rev. 4.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cobalt	0.037	µg/L	1	0.020	0.003		GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/18/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/10/2021 17:40	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in black ink that reads "Michael S. Ohlinger". The signature is written in a cursive style and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215119

Customer: Welsh Power Station

Date Reported: 07/06/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welsh</u>				Number of Plastic Containers: <u>10</u>			
Opened By <u>SM</u>				Number of Glass Containers: _____			
Date/Time <u>6-7-21 1p</u>				Number of Mercury Containers: <u>5</u>			
Were all temperatures within 0-6°C? Y / N or <u>(N/A)</u> Initial: <u>SM</u> on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <u>(Y)</u> N Comments _____							
Was Chain of Custody received? <u>(Y)</u> N Comments _____							
Requested turnaround: <u>rotel</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? (Y) N Comments _____

Were samples labeled properly? (Y) N Comments _____

Were correct containers used? (Y) N Comments _____

Was pH checked & Color Coding done? (Y) N or N/A Initial & Date: Mark 6-8-21

pH paper (circle one): MQuant,PN1.09535 0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? (Y) N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? (Y) N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215119 Initial & Date & Time : _____

Logged by SM Comments: partial order waiting on cooler from Fed Ex

Reviewed by MRO

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
Other _____							
Plant/Customer <u>Welsh</u>			Number of Plastic Containers: <u>7</u>				
Opened By <u>SM</u>			Number of Glass Containers: _____				
Date/Time <u>09-21 1:35</u>			Number of Mercury Containers: _____				
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>SM</u> on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>sooner</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? X / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: SM 6-9-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215119 Initial & Date & Time: _____

Logged by SM Comments: Remaining samples arrived, added to original order

Reviewed by MSS

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-1

Customer Description:

Lab Number: 216027-001

Preparation:

Date Collected: 10/20/2021 10:34

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.21	mg/L	2	0.04	0.02		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	2	0.06	0.02		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	72.4	mg/L	2	0.40	0.06		CRJ	10/29/2021 14:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	12	mg/L	1	20	5	J1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	190	mg/L	1	50	20		SDW	10/25/2021 11:28	SM 2540C-2011

Customer Sample ID: AD-5

Customer Description:

Lab Number: 216027-002

Preparation:

Date Collected: 10/20/2021 09:15

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	17.4	mg/L	2	0.04	0.02		CRJ	10/29/2021 16:44	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	10/29/2021 16:44	EPA 300.1 -1997, Rev. 1.0
Sulfate	155	mg/L	10	2.0	0.3		CRJ	10/29/2021 13:45	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	51	mg/L	1	20	5		MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	370	mg/L	1	50	20		SDW	10/25/2021 11:28	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216027-003

Preparation:

Date Collected: 10/20/2021 12:02

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	37.3	mg/L	5	0.10	0.05		CRJ	10/29/2021 17:35	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.16	mg/L	5	0.15	0.05		CRJ	10/29/2021 17:35	EPA 300.1 -1997, Rev. 1.0
Sulfate	1040	mg/L	50	10	2		CRJ	10/29/2021 20:08	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	1710	mg/L	1	50	20		SDW	10/25/2021 11:33	SM 2540C-2011

Customer Sample ID: Duplicate - Background

Customer Description:

Lab Number: 216027-004

Preparation:

Date Collected: 10/20/2021 12:00

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	2.18	mg/L	5	0.10	0.05		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	5	0.15	0.05		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	68.9	mg/L	5	1.0	0.2		CRJ	10/29/2021 17:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	14	mg/L	1	20	5	J1	MGK	11/05/2021 15:55	SM 2320B-2011
TDS, Filterable Residue	200	mg/L	1	50	20		SDW	10/25/2021 11:40	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216027

Customer: Welsh Power Station

Date Reported: 11/18/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

U1 - Not detected at or above method detection limit (MDL).

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Contacts: Michael Ohlinger (614-836-4184)

Project Name: Welsh Background
Contact Name: Jill Parker-Witt
Contact Phone: (318) 673-3816

Sampler(s): Matt Hamilton Kenny McDonald

Sample Identification	Analysis Turnaround Time (in Calendar Days) Routine (28 days)				Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Site Contact	250 mL bottle, pH<2, HNO ₃	Field-filter 500 mL bottle, then pH<2, HNO ₃	1 L bottle, Cool, 0-6°C	Three (six every 10th*) 1 L bottles, pH<2, HNO ₃	40 mL Glass Vial or 125 mL PTFE lined bottle, HCL, pH<2	COC/Order #	For Lab Use Only:		
	B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, Tl		Ra-226, Ra-228															Hg	Sample Specific Notes
	dissolved Fe and Mn		TDS, F, Cl, SO ₄																
AD-1	10/20/2021	1034	G	GW	1														
AD-5	10/20/2021	915	G	GW	1														
AD-17	10/20/2021	1202	G	GW	1														
DUPLICATE - BACKGROUND	10/20/2021	1200	G	GW	1														
<p>Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field</p> <p>* Six 1L Bottles must be collected for Radium for every 10th sample.</p>																			
Special Instructions/QC Requirements & Comments:																			
<p>Relinquished by: <i>[Signature]</i> Date/Time: 10-21-21 12:00 Received by: Date/Time:</p> <p>Relinquished by: <i>Esk</i> Date/Time: Received by: Date/Time:</p> <p>Relinquished by: <i>[Signature]</i> Date/Time: Received in Laboratory by: <i>Michael only</i> Date/Time: 10/22/21 10:50 AM</p>																			

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welch</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>MGH/MSO</u>				Number of Glass Containers: _____			
Date/Time <u>10/22/21 10:50 AM</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>MSO</u> on ice / no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MGH 10/22/21

pH paper (circle one): MQuant PN1 09535 0001.LOT# HC904495 [OR] Lab Rat, PN4801.LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216027 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by mgk _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-1

Customer Description:

Lab Number: 216055-001

Preparation:

Date Collected: 10/20/2021 10:34

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Barium	86.1	µg/L	1	0.20	0.05		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Beryllium	0.932	µg/L	1	0.050	0.007		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Boron	0.732	mg/L	1	0.050	0.009		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Cadmium	0.026	µg/L	1	0.020	0.004		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Calcium	4.8	mg/L	1	0.3	0.1		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Cobalt	2.44	µg/L	1	0.020	0.003		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Lithium	0.00756	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Magnesium	2.69	mg/L	1	0.10	0.02		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Potassium	1	mg/L	1	1.0	0.2		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Selenium	7.39	µg/L	1	0.50	0.09		GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4
Sodium	32.7	mg/L	1	0.5	0.2		DAM	10/28/2021 10:17	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:17	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.55	pCi/L	0.11	0.13	P1	ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.2	%						
Radium-228	0.44	pCi/L	0.14	0.47		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	78.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-5

Customer Description:

Lab Number: 216055-002

Preparation:

Date Collected: 10/20/2021 09:15

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Arsenic	1.44	µg/L	1	0.10	0.03		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Barium	53.2	µg/L	1	0.20	0.05		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Beryllium	0.018	µg/L	1	0.050	0.007	J1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Boron	0.038	mg/L	1	0.050	0.009	J1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Calcium	38.4	mg/L	1	0.3	0.1		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Cobalt	6.85	µg/L	1	0.020	0.003		GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Lithium	0.133	mg/L	1	0.00020	0.00005	M1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Magnesium	13.3	mg/L	1	0.10	0.02		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Potassium	3.2	mg/L	1	1.0	0.2		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4
Sodium	33.2	mg/L	1	0.5	0.2		DAM	10/28/2021 10:46	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:22	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.74	pCi/L	0.12	0.12		ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	1.94	pCi/L	0.22	0.68		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	73.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216055-003

Preparation:

Date Collected: 10/20/2021 12:02

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Arsenic	0.57	µg/L	1	0.10	0.03		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Barium	10.2	µg/L	1	0.20	0.05		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Beryllium	0.035	µg/L	1	0.050	0.007	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Boron	0.104	mg/L	1	0.050	0.009		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Calcium	164	mg/L	1	0.3	0.1		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Cobalt	42.9	µg/L	1	0.020	0.003		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Lithium	0.250	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Magnesium	47.4	mg/L	1	0.10	0.02		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Potassium	7.7	mg/L	1	1.0	0.2		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4
Sodium	29.1	mg/L	1	0.5	0.2		DAM	10/28/2021 10:50	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	10/28/2021 11:38	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.10	0.09		ST	11/15/2021 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.6	%						
Radium-228	1.14	pCi/L	0.19	0.57		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	67.1	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: Duplicate - Background

Customer Description:

Lab Number: 216055-004

Preparation:

Date Collected: 10/20/2021 12:00

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Barium	87.9	µg/L	1	0.20	0.05		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Beryllium	0.935	µg/L	1	0.050	0.007		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Boron	0.725	mg/L	1	0.050	0.009		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Cadmium	0.032	µg/L	1	0.020	0.004		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Calcium	4.9	mg/L	1	0.3	0.1		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Cobalt	2.55	µg/L	1	0.020	0.003		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Lead	0.24	µg/L	1	0.20	0.05		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Lithium	0.00759	mg/L	1	0.00020	0.00005		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Magnesium	2.72	mg/L	1	0.10	0.02		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Mercury	2	ng/L	1	5	2	J1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Selenium	7.99	µg/L	1	0.50	0.09		GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4
Sodium	33.0	mg/L	1	0.5	0.2		DAM	10/28/2021 10:54	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	10/28/2021 11:43	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Customer Sample ID: Equipment Blank - Background

Customer Description:

Lab Number: 216055-005

Preparation:

Date Collected: 10/20/2021 10:42

Date Received: 10/26/2021 13:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Cobalt	0.013	µg/L	1	0.020	0.003	J1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Lithium	0.00009	mg/L	1	0.00020	0.00005	J1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/15/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4
Sodium	<0.2	mg/L	1	0.5	0.2	U1	DAM	10/28/2021 10:58	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	10/28/2021 11:48	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216055

Customer: Welsh Power Station

Date Reported: 11/16/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

U1 - Not detected at or above method detection limit (MDL).

M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welsh</u>			Number of Plastic Containers: <u>17</u>				
Opened By <u>Misgina</u>			Number of Glass Containers: _____				
Date/Time <u>10/26/2021 12:00pm</u>			Number of Mercury Containers: <u>5</u>				
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: <u>MLK</u> on ice / <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: _____ If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MLK 10/26/2021

pH paper (circle one): MQuant.PN1.09535.0001, LOT# HC904495 [OR] Lab Rat, PN4801, LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216055 Initial & Date & Time : _____

Logged by MSG Comments: _____

Reviewed by MLK _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216025

Customer: Welsh Power Station

Date Reported: 11/05/2021

Customer Sample ID: AD-8

Customer Description:

Lab Number: 216025-001

Preparation:

Date Collected: 10/19/2021 11:36

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	13.7	mg/L	2	0.04	0.02		CRJ	10/28/2021 17:08	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.90	mg/L	2	0.06	0.02		CRJ	10/28/2021 17:08	EPA 300.1 -1997, Rev. 1.0
Sulfate	139	mg/L	10	2.0	0.3		CRJ	10/28/2021 16:42	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	300	mg/L	1	50	20		SDW	10/25/2021 11:03	SM 2540C-2011

Customer Sample ID: AD-9

Customer Description:

Lab Number: 216025-002

Preparation:

Date Collected: 10/19/2021 10:17

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	31.8	mg/L	2	0.04	0.02		CRJ	10/28/2021 15:51	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.19	mg/L	2	0.06	0.02		CRJ	10/28/2021 15:51	EPA 300.1 -1997, Rev. 1.0
Sulfate	374	mg/L	25	5.0	0.8		CRJ	10/28/2021 15:26	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	700	mg/L	1	50	20		SDW	10/25/2021 11:03	SM 2540C-2011

Customer Sample ID: AD-15

Customer Description:

Lab Number: 216025-003

Preparation:

Date Collected: 10/19/2021 11:35

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	28.0	mg/L	2	0.04	0.02		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.09	mg/L	2	0.06	0.02		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0
Sulfate	10.3	mg/L	2	0.40	0.06		CRJ	10/28/2021 15:01	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	140	mg/L	1	50	20		SDW	10/25/2021 11:09	SM 2540C-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216025

Customer: Welsh Power Station

Date Reported: 11/05/2021

Customer Sample ID: Duplicate - PBAP

Customer Description:

Lab Number: 216025-004

Preparation:

Date Collected: 10/19/2021 12:00

Date Received: 10/22/2021 10:50

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	40.2	mg/L	25	0.5	0.3		CRJ	10/28/2021 13:45	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	10/28/2021 14:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	522	mg/L	25	5.0	0.8		CRJ	10/28/2021 13:45	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	940	mg/L	1	50	20		SDW	10/25/2021 11:09	SM 2540C-2011

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Welch</u>				Number of Plastic Containers: <u>4</u>			
Opened By <u>MGH/MSO</u>				Number of Glass Containers: _____			
Date/Time <u>10/22/21 10:50 AM</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / N or N/A Initial: <u>MSO</u> on ice / no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____							
Requested turnaround: <u>ROUTINE</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MGH 10/22/21

pH paper (circle one): MQuant,PN1.09535.0001.LOT# HC904495 [OR] Lab Rat,PN4801.LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216025 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by MGH _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-8

Customer Description:

Lab Number: 216058-001

Preparation:

Date Collected: 10/19/2021 11:36

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Barium	23.3	µg/L	1	0.20	0.05		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.01	µg/L	2	0.10	0.01	U1	GES	11/01/2021 11:26	EPA 200.8-1994, Rev. 5.4
Boron	1.10	mg/L	1	0.050	0.009		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Calcium	17.2	mg/L	1	0.3	0.1		DAM	10/29/2021 12:13	EPA 200.7-1994, Rev. 4.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Cobalt	4.13	µg/L	1	0.020	0.003		GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.0690	mg/L	2	0.0004	0.0001		GES	11/01/2021 11:26	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/01/2021 10:04	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.10	0.12		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.7	%						
Radium-228	0.65	pCi/L	0.15	0.47		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	77.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-9

Customer Description:

Lab Number: 216058-002

Preparation:

Date Collected: 10/19/2021 10:17

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Barium	50.3	µg/L	1	0.20	0.05		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Beryllium	1.36	µg/L	2	0.10	0.01		GES	11/01/2021 10:34	EPA 200.8-1994, Rev. 5.4
Boron	0.226	mg/L	1	0.050	0.009		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.315	µg/L	1	0.020	0.004		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Calcium	11.9	mg/L	1	0.3	0.1		DAM	10/29/2021 12:30	EPA 200.7-1994, Rev. 4.4
Chromium	0.68	µg/L	1	0.20	0.04		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Cobalt	20.6	µg/L	1	0.020	0.003		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.184	mg/L	2	0.0004	0.0001	P3	GES	11/01/2021 10:34	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4
Thallium	0.23	µg/L	1	0.20	0.04		GES	11/01/2021 10:14	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.97	pCi/L	0.15	0.14		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	0.77	pCi/L	0.16	0.51		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	75.0	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: AD-15

Customer Description:

Lab Number: 216058-003

Preparation:

Date Collected: 10/19/2021 11:35

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Arsenic	3.72	µg/L	1	0.10	0.03		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Barium	73.1	µg/L	1	0.20	0.05		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Beryllium	0.143	µg/L	1	0.050	0.007		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Boron	0.218	mg/L	1	0.050	0.009		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Calcium	2.7	mg/L	1	0.3	0.1		DAM	10/29/2021 12:34	EPA 200.7-1994, Rev. 4.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Cobalt	2.84	µg/L	1	0.020	0.003		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.00435	mg/L	1	0.00020	0.00005		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Selenium	0.55	µg/L	1	0.50	0.09		GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4
Thallium	0.06	µg/L	1	0.20	0.04	J1	GES	11/01/2021 10:50	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.77	pCi/L	0.12	0.12		ST	11/08/2021 11:14	SW-846 9315-1986, Rev. 0
Carrier Recovery	106	%						
Radium-228	1.25	pCi/L	0.16	0.49		TTP	11/01/2021 15:34	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: DUPLICATE - PBAP

Customer Description:

Lab Number: 216058-004

Preparation:

Date Collected: 10/19/2021 12:00

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Barium	47.9	µg/L	1	0.20	0.05		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Beryllium	1.36	µg/L	2	0.10	0.01		GES	11/01/2021 11:05	EPA 200.8-1994, Rev. 5.4
Boron	0.207	mg/L	1	0.050	0.009		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.289	µg/L	1	0.020	0.004		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Calcium	11.6	mg/L	1	0.3	0.1		DAM	10/29/2021 12:38	EPA 200.7-1994, Rev. 4.4
Chromium	0.72	µg/L	1	0.20	0.04		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Cobalt	19.4	µg/L	1	0.020	0.003		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.187	mg/L	2	0.0004	0.0001		GES	11/01/2021 11:05	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.22	µg/L	1	0.20	0.04		GES	11/01/2021 10:55	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Customer Sample ID: EQUIPMENT BLANK - PBAP

Customer Description:

Lab Number: 216058-005

Preparation:

Date Collected: 10/19/2021 11:15

Date Received: 10/26/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Barium	0.12	µg/L	1	0.20	0.05	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	10/29/2021 12:42	EPA 200.7-1994, Rev. 4.4
Chromium	0.22	µg/L	1	0.20	0.04		GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Cobalt	0.015	µg/L	1	0.020	0.003	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.00016	mg/L	1	0.00020	0.00005	J1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	11/02/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/01/2021 11:00	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 216058

Customer: Welsh Power Station

Date Reported: 11/18/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

U1 - Not detected at or above method detection limit (MDL).

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

P3 - The precision on the matrix spike duplicate (MSD) was above acceptance limits.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input type="radio"/> UPS	<input type="radio"/> FedEx	<input type="radio"/> USPS
				Other _____			
Plant/Customer <u>Welsh</u>			Number of Plastic Containers: <u>17</u>				
Opened By <u>Misquina</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>10/26/2021 12:00pm</u>			Number of Mercury Containers: <u>5</u>				
Were all temperatures within 0-6°C? Y/N or N/A Initial: <u>MIC</u> on ice / <input checked="" type="radio"/> no ice							
1 (IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y N Comments _____

Were samples labeled properly? Y N Comments _____

Were correct containers used? Y N Comments _____

Was pH checked & Color Coding done? Y N or N/A Initial & Date: MIC 10/26/2021

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216058 Initial & Date & Time : _____

Logged by MSJ Comments: _____

Reviewed by MIC _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.