

Annual Groundwater Monitoring Report

Southwestern Electric Power Company

Welsh Power Plant

Landfill

CN 602843245; RN100213370

Registration No: CCR 110

1187 Country Road 4865

Titus County

Pittsburg, Texas

January 2024

Prepared by:

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An **AEP** Company

BOUNDLESS ENERGY™

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Abbreviations:

ASD - Alternate Source Demonstration

CCR – Coal Combustion Residual

GWPS - Groundwater protection standards

LF – Landfill

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 (SWEPCO's), a wholly owned subsidiary of American Electric Power Company (AEP), Welsh Power Plant. The Texas Commission on Environmental Quality's (TCEQ's) CCR rule requires that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31, 2024.

In general, the following activities were completed:

- At the start of the current annual reporting period, the LF was operating under the Assessment monitoring program.
- At the end of the current annual reporting period, the LF was operating under the Assessment monitoring program.
- The LF initiated an assessment monitoring program on April 13, 2018.
- Groundwater samples and elevations were collected for AD-1, AD-5, AD-17, AD-11, AD-13, and AD-14 and analyzed for Appendix III and IV constituents, as specified in 30 TAC §352.951*et seq.* and AEP's *Groundwater Sampling and Analysis Plan (2021)*.
- Data and statistical analysis not available for the previous reporting period indicated that during the 2nd semi-annual 2022 sampling event (October 31 and November 1, 2022):
 - Potential Statistically Significant Increases (SSIs) above background were identified for:
 - Boron at AD-11, AD-13 and AD-14
 - pH at AD-11
 - No potential Statistically significant levels (SSLs) above groundwater protection standards (GWPS) were identified.
- Annual groundwater sampling event was conducted in February 2023;
- First semi-annual groundwater sampling event was conducted in June 2023:
 - Potential SSIs above background were identified for:
 - Boron at AD-11, AD-13, and AD-14
 - pH at AD-11 and AD-13
 - Sulfate at AD-14
 - TDS at AD-14
 - No potential SSLs above GWPS were identified.
- Second semi-annual groundwater sampling event was conducted in October 2023:
 - Potential SSIs above background were identified for:
 - Boron at AD-11, AD-13, and AD-14
 - Fluoride at AD-11

- pH at AD-11 and AD-14
 - Sulfate at AD-14
 - TDS at AD-14
- No potential SSLs above GWPS were identified.

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 LF 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 SSL(s) (Attached as Appendix 2, where applicable);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as Appendix 3, where applicable);
- A summary of any transition between monitoring programs or an alternate monitoring frequency (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 (Attached as Appendix 5, where applicable); and
- Other information required to be included in the annual report such as field sheets, analytical reports, etc. (Appendix 6)

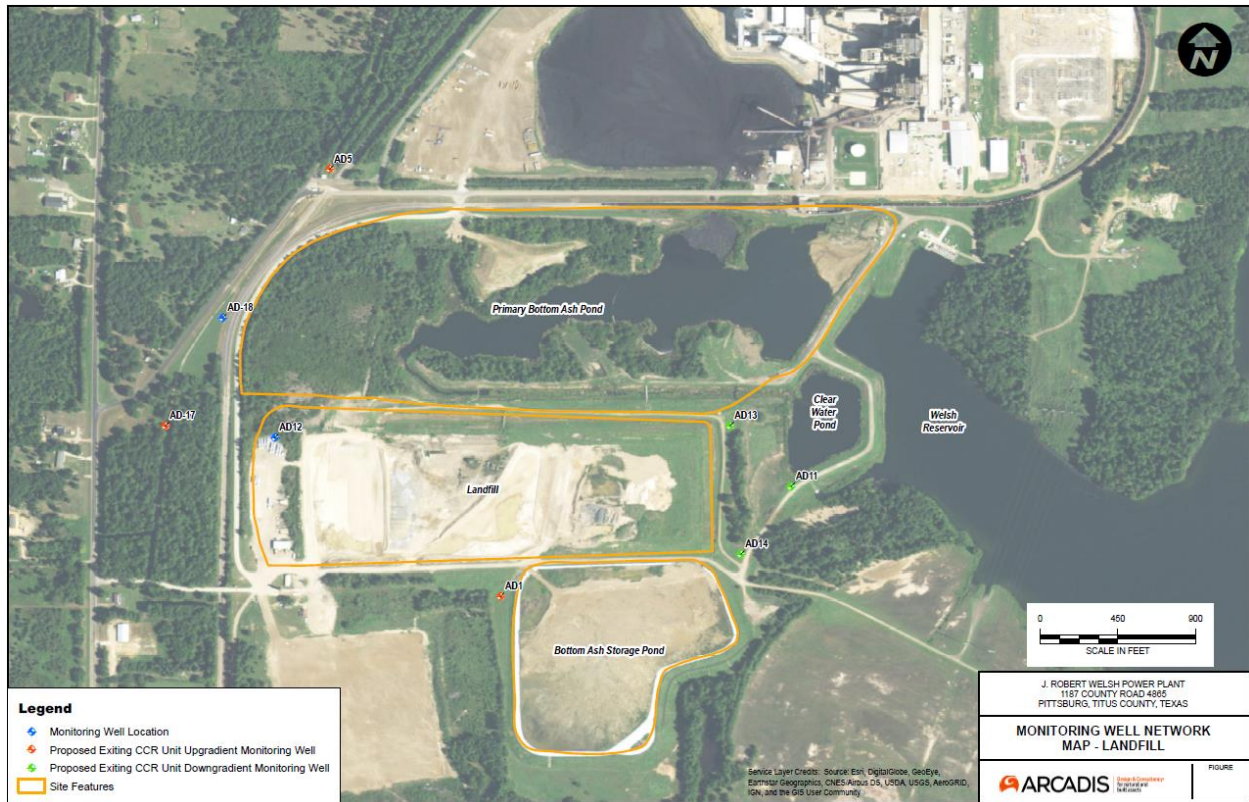
In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

II. Groundwater Monitoring Well Locations and Identification Numbers

The below figure depicts the PE-certified groundwater monitoring network for the Landfill (LF), the monitoring well locations, and their corresponding identification numbers.

LF Monitoring Wells	
Background	Down Gradient
AD-1	AD-11
AD-5	AD-13
AD-17	AD-14

Note: AD-18 is used for gauging purposes



III. Monitoring Wells Installed or Decommissioned

There were no groundwater monitoring wells installed or decommissioned during this reporting period.

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

Groundwater samples and elevations were collected for AD-1, AD-5, AD-17, AD-11, AD-13, and AD-14 and analyzed for Appendix III and IV constituents, as specified in 30 TAC §352.951 *et seq.* and AEP's *Groundwater Sampling and Analysis Plan (2021)*.

Appendix 1 contains potentiometric maps with the static water elevation, groundwater flow direction for each monitoring event, groundwater elevation data summary, tables showing groundwater velocity, and all the groundwater quality data collected to date under 30 TAC 352.

V. Groundwater Quality Data Statistical Analysis

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

- Data and statistical analysis (certified March 19, 2023) not available for the previous reporting period indicated that during the 2nd semi-annual 2022 sampling event (October 31 and November 1, 2022):
 - Potential Statistically Significant Increases (SSIs) above background were identified for:
 - Boron at AD-11, AD-13 and AD-14
 - pH at AD-11
 - No potential SSLs above GWPS were identified.

The annual sampling event for the compliance wells for the Appendix III and IV constituents was conducted February 6, 2023 and satisfies the requirement of 30 TAC 352.951.

The 1st semi-annual groundwater sampling event was conducted June 5-6, 2023 and certified October 3, 2023:

- Potential SSIs above background were identified for:
 - Boron at AD-11, AD-13, and AD-14
 - pH at AD-11 and AD-13
 - Sulfate at AD-14
 - TDS at AD-14
- No potential SSLs above GWPS were identified.

The 2nd semi-annual groundwater sampling event was conducted October 3-4, 2023 and certified January 24, 2024:

- Potential SSIs above background were identified for:
 - Boron at AD-11, AD-13, and AD-14
 - Fluoride at AD-11
 - pH at AD-11 and AD-14
 - Sulfate at AD-14
 - TDS at AD-14

- No potential SSLs above GWPS were identified.

VI. Alternate Source Demonstrations completed

No ASDs were conducted for this reporting period.

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 for statistical analysis.

VIII. Other Information Required

Field sheets and laboratory reports are in Appendix 6.

Appendix 2 contains a memorandum that explains the reissuance of select analytical laboratory reports to correct laboratory equipment data quality assurance/quality control issues.

IX. Description of Any Problems Encountered and Actions Taken

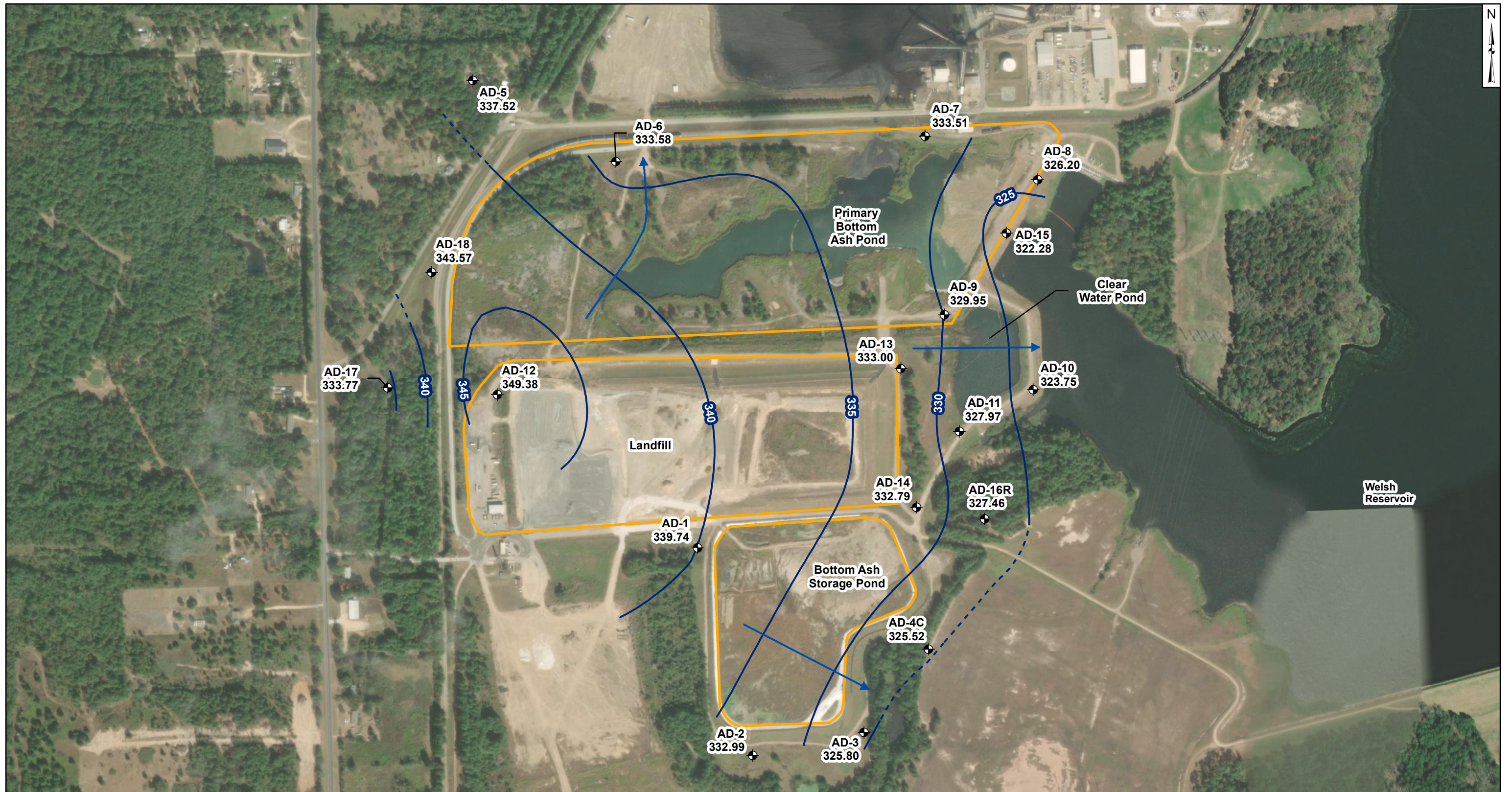
No significant problems were encountered.

X. A Projection of Key Activities for the Upcoming Year

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

APPENDIX 1

Potentiometric maps and Tables that follow show 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**
1. Monitoring well coordinates and water level data (collected on February 6 and 7, 2023) provided by AEP.
 2. Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2022).
 3. Groundwater elevation units are feet above mean sea level.
 4. Satellite imagery provided by ESRI.



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 November 30, 2023
 Geosyntec Consultants, Inc.
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**Groundwater Potentiometric Map
 February 2023**

AEP Welsh Power Plant
 Cason, Texas

Geosyntec
 consultants

Figure

1

Columbus, Ohio

2023/11/30



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

- Notes**
1. Monitoring well coordinates and water level data (collected on June 6, 2023) provided by AEP.
 2. AD-12 was not gauged during the June 2023 event.
 3. Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2022).
 4. Groundwater elevation units are feet above mean sea level.
 5. Satellite imagery provided by ESRI.

500 250 0 500 Feet

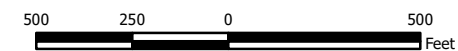
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Groundwater Potentiometric Map June 2023		Figure 2
AEP Welsh Power Plant Cason, Texas		
Geosyntec consultants		
Columbus, Ohio	2023/11/30	



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

- Notes**
1. Monitoring well coordinates and water level data (collected on October 3 and 4, 2023) provided by AEP.
 2. Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2022).
 3. Groundwater elevation units are feet above mean sea level.
 4. Satellite imagery provided by ESRI.



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**Groundwater Potentiometric Map
 October 2023**

AEP Welsh Power Plant
 Cason, Texas

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 consultants

Columbus, Ohio

2023/11/30

Figure

3

**Table 1. Groundwater Elevation Data Summary
Welsh Power Plant**

Unit	All Units			Bottom Ash Storage Pond			Primary Bottom Ash Pond			Landfill		
Gradient	Background			Downgradient			Downgradient			Downgradient		
Well	AD-1	AD-5	AD-17	AD-3	AD-4C	AD-16R*	AD-8	AD-9	AD-15	AD-11	AD-13	AD-14
Mar-2016	342.83	338.04	334.64	325.12	326.19	337.09	325.70	329.74	322.14	328.13	334.76	334.83
May-2016	344.89	337.62	334.26	312.97	325.89	335.84	325.68	329.28	321.93	328.39	334.54	334.51
Jul-2016	342.89	337.24	334.30	323.70	324.01	332.14	325.05	329.53	321.28	328.14	332.93	331.71
Sep-2016	341.42	337.51	334.45	323.63	324.00	326.52	325.49	329.11	321.42	327.99	332.65	331.17
Oct-2016	341.23	337.74	334.64	323.47	323.76	331.43	325.29	328.92	321.71	327.87	332.39	330.94
Dec-2016	340.58	337.01	334.05	323.78	325.07	330.96	325.92	329.31	321.64	328.20	332.84	330.79
Jan-2017	341.18	338.34	333.94	325.04	326.39	330.71	326.76	330.50	322.81	328.90	334.54	332.63
Feb-2017	339.74	336.17	333.94	324.92	324.89	--	324.27	328.05	321.93	328.25	331.83	330.87
May-2018	340.31	335.56	332.85	321.79	324.54	328.72	325.72	329.32	320.26	326.36	330.38	330.57
Aug-2018	339.16	336.37	333.95	323.02	323.43	326.91	325.84	329.58	321.57	327.67	331.01	329.38
Nov-2018	--	--	--	325.51	326.24	327.20	--	--	--	--	--	--
Feb-2019	341.95	338.15	334.86	325.97	326.50	331.39	326.37	330.03	322.60	328.80	333.60	334.25
Apr-2019	--	--	--	325.37	326.28	335.76	326.20	330.00	--	328.16	333.29	334.59
May-2019	345.68	337.54	335.13	325.65	326.15	339.02	326.09	329.83	322.03	328.08	333.46	334.77
Jul-2019	343.95	336.89	334.94	324.72	324.73	332.17	325.80	329.57	321.43	327.97	332.23	331.85
Feb-2020	341.88	338.56	334.94	--	--	--	326.04	329.58	322.12	328.10	333.38	333.44
May-2020	344.09	337.79	335.10	325.38	326.20	330.42	326.32	329.75	322.17	328.33	333.29	333.97
Oct-2020	340.56	337.35	334.69	323.57	324.19	327.67	325.36	328.60	321.12	327.49	330.97	330.04
Dec-2020	340.04	337.61	334.63	323.51	325.17	327.12	--	--	--	--	--	--
Feb-2021	341.68	338.16	334.72	--	--	--	326.38	329.55	322.20	328.46	333.35	333.73
Jun-2021	345.82	337.15	334.93	326.36	326.87	330.59	326.77	329.92	322.45	328.70	334.69	335.88
Jul-2021	--	--	--	--	325.45	--	--	--	--	--	--	--
Oct-2021	340.54	336.75	334.53	322.86	323.58	327.58	325.23	328.51	320.33	327.08	330.94	329.73
Mar-2022	339.58	337.12	333.92	323.80	325.62	326.17	DRY	DRY	DRY	DRY	DRY	DRY
Jun-2022	338.86	335.94	333.48	323.11	323.46	326.44	324.65	328.45	320.27	327.03	330.56	329.18
Aug-2022	339.01	336.02	333.48	322.80	324.21	325.87	--	--	--	--	--	--
Oct-2022	--	--	--	--	--	--	324.90	328.75	321.19	327.16	330.50	329.17
Nov-2022	338.17	336.41	333.31	323.12	324.46	325.74	--	--	--	--	--	--
Feb-2023	--	--	--	325.80	325.52	327.52	326.20	329.95	322.28	327.97	333.00	332.79
Jun-2023	339.19	336.58	333.87	324.06	324.44	327.57	325.51	328.86	321.42	327.60	330.98	330.04
Jul-2023	--	--	--	--	324.76	--	--	--	--	--	--	--
Oct-2023	338.51	336.62	333.95	322.97	323.28	326.78	325.44	328.98	320.82	327.03	330.46	329.12
Dec-2023	--	--	--	323.85	325.01	326.04	--	--	--	--	--	--

Notes:

1. Groundwater elevation measured in feet above mean sea level.

*AD-16 prior to February 2017.

**Table 1: Residence Time Calculation Summary
Welsh Landfill**

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2023-02		2023-06		2023-10	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Landfill	AD-1 ^[1]	2.0	2.6	23.2	3.1	19.8	2.0	31.0
	AD-5 ^[1]	2.0	2.5	24.6	4.4	13.8	1.2	52.7
	AD-11 ^[2]	2.0	4.8	12.8	3.3	18.4	2.2	27.5
	AD-13 ^[2]	2.0	4.4	13.8	3.2	19.2	2.7	22.5
	AD-14 ^[2]	2.0	4.9	12.4	2.1	29.1	1.8	34.4
	AD-17 ^[1]	2.0	8.6	7.1	3.7	16.6	7.6	8.0

Notes:

[1] - Upgradient Well

[2] - Downgradient Well

**Table 1. Groundwater Data Summary: AD-1
Welsh - LF
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
6/28/2022	Assessment	0.768	6.76	2.32	0.22	4.9	74.7	180
11/1/2022	Assessment	0.586	7.87	2.70	0.14	4.8	61.3	170
6/6/2023	Assessment	0.729	6.59	3.03	0.24	4.9	91.1	210
10/4/2023	Assessment	0.901	6.56	3.03	0.2	5.3	80.7	200

Table 1. Groundwater Data Summary: AD-1

Welsh - LF

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
6/28/2022	Assessment	0.03 J1	0.26	85.4	0.995	0.030	0.37	2.34	3.69	0.22	0.33	0.00855	0.002 J1	< 0.1 U1	8.35	0.05 J1
11/1/2022	Assessment	0.03 J1	0.19	78.9	0.620	0.024	0.35	1.17	2.01	0.14	0.13 J1	0.00818	0.002 J1	< 0.1 U1	5.51	< 0.04 U1
6/6/2023	Assessment	0.041 J1	0.21	83.4	1.11	0.034	0.35	2.67	0.95	0.24	0.37	0.00805	0.002 J1	< 0.1 U1	10.1	0.04 J1
10/4/2023	Assessment	0.029 J1	0.19	80.0	1.06	0.027	0.38	2.25	1.86	0.2	0.44	0.0103	0.002 J1	< 0.1 U1	9.26	0.05 J1

**Table 1. Groundwater Data Summary: AD-5
Welsh - LF
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
6/28/2022	Assessment	0.048 J1	32.9	15.3	0.15	5.9	146	310
11/1/2022	Assessment	0.041 J1	38.6	16.9	0.16	5.9	185	380
6/6/2023	Assessment	0.030 J1	26.5	16.1	0.15	5.8	114	280
10/4/2023	Assessment	0.042 J1	35.2	17.5	0.17	6.6	132	290

Table 1. Groundwater Data Summary: AD-5

Welsh - LF

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	< 0.01 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
6/28/2022	Assessment	< 0.02 U1	3.01	51.8	0.032 J1	< 0.004 U1	0.22	12.8	2.06	0.15	< 0.05 U1	0.161	< 0.002 U1	0.1 J1	< 0.09 U1	0.05 J1
11/1/2022	Assessment	< 0.02 U1	2.77	63.2	0.046 J1	< 0.004 U1	0.43	15.1	3.88	0.16	< 0.05 U1	0.174	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1
6/6/2023	Assessment	0.010 J1	4.30	45.5	0.055	< 0.004 U1	0.24 J1	9.47	1.72	0.15	< 0.05 U1	0.106	< 0.002 U1	< 0.1 U1	0.06 J1	< 0.02 U1
10/4/2023	Assessment	< 0.008 U1	2.94	63.9	0.049 J1	< 0.004 U1	0.30	12.8	3.57	0.17	< 0.05 U1	0.143	< 0.002 U1	< 0.1 U1	0.05 J1	< 0.02 U1

Table 1. Groundwater Data Summary: AD-11

Geosyntec Consultants, Inc.

Welsh - LF

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	2.47	8.47	9	2	5.2	518	388
7/28/2016	Background	2.83	8.88	10	2	3.8	596	1,000
9/29/2016	Background	3.4	10.7	12	2	4.1	683	1,065
10/19/2016	Background	3.77	8.78	11	3	3.7	706	1,024
12/12/2016	Background	3.36	8.98	10	2	3.8	548	1,044
1/17/2017	Background	2.81	10.3	11	2	4.4	760	1,048
2/22/2017	Background	2.88	9.31	10	2	4.3	558	876
6/6/2017	Background	2.79	9.93	10	1.366	3.9	556	960
10/5/2017	Detection	2.58	6.99	10	< 0.083 U1	4.4	527	752
1/18/2018	Detection	1.9	--	--	--	4.5	377	564
5/23/2018	Assessment	--	--	--	< 0.083 U1	4.1	--	--
8/15/2018	Assessment	--	--	--	< 0.083 U1	4.7	--	--
9/17/2018	Assessment	1.84	6.61	15	--	--	410	720
2/5/2019	Assessment	1.47	4.56	9.47	0.47	4.3	225	--
2/21/2019	Assessment	1.63	19.1	9.23	0.41	4.9	306	542
4/30/2019	Assessment	1.34	7.53	--	--	5.3	--	--
5/29/2019	Assessment	1.40	5.78	6.96	0.47	4.2	367	680
7/23/2019	Assessment	1.56	7.19	6	0.338 J1	4.5	342	700
2/17/2020	Assessment	1.47	20.5	8.19	0.42	4.9	350	622
5/19/2020	Assessment	1.54	24.3	6.83	0.51	6.3	419	720
7/22/2020	Assessment	1.81	9.45	--	--	4.0	--	--
10/12/2020	Assessment	1.69	8.57	8.16	0.63	3.9	604	764
2/23/2021	Assessment	1.15	23.3	--	0.52	6.3	--	--
6/1/2021	Assessment	1.64	22.0	6.52	0.62	5.7	485	790
10/19/2021	Assessment	1.95	8.1	9.73	0.66	3.6	488	800
3/1/2022	Assessment	1.67	10.2	11.5	1.19	3.6	594	900
6/27/2022	Assessment	1.44	10.5	11.0	0.74	3.8	502	800
10/31/2022	Assessment	1.24	4.63	10.6	0.29	3.9	269	450
2/6/2023	Assessment	1.21	15.8	9.63	0.69	5.0	368	620
6/5/2023	Assessment	0.969	7.50	10.8	0.51	4.0	413	670
10/3/2023	Assessment	1.41	10.5	10.6	0.69	4.1	490	750

Table 1. Groundwater Data Summary: AD-11

Welsh - LF

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	14	4	0.325877 J1	3	26	1.773	2	< 0.68 U1	0.032	0.02258 J1	< 0.29 U1	1.54658 J1	< 0.86 U1
7/28/2016	Background	< 0.93 U1	< 1.05 U1	12	4	0.453906 J1	0.581828 J1	26	2.23	2	< 0.68 U1	0.047	0.00624 J1	< 0.29 U1	1.63477 J1	1.31673 J1
9/29/2016	Background	< 0.93 U1	1.77308 J1	52	5	0.579196 J1	7	30	3.92	2	4.25302 J1	0.047	0.01924 J1	< 0.29 U1	2.09096 J1	1.07034 J1
10/19/2016	Background	< 0.93 U1	< 1.05 U1	20	5	0.515668 J1	2	27	2.56	3	< 0.68 U1	0.047	0.0156 J1	1.51918 J1	< 0.99 U1	< 0.86 U1
12/12/2016	Background	< 0.93 U1	< 1.05 U1	13	4	0.366319 J1	0.365212 J1	25	1.569	2	< 0.68 U1	0.041	0.01212 J1	< 0.29 U1	1.57203 J1	< 0.86 U1
1/17/2017	Background	< 0.93 U1	< 1.05 U1	13	4	0.394925 J1	0.749253 J1	25	1.082	2	< 0.68 U1	0.046	< 0.005 U1	< 0.29 U1	< 0.99 U1	1.23139 J1
2/22/2017	Background	< 0.93 U1	< 1.05 U1	19	4	0.430668 J1	2	24	1.45	2	1.18289 J1	0.035	0.01613 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	< 0.93 U1	1.23 J1	10.12	2.79	0.41 J1	0.32 J1	22.16	1.902	1.366	< 0.68 U1	0.03654	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
5/23/2018	Assessment	< 0.93 U1	2.6 J1	16.27	0.89 J1	0.18 J1	0.8 J1	8.63	1.912	< 0.083 U1	< 0.68 U1	0.01875	0.007 J1	< 0.29 U1	1.34 J1	46
8/15/2018	Assessment	0.02 J1	1.05	11.9	1.18	0.37	0.257	15.3	2.568	< 0.083 U1	1.42	0.0175	< 0.005 U1	0.05 J1	2.4	0.200
2/21/2019	Assessment	0.03 J1	0.51	40.3	0.824	0.19	0.259	8.58	1.506	0.41	0.523	0.0157	< 0.005 U1	< 0.4 U1	1.5	0.1 J1
5/29/2019	Assessment	< 0.02 U1	0.78	19.1	1.05	0.20	0.369	9.82	1.473	0.47	0.847	0.02 J1	< 0.005 U1	< 0.4 U1	2.2	0.1 J1
7/23/2019	Assessment	< 0.02 U1	0.59	16.4	0.987	0.24	0.413	10.5	2.246	0.338 J1	0.976	0.0153	< 0.005 U1	< 0.4 U1	1.0	0.2 J1
2/17/2020	Assessment	0.03 J1	0.39	57.9	0.431	0.21	0.334	8.41	2.106	0.42	0.493	0.0142	0.007	2 J1	0.8	0.1 J1
5/19/2020	Assessment	0.04 J1	0.55	35.7	0.782	0.26	0.254	11.4	2.352	0.51	0.427	0.0138	0.006	< 0.4 U1	1.4	0.1 J1
10/12/2020	Assessment	0.02 J1	0.64	14.1	1.52	0.31	0.306	14.0	2.651	0.63	1.25	0.0246	0.006	< 0.4 U1	1.8	0.2 J1
2/23/2021	Assessment	0.04 J1	0.47	38.2	0.515	0.18	0.276	8.63	1.298	0.52	0.435	0.0102	0.011	< 0.4 U1	1.0	0.1 J1
6/1/2021	Assessment	0.03 J1	0.50	36.3	0.896	0.325	0.39	13.8	5.93	0.62	0.69	0.0145	0.007	0.2 J1	1.31	0.14 J1
10/19/2021	Assessment	0.02 J1	0.64	12.3	1.31	0.320	0.62	15.2	2.15	0.66	1.37	0.0211	0.007	< 0.1 U1	2.12	0.18 J1
3/1/2022	Assessment	< 0.02 U1	0.84	10.5	2.56	0.426	0.66	21.3	4.90	1.19	1.48	0.0254	0.010 Q1	< 0.1 U1	1.89	0.20
6/27/2022	Assessment	< 0.02 U1	0.71	9.25	1.39 M1	0.366	0.71	17.6	1.74	0.74	1.18	0.0230	0.006	< 0.1 U1	1.93	0.18 J1
10/31/2022	Assessment	< 0.02 U1	0.30	15.9	0.83	0.164	0.45	7.58	2.37	0.29	0.68	0.0244	0.004 J1	< 0.1 U1	0.55	0.13 J1
2/6/2023	Assessment	0.02 J1	0.56	28.6	1.25	0.282	0.38	12.9	4.05	0.69	0.88	0.0213	0.007	0.1 J1	1.36	0.16 J1
6/5/2023	Assessment	0.020 J1	0.66	11.2	1.02	0.244	0.57	12.1	3.69	0.51	0.94	0.0185	0.012	< 0.1 U1	1.58	0.14 J1
10/3/2023	Assessment	0.015 J1	0.85	12.8	1.44 M1	0.385	0.57	16.9	2.9	0.69	1.48	0.0283 M1	0.006	< 0.1 U1	2.36	0.20

Table 1. Groundwater Data Summary: AD-13

Geosyntec Consultants, Inc.

Welsh - LF

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	1.19	8.02	12	0.4948 J1	6.1	177	900
7/27/2016	Background	1.23	3.7	15	0.7416 J1	4.5	187	404
9/29/2016	Background	1.37	2.7	17	0.6464 J1	4.6	207	431
10/19/2016	Background	1.67	3.66	19	1.1263	4.3	226	482
12/13/2016	Background	1.96	3.77	18	0.4149 J1	4.8	287	596
1/19/2017	Background	0.402	33.5	7	< 0.083 U1	5.4	90	222
2/23/2017	Background	1.27	10.3	13	< 0.083 U1	5.1	183	392
6/6/2017	Background	1.68	3.03	15	0.6679 J1	4.2	244	494
10/6/2017	Detection	2.23	5.11	13	< 0.083 U1	4.6	345	564
1/18/2018	Detection	2.13	--	--	--	4.7	383	588
5/23/2018	Assessment	--	--	--	0.6534 J1	4.5	--	--
8/14/2018	Assessment	--	--	--	0.7442 J1	4.8	--	--
9/17/2018	Assessment	1.49	10.1	18	--	--	316	620
2/5/2019	Assessment	0.656	5.85	5.43	0.39	4.5	130	--
2/20/2019	Assessment	0.484	17.7	3.95	0.28	4.9	96.3	234
4/30/2019	Assessment	0.483	--	--	--	4.9	--	--
5/30/2019	Assessment	0.477	9.88	3.60	0.53	5.2	94.0	196
7/23/2019	Assessment	0.780	6.16	5	0.169 J1	4.8	146	334
2/17/2020	Assessment	0.929	17.6	7.79	0.69	4.9	236	442
5/19/2020	Assessment	0.936	19.2	8.38	0.44	5.5	193	390
7/22/2020	Assessment	1.44	--	--	--	4.8	--	--
10/12/2020	Assessment	1.52	8.03	18.1	0.33	4.5	278	522
2/23/2021	Assessment	0.581	46.4	--	0.27	5.9	--	--
6/1/2021	Assessment	0.831	41.3	3.70	0.43	6.1	94.6	280
10/19/2021	Assessment	1.36	5.5	10.9	0.19	4.3	201	400
3/1/2022	Assessment	1.36	4.98	11.0	0.17	4.1	221	390
6/27/2022	Assessment	1.33	6.57	10.3	0.18	4.5	226	420
10/31/2022	Assessment	1.02	9.01	11.9	0.18	4.9	207	410
2/6/2023	Assessment	1.02	16.5 M1	4.85	0.39	5.5	138	280
6/5/2023	Assessment	1.22	4.24	8.39	0.11	4.6	184	350
10/3/2023	Assessment	0.961	6.73	10.9	0.15	5.3	181	360

Table 1. Groundwater Data Summary: AD-13

Welsh - LF

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	62	0.682114 J1	< 0.07 U1	0.690428 J1	4.11633 J1	1.223	0.4948 J1	< 0.68 U1	0.011	0.01797 J1	< 0.29 U1	1.4772 J1	< 0.86 U1
7/27/2016	Background	< 0.93 U1	< 1.05 U1	36	0.922975 J1	0.0850015 J1	< 0.23 U1	4.46011 J1	1.601	0.7416 J1	< 0.68 U1	0.026	0.00515 J1	< 0.29 U1	2.00998 J1	< 0.86 U1
9/29/2016	Background	< 0.93 U1	< 1.05 U1	40	0.827513 J1	0.0965393 J1	0.77177 J1	4.59287 J1	2.213	0.6464 J1	< 0.68 U1	0.02	< 0.005 U1	< 0.29 U1	1.03137 J1	< 0.86 U1
10/19/2016	Background	< 0.93 U1	< 1.05 U1	30	0.934335 J1	0.0913657 J1	0.581648 J1	4.91926 J1	3.662	1.1263	< 0.68 U1	0.022	< 0.005 U1	0.870491 J1	1.03637 J1	0.97358 J1
12/13/2016	Background	< 0.93 U1	3.69546 J1	51	1	0.185393 J1	7	7	2.27	0.4149 J1	1.09698 J1	0.025	0.01565 J1	0.353324 J1	1.64297 J1	< 0.86 U1
1/19/2017	Background	< 0.93 U1	6	112	0.198035 J1	< 0.07 U1	4	1.76949 J1	2.228	< 0.083 U1	2.72659 J1	0.004	0.00673 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/23/2017	Background	< 0.93 U1	< 1.05 U1	41	0.612394 J1	< 0.07 U1	< 0.23 U1	4.55541 J1	1.556	< 0.083 U1	< 0.68 U1	0.015	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	1.53 J1	< 1.05 U1	17.12	0.89 J1	0.14 J1	< 0.23 U1	6.24	1.565	0.6679 J1	< 0.68 U1	0.02082	< 0.005 U1	< 0.29 U1	1.03 J1	< 0.86 U1
5/23/2018	Assessment	< 0.93 U1	< 1.05 U1	26.53	0.87 J1	< 0.07 U1	0.73 J1	9.37	2.16	0.6534 J1	< 0.68 U1	0.0291	0.008 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/14/2018	Assessment	0.03 J1	1.37	16.9	0.971	0.31	0.503	13.1	4.073	0.7442 J1	1.00	0.0321	< 0.005 U1	0.06 J1	1.7	0.277
2/20/2019	Assessment	0.02 J1	0.38	55.2	0.302	0.05	0.2 J1	2.35	2.534	0.28	0.05 J1	0.0094	< 0.005 U1	< 0.4 U1	0.4	< 0.1 U1
5/30/2019	Assessment	0.03 J1	0.32	60.9	0.385	0.07	0.310	3.15	3.15	0.53	0.05 J1	0.009 J1	< 0.005 U1	< 0.4 U1	0.4	< 0.1 U1
7/23/2019	Assessment	0.02 J1	0.37	23.6	0.443	0.09	0.283	3.82	1.748	0.169 J1	0.204	0.0175	< 0.005 U1	< 0.4 U1	0.3	0.1 J1
2/17/2020	Assessment	0.03 J1	0.59	59.4	0.528	0.12	0.354	3.84	3.79	0.69	0.1 J1	0.0132	0.012	0.5 J1	1.1	< 0.1 U1
5/19/2020	Assessment	0.05 J1	0.53	50.3	0.533	0.09	0.261	3.87	1.977	0.44	0.06 J1	0.0147	0.034	1 J1	1.3	< 0.1 U1
10/12/2020	Assessment	< 0.02 U1	0.55	18.5	0.834	0.17	0.410	8.50	1.546	0.33	0.324	0.0480	< 0.002 U1	< 0.4 U1	0.5	0.2 J1
2/23/2021	Assessment	0.06 J1	0.67	115	0.04 J1	0.03 J1	0.243	0.717	2.264	0.27	0.1 J1	0.00302	0.002 J1	2.34	0.5	< 0.1 U1
6/1/2021	Assessment	0.09 J1	0.73	116	0.103	0.032	0.41	0.971	2.27	0.43	0.06 J1	0.00211	0.003 J1	2.6	1.04	< 0.04 U1
10/19/2021	Assessment	< 0.02 U1	0.34	14.6	0.505	0.146	0.34	6.75	1.22	0.19	0.36	0.0330	0.002 J1	< 0.1 U1	0.37 J1	0.19 J1
3/1/2022	Assessment	< 0.02 U1	0.22	12.9	0.67	0.148	0.32	6.57	3.87	0.17	0.30	0.0305	0.003 Q1, J1	< 0.1 U1	0.32 J1	0.16 J1
6/27/2022	Assessment	< 0.02 U1	0.52	15.0	0.641	0.177	0.52	8.44	1.39	0.18	0.54	0.0378	0.002 J1	0.2 J1	0.60	0.22
10/31/2022	Assessment	< 0.02 U1	0.91	24.8	0.66	0.169	0.64	7.70	3.52	0.18	0.51	0.0667	< 0.002 U1	0.2 J1	0.39 J1	0.17 J1
2/6/2023	Assessment	0.03 J1	0.37	70.8	0.182	0.079	0.41	2.87	3.55	0.39	0.08 J1	0.0147	0.002 J1	0.2 J1	0.39 J1	0.07 J1
6/5/2023	Assessment	0.016 J1	0.37	11.9	0.403	0.115	0.48	5.09	1.64	0.11	0.35	0.0232	0.004 J1	< 0.1 U1	0.49 J1	0.14 J1
10/3/2023	Assessment	0.016 J1	0.86	19.7	0.566	0.150	0.57	6.56	2.42	0.15	0.56	0.0477	< 0.002 U1	0.2 J1	0.42 J1	0.16 J1

Table 1. Groundwater Data Summary: AD-14

Geosyntec Consultants, Inc.

Welsh - LF

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	1.28	2.88	4	< 0.083 U1	4.8	115	285
7/28/2016	Background	1.14	2.51	5	< 0.083 U1	4.2	111	267
9/22/2016	Background	1.14	1.19	5	< 0.083 U1	4.2	111	252
10/19/2016	Background	1.25	2.48	4	< 0.083 U1	3.9	118	276
12/12/2016	Background	1.25	2.41	5	< 0.083 U1	4.1	101	296
1/17/2017	Background	0.915	10.3	4	< 0.083 U1	6.1	92	254
2/22/2017	Background	1.06	9.48	4	< 0.083 U1	5.4	90	212
6/6/2017	Background	1.26	7.69	6	< 0.083 U1	4.8	108	256
10/6/2017	Detection	1.63	3.55	10	< 0.083 U1	4.6	143	288
1/18/2018	Detection	1.57	--	6.43	--	5.7	--	--
5/23/2018	Assessment	--	--	--	< 0.083 U1	4.2	--	--
8/14/2018	Assessment	--	--	--	< 0.083 U1	4.3	--	--
9/17/2018	Assessment	1.51	4.51	12	--	--	204	384
2/5/2019	Assessment	1.10	4.13	3.13	0.15	4.3	99.9	--
2/20/2019	Assessment	1.2	10.3	2.2	0.14	4.3	90.4	236
4/30/2019	Assessment	1.04	--	--	--	4.4	--	--
5/29/2019	Assessment	1.21	9.80	3.65	0.19	4.5	122	274
7/23/2019	Assessment	1.25	9.93	8	0.162 J1	5.5	171	440
2/17/2020	Assessment	1.12	38.7	2.00	0.24	5.2	85.6	294
5/19/2020	Assessment	1.22	15.1	1.46	0.15	5.4	88.5	263
7/22/2020	Assessment	1.24	17.3	--	--	5.2	--	--
10/12/2020	Assessment	1.14	9.63	8.59	0.24	4.3	246	469
2/23/2021	Assessment	1.09	13.1	--	0.20	5.3	--	--
6/1/2021	Assessment	1.33	29.5	1.10	0.20	5.9	91.8	280
10/19/2021	Assessment	1.05	8.2	8.22	0.23	4.0	223	430
3/1/2022	Assessment	1.08	8.58	9.34	0.28	4.3	241	440
6/27/2022	Assessment	1.27	10.4	9.93	0.31	4.0	269	600 P1
10/31/2022	Assessment	1.32	17.6	3.72	0.20	5.7	133	280
2/6/2023	Assessment	1.06	9.63	1.77	0.15	4.8	89.6	230
6/5/2023	Assessment	1.26	10.8	11.5	0.50	5.3	367	610
10/3/2023	Assessment	1.57	12.9	11.4	0.46	4.6	404	670

Table 1. Groundwater Data Summary: AD-14

Welsh - LF

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	1.89384 J1	31	0.65845 J1	0.99504 J1	0.536293 J1	10	0.871	< 0.083 U1	< 0.68 U1	0.012	0.03	< 0.29 U1	2.91711 J1	< 0.86 U1
7/28/2016	Background	< 0.93 U1	< 1.05 U1	84	0.653837 J1	0.976466 J1	1	9	1.487	< 0.083 U1	< 0.68 U1	0.024	0.02159 J1	< 0.29 U1	1.93417 J1	< 0.86 U1
9/22/2016	Background	< 0.93 U1	1.45308 J1	30	0.473938 J1	0.975306 J1	0.775009 J1	9	4.817	< 0.083 U1	< 0.68 U1	0.015	0.02217 J1	< 0.29 U1	2.73939 J1	< 0.86 U1
10/19/2016	Background	< 0.93 U1	< 1.05 U1	39	0.543258 J1	1	0.640984 J1	9	1.972	< 0.083 U1	< 0.68 U1	0.014	0.02024 J1	0.49697 J1	2.46916 J1	< 0.86 U1
12/12/2016	Background	< 0.93 U1	< 1.05 U1	47	0.536415 J1	1	1	9	1.271	< 0.083 U1	< 0.68 U1	0.013	0.037	< 0.29 U1	3.32013 J1	< 0.86 U1
1/17/2017	Background	< 0.93 U1	< 1.05 U1	38	0.215525 J1	0.226476 J1	0.700394 J1	2.91252 J1	1.825	< 0.083 U1	< 0.68 U1	0.013	0.01863 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/22/2017	Background	< 0.93 U1	< 1.05 U1	42	0.286071 J1	0.187588 J1	< 0.23 U1	3.50056 J1	0.512	< 0.083 U1	< 0.68 U1	0.012	0.01443 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
6/6/2017	Background	< 0.93 U1	< 1.05 U1	44.83	0.38 J1	0.67 J1	1.27	6.78	1.138	< 0.083 U1	< 0.68 U1	0.0127	0.021 J1	< 0.29 U1	2.61 J1	< 0.86 U1
5/23/2018	Assessment	< 0.93 U1	< 1.05 U1	28.17	0.78 J1	1.61	< 0.23 U1	14.34	1.601	< 0.083 U1	< 0.68 U1	0.0152	0.145	< 0.29 U1	3.62 J1	< 0.86 U1
8/14/2018	Assessment	0.01 J1	0.39	24.0	0.854	1.99	0.276	17.6	1.502	< 0.083 U1	0.174	0.0110	0.181	0.03 J1	3.7	0.242
2/20/2019	Assessment	0.03 J1	0.34	41.2	0.387	0.35	0.247	4.37	1.172	0.14	0.09 J1	0.0114	< 0.005 U1	< 0.4 U1	0.8	< 0.1 U1
5/29/2019	Assessment	0.03 J1	0.40	44.8	0.556	0.81	0.2 J1	7.82	1.946	0.19	0.137	0.02 J1	0.181	< 0.4 U1	2.0	< 0.1 U1
7/23/2019	Assessment	< 0.02 U1	0.43	36.2	0.934	2.49	0.286	18.5	2.731	0.162 J1	0.200	0.0155	0.123	< 0.4 U1	2.7	0.2 J1
2/17/2020	Assessment	0.07 J1	0.43	44.4	0.179	0.2	0.2 J1	2.32	2.552	0.24	0.07 J1	0.0063	0.003 J1	2 J1	2.5	0.1 J1
5/19/2020	Assessment	0.03 J1	0.32	35.3	0.396	0.32	0.307	3.81	0.778	0.15	0.1 J1	0.00875	0.002 J1	1 J1	1.5	< 0.1 U1
10/12/2020	Assessment	< 0.02 U1	0.44	22.9	1.46	3.21	0.357	26.0	4.259	0.24	0.307	0.0195	0.391	< 0.4 U1	2.0	0.3 J1
2/23/2021	Assessment	0.03 J1	0.31	36.5	0.4 J1	0.36	0.2 J1	4.18	1.032	0.20	0.1 J1	0.00900	< 0.02 U1	< 0.4 U1	1.3	< 0.1 U1
6/1/2021	Assessment	0.06 J1	0.35	48.6	0.253	0.318	0.41	3.60	1.61	0.20	0.11 J1	0.00676	< 0.002 U1	0.6	2.61	0.05 J1
10/19/2021	Assessment	< 0.02 U1	0.41	23.8	1.24	2.72	0.58	23.4	2.42	0.23	0.35	0.0151	0.308	< 0.1 U1	2.34	0.28
3/1/2022	Assessment	< 0.02 U1	0.42	21.9	1.60	3.34	0.57	26.7	6.06	0.28	0.35	0.0180	0.500 Q1	< 0.1 U1	2.22	0.30
6/27/2022	Assessment	< 0.02 U1	0.54	21.3	1.35	3.74	0.69	29.9	1.73	0.31	0.34	0.0174	0.500	< 0.1 U1	1.21	0.32
10/31/2022	Assessment	0.05 J1	0.35	31.1	0.37	1.06	0.61	7.93	3.35	0.20	0.13 J1	0.0107	0.500	0.4 J1	3.24	0.12 J1
2/6/2023	Assessment	0.03 J1	0.25	35.8	0.460	0.359	0.31	4.17	3.07	0.15	0.16 J1	0.00940	< 0.002 U1	0.2 J1	3.24	0.06 J1
6/5/2023	Assessment	0.020 J1	1.13	20.9	2.56	4.73	0.83	38.7	2.34	0.50	0.60	0.0211	0.524	< 0.1 U1	2.44	0.33
10/3/2023	Assessment	0.014 J1	0.81	16.7	2.34	5.99	0.69	44.8	3.28	0.46	0.62	0.0213	0.530	< 0.1 U1	3.28	0.42

Table 1. Groundwater Data Summary: AD-17

Geosyntec Consultants, Inc.

Welsh - LF

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
10/6/2017	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
6/28/2022	Assessment	0.112	167	37.0	0.09 J1	5.2	1,050	1,740
11/1/2022	Assessment	0.097	165	40.3	0.09 J1	5.7	1,110	1,690
6/6/2023	Assessment	0.10 J1	150	35.6	< 0.05 U1	5.3	1,190	1,510
10/4/2023	Assessment	0.14 J1	176 M1	37.9	0.06 J1	5.8	1,180	1,520

Table 1. Groundwater Data Summary: AD-17

Welsh - LF

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
6/28/2022	Assessment	< 0.02 U1	0.53	12.6	0.040 J1	0.011 J1	0.40	41.3	6.54	0.09 J1	0.12 J1	0.267	0.003 J1	0.1 J1	< 0.09 U1	< 0.04 U1
11/1/2022	Assessment	0.02 J1	0.62	12.7	0.073	0.019 J1	0.96	41.9	3.81	0.09 J1	0.27	0.278	0.004 J1	< 0.1 U1	< 0.09 U1	< 0.04 U1
6/6/2023	Assessment	< 0.08 U1	1.1	19.6	0.11 J1	< 0.04 U1	1.1 J1	36.8	1.42	< 0.05 U1	0.7 J1	0.254	0.003 J1	< 1 U1	0.5 J1	< 0.2 U1
10/4/2023	Assessment	< 0.08 U1	0.5 J1	11.8	< 0.07 U1	< 0.04 U1	1.3 J1	41.2	2.05	0.06 J1	< 0.5 U1	0.305 M1	< 0.002 U1	< 1 U1	< 0.4 U1	< 0.2 U1

**Table 1. Groundwater Data Summary
Welsh - LF**

Geosyntec Consultants, Inc.

Notes:

--: Not analyzed

<: 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.

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.

mg/L: milligrams per liter

P1: The precision between duplicate results was above acceptance limits.

pCi/L: picocuries per liter

Q1: Sample received in inappropriate sample container.

SU: standard unit

µg/L: micrograms per liter

APPENDIX 2

Where applicable, shown in this appendix the are results from statistical analyses, and a description of the statistical analysis method chosen. These statistical analyses are conducted separately for each constituent in each monitoring well.

Memorandum

Date: January 17, 2024

To: Rebecca Jones (AEP)

Copies to: Brian Newton (AEP)

From: Allison Kreinberg (Geosyntec)

Subject: Evaluation of 2023 Reissued Analytical Laboratory Data for
J. Robert Welsh Plant's Landfill

In accordance with Texas Commission on Environmental Quality (TCEQ) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule") groundwater sampling was completed in 2023 to support assessment monitoring at the Landfill, an existing CCR unit at the J. Robert Welsh Plant in Pittsburg, Texas. After the statistical evaluation was completed using data from the first semiannual assessment monitoring event,¹ select analytical laboratory reports were reissued to correct an inconsistent number of significant figures in electronic data deliverables and the published laboratory reports.

A review of the reissued analytical laboratory reports identified reported lithium and mercury results that had the number of significant figures changed (Table 1). The site-specific background value for lithium was not updated as part of the first semiannual assessment monitoring event; therefore, the lithium result at background location AD-1 was not used in the statistical evaluation before the reissued analytical laboratory reports were reviewed. Both the initial reported lithium value and the revised lithium value at downgradient location AD-14 were below the site-specific groundwater protection standard of 0.394 milligrams per liter (mg/L), and no statistically significant levels of lithium were identified during the first semiannual assessment monitoring event.¹ Likewise, both the initial reported mercury value and the revised mercury value at downgradient location AD-14 were below the site-specific groundwater protection standard of 0.00243 mg/L, and no statistically significant levels of mercury were identified during the first

¹ Geosyntec. 2023. *Statistical Analysis Summary – Landfill. J. Robert Welsh Plant, Pittsburg, Texas*. Geosyntec Consultants, Inc. October.

semiannual assessment monitoring event.¹ Therefore, no changes to the statistical outcome of the first semiannual assessment monitoring event would occur.

The revised lithium and mercury values in the reissued laboratory analytical reports will be used in future reporting and statistical evaluations.

**Table 1. 2023 Revised Analytical Results
Welsh Plant - Landfill**

Geosyntec Consultants, Inc.

Sample Date	Well ID	Well Location	Constituent	Units	Initial Reported Value	Revised Value
6/6/2023	AD-1	Background	Lithium	mg/L	0.0081	0.00805
6/5/2023	AD-14	Downgradient	Lithium	mg/L	0.021	0.0211
6/5/2023	AD-14	Downgradient	Mercury	ng/L	500	524

Notes:

mg/L: milligrams per liter

ng/L: nanograms per liter

STATISTICAL ANALYSIS SUMMARY, LANDFILL

J. Robert Welsh Plant Pittsburg, Texas

Prepared for

American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215-2372

Prepared by

Geosyntec Consultants, Inc.
500 West Wilson Bridge Road, Suite 250
Worthington, Ohio 43085

Project Number: CHA8500B

March 19, 2023

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ACRONYMS AND ABBREVIATIONS

CCR	coal combustion residual
GWPS	groundwater protection standard
LPL	lower prediction limit
MDL	method detection limit
mg/L	milligram per liter
PQL	practical quantitation limit
QA/ QC	quality assurance/quality control
SSI	statistically significant increase
SSL	statistically significant level
SU	standard units
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
UPL	upper prediction limit

1. EXECUTIVE SUMMARY

In accordance with Texas Commission on Environmental Quality (TCEQ) 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 Landfill at the Welsh Power Plant in Pittsburg, Texas. The Welsh Landfill is an existing CCR unit. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were identified for boron, total dissolved solids (TDS), and sulfate at the landfill. An alternative source was not identified at the time, so assessment monitoring was initiated and GWPSs were set in accordance with § 352.951(b) (Geosyntec 2018). During 2022, as required by § 352.951(a), an annual sampling event for Appendix III and Appendix IV parameters was completed in March, and semiannual sampling events for both Appendix III parameters and Appendix IV parameters were completed in June and October. During the March and June 2022 assessment monitoring events, no statistically significant levels (SSLs) were observed. However, concentrations of Appendix III parameters remained above background (Geosyntec 2022). Thus, the unit remained in assessment monitoring. The results of the October 2022 assessment event are documented in this report.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were reestablished for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether SSLs of Appendix IV parameters were present above the GWPS. No SSLs were identified during the October 2022 event. 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.

2. BOTTOM ASH POND EVALUATION

2.1 Data Validation and QA/QC

During the October 2022 assessment monitoring event, one set of samples was collected for analysis from each background and compliance well. Samples from October 2022 were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected from this assessment monitoring event may be found in Table 1.

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

A data quality review was completed to assess whether the data met the objectives outlined in TCEQ Draft Technical Guidance No. 32 related to groundwater sampling and analysis (TCEQ 2020). As noted in the review memorandum (Attachment B), the data were determined usable for supporting project objectives. 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.9.6.36 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

2.2 Statistical Analysis

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

The data obtained in October 2022 were screened for potential outliers. The results for fluoride at background well AD-1 and mercury at background well AD-17 were identified as low outliers. However, these results were estimated results under the reporting limit (practical quantitation limit [PQL]) but above the method detection limit (MDL)—that is, “J-flagged” data—and were retained in the data set.

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with § 352.951(b) and the Statistical Analysis Plan (Geosyntec 2020). The established GWPS was set to whichever was greater of the background concentration and the maximum contaminant level for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit was calculated using data that were pooled from the background wells and collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for barium, beryllium, chromium, and combined radium. Nonparametric tolerance limits were calculated for arsenic, cadmium, cobalt, fluoride, lithium, and selenium, due to apparent nonnormal distributions, and for antimony, lead, mercury, molybdenum,

and thallium, due to a high nondetect frequency. Upper 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 ($\alpha = 0.01$), but nonparametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the nondetect frequency was too high). An SSL was concluded if the lower confidence limit was above the GWPS (i.e., if the entire confidence interval was above the GWPS). Calculated confidence limits are shown in Attachment C.

No SSLs were identified at the Welsh Landfill.

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPLs) were previously established for all Appendix III parameters following the background monitoring period (Geosyntec 2018). Intrawell tests were used to evaluate potential SSIs for calcium, chloride, sulfate, and TDS, whereas interwell tests were used to evaluate potential SSIs for boron, fluoride, and pH. Interwell and intrawell prediction limits are updated periodically during the assessment monitoring period as sufficient data become available.

Mann-Whitney tests (Wilcoxon rank-sum tests) were performed to determine whether the newer data are affected by a release from the landfill. Because the interwell Appendix III limits and the Appendix IV GWPSs are based on data from upgradient wells, which were not expected 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 (July 2016–May 2020) with the more recent compliance samples (June 2020–June 2022). Results were evaluated to determine whether 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 data set. 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 whether adding newer data to the background data set, replacing the background data set with the newer data, or continuing to use the existing background data set was most appropriate. If the differences appeared to have been caused by a release, then the previous background data set would have been used as before.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment C. A statistically significant difference was found between the two groups for sulfate at background well AD-1. However, the recent data were mostly within range of historic concentrations. Thus, the background data sets were updated to include all available data through June 2022.

Prediction limits for the interwell tests were calculated using data collected through the October 2022 assessment monitoring event. New background well data were tested for outliers before being added to the background data set. Background well data were also evaluated for statistically significant trends using the Sen's Slope/Mann-Kendall trend test, and the results are included in Attachment C. The boron, fluoride, and pH prediction limits were calculated using a one-of-two retesting procedure, as during detection monitoring.

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

Interwell UPLs were updated for boron, fluoride, and pH, and lower prediction limits (LPLs) were also updated for pH using historical data through October 2022. Intrawell UPLs were updated for calcium, chloride, sulfate, and TDS using the historical data through June 2022. The updated prediction limits are summarized in Table 3. The prediction limits were calculated for a one-of-two retesting procedure: If at least one sample in a series of two is not above the UPL (or, in the case of pH, is neither less than the LPL nor greater than the UPL), then it can be concluded that an SSI has not occurred. In practice, where the initial result is not above the UPL (or, in the case of pH, is neither less than the LPL nor greater than the UPL), a second sample will not be collected. The retesting procedures allowed for an acceptably high statistical power that could detect changes at compliance wells for constituents evaluated using intrawell prediction limits.

2.2.4 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 were above background concentrations. Data collected during the October 2022 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 were detected above the UPLs, or, in the case of pH, below the LPLs:

- Boron concentrations were detected above the interwell UPL of 0.801 milligrams per liter (mg/L) at AD-11 (1.24 mg/L), AD-13 (1.02 mg/L), and AD-14 (1.32 mg/L).
- pH values were below the interwell LPL of 4.8 standard units (SU) at AD-11 (3.9 SU).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the initial (October 2022) sample was above the UPL or below the LPL. Based on these results, concentrations of boron appear to be above background concentrations, and pH values appear to be below background values. Therefore, the unit will remain in assessment monitoring.

2.3 Conclusions

A semiannual assessment monitoring event was conducted in accordance with the TCEQ CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC

issues identified that prevented data usage. No outliers were removed from the October 2022 data. GWPSs were reestablished for 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 was above the GWPS. No SSLs were identified.

The interwell prediction limits were updated for boron, fluoride, and pH, and the intrawell prediction limits for calcium, chloride, sulfate, and TDS were updated to incorporate more recent data. Appendix III results were compared to established prediction limits, with values above the UPL detected for boron and with results below the LPL for pH.

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

3. REFERENCES

Geosyntec. 2018. Statistical Analysis Summary – Landfill, J. Robert Welsh Plant, Pittsburg, Texas. Geosyntec Consultants, Inc. January.

Geosyntec. 2022. Statistical Analysis Summary – Landfill, J. Robert Welsh Plant. Geosyntec Consultants, Inc. October.

TCEQ. 2020. Draft Technical Guidance No. 32. Coal Combustion Residuals Groundwater Monitoring and Corrective Action. Texas Commission on Environmental Quality. May.

TABLES

**Table 1. Groundwater Data Summary
Statistical Analysis Summary
Welsh Plant - Landfill**

Well ID		AD-1	AD-5	AD-11	AD-13	AD-14	AD-17
Well Classification		Background	Background	Compliance	Compliance	Compliance	Background
Parameter	Unit	11/1/2022	11/1/2022	10/31/2022	10/31/2022	10/31/2022	11/1/2022
Antimony	µg/L	0.03 J1	0.1 U1	0.1 U1	0.1 U1	0.05 J1	0.02 J1
Arsenic	µg/L	0.19	2.77	0.30	0.91	0.35	0.62
Barium	µg/L	78.9	63.2	15.9	24.8	31.1	12.7
Beryllium	µg/L	0.620	0.046 J1	0.83	0.66	0.37	0.073
Boron	mg/L	0.586	0.041 J1	1.24	1.02	1.32	0.097
Cadmium	µg/L	0.024	0.02 U1	0.164	0.169	1.06	0.019 J1
Calcium	mg/L	7.87	38.6	4.63	9.01	17.6	165
Chloride	mg/L	2.70	16.9	10.6	11.9	3.72	40.3
Chromium	µg/L	0.35	0.43	0.45	0.64	0.61	0.96
Cobalt	µg/L	1.17	15.1	7.58	7.70	7.93	41.9
Combined Radium	pCi/L	2.01	3.88	2.37	3.52	3.35	3.81
Fluoride	mg/L	0.14	0.16	0.29	0.18	0.20	0.09 J1
Lead	µg/L	0.13 J1	0.2 U1	0.68	0.51	0.13 J1	0.27
Lithium	mg/L	0.00818	0.174	0.0244	0.0667	0.0107	0.278
Mercury	µg/L	0.002 J1	0.005 U1	0.004 J1	0.005 U1	0.500	0.004 J1
Molybdenum	µg/L	0.5 U1	0.5 U1	0.5 U1	0.2 J1	0.4 J1	0.5 U1
Selenium	µg/L	5.51	0.5 U1	0.55	0.39 J1	3.24	0.5 U1
Sulfate	mg/L	61.3	185	269	207	133	1,110
Thallium	µg/L	0.2 U1	0.2 U1	0.13 J1	0.17 J1	0.12 J1	0.2 U1
Total Dissolved Solids	mg/L	170	380	450	410	280	1,690
pH	SU	4.75	5.87	3.94	4.87	5.66	5.68

Notes:

µg/L: Micrograms per Liter

mg/L: Milligrams per Liter

pCi/L: Picocuries per Liter

SU: Standard Unit

U1: Not detected at or above method detection limit (MDL). For statistical analysis, parameters that were not detected were replaced with the reporting limit.

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

**Table 2. Appendix IV Groundwater Protection Standards
Statistical Analysis Summary
Welsh Plant - Landfill**

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00317	0.00600
Arsenic, Total (mg/L)	0.0100	0.00628	0.0100
Barium, Total (mg/L)	2.00	0.564	2.00
Beryllium, Total (mg/L)	0.00400	0.00112	0.00400
Cadmium, Total (mg/L)	0.00500	0.00400	0.00500
Chromium, Total (mg/L)	0.100	0.00233	0.100
Cobalt, Total (mg/L)	n/a	0.0748	0.0748
Combined Radium, Total (pCi/L)	5.00	4.61	5.00
Fluoride, Total (mg/L)	4.00	0.583	4.00
Lead, Total (mg/L)	n/a	0.00338	0.00338
Lithium, Total (mg/L)	n/a	0.394	0.394
Mercury, Total (mg/L)	0.00200	0.0000330	0.00200
Molybdenum, Total (mg/L)	n/a	0.00243	0.00243
Selenium, Total (mg/L)	0.0500	0.00835	0.0500
Thallium, Total (mg/L)	0.00200	0.00125	0.00200

Notes:

MCL: Maximum Contaminant Level

GWPS: Groundwater Protection Standard

mg/L: Milligrams per Liter

pCi/L: Picocuries per Liter

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

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

**Table 3. Appendix III Data Summary
Statistical Analysis Summary
Welsh Plant - Landfill**

Analyte	Unit	Description	AD-11	AD-13	AD-14
			10/31/2022	10/31/2022	10/31/2022
Boron	mg/L	Interwell Background Value (UPL)	0.801		
		Analytical Result	1.24	1.02	1.32
Calcium	mg/L	Intrawell Background Value (UPL)	24.5	40.7	26.9
		Analytical Result	4.63	9.01	17.6
Chloride	mg/L	Intrawell Background Value (UPL)	13.7	21.3	11.5
		Analytical Result	10.6	11.9	3.72
Fluoride	mg/L	Interwell Background Value (UPL)	0.583		
		Analytical Result	0.29	0.18	0.20
pH	SU	Interwell Background Value (UPL)	6.9		
		Interwell Background Value (LPL)	4.8		
		Analytical Result	3.9	4.9	5.7
Sulfate	mg/L	Intrawell Background Value (UPL)	745	365	269
		Analytical Result	269	207	133
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1147	656	527
		Analytical Result	450	410	280

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

mg/L: Milligrams per Liter

SU: Standard Units

Background values are shaded gray.

Bold values exceed the background value.

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Mountaineer 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

03.20.2023

Date

ATTACHMENT B
Data Quality Review Memorandum

Memorandum

Date: January 18, 2023
To: David Miller (AEP)
Copies to: Jill Parker-Witt (AEP)
From: Allison Kreinberg (Geosyntec)
Subject: Data Quality Review – Welsh Power Plant
October-November 2022 Sampling Event

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the Welsh Power Plant, located in Pittsburg, Texas in October and November 2022. The groundwater samples were collected to comply 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"). 40 CFR 257 Appendix III and IV constituents were analyzed.

The following sample data groups (SDGs) were associated with the twenty-one (21) groundwater samples collected during the October and November 2022 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223477
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223481
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223483
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223484
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223509
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223510
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223511
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223515

The data included in these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32¹ prior to submittal of this data to TCEQ.

The following data quality issues were identified:

- As reported in SDG 223509, chromium and cobalt were detected in the equipment blank sample “EQUIPMENT BLANK - BASP” collected on 11/1/2022. The detected chromium concentration in the equipment blank (0.53 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The detected cobalt concentration in the equipment blank (0.145 µg/L) was more than 10% of the detected value in sample AD-4C (0.757 µg/L), which could result in high bias in the AD-4C cobalt results.
- As reported in SDG 222510, barium, boron, chromium, cobalt, lithium, and molybdenum were detected in the equipment blank sample “EB - Background” collected on 11/1/2022. The detected boron concentration in the equipment blank (0.01 mg/L) was more than 10% of the detected value in samples AD-5 (0.041 mg/L) and AD-17 (0.097 mg/L), which could result in high bias in the AD-5 and AD-17 boron results. Likewise, the detected chromium concentration in the equipment blank (0.52 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The detected cobalt concentration in the equipment blank (0.161 µg/L) was more than 10% of the detected value in samples AD-1 (1.17 µg/L) and “Dup-Background” (1.17 µg/L), which could result in high bias in the AD-1 and duplicate cobalt results. All other equipment blank detections were less than 10% of the detected values in groundwater and would not result in a high bias.
- As reported in SDG 223511, chromium, cobalt, lithium, and molybdenum were detected in the equipment blank sample “EQUIPMENT BLANK – PBAP” collected on 10/31/2022. The detected chromium concentration in the equipment blank (0.53 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The estimated molybdenum concentration in the equipment blank (0.2 µg/L) was more than 10% of the estimated value in sample AD-8 (0.2 µg/L), which could result in high bias in the AD-8 molybdenum results. All other equipment blank detections were less than 10% of the detected values in groundwater and would not result in a high bias.

¹ TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

- As reported in SDG 223513, chromium, cobalt, lithium, and molybdenum were detected in the equipment blank sample “EQUIPMENT BLANK – LF” collected on 10/31/2022. The detected chromium concentration in the equipment blank (0.7 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The estimated molybdenum concentration in the equipment blank (0.3 µg/L) was more than 10% of the estimated value in samples AD-13 (0.2 µg/L) and AD-14 (0.4 µg/L), which could result in high bias in the AD-13 and AD-14 molybdenum results. All other equipment blank detections were less than 10% of the detected values in groundwater and would not result in a high bias.
- As reported in SDG 223510, the relative percent difference (RPD) for chromium concentrations from parent sample “AD-1” and duplicate sample “Dup Background” was 41%. The AD-1 chromium results should be considered estimated.
- As reported in SDG 223510, the RPD for radium-226 (77.1%) in the laboratory duplicate was above the acceptable limit of 25%. The “AD-1” radium-226 results should be considered estimated.
- As reported in SDG 223509, the matrix spike (MS) recovery (47.8%) and matrix spike duplicate (MSD) recovery (35.3%) for lithium were below the acceptable range of 75-125%. The associated sample (AD-3) was flagged M1: the associated MS or MSD recovery was outside acceptance limits. The AD-3 lithium results should be considered estimated.

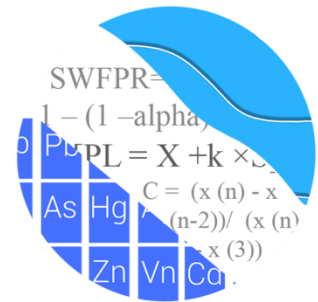
Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.

ATTACHMENT C
Statistical Analysis Output

GROUNDWATER STATS CONSULTING

February 9, 2023

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
500 W. Wilson Bridge Road, Suite 250
Worthington, OH 43085



Re: Welsh Landfill - Assessment Monitoring Event & Background Update 2022

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 2022 groundwater data for American Electric Power Inc.'s Welsh Landfill. 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 Residuals (CCR) program in 2016. Below is a list of the monitoring wells, as provided by Geosyntec Consultants. Note that originally the network included upgradient well AD-18; however, further research, reportedly, identified that this well was not providing adequate representation of the groundwater quality upgradient of this site and exhibited different chemical properties from the neighboring upgradient wells. Therefore, data from this well are no longer included in the statistical analysis.

- **Upgradient wells:** AD-1, AD-5, and AD-17
- **Downgradient wells:** AD-11, AD-13, and AD-14

Data were sent electronically, and the statistical analysis was reviewed by Kristina Rayner, Senior Statistician and Founder of Groundwater Stats Consulting. The analysis was conducted according to the Statistical Analysis Plan prepared by GSC and approved by Dr. Kirk Cameron with MacStat Consulting.

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 on the Outlier Summary following this letter (Figure C). These values are plotted in a lighter font and disconnected symbol on the time series graphs.

Summary of Statistical Methods

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

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 non-detects, 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. Non-detects are handled as follows:

- 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, 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 prediction limits are used on data containing greater than 50% non-detects.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits will be necessary to accommodate these types of changes. In the interwell case, newer data may be included in background during each sample event after screening the upgradient well data for any new outliers. Data will also be periodically evaluated for statistically significant trends, and earlier data may be deselected prior to construction of statistical limits so that limits represent present-day conditions.

In the intrawell case, data for all wells and constituents are re-evaluated when a minimum of 4 new data points are available to determine whether earlier concentrations are representative of present-day groundwater quality. In some cases, as well, the earlier portion of data are deselected prior to construction of limits in order to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though the data are excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

Summary of Background Screening Conducted December 2017

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.

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 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. Based upon the results of the 2019 screening, intrawell methods were recommended for calcium, chloride, sulfate, and TDS; and interwell methods were recommended for boron, fluoride, and pH. A summary of those findings was included in the report.

Appendix III Background Update Summaries

December 2020

Prior to updating background data for the 2020 analysis, data were evaluated using Tukey's outlier test and visual screening for updating background limits through May 2020 for intrawell prediction limits, and through October 2020 for interwell prediction limits. Interwell prediction limits are used for boron, fluoride, and pH; therefore, pooled upgradient well data were tested for outliers for these constituents. All other Appendix III parameters, which use intrawell prediction limits, were tested for outliers at each well. Tukey's test identified outliers for calcium in upgradient well AD-17, TDS in downgradient well AD-14, and for fluoride which uses interwell prediction limits. None of these values were flagged as they do not differ greatly from the rest of the data. Values for the following well/constituent pairs were not identified as outliers by Tukey's test but were flagged as outliers in the database because they did not appear to represent the population at these wells: calcium in AD-14, chloride in AD-1, and TDS in AD-13.

For constituents requiring intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test at the 99% confidence level was used to compare the median of historical data through February 2019 to the median of new compliance samples at each well through May 2020. Statistically significant differences were noted for chloride in upgradient well AD-1 and downgradient well AD-11, and all well/constituent pairs for parameters using

intrawell prediction limits were updated with compliance samples to use all historical data through May 2020.

The Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells for boron, fluoride, and pH to identify statistically significant increasing or decreasing trends. The results of the trend analyses showed only one statistically significant increasing trend, for boron at upgradient well AD-1, and two statistically significant decreasing trends, for fluoride in upgradient wells AD-1 and AD-17. These trends did not require any adjustment of the background time periods for the upgradient wells, and all well/constituent pairs for parameters using interwell prediction limits were updated to use all historical data through October 2020. A summary of the background update results was included in the December 2020 report.

February 2022

Outlier Analysis

Tukey's outlier test and visual screening were used to re-evaluate data through October 2021 at all upgradient wells for parameters utilizing interwell prediction limits (boron, fluoride, and pH). Tukey's outlier test identified both high and low values for fluoride as outliers, but these values were also similar to remaining observations within their respective records; therefore, the values were not flagged in the database. No new values were flagged as outliers and no changes were made to previously flagged outliers.

For parameters which use intrawell prediction limits (calcium, chloride, sulfate, and TDS), values were not re-evaluated for new outliers as these records had insufficient samples for updating background during this evaluation period.

Intrawell – Prediction Limits

Intrawell prediction limits, combined with a 1-of-2 resample plan, are constructed using historical data through May 2020 for calcium, chloride, sulfate, and TDS. Background data sets for all parameters utilizing intrawell prediction limits will be updated after the Fall 2022 sample event when a minimum of 4 compliance samples are available.

Interwell – Trend Test Evaluation

For parameters which are tested using interwell prediction limits, the Sen's Slope/Mann-Kendall trend test was used to test data in upgradient wells to determine whether

concentrations are statistically increasing, decreasing or stable. Statistically significant trends were identified for the following well/constituent pairs:

Increasing

- Boron: AD-1

Decreasing

- Fluoride: AD-1, AD-5, and AD-17
- pH: AD-17

Although statistically significant trends were identified for boron in upgradient well AD-1 and for pH in upgradient well AD-17, the magnitude of the trends is marginal relative to the respective concentrations; therefore, no adjustments were required for these well/constituent pairs at this time. For fluoride in all three upgradient wells, the trend is influenced by earlier trace values below the current reporting limit and varying reporting limits later in the record. Therefore, all data from upgradient wells were used to construct interwell prediction limits for fluoride.

February 2023

Outlier Analysis

Prior to updating background for the 2023 analysis, data were evaluated using Tukey's outlier test and visual screening for updating background limits through June 2022 on all wells for constituents that use intrawell prediction limits (calcium, chloride, sulfate, and TDS) and through November 2022 on pooled upgradient well data from upgradient wells for constituents that use interwell prediction limits (boron, fluoride, and pH). Results of the outlier tests follows this report (Figure C).

Tukey's outlier test on all wells for calcium, chloride, sulfate, and TDS did not identify any values; therefore, no additional values were flagged. Most of previously flagged outliers were confirmed through Tukey's outlier test and visual screening. Note that the previously flagged concentration of 9.0 mg/L for chloride at upgradient well AD-1 was unflagged during this analysis. While this this measurement was originally flagged as it was slightly different than remaining measurements within this well, after further evaluation it was determined that all low-level chloride concentrations within the record represent naturally occurring groundwater quality upgradient of the site. This step resulted in an intrawell prediction limit of 6.989 mg/L compared to the previously established limit of 5.876 mg/L. Additionally, the previously flagged measurement of 38.7 mg/L for calcium at downgradient well AD-14 was unflagged as this measurement is no longer significantly

different than remaining measurements within this well and a more recent observation was of similar magnitude.

Tukey's outlier test on pooled upgradient well data identified both high and low values for fluoride as outliers, but these values were also similar to remaining observations within their respective records; therefore, the values were not flagged in the database. No additional values were flagged as outliers. A list of all flagged values follows this report (Figure C).

Intrawell – Mann-Whitney Test

For calcium, chloride, sulfate, and TDS which are tested using intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through May 2020 to the new compliance samples at each well through June 2022 to evaluate whether the groups are statistically different at the 99% confidence level, in which case background data may be updated with compliance data (Figure D). A statistically significant difference was identified for the following well/constituent pair:

- Sulfate: AD-1 (upgradient)

In this case, while a statistically significant increase in medians was identified, the increase was identified upgradient of the facility and most of more recent concentrations are within the range of or slightly higher than those reported historically. Therefore, all data sets were updated with compliance samples through June 2022.

Intrawell – Prediction Limits

Intrawell prediction limits, combined with a 1-of-2 resample plan, are constructed using historical data through June 2022 for calcium, chloride, sulfate, and TDS. A summary of the limits follows this letter (Figure E). No comparison of the October/November 2022 observation was performed in this analysis.

Interwell – Trend Test Evaluation

For parameters which are tested using interwell prediction limits, the Sen's Slope/Mann-Kendall trend test was used to test data in upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable at the 99% confidence level (Figure F). Statistically significant trends were identified for the following well/constituent pairs:

Increasing

- Boron: AD-1

Decreasing

- Fluoride: AD-1, AD-5, and AD-17
- pH: AD-17

Although statistically significant trends were identified for boron in upgradient well AD-1, fluoride in upgradient well AD-5, and pH in upgradient well AD-17, the magnitudes of the trends are marginal relative to the respective concentrations; therefore, no adjustments were required for these well/constituent pairs at this time. For fluoride in upgradient wells AD-1 and AD-17, the trend is influenced by earlier trace values below the current reporting limit and varying reporting limits later in the record. Therefore, all data from upgradient wells were used to construct interwell prediction limits for fluoride.

Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells through October/November 2022 for boron, fluoride, 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. No comparison of the October/November 2022 compliance observations was performed in this analysis.

Evaluation of Appendix IV Parameters – October/November 2022

Outlier Analysis

Prior to evaluating Appendix IV parameters, upgradient well data are screened through both visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. All flagged values may be seen on the Outlier Summary following this letter (Figure C) and no changes to previously flagged outliers for Appendix IV parameters were made.

For the current analysis, Tukey's outlier test on pooled upgradient well data through October/November 2022 identified outliers for chromium, fluoride, lead, and mercury. The values identified by Tukey's test, with the exception of the highest value for chromium at AD-17, were either similar to concentrations upgradient of the facility or were lower than the respective Maximum Contaminant Level (MCL); therefore, these values were not flagged as outliers.

Previously flagged values were confirmed by visual screening and Tukey's outlier test. The highest value for chromium at upgradient well AD-17, molybdenum in upgradient well AD-1, and two highest values for cadmium in upgradient well AD-17 remain flagged in order to maintain statistical limits that are conservative (i.e., lower) from a regulatory perspective.

Additionally, downgradient well data through October/November 2022 were screened through visual screening using time series graphs. Since the downgradient well data are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is particular justification for excluding them. No additional outliers among downgradient wells were flagged during this analysis.

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data through October/November 2022 for Appendix IV parameters (Figure H). For parametric limits a target of 95% confidence and 95% coverage is used. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

These background limits were compared to the Maximum Contaminant Levels (MCLs) as shown 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

Confidence intervals were then constructed using data through October/November 2022 on downgradient wells for each of the Appendix IV parameters and compared to the GWPS, (i.e., the highest limit of the MCL or background limit as discussed above). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete graphical results of the confidence intervals follow this letter (Figure J). No statistical exceedances were identified.

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

For Groundwater Stats Consulting,



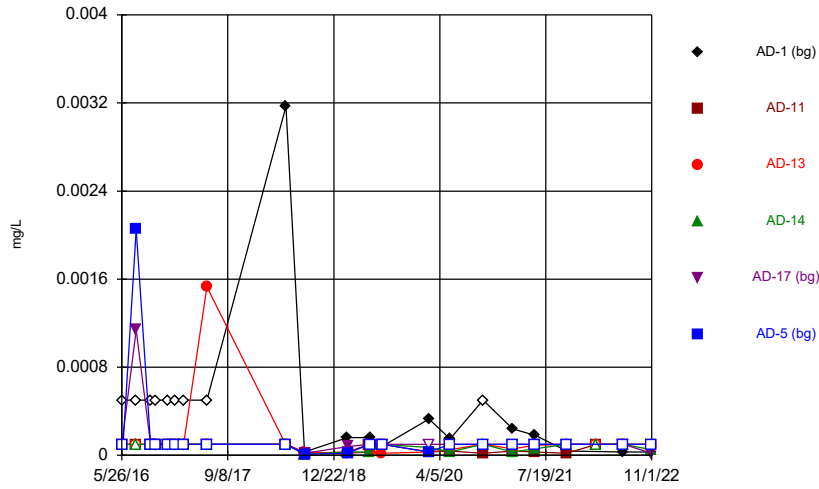
Tristan Clark
Groundwater Analyst



Kristina L. Rayner
Senior Statistician

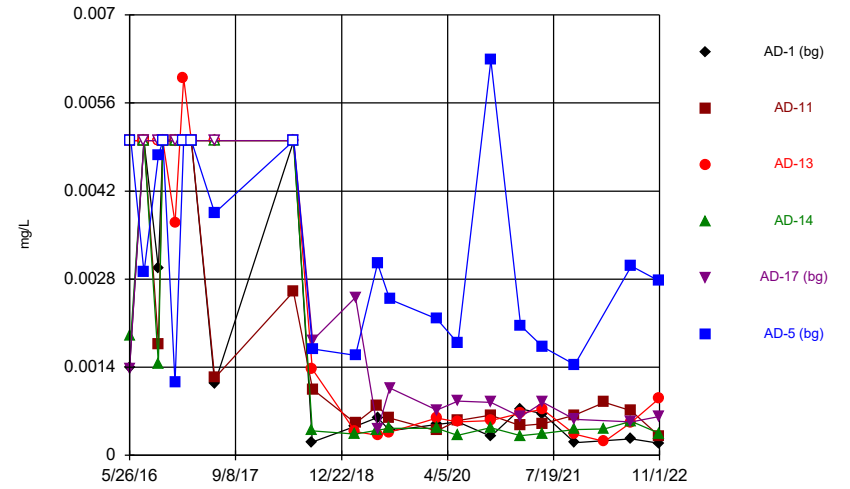
FIGURE A
Time Series

Time Series



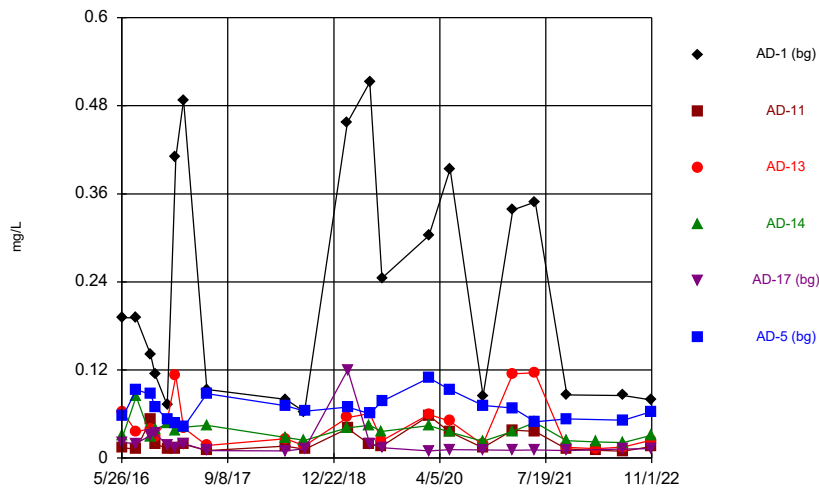
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 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



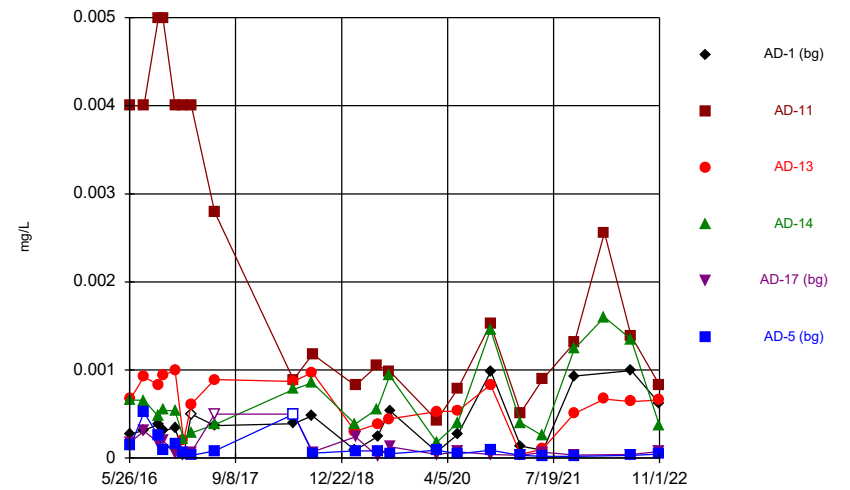
Constituent: Arsenic, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



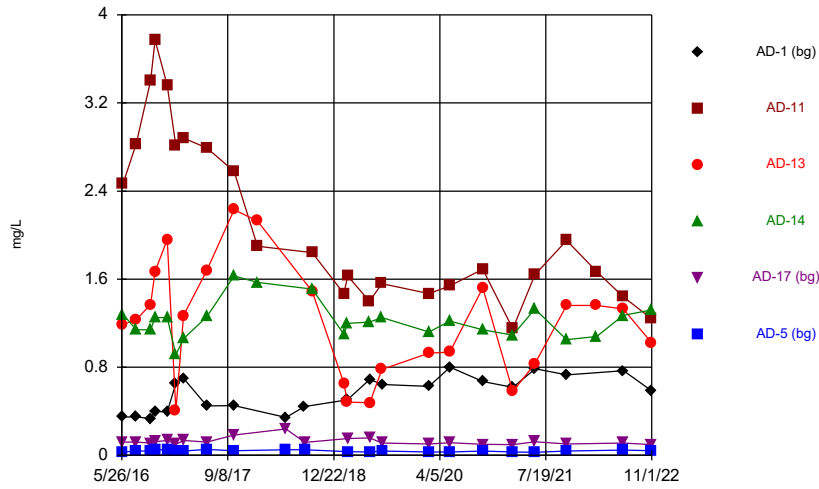
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 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



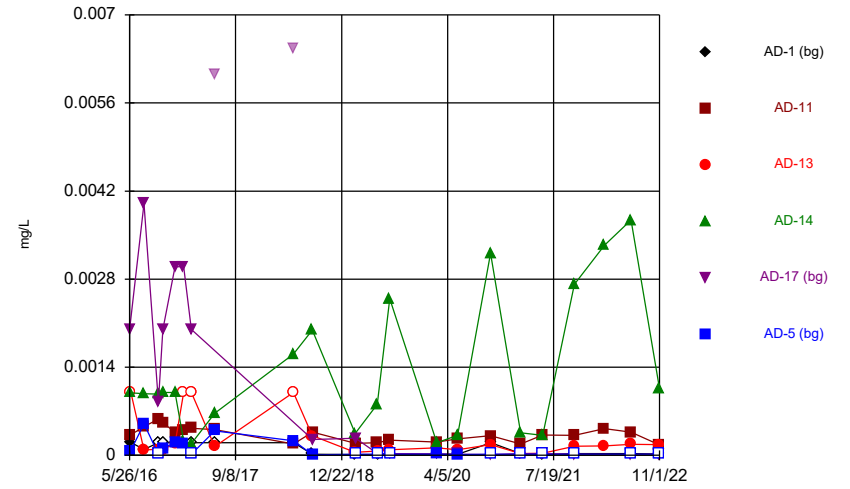
Constituent: Beryllium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



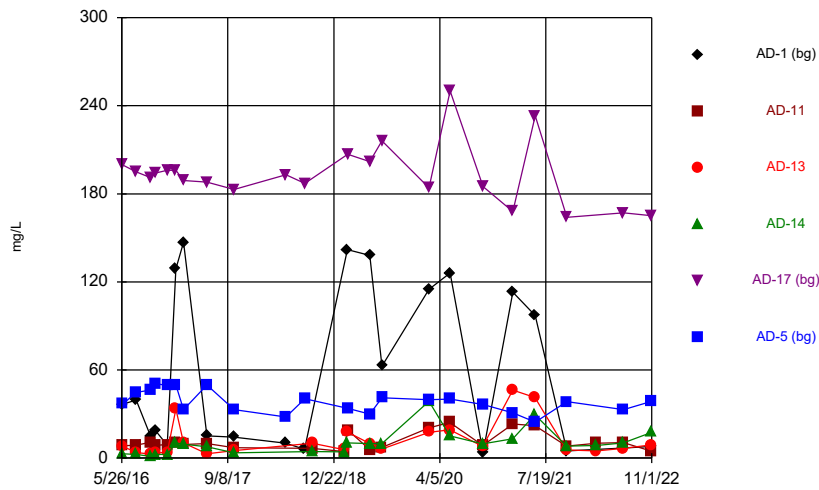
Constituent: Boron, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



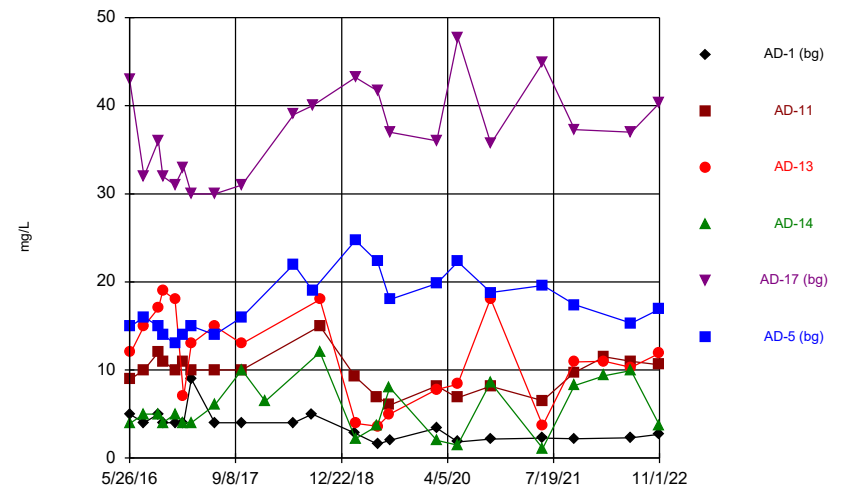
Constituent: Cadmium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



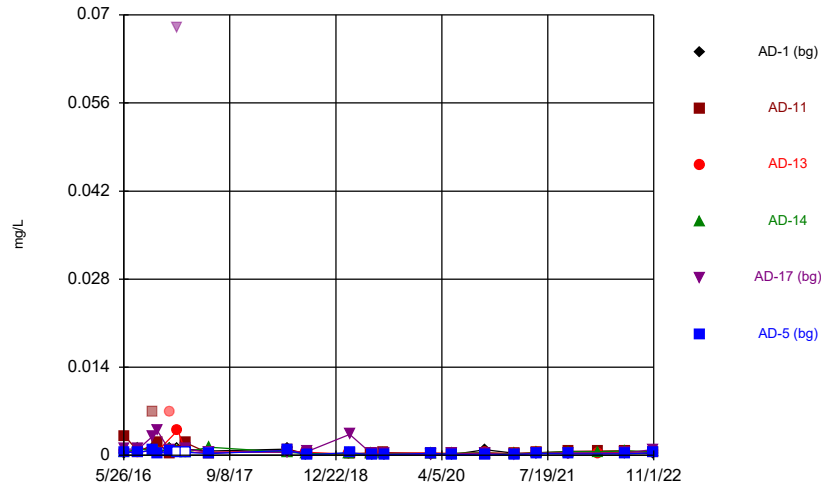
Constituent: Calcium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



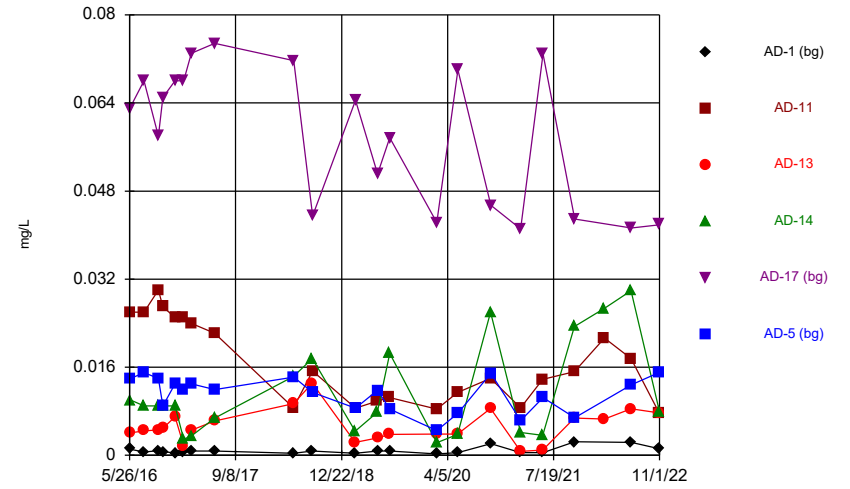
Constituent: Chloride, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



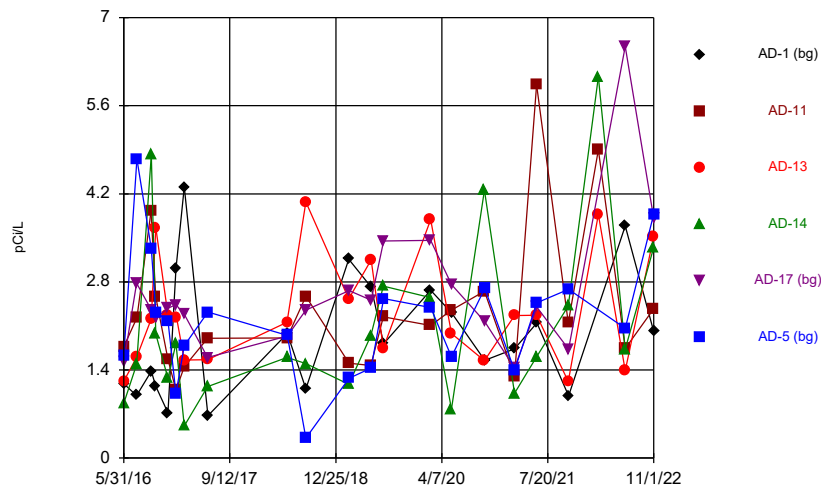
Constituent: Chromium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



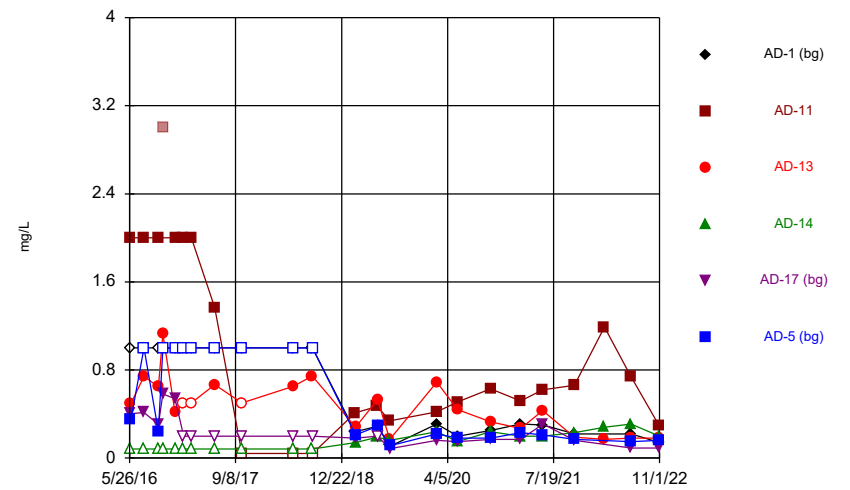
Constituent: Cobalt, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



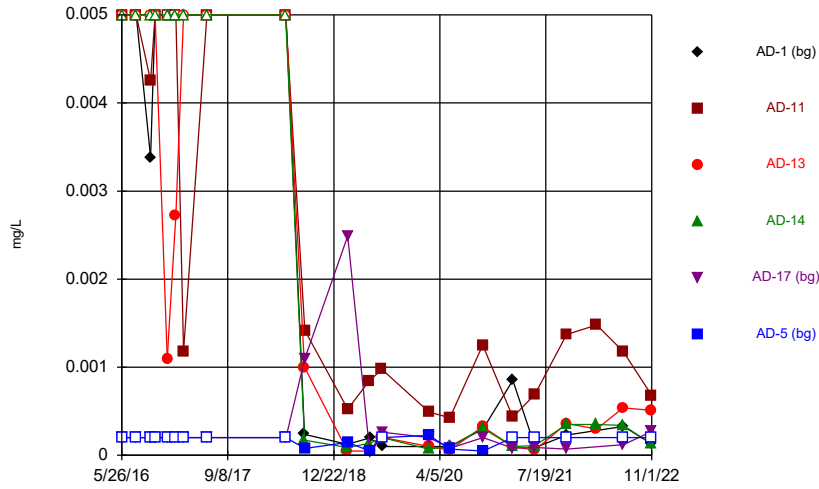
Constituent: Combined Radium 226 + 228 Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



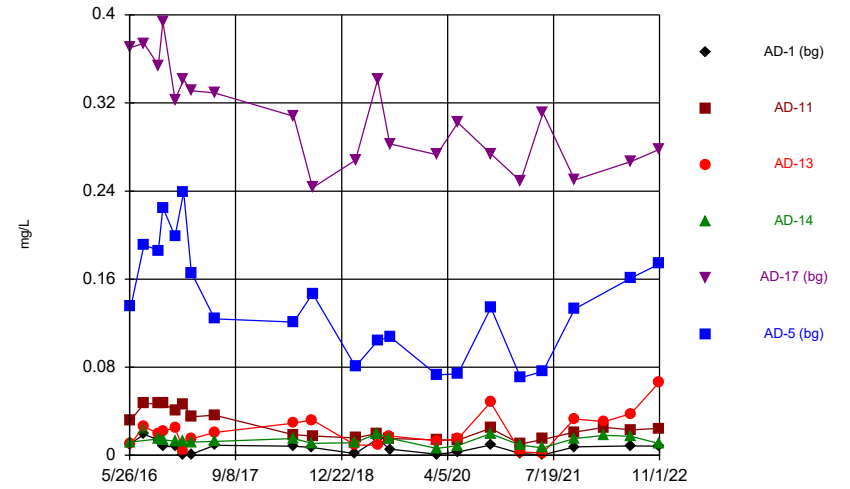
Constituent: Fluoride, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



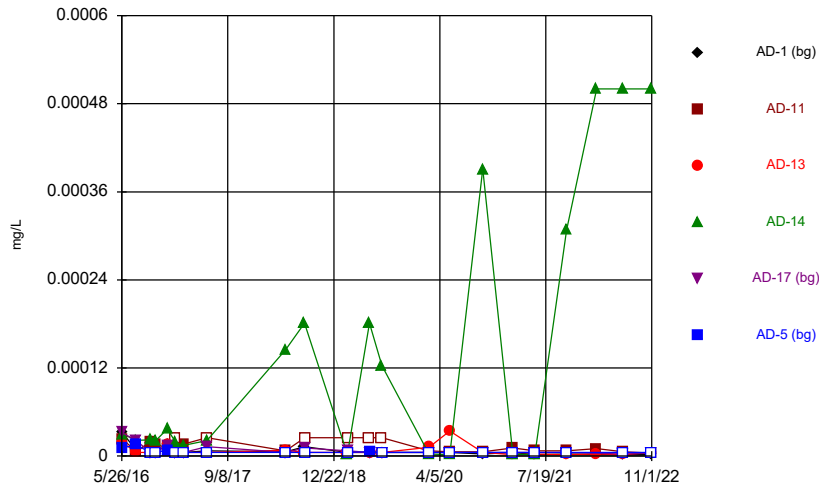
Constituent: Lead, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



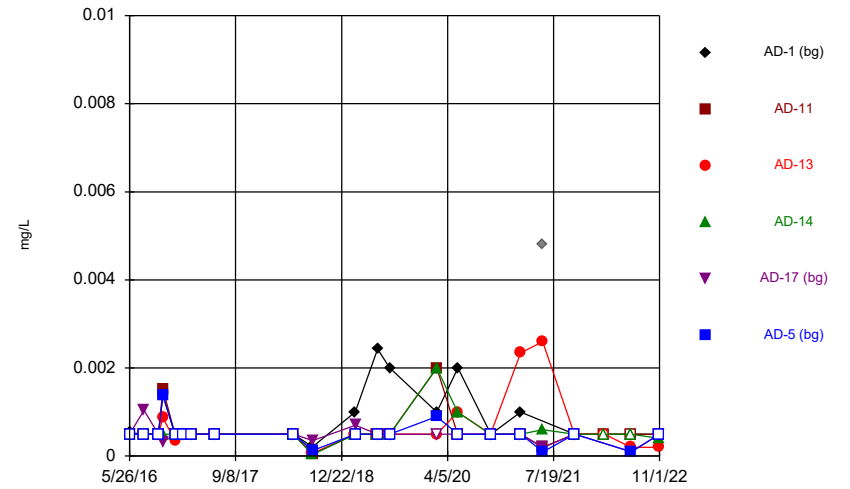
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Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



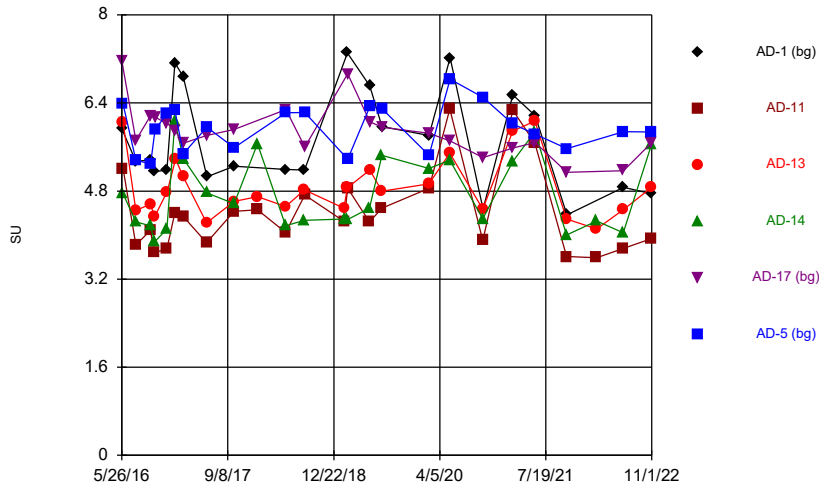
Constituent: Mercury, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



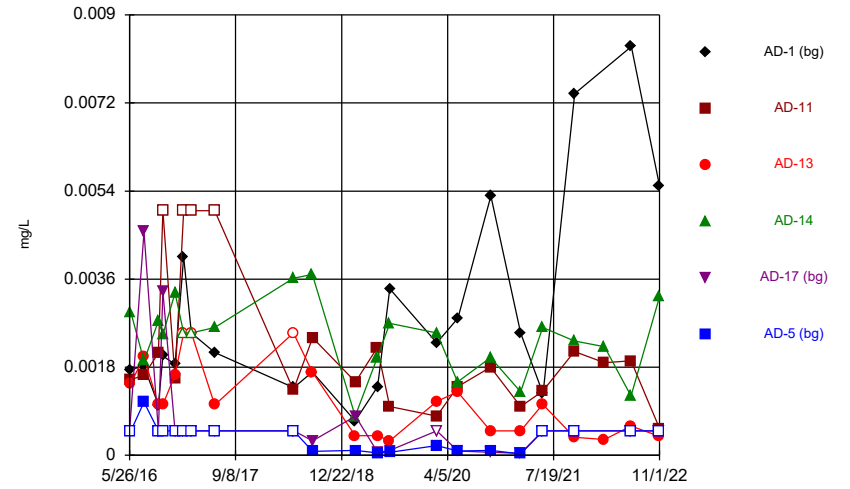
Constituent: Molybdenum, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



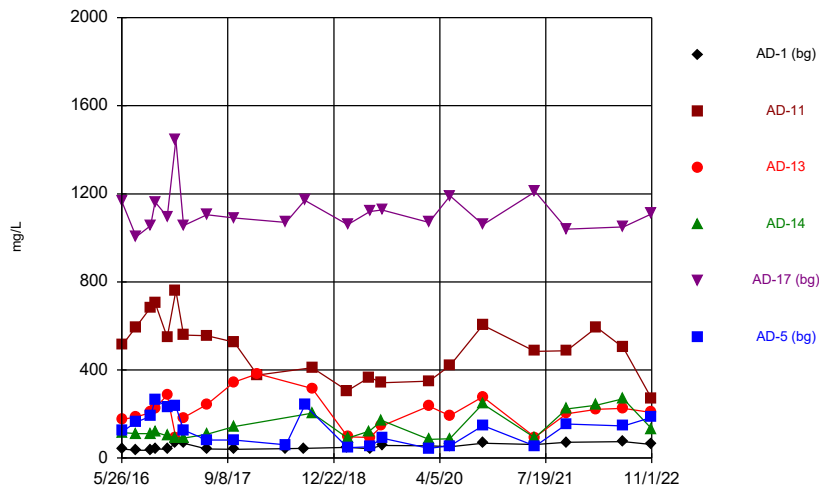
Constituent: pH, field Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



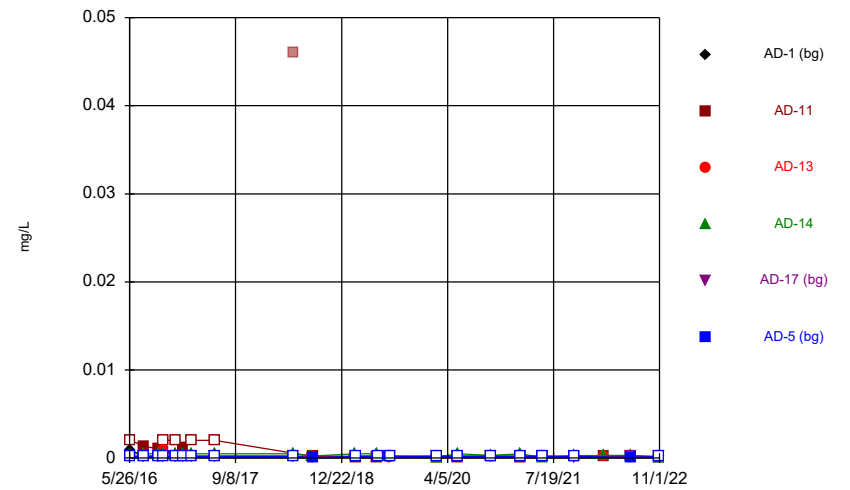
Constituent: Selenium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



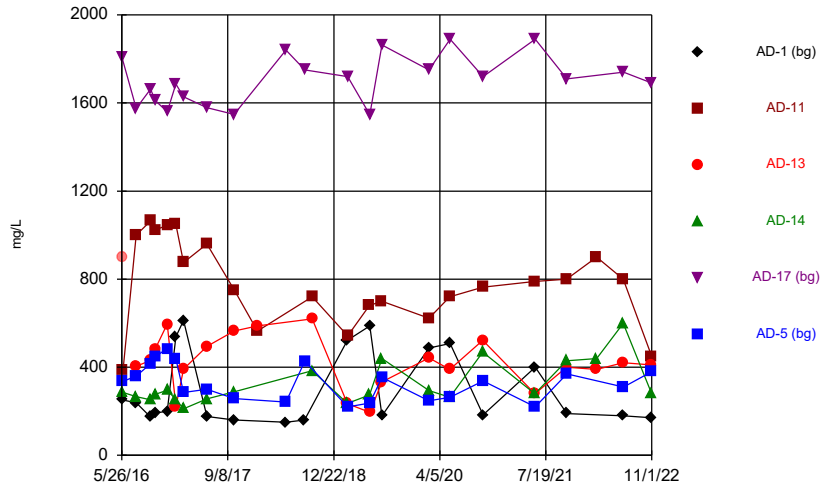
Constituent: Sulfate, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



Constituent: Thallium, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

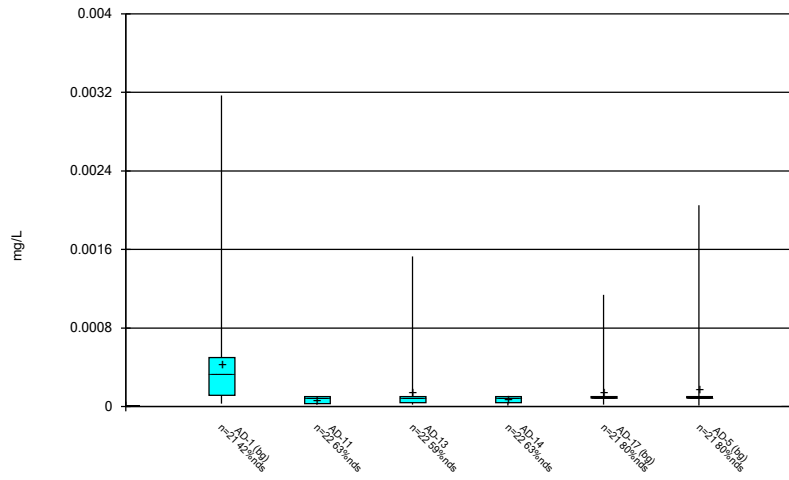
Time Series



Constituent: Total Dissolved Solids Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

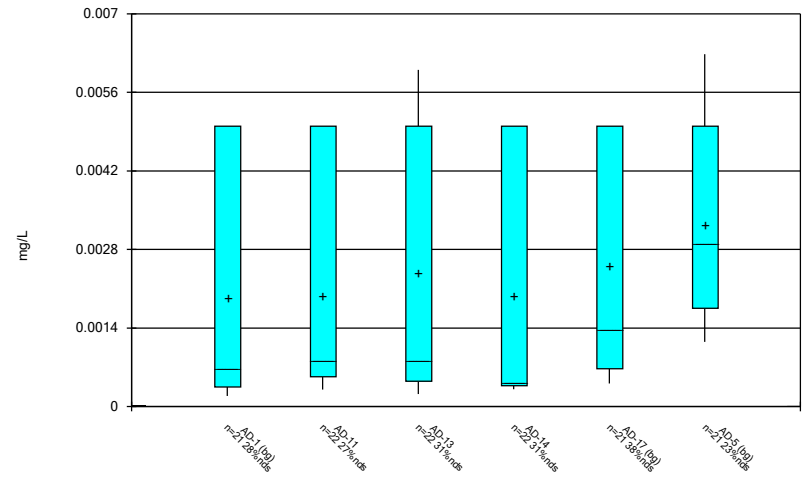
FIGURE B
Box Plots

Box & Whiskers Plot



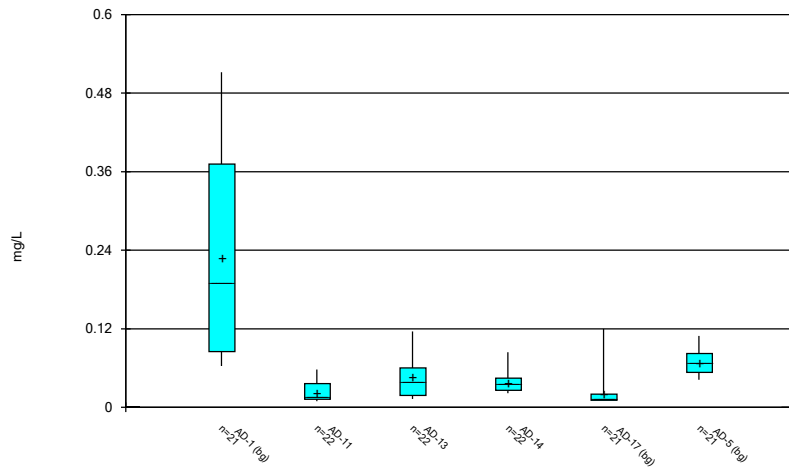
Constituent: Antimony, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



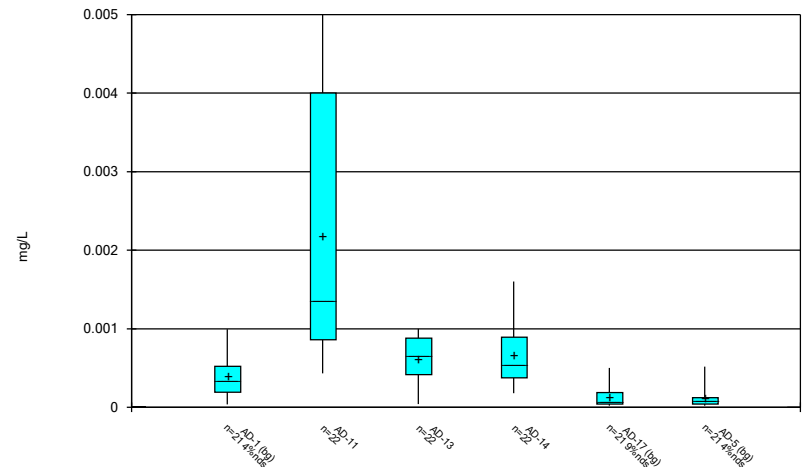
Constituent: Arsenic, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



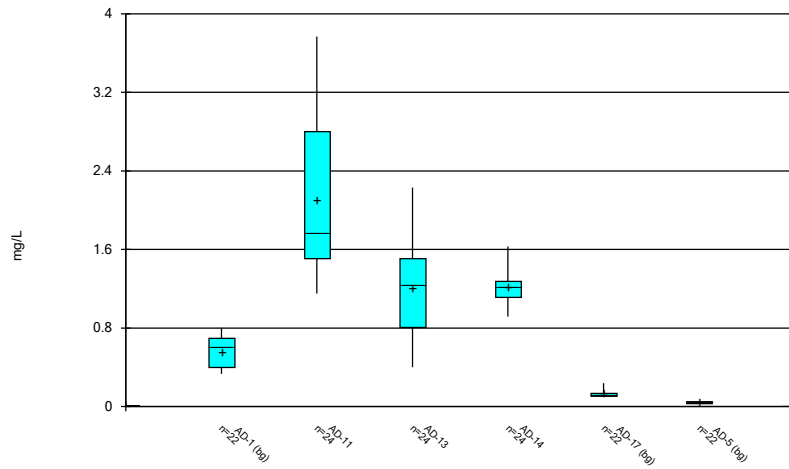
Constituent: Barium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



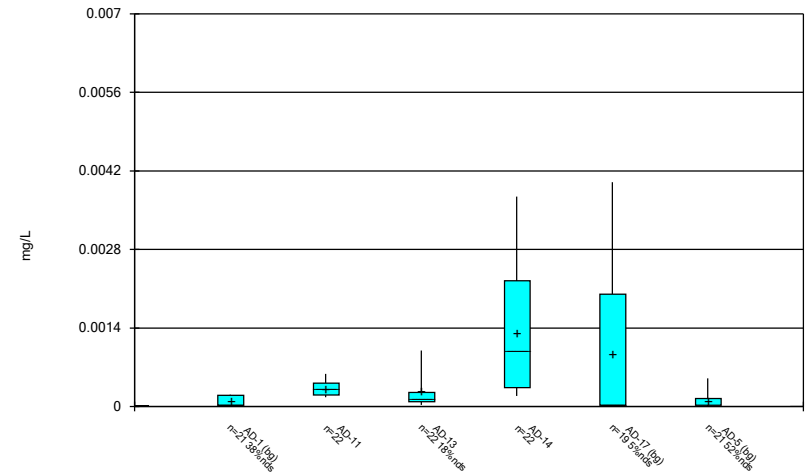
Constituent: Beryllium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



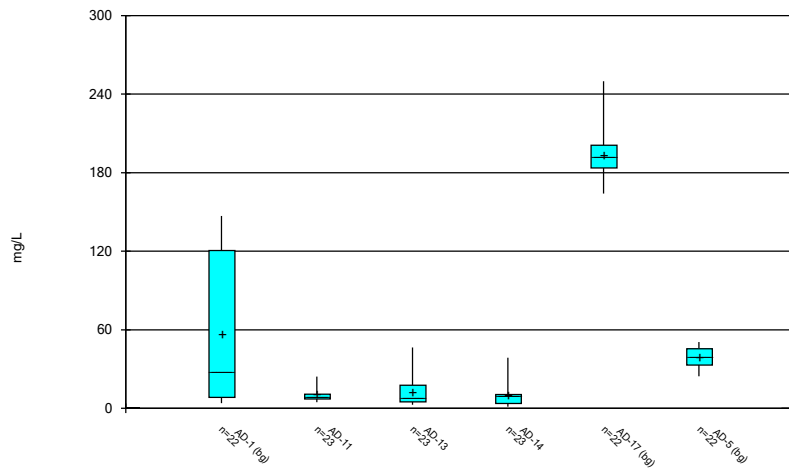
Constituent: Boron, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



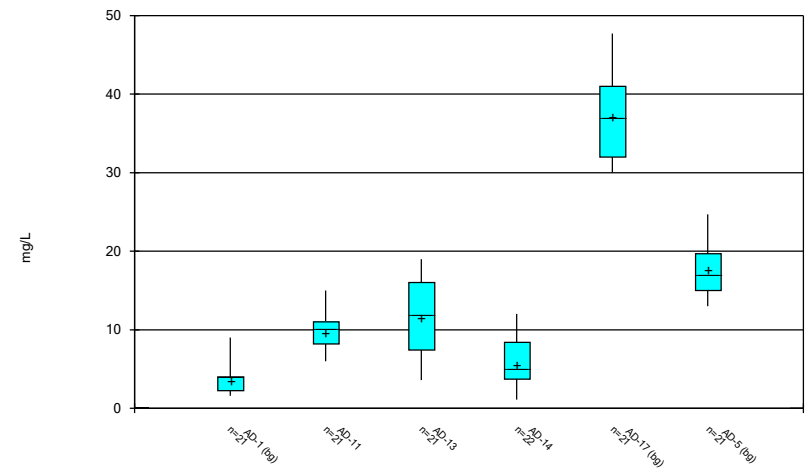
Constituent: Cadmium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



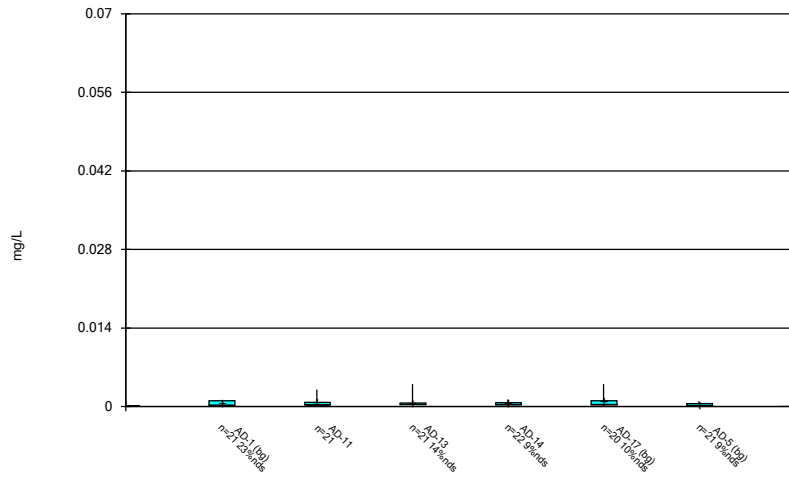
Constituent: Calcium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



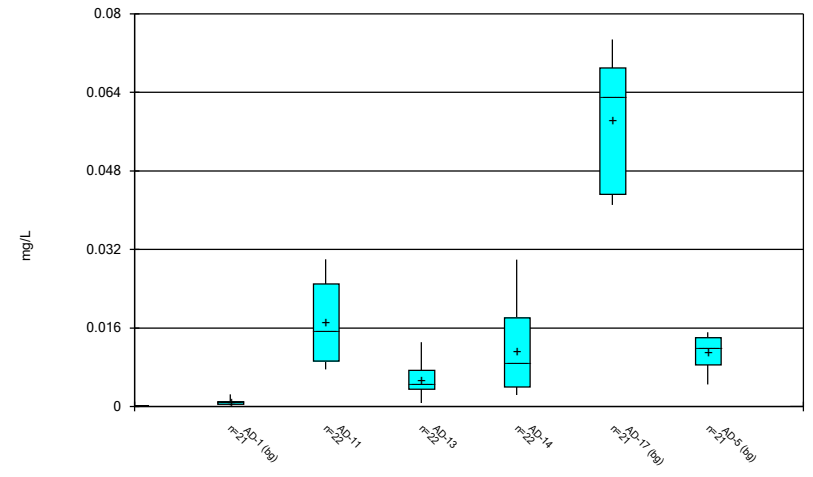
Constituent: Chloride, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



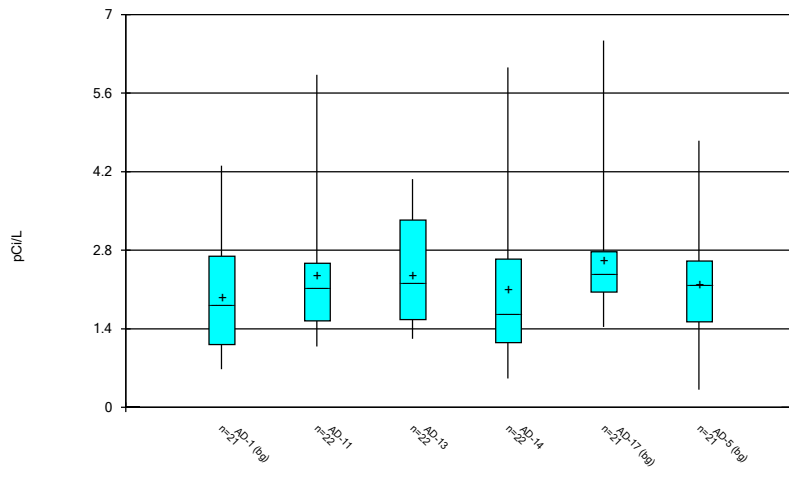
Constituent: Chromium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



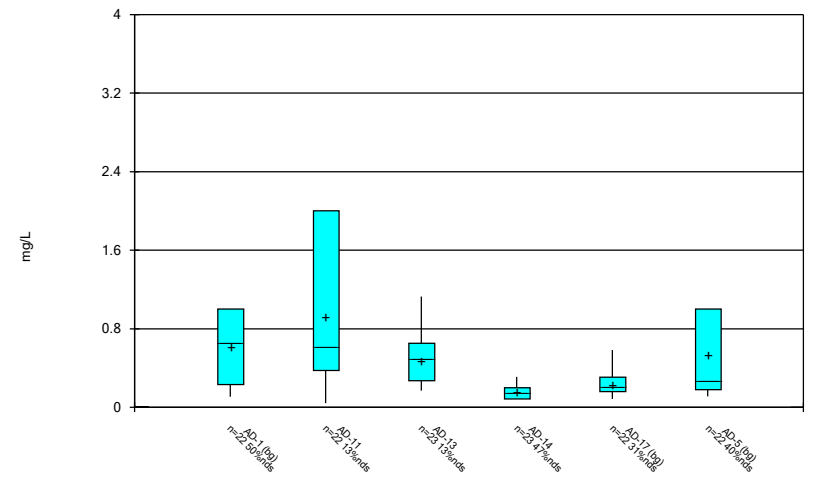
Constituent: Cobalt, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



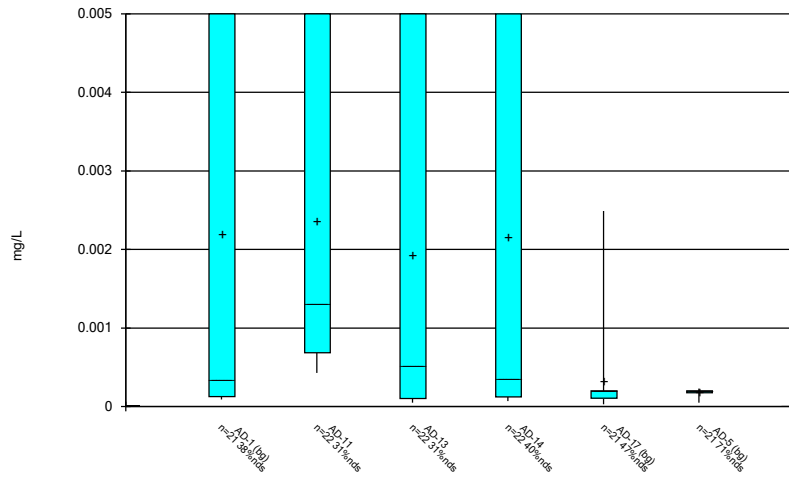
Constituent: Combined Radium 226 + 228 Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



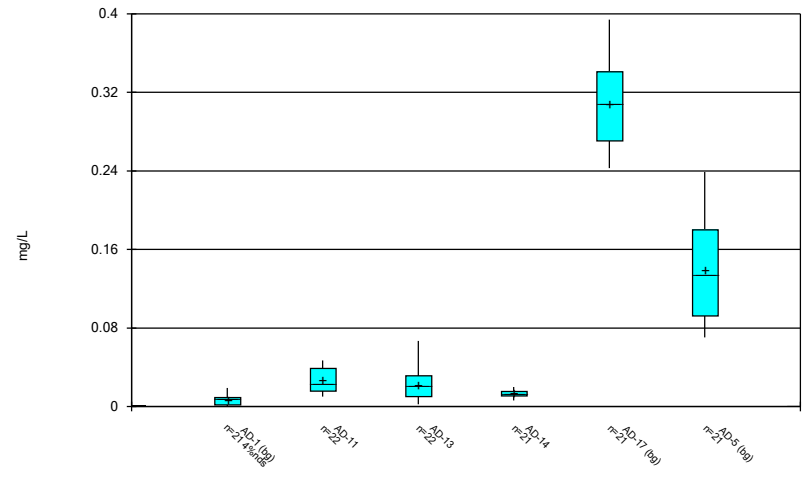
Constituent: Fluoride, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



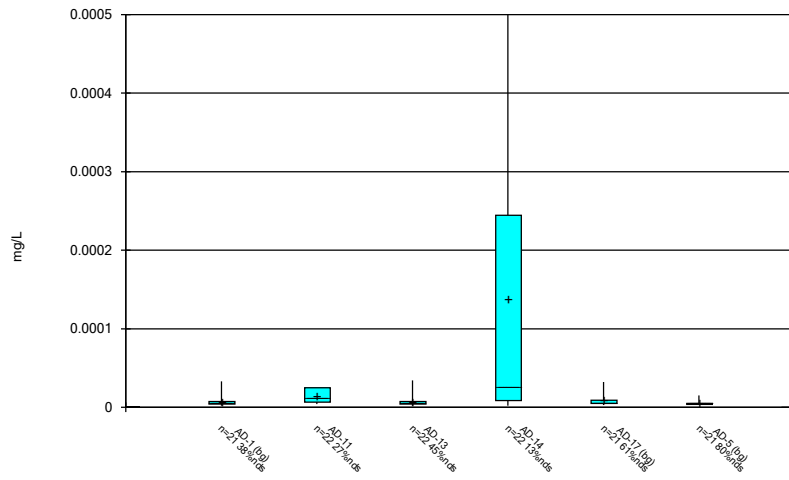
Constituent: Lead, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



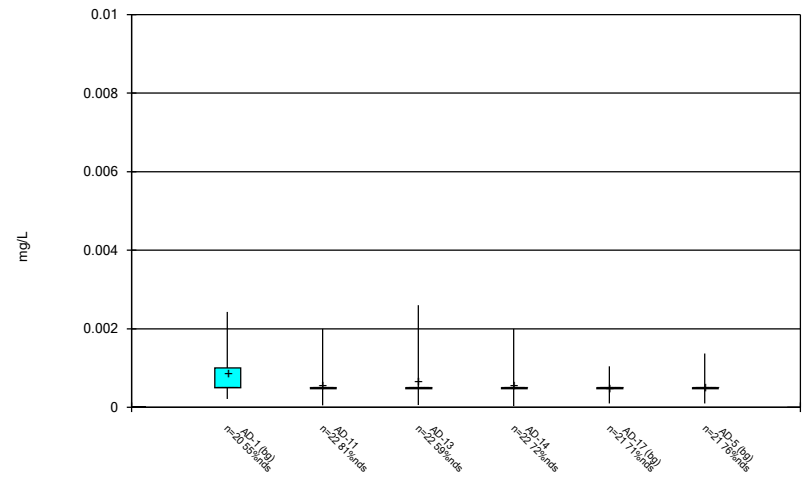
Constituent: Lithium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



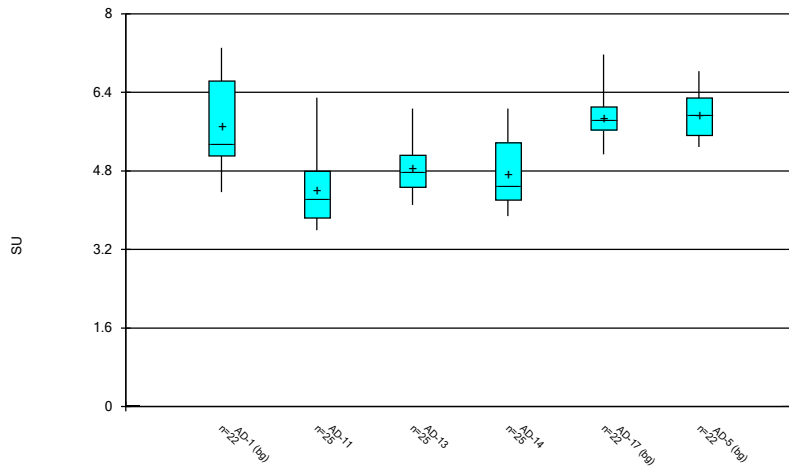
Constituent: Mercury, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



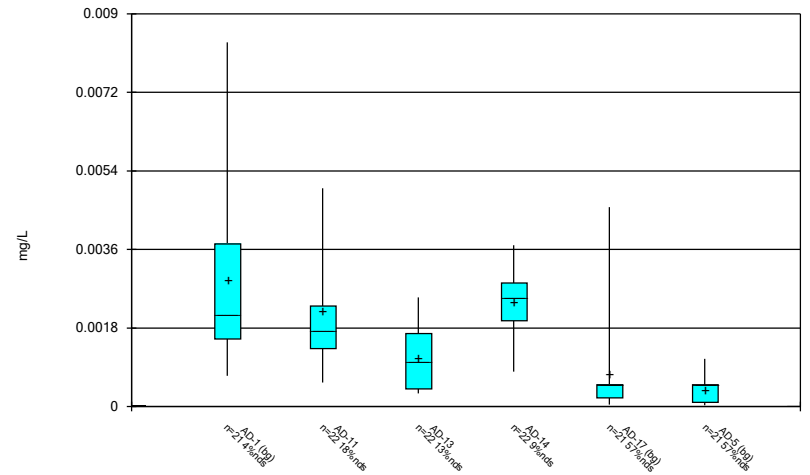
Constituent: Molybdenum, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



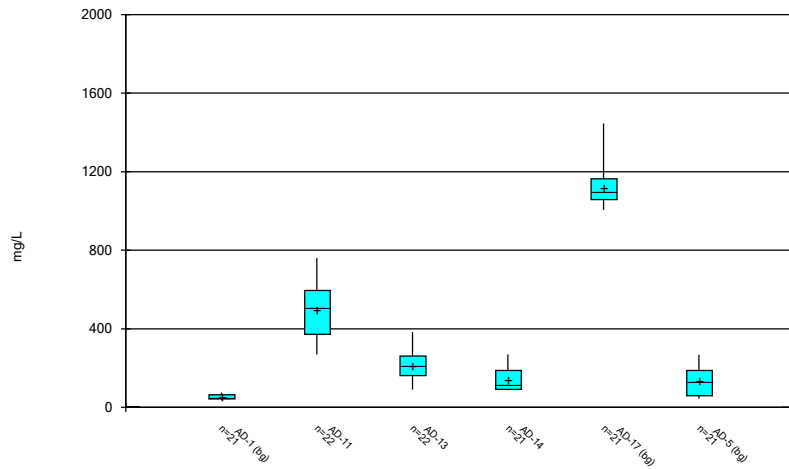
Constituent: pH, field Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



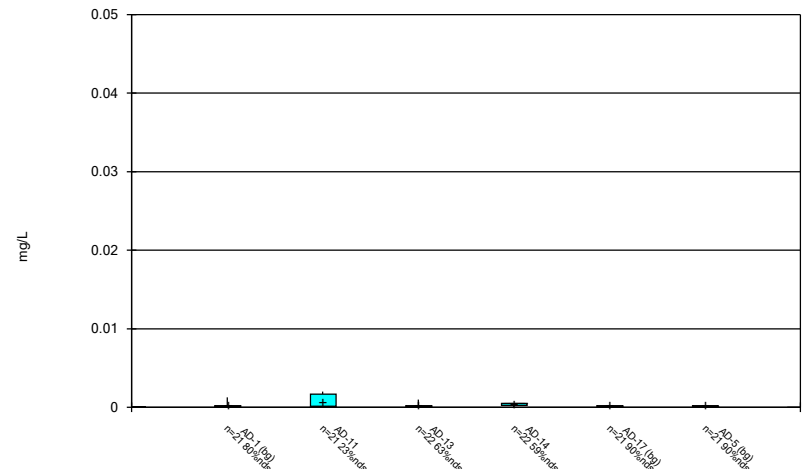
Constituent: Selenium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



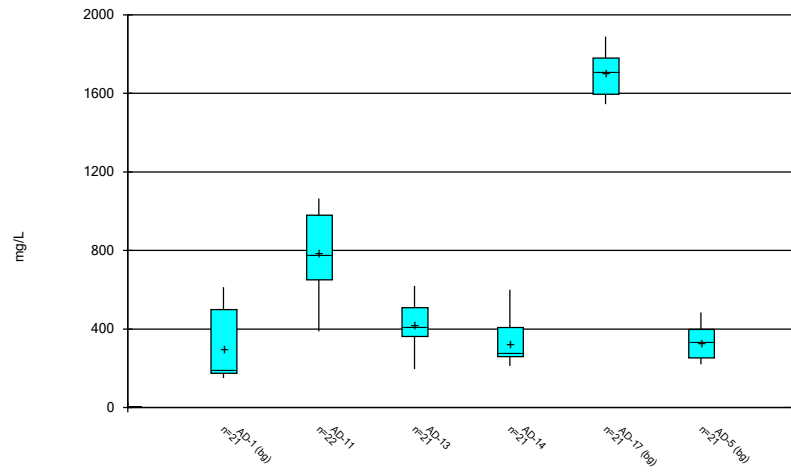
Constituent: Sulfate, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE C

Outlier Summary and Tukey's Outlier Test

Outlier Summary

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/7/2023, 12:54 PM

	AD-17 Cadmium, total (mg/L)	AD-11 Chromium, total (mg/L)	AD-13 Chromium, total (mg/L)	AD-17 Chromium, total (mg/L)	AD-11 Fluoride, total (mg/L)	AD-14 Lithium, total (mg/L)	AD-1 Molybdenum, total (mg/L)	AD-11 Thallium, total (mg/L)	AD-13 Total Dissolved Solids (mg/L)
5/31/2016									900 (o)
7/29/2016					0.024 (o)				
9/30/2016	0.007 (o)								
10/21/2016				3 (o)					
12/14/2016		0.007 (o)							
1/20/2017			0.068 (O)						
6/8/2017	0.00606 (o)								
5/23/2018							0.046 (o)		
5/24/2018	0.00646 (o)								
6/2/2021						0.0048 (o)			

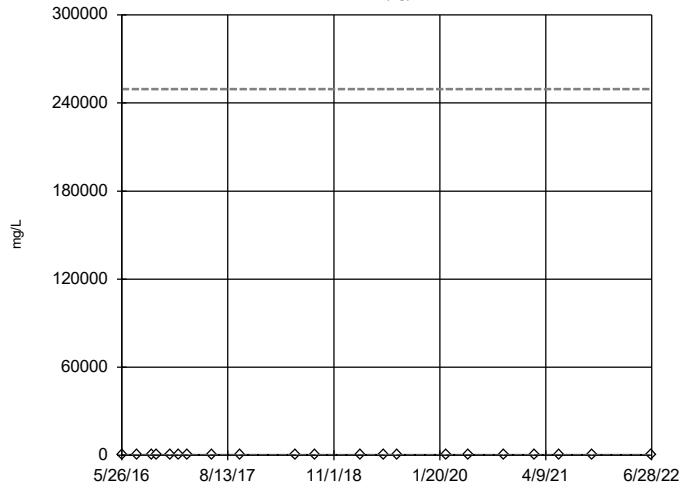
Tukey's Outlier Analysis - All Results (No Significant)

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 10:52 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Calcium, total (mg/L)	AD-1 (bg)	No	n/a	NP	NaN	21	59.51	55.92	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-11	No	n/a	NP	NaN	22	11.5	6.007	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-13	No	n/a	NP	NaN	22	12.41	12.48	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-14	No	n/a	NP	NaN	22	9.744	8.876	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-17 (bg)	No	n/a	NP	NaN	21	194.7	20.17	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-5 (bg)	No	n/a	NP	NaN	21	38.6	7.729	$x^{(1/3)}$	ShapiroWilk
Chloride, total (mg/L)	AD-1 (bg)	No	n/a	NP	NaN	20	3.63	1.685	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-11	No	n/a	NP	NaN	20	9.606	2.138	sqrt(x)	ShapiroWilk
Chloride, total (mg/L)	AD-13	No	n/a	NP	NaN	20	11.49	5.192	normal	ShapiroWilk
Chloride, total (mg/L)	AD-14	No	n/a	NP	NaN	21	5.71	3.1	sqrt(x)	ShapiroWilk
Chloride, total (mg/L)	AD-17 (bg)	No	n/a	NP	NaN	20	36.88	5.261	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-5 (bg)	No	n/a	NP	NaN	20	17.56	3.38	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-1 (bg)	No	n/a	NP	NaN	20	51.68	12.91	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-11	No	n/a	NP	NaN	21	509.3	125.2	sqrt(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-13	No	n/a	NP	NaN	21	211	81.64	normal	ShapiroWilk
Sulfate, total (mg/L)	AD-14	No	n/a	NP	NaN	20	141.1	61.07	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-17 (bg)	No	n/a	NP	NaN	20	1117	95.11	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-5 (bg)	No	n/a	NP	NaN	20	129.5	73.02	$x^{(1/3)}$	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-1 (bg)	No	n/a	NP	NaN	20	304.6	170.1	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-11	No	n/a	NP	NaN	21	798	185.4	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-13	No	n/a	NP	NaN	21	442.9	160.3	$x^{(1/3)}$	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-14	No	n/a	NP	NaN	20	324.8	100.6	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-17 (bg)	No	n/a	NP	NaN	20	1704	114.5	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	AD-5 (bg)	No	n/a	NP	NaN	20	328	82.5	ln(x)	ShapiroWilk

Tukey's Outlier Screening

AD-1 (bg)

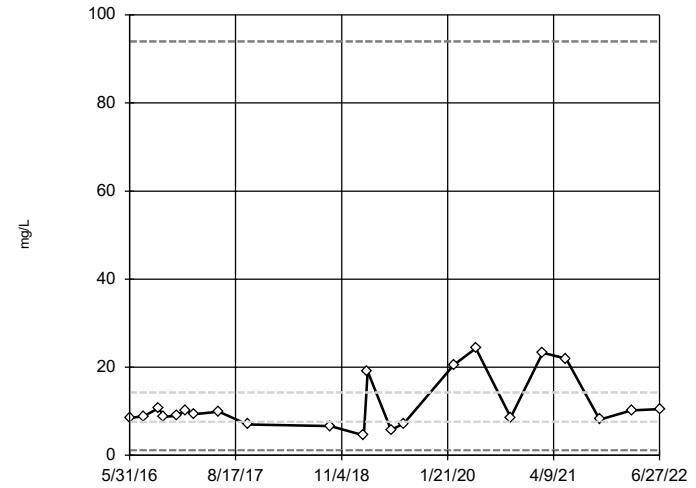


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 249442, low cutoff = 0.004556, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-11

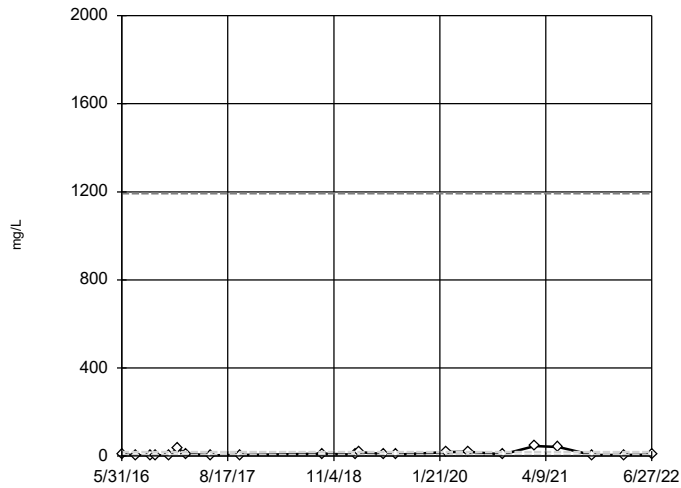


n = 22
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 93.98, low cutoff = 1.161, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-13

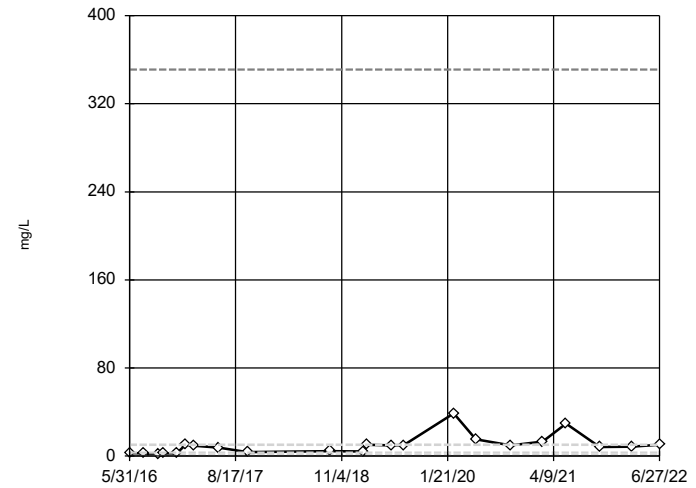


n = 22
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1193, low cutoff = 0.06411, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-14

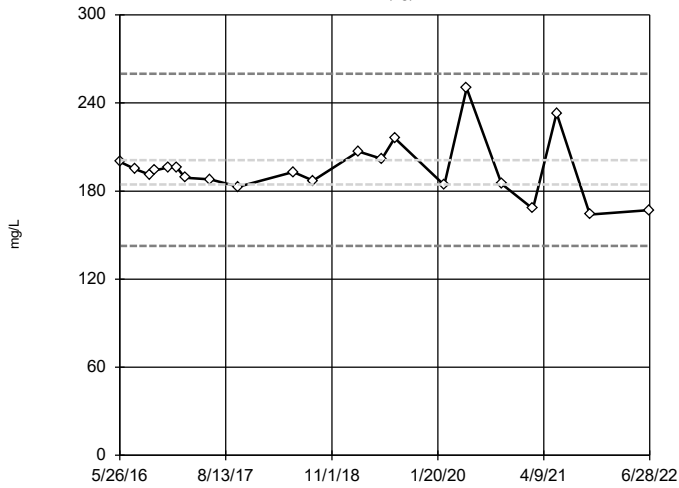


n = 22
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 351, low cutoff = 0.09428, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-17 (bg)

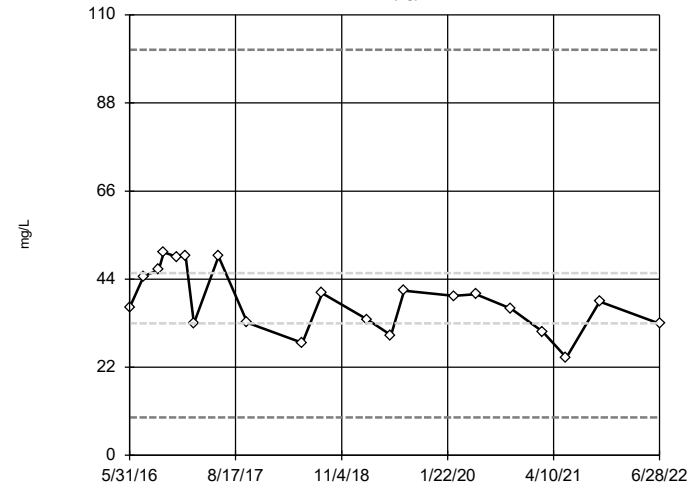


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 259.9, low cutoff = 142.7, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-5 (bg)

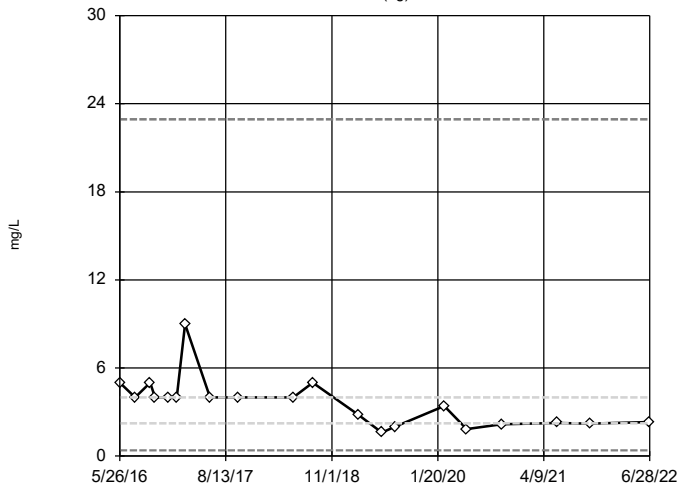


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 101.3, low cutoff = 9.447, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-1 (bg)

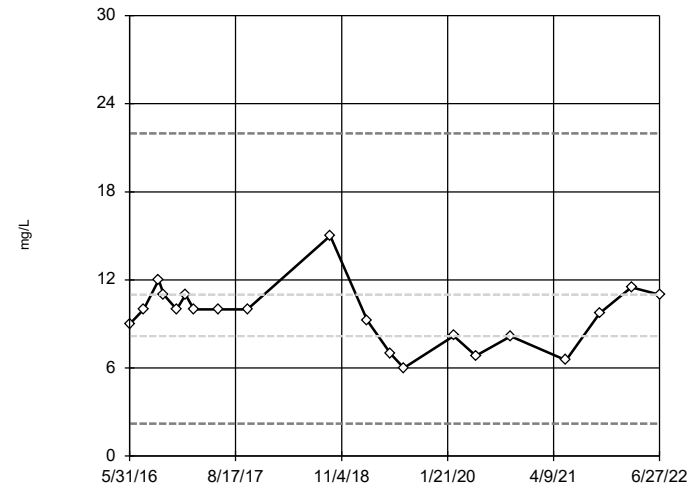


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 22.93, low cutoff = 0.3898, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-11

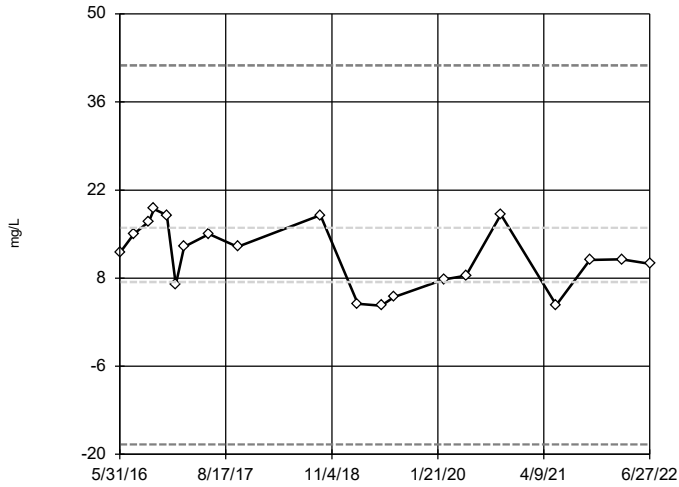


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 21.99, low cutoff = 2.211, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-13

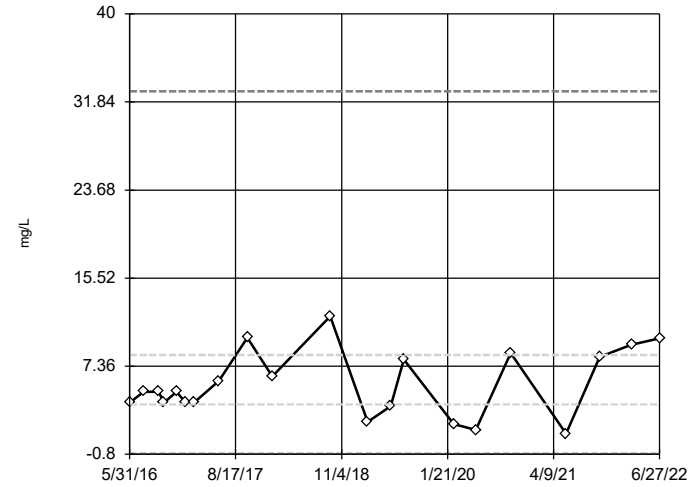


n = 20
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 41.82, low cutoff = -18.42, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-14

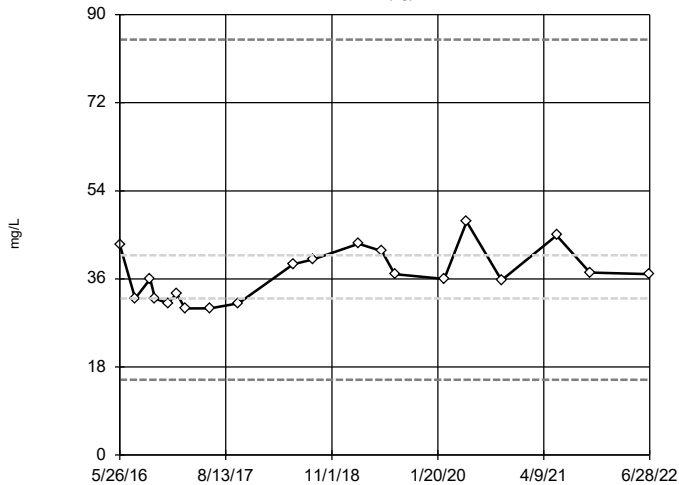


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 32.83, low cutoff = -0.7672, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-17 (bg)

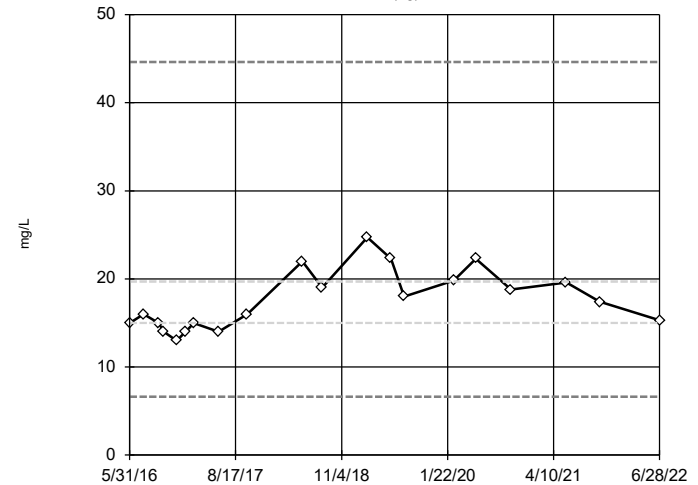


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 84.91, low cutoff = 15.39, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-5 (bg)

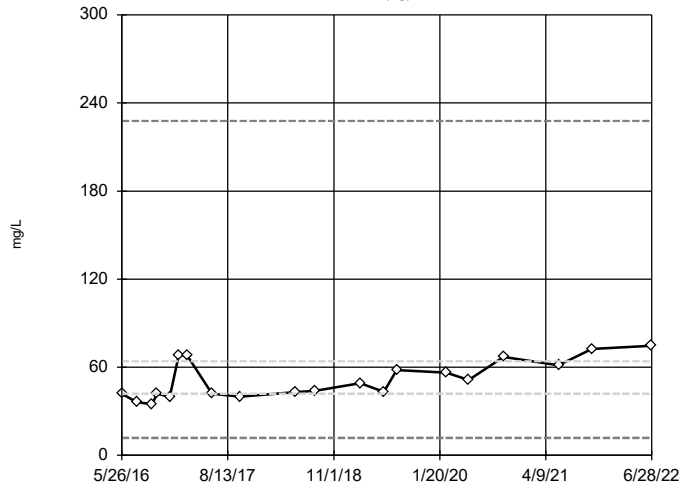


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 44.62, low cutoff = 6.622, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-1 (bg)

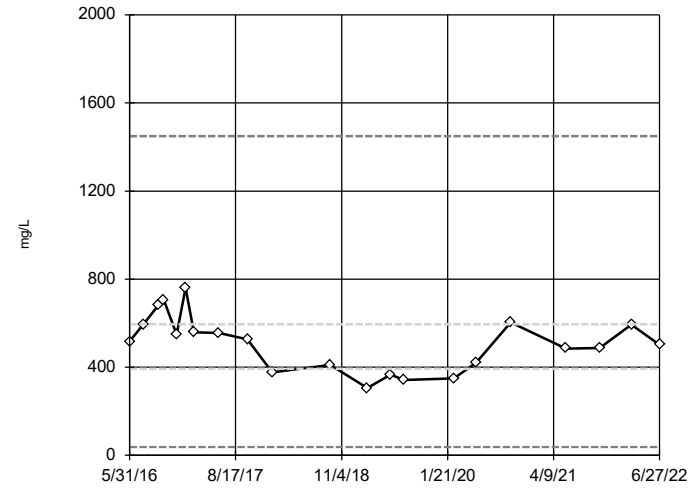


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 227.7, low cutoff = 11.82, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-11

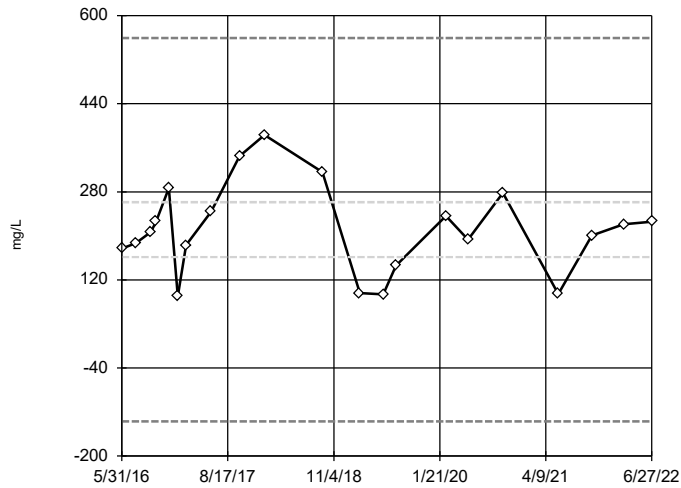


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1450, low cutoff = 37.85, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-13

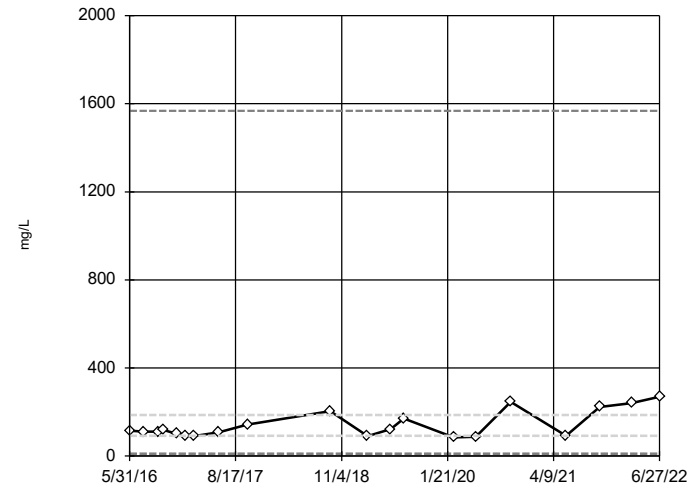


n = 21
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality, analysis run on raw data.
 High cutoff = 559.5, low cutoff = -137, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-14

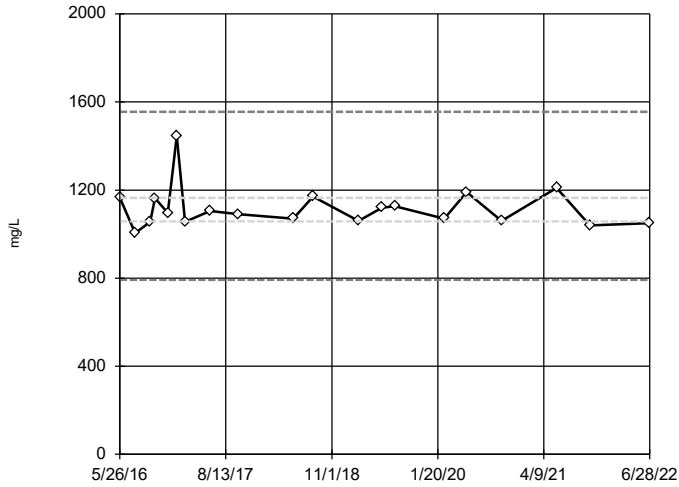


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1568, low cutoff = 10.95, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-17 (bg)

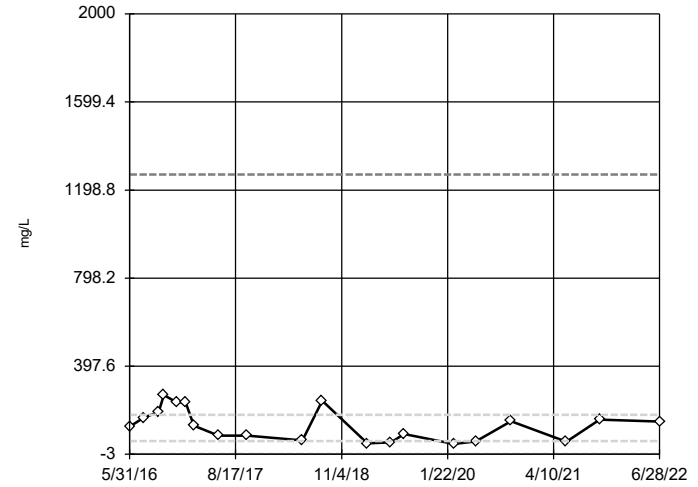


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1555, low cutoff = 792, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-5 (bg)

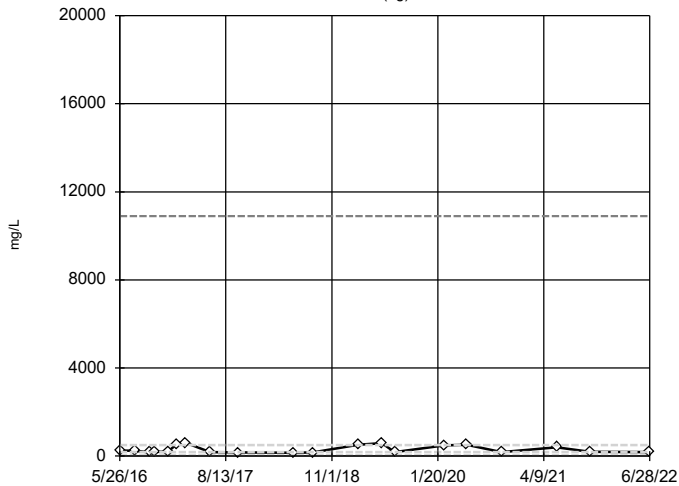


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1270, low cutoff = -2.507, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-1 (bg)

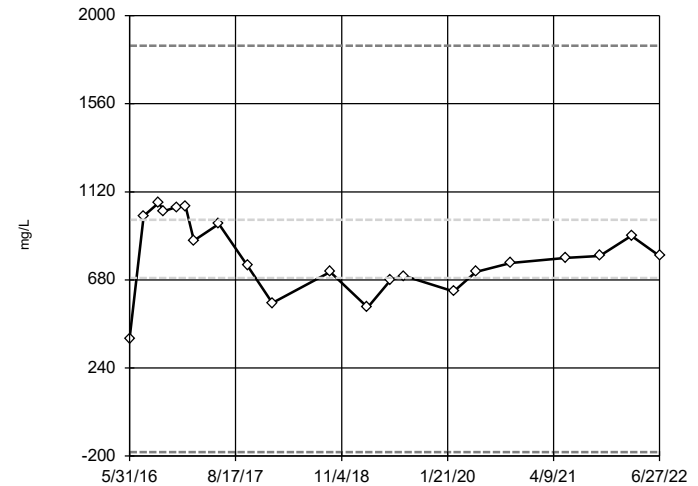


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 10899, low cutoff = 8.131, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-11

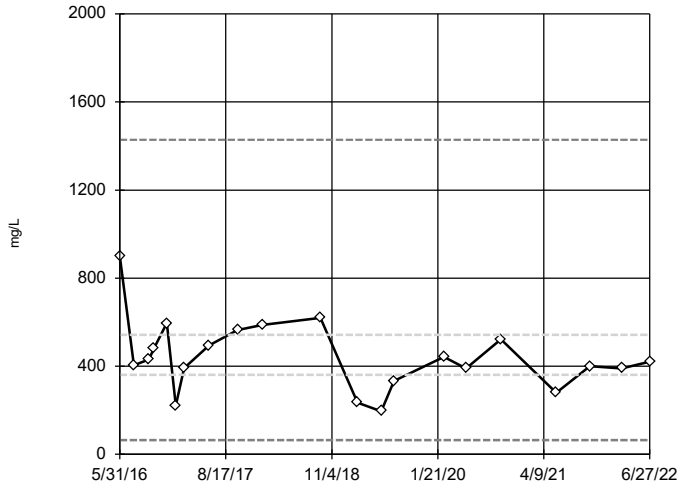


n = 21
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 1850, low cutoff = -180, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-13

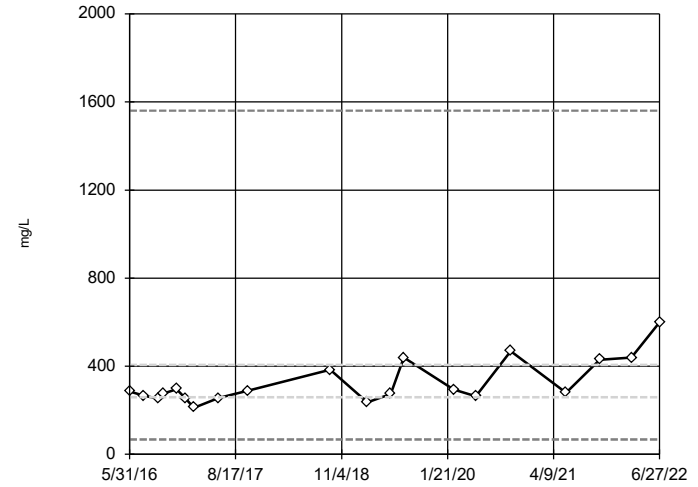


n = 21
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1428, low cutoff = 64.86, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-14

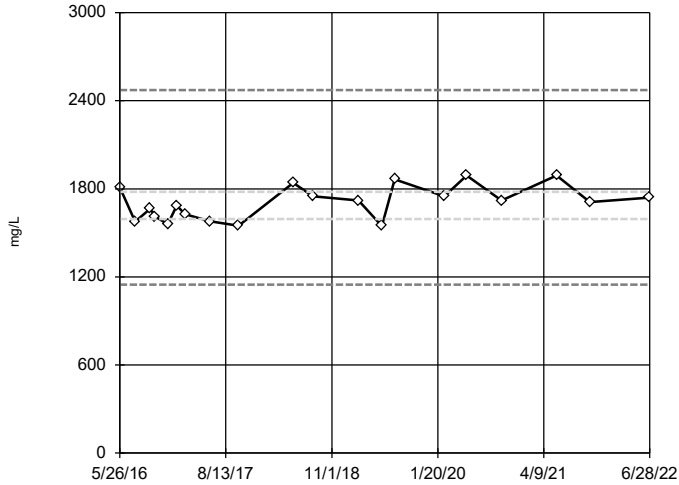


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1561, low cutoff = 67.56, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-17 (bg)

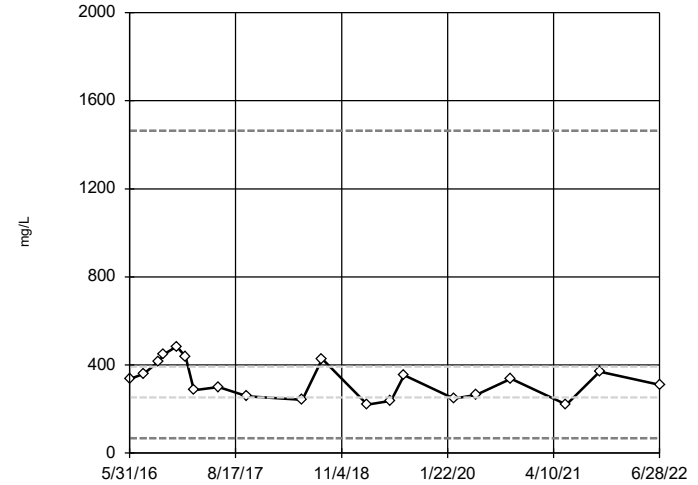


n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 2473, low cutoff = 1148, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening

AD-5 (bg)



n = 20
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1464, low cutoff = 67.8, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Analysis - Upgradient Wells - Significant Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 11:06 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Chromium, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.068	NP	NaN	63	0.00163	0.008526	In(x)	ShapiroFrancia
Fluoride, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.583,0.5399,0.085,0.09,0.09	NP	NaN	66	0.2197	0.08753	In(x)	ShapiroFrancia
Lead, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.003384,0.000852,0.0011,0.00...	NP	NaN	63	0.0002888	0.0005141	In(x)	ShapiroFrancia
Mercury, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.000033,0.00001773,0.0000152...	NP	NaN	63	0.000007205	0.000005973	In(x)	ShapiroFrancia

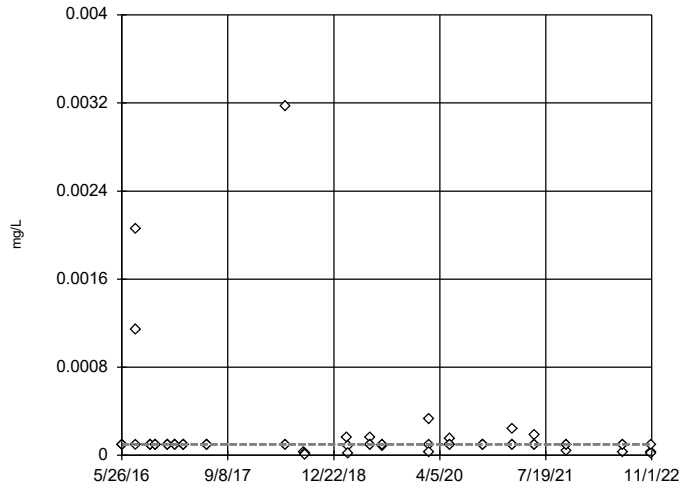
Tukey's Outlier Analysis - Upgradient Wells - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 11:06 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-1,AD-17,AD-5	n/a	n/a	NP	NaN	63	0.0001947	0.0004732	unknown	ShapiroFrancia
Arsenic, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.002556	0.001952	ln(x)	ShapiroFrancia
Barium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.1055	0.1271	ln(x)	ShapiroFrancia
Beryllium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.0002176	0.0002374	ln(x)	ShapiroFrancia
Boron, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	66	0.2416	0.2468	ln(x)	ShapiroFrancia
Cadmium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.0005197	0.001325	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.068	NP	NaN	63	0.00163	0.008526	ln(x)	ShapiroFrancia
Cobalt, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.02345	0.02626	x^(1/3)	ShapiroFrancia
Combined Radium 226 + 228 (pCi/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	2.256	1.044	x^(1/3)	ShapiroFrancia
Fluoride, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.583,0.5399,0.085,0.09,0.09	NP	NaN	66	0.2197	0.08753	ln(x)	ShapiroFrancia
Lead, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.003384,0.000852,0.0011,0.00...	NP	NaN	63	0.0002888	0.0005141	ln(x)	ShapiroFrancia
Lithium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.1513	0.1299	sqrt(x)	ShapiroFrancia
Mercury, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.000033,0.00001773,0.0000152...	NP	NaN	63	0.000007205	0.000005973	ln(x)	ShapiroFrancia
Molybdenum, total (mg/L)	AD-1,AD-17,AD-5	n/a	n/a	NP	NaN	63	0.0006775	0.0006766	unknown	ShapiroFrancia
pH, field (SU)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	66	5.853	0.637	x^(1/3)	ShapiroFrancia
Selenium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	0.001306	0.001756	ln(x)	ShapiroFrancia
Total Dissolved Solids (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	63	777.3	671.7	ln(x)	ShapiroFrancia

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

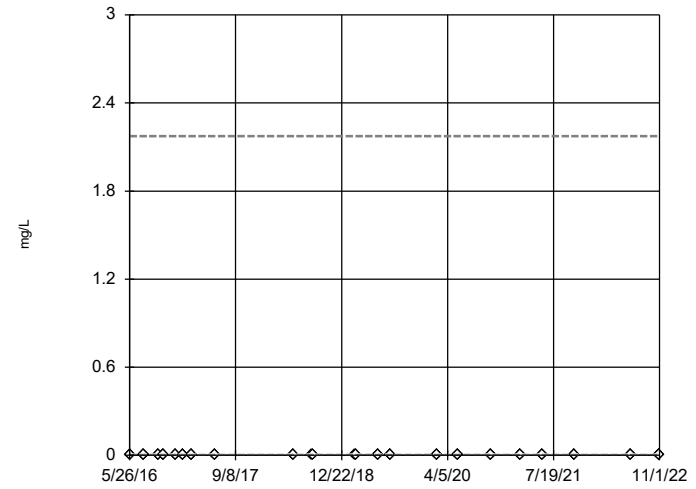


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

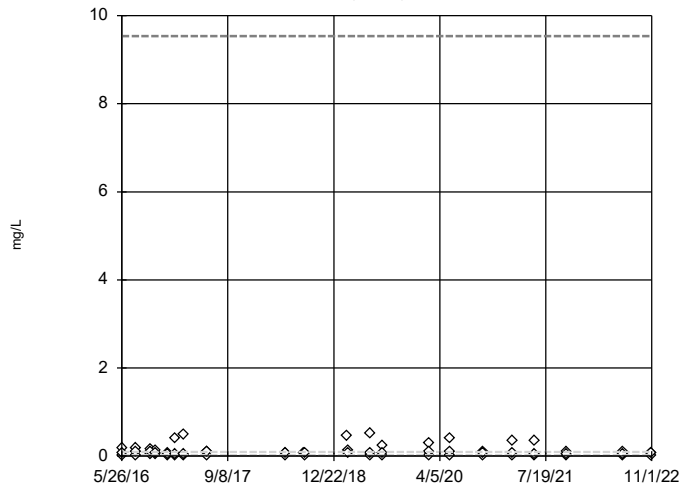


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 2.174, low cutoff = 0.000001518, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

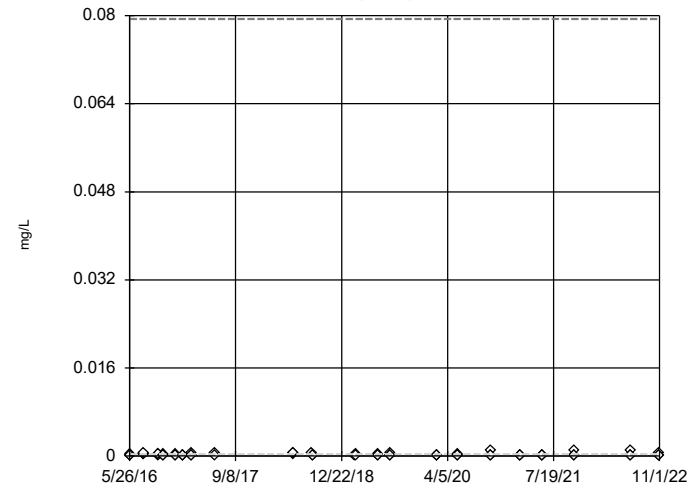


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.537, low cutoff = 0.000196, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

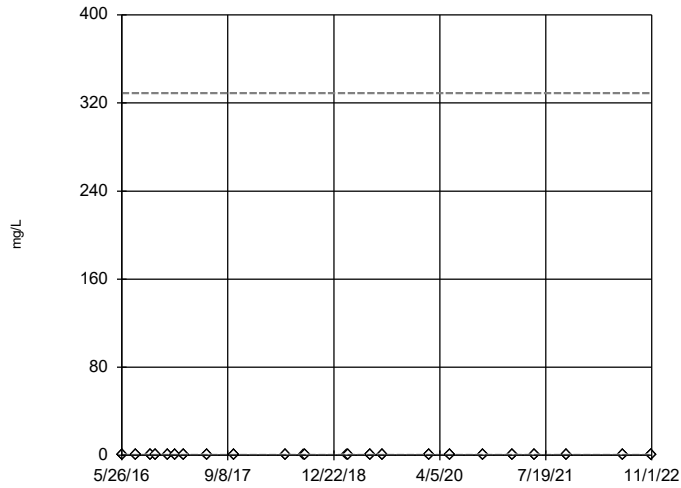


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0794, low cutoff = 2.0e-7, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

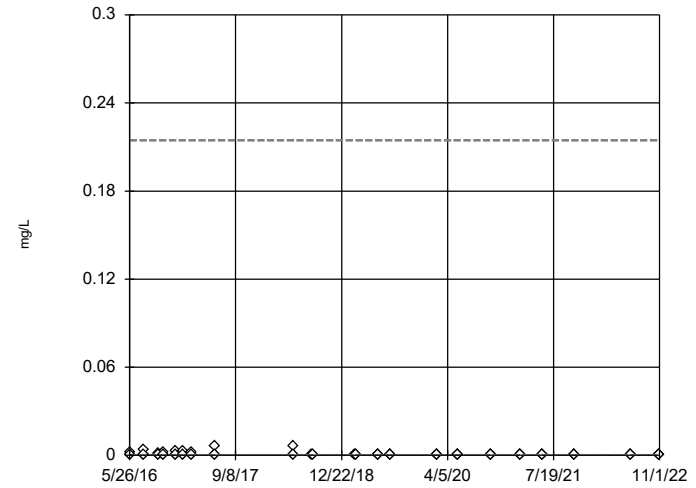


n = 66
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 329, low cutoff = 0.00005813, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

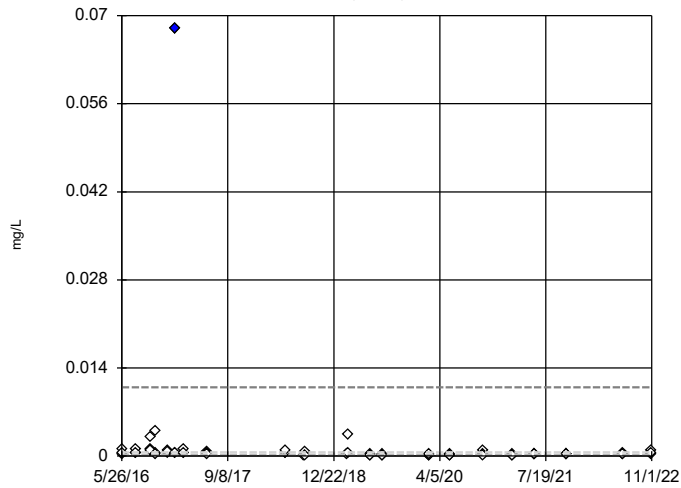


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.2146, low cutoff = 1.9e-8, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

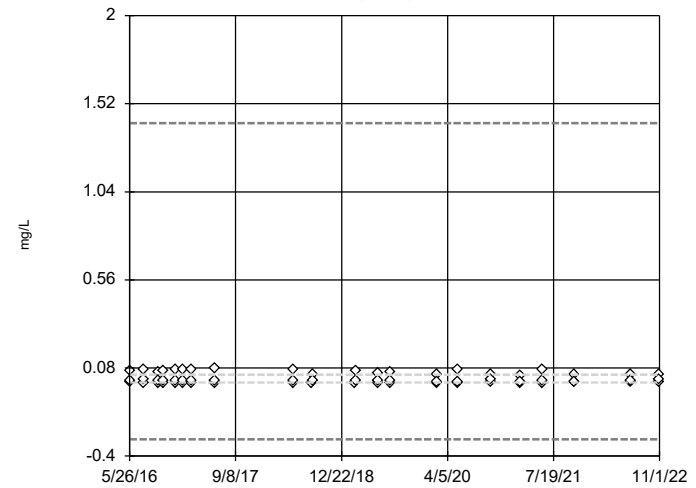


n = 63
 Outlier is drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01094, low cutoff = 0.0000127, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

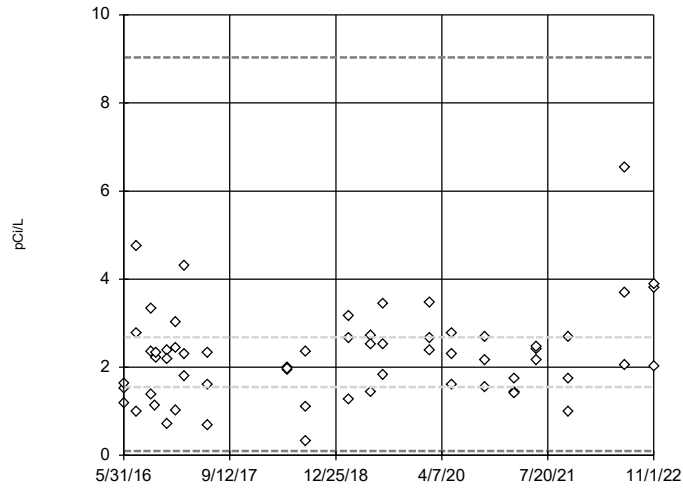


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1.415, low cutoff = -0.3091, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

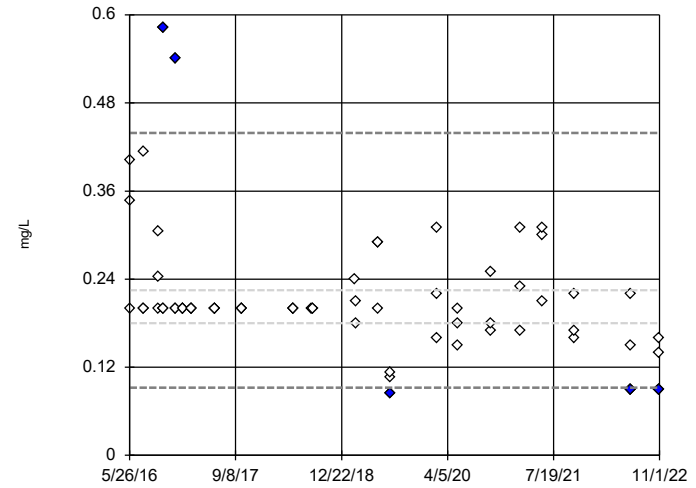


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.035, low cutoff = 0.09995, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

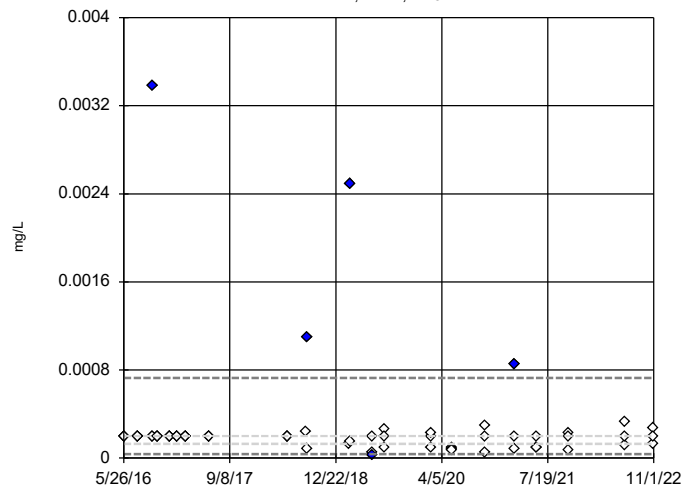


n = 66
 Outliers are drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.439, low cutoff = 0.09223, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

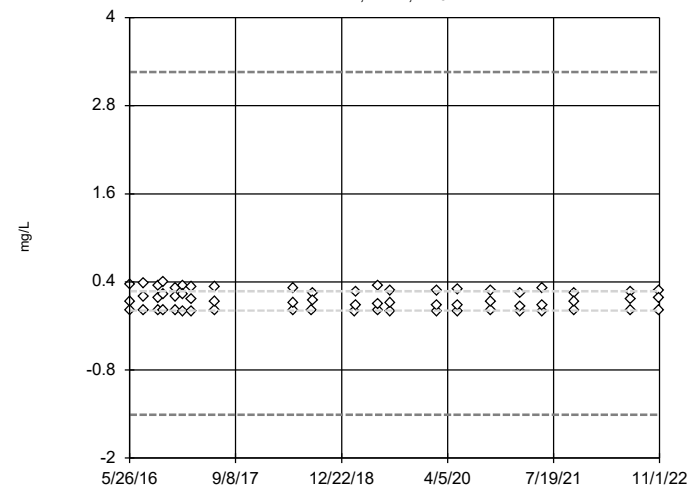


n = 63
 Outliers are drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0007283, low cutoff = 0.0000357, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

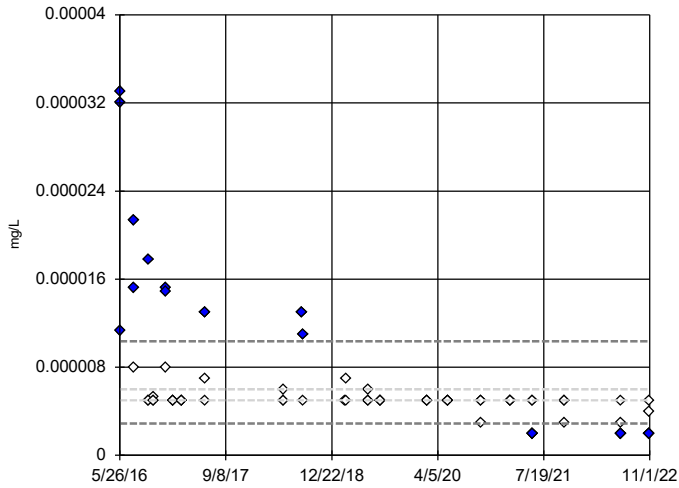


n = 63
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 3.258, low cutoff = -1.41, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

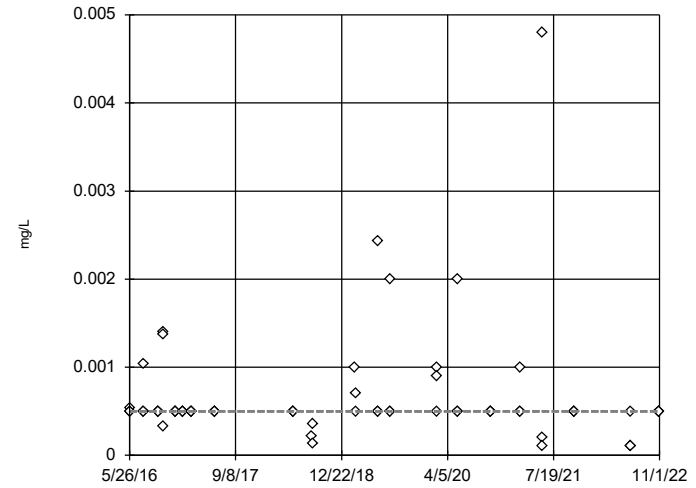


n = 63
 Outliers are drawn as solid. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.00001037, low cutoff = 0.000002894, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

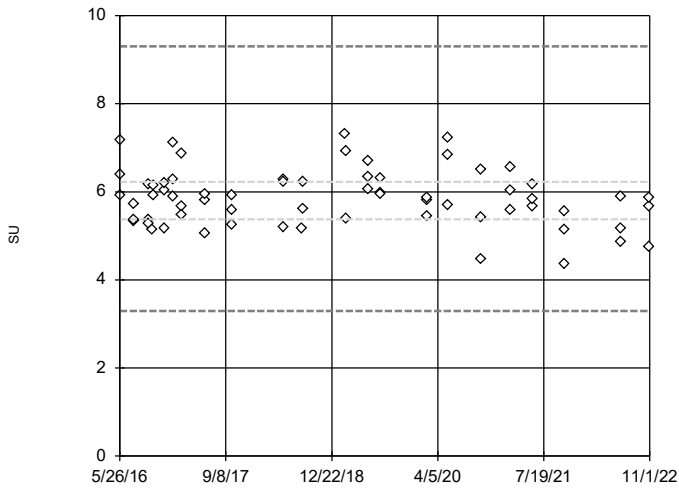


n = 63
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Molybdenum, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

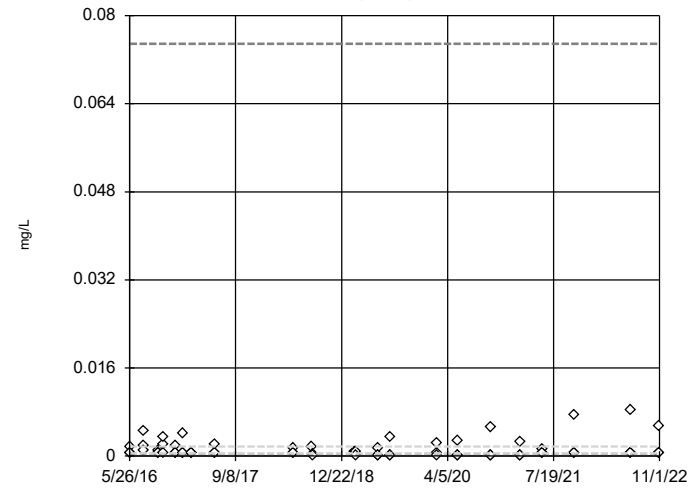


n = 66
 No outliers found. Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.302, low cutoff = 3.295, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

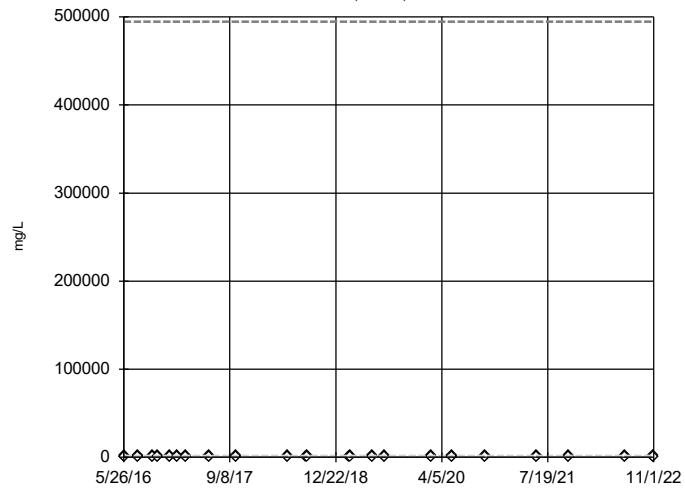


n = 63
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0749, low cutoff = 0.00001168, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5



n = 63

No outliers found.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

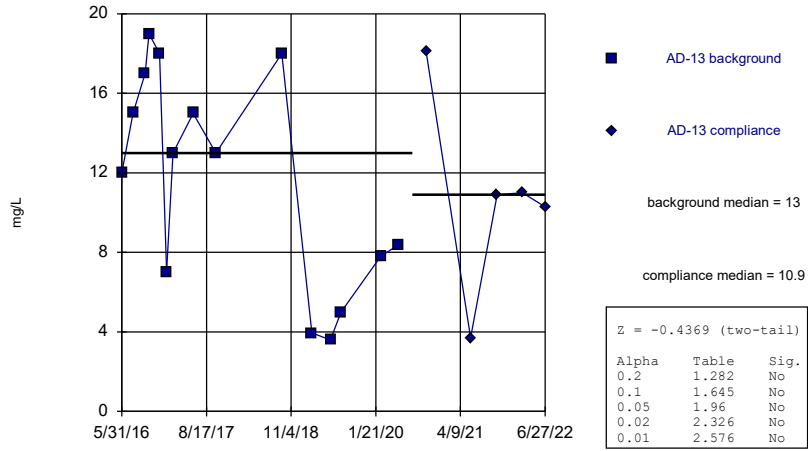
High cutoff = 494614,
low cutoff = 0.7789, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE D
Mann-Whitney

Mann-Whitney (Wilcoxon Rank Sum)

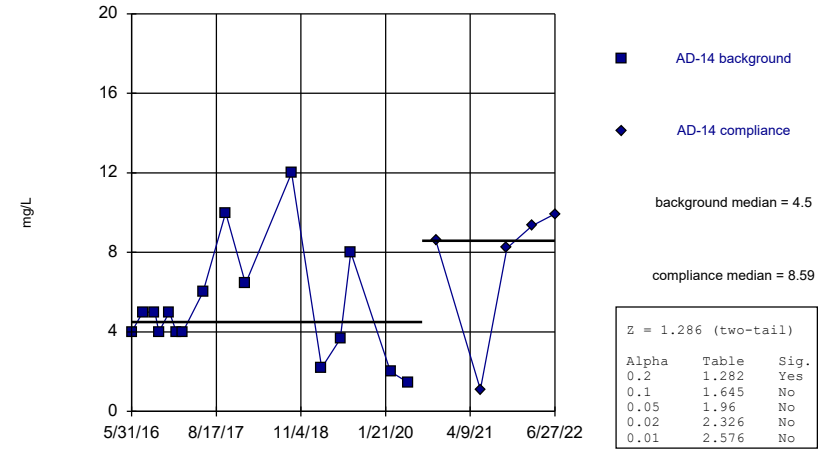
AD-13



Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

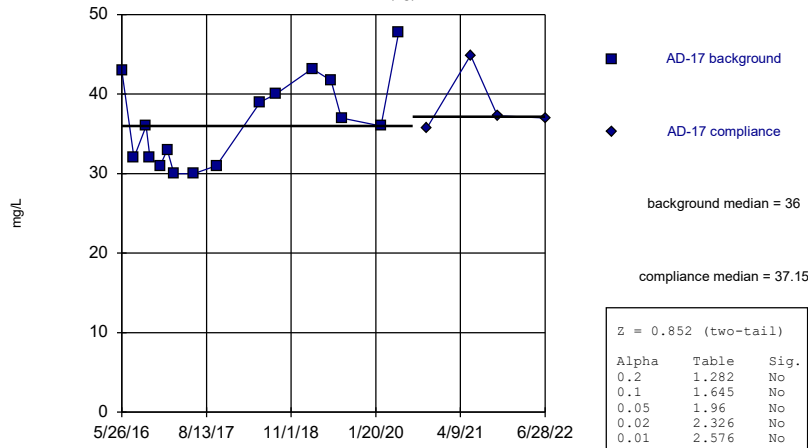
AD-14



Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

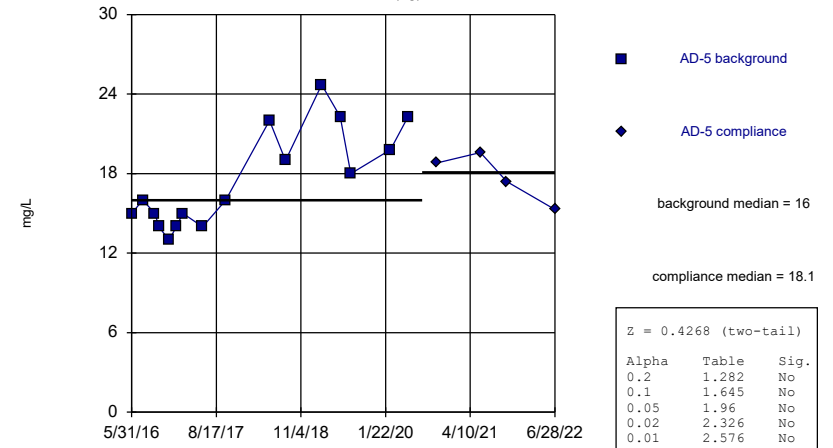
AD-17 (bg)



Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

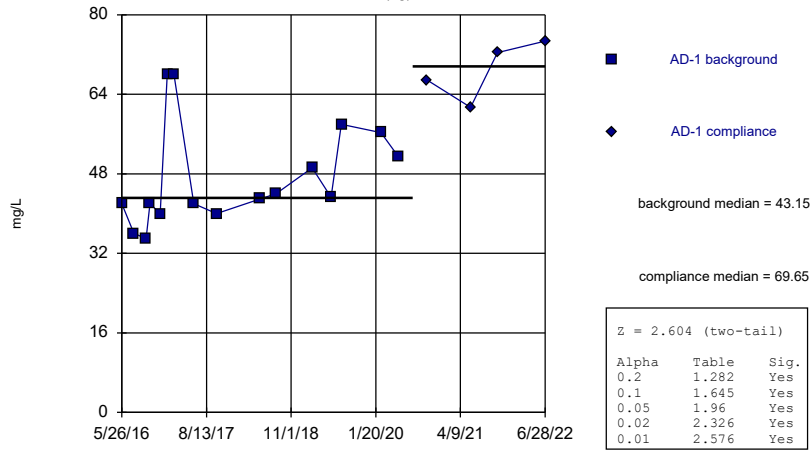
AD-5 (bg)



Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

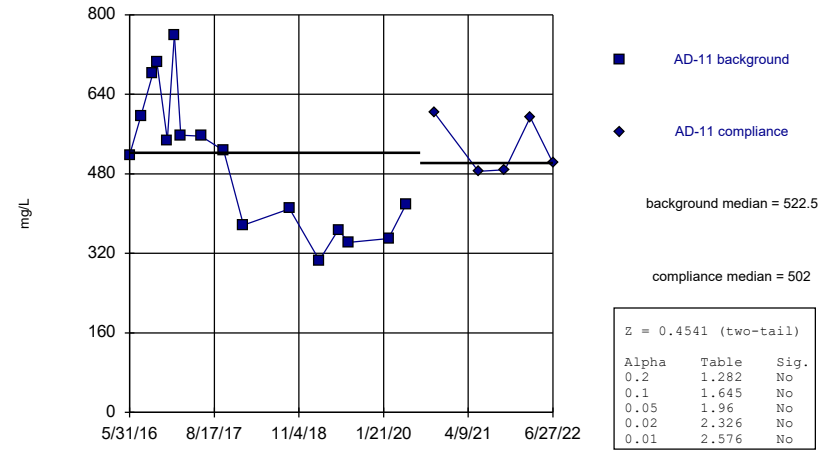
AD-1 (bg)



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

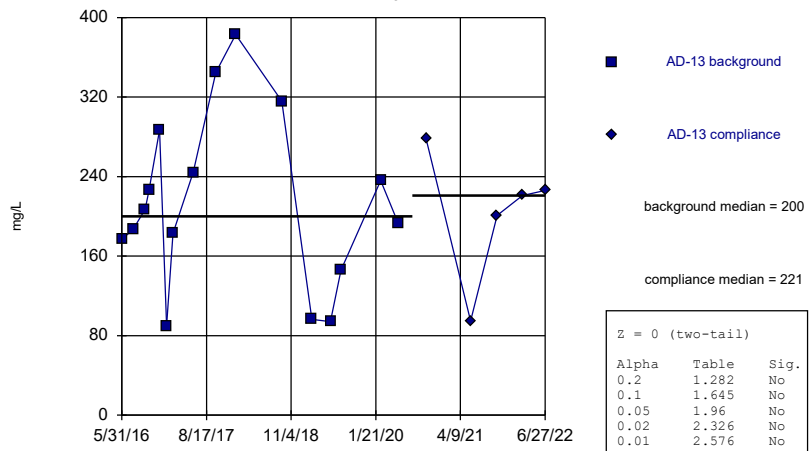
AD-11



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

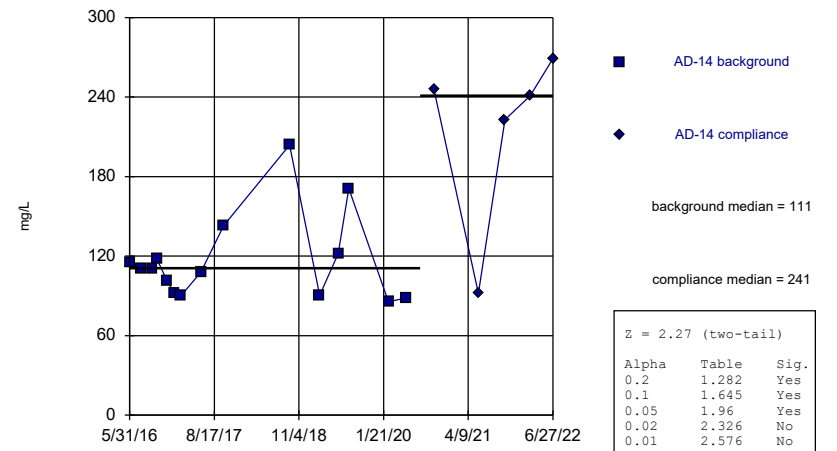
AD-13



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

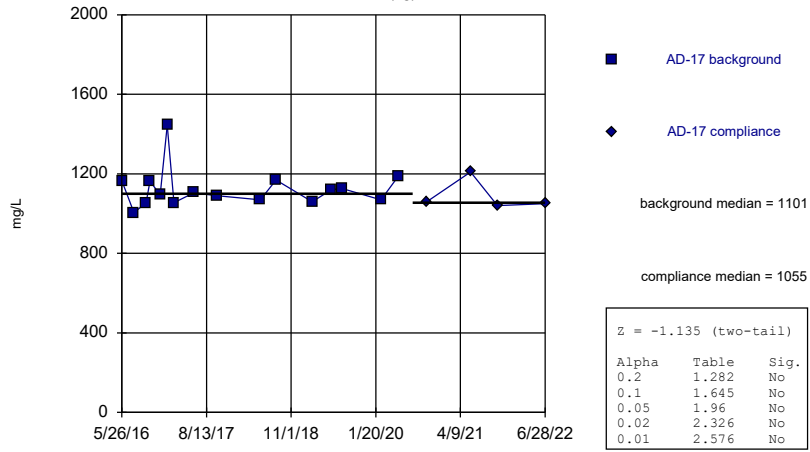
AD-14



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

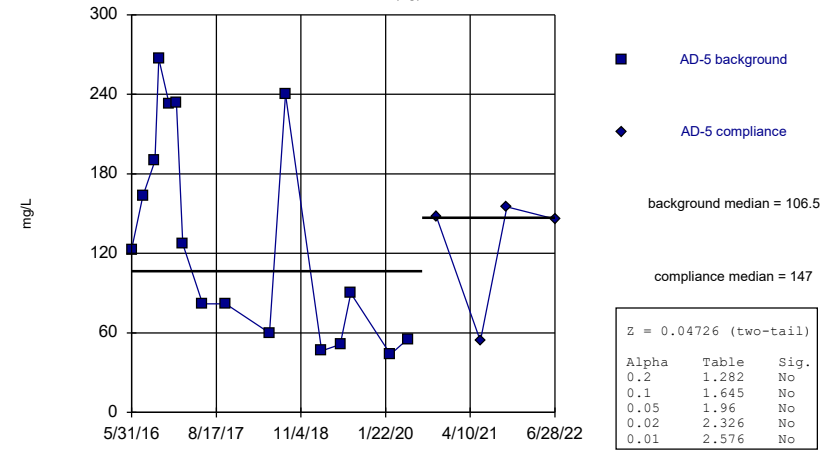
AD-17 (bg)



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

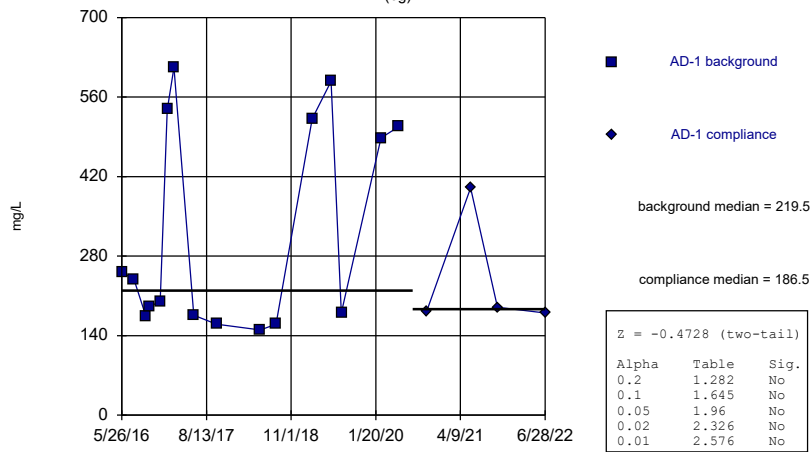
AD-5 (bg)



Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

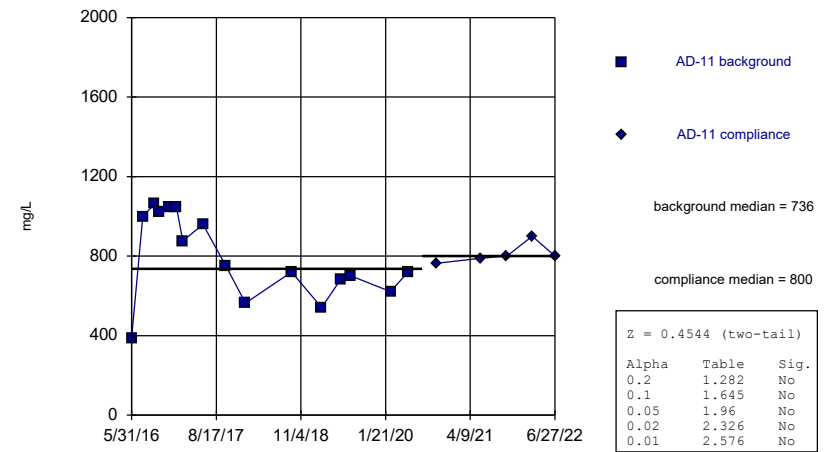
AD-1 (bg)



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

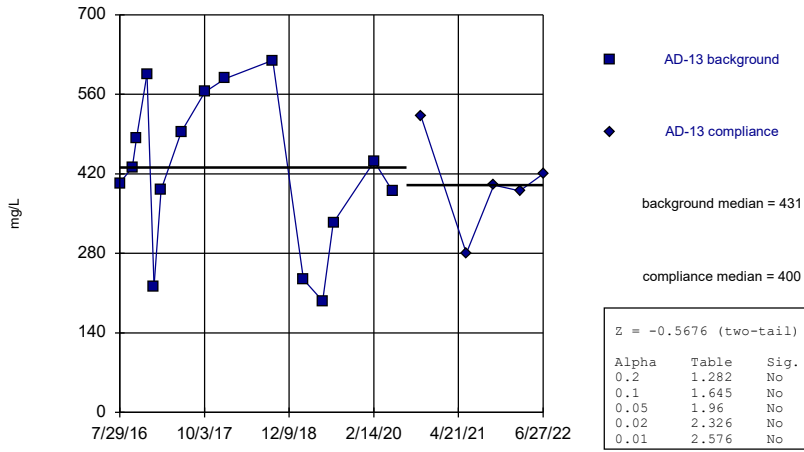
AD-11



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

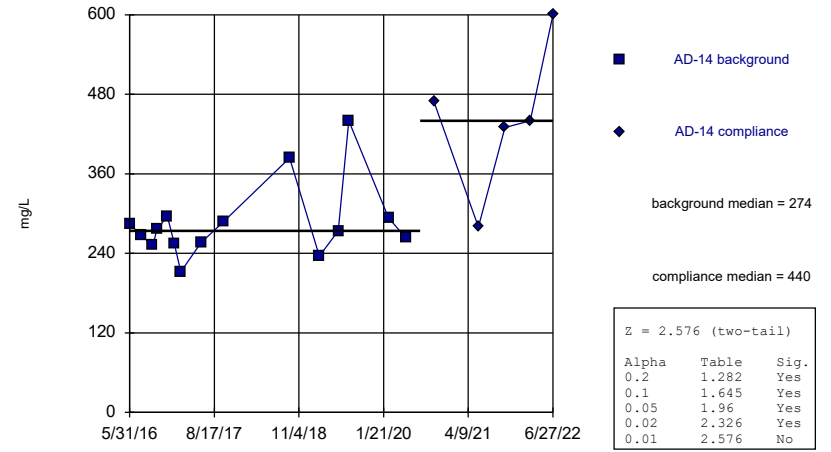
AD-13



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

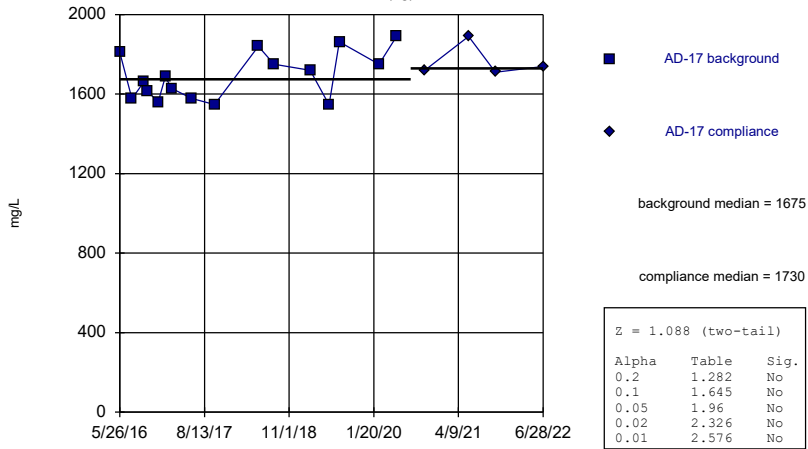
AD-14



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

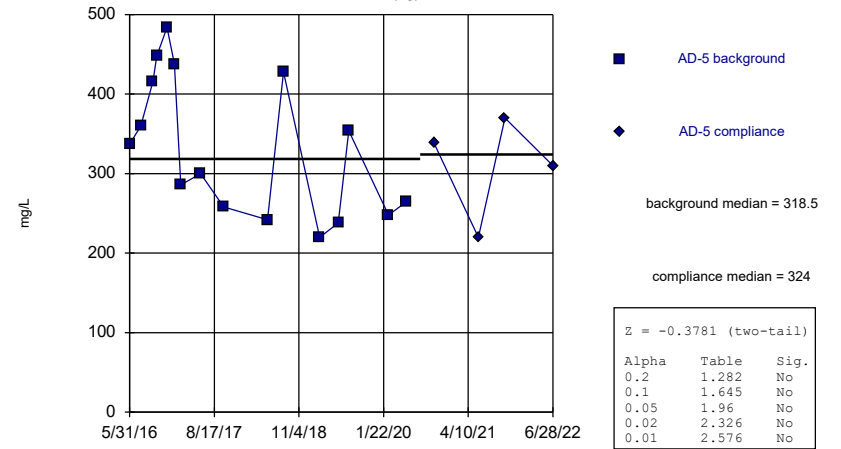
AD-17 (bg)



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Mann-Whitney (Wilcoxon Rank Sum)

AD-5 (bg)



Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE E
Intrawell PL

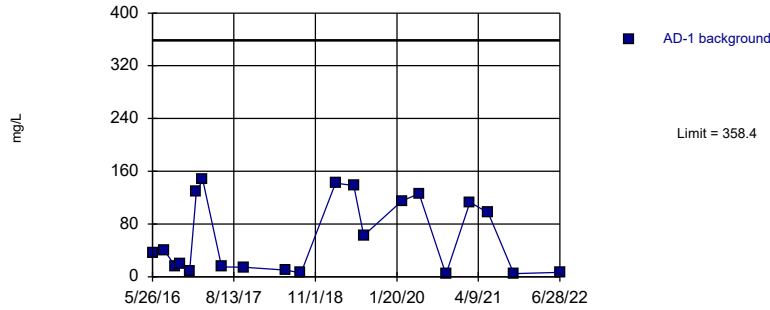
Intrawell Prediction Limit - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/7/2023, 12:59 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-1	358.4	n/a	n/a	1 future	n/a	21	3.437	1.3	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-11	24.51	n/a	n/a	1 future	n/a	22	2.332	0.4638	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-13	40.74	n/a	n/a	1 future	n/a	22	2.15	0.833	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-14	26.85	n/a	n/a	1 future	n/a	22	2.88	1.231	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-17	232.6	n/a	n/a	1 future	n/a	21	194.7	20.17	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-5	53.13	n/a	n/a	1 future	n/a	21	38.6	7.729	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-1	6.989	n/a	n/a	1 future	n/a	20	1.862	0.413	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-11	13.65	n/a	n/a	1 future	n/a	20	9.606	2.138	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-13	21.31	n/a	n/a	1 future	n/a	20	11.49	5.192	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-14	11.54	n/a	n/a	1 future	n/a	21	5.71	3.1	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-17	46.83	n/a	n/a	1 future	n/a	20	36.88	5.261	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-5	23.96	n/a	n/a	1 future	n/a	20	17.56	3.38	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-1	76.11	n/a	n/a	1 future	n/a	20	51.68	12.91	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-11	744.7	n/a	n/a	1 future	n/a	21	509.3	125.2	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-13	364.5	n/a	n/a	1 future	n/a	21	211	81.64	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-14	269	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Sulfate, total (mg/L)	AD-17	1445	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Sulfate, total (mg/L)	AD-5	267.7	n/a	n/a	1 future	n/a	20	129.5	73.02	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-1	612	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Total Dissolved Solids (mg/L)	AD-11	1147	n/a	n/a	1 future	n/a	21	798	185.4	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-13	655.6	n/a	n/a	1 future	n/a	20	420.1	124.5	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-14	526.7	n/a	n/a	1 future	n/a	20	5.744	0.2761	0	None	ln(x)	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-17	1921	n/a	n/a	1 future	n/a	20	1704	114.5	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-5	484	n/a	n/a	1 future	n/a	20	328	82.5	0	None	No	0.002505	Param Intra 1 of 2

Prediction Limit

Intrawell Parametric, AD-1 (bg)

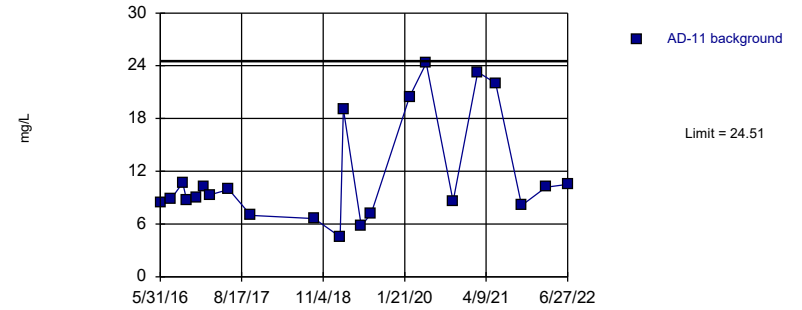


Background Data Summary (based on natural log transformation): Mean=3.437, Std. Dev.=1.3, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8865, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

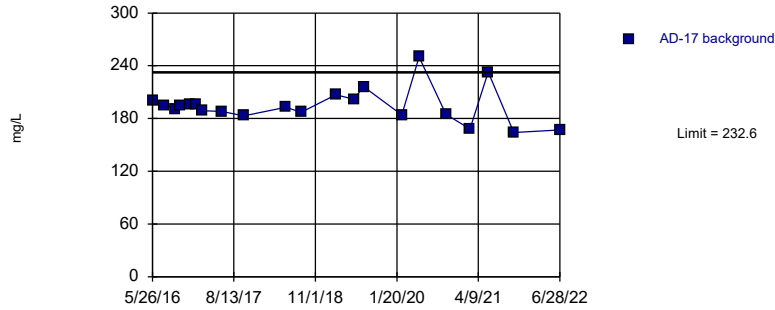
Prediction Limit

Intrawell Parametric, AD-11



Prediction Limit

Intrawell Parametric, AD-17 (bg)

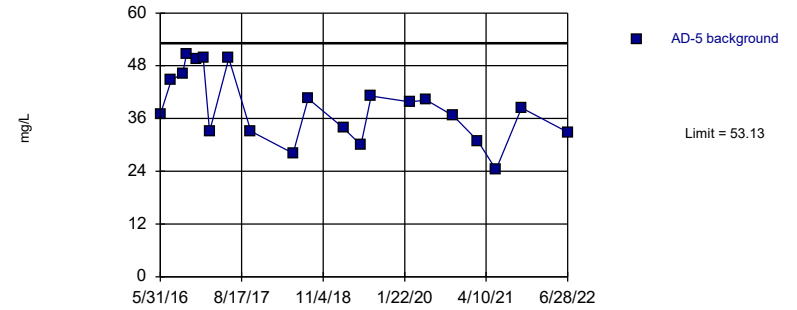


Background Data Summary: Mean=194.7, Std. Dev.=20.17, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9017, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-5 (bg)

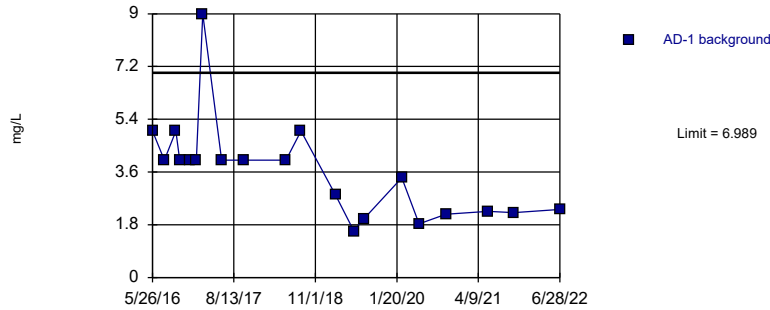


Background Data Summary: Mean=38.6, Std. Dev.=7.729, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9562, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

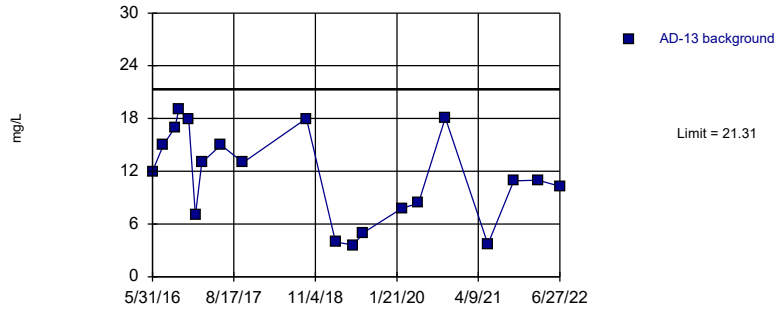
Prediction Limit

Intrawell Parametric, AD-1 (bg)



Prediction Limit

Intrawell Parametric, AD-13

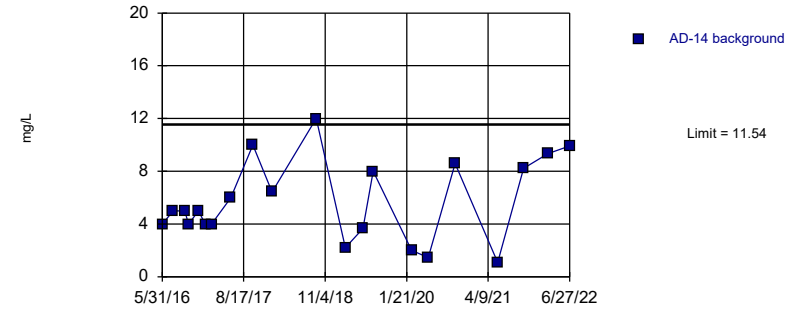


Background Data Summary: Mean=11.49, Std. Dev.=5.192, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9315, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-14

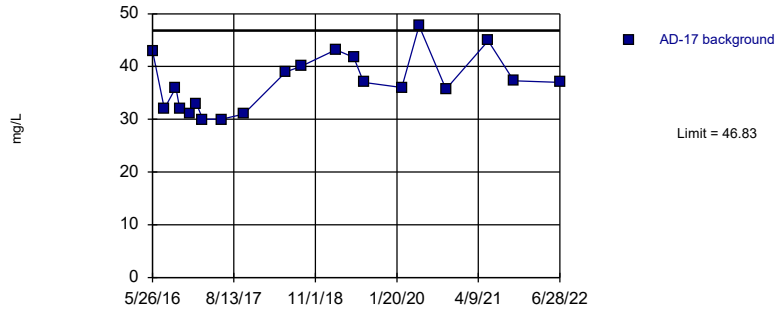


Background Data Summary: Mean=5.71, Std. Dev.=3.1, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9514, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-17 (bg)

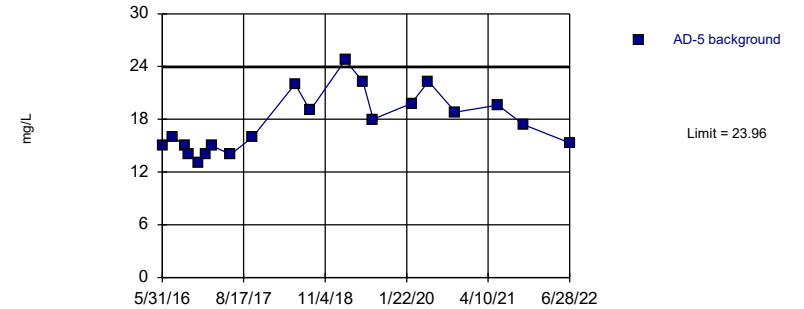


Background Data Summary: Mean=36.88, Std. Dev.=5.261, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9435, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-5 (bg)

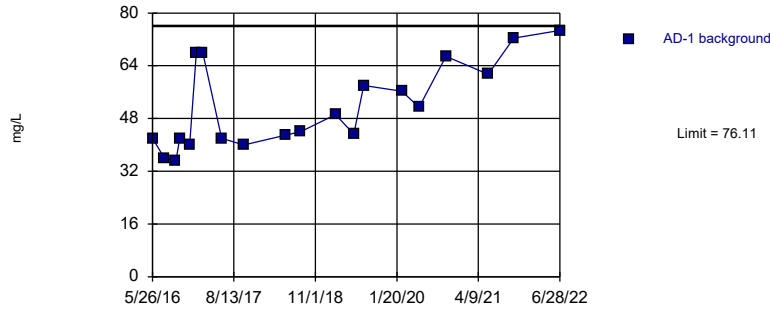


Background Data Summary: Mean=17.56, Std. Dev.=3.38, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9265, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-1 (bg)

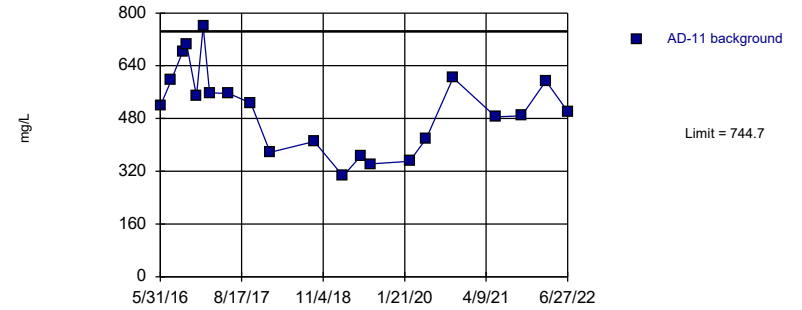


Background Data Summary: Mean=51.68, Std. Dev.=12.91, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8957, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-11

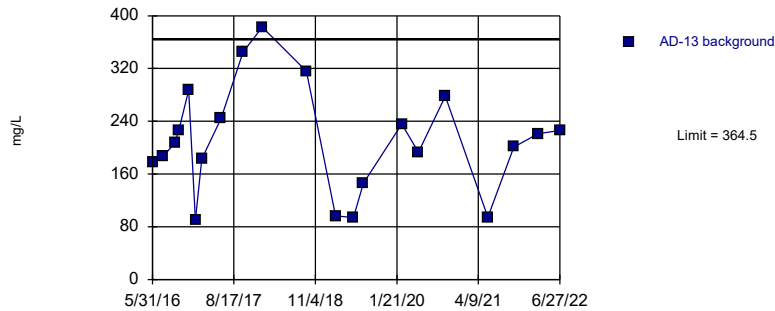


Background Data Summary: Mean=509.3, Std. Dev.=125.2, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9698, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-13

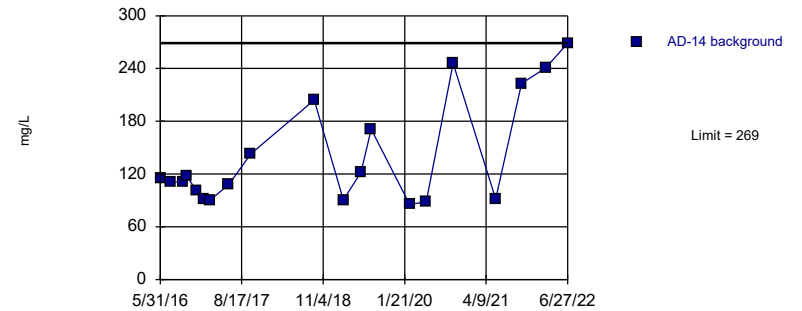


Background Data Summary: Mean=211, Std. Dev.=81.64, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9558, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

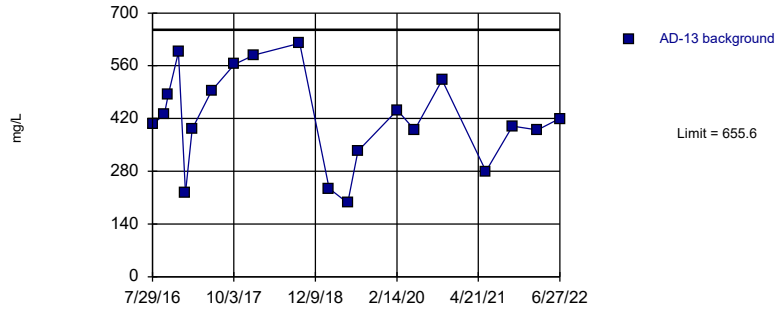
Intrawell Non-parametric, AD-14



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 20 background values. Well-constituent pair annual alpha = 0.008564. Individual comparison alpha = 0.004291 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

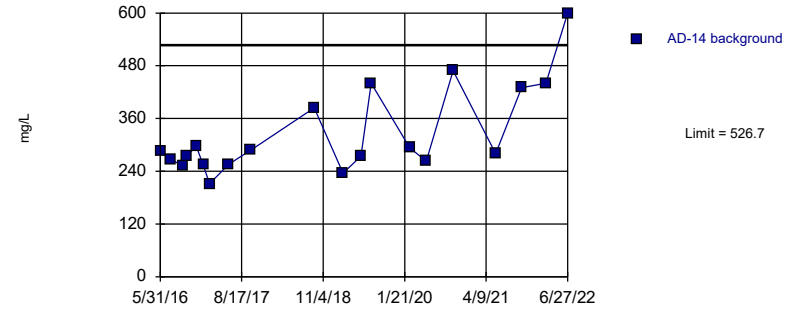
Prediction Limit
Intrawell Parametric, AD-13



Background Data Summary: Mean=420.1, Std. Dev.=124.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.868. Kappa = 1.892 (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 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

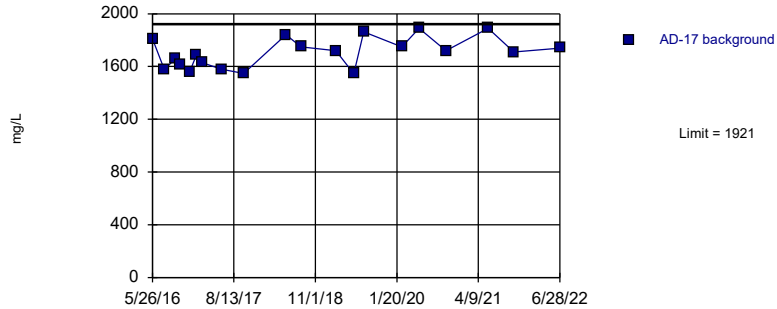
Prediction Limit
Intrawell Parametric, AD-14



Background Data Summary (based on natural log transformation): Mean=5.744, Std. Dev.=0.2761, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.868. Kappa = 1.892 (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 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

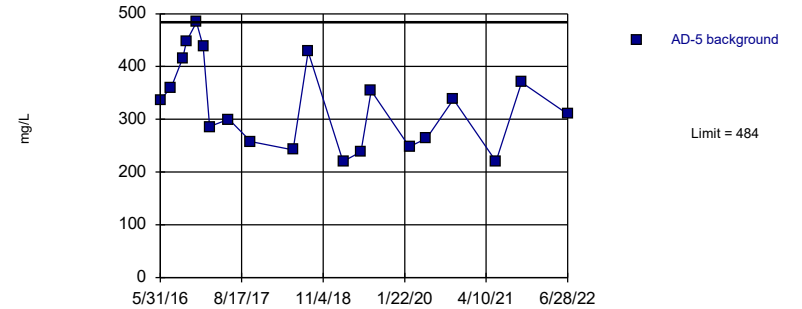
Prediction Limit
Intrawell Parametric, AD-17 (bg)



Background Data Summary: Mean=1704, Std. Dev.=114.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9349, critical = 0.868. Kappa = 1.892 (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 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit
Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=328, Std. Dev.=82.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9369, critical = 0.868. Kappa = 1.892 (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 2/7/2023 12:58 PM View: Intrawell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE F
Upgradient Trend Test

Trend Test - Significant Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 11:39 AM

<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)	0.0668	121	92	Yes	22	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-1 (bg)	-0.1434	-128	-92	Yes	22	50	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-17 (bg)	-0.0265	-139	-92	Yes	22	31.82	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-5 (bg)	-0.05011	-123	-92	Yes	22	40.91	n/a	n/a	0.01	NP
pH, field (SU)	AD-17 (bg)	-0.1264	-112	-92	Yes	22	0	n/a	n/a	0.01	NP

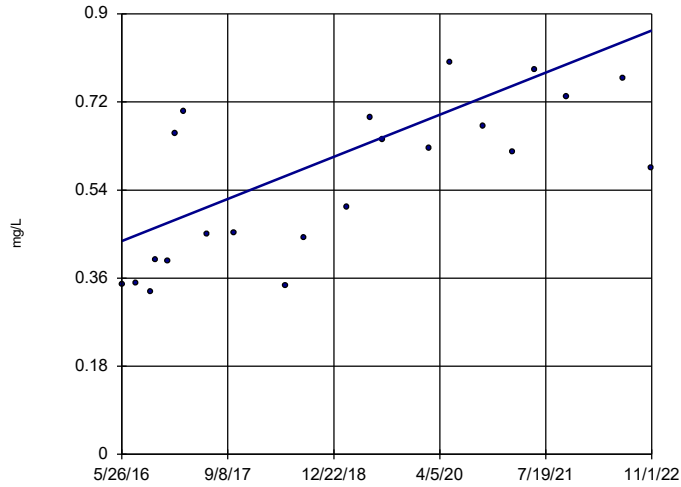
Trend Test - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 11:39 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-1 (bg)	0.0668	121	92	Yes	22	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-17 (bg)	-0.003145	-67	-92	No	22	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-5 (bg)	-0.0004375	-41	-92	No	22	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-1 (bg)	-0.1434	-128	-92	Yes	22	50	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-17 (bg)	-0.0265	-139	-92	Yes	22	31.82	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-5 (bg)	-0.05011	-123	-92	Yes	22	40.91	n/a	n/a	0.01	NP
pH, field (SU)	AD-1 (bg)	-0.08036	-32	-92	No	22	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-17 (bg)	-0.1264	-112	-92	Yes	22	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-5 (bg)	0.02743	19	92	No	22	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

AD-1 (bg)



Sen's Slope Estimator

AD-5 (bg)

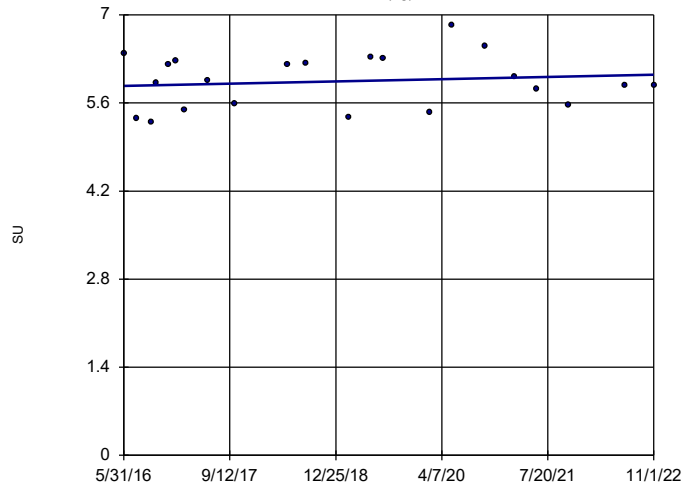


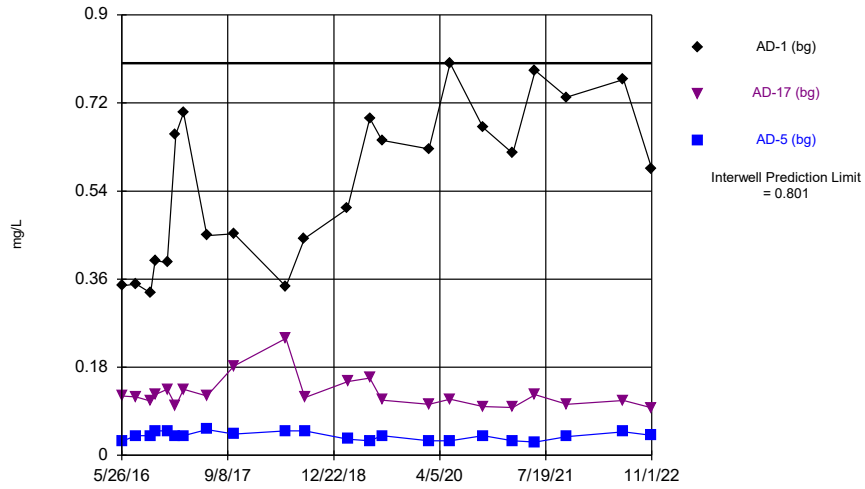
FIGURE G
Interwell PL

Interwell Prediction Limit - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/3/2023, 2:34 PM

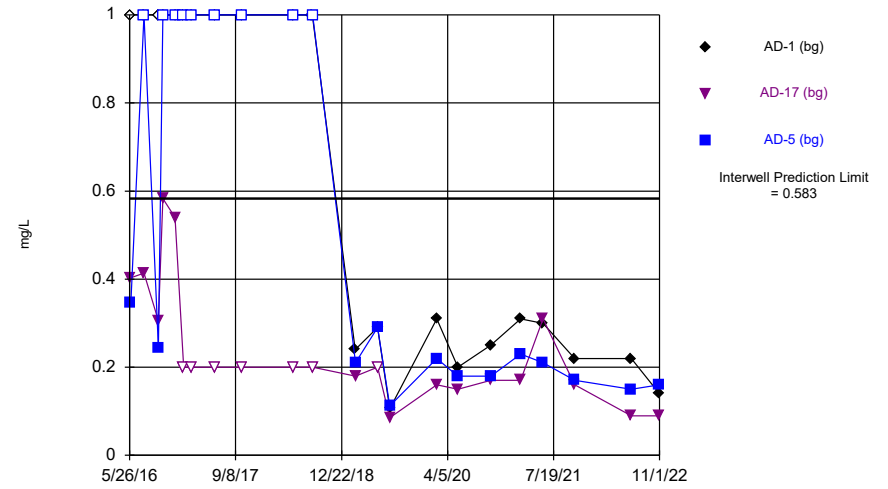
<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bq N</u>	<u>Bq Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	n/a	0.801	n/a	n/a	3 future	n/a	66	n/a	n/a	0	n/a	n/a	0.0004437	NP Inter (normality) 1 of 2
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	3 future	n/a	66	n/a	n/a	40.91	n/a	n/a	0.0004437	NP Inter (normality) 1 of 2
pH, field (SU)	n/a	6.936	4.77	n/a	3 future	n/a	66	5.853	0.637	0	None	No	0.001253	Param Inter 1 of 2

Time Series



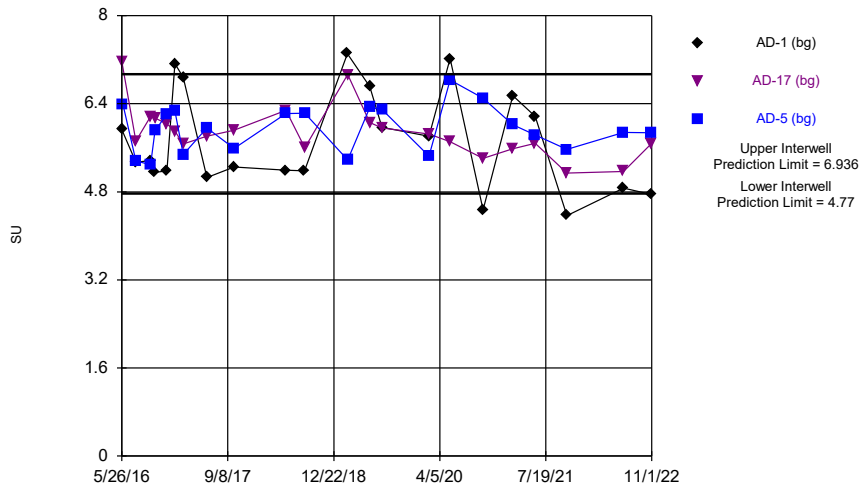
Constituent: Boron, total Analysis Run 2/9/2023 10:15 AM View: Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



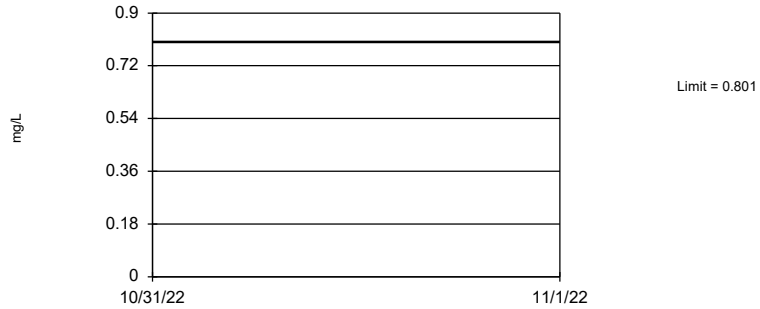
Constituent: Fluoride, total Analysis Run 2/9/2023 10:16 AM View: Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



Constituent: pH, field Analysis Run 2/9/2023 10:17 AM View: Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

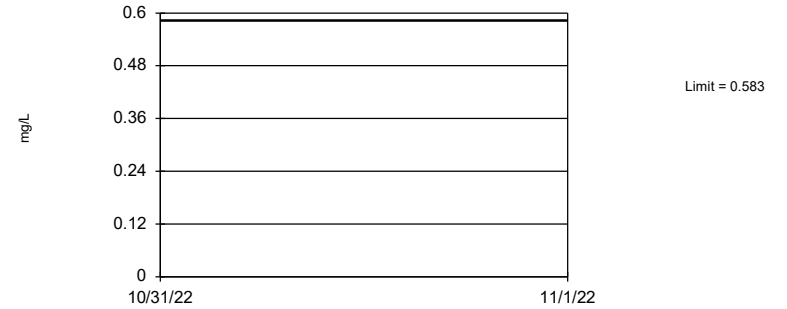
Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 66 background values. Annual per-constituent alpha = 0.002659. Individual comparison alpha = 0.0004437 (1 of 2). Assumes 3 future values.

Constituent: Boron, total Analysis Run 2/3/2023 2:33 PM View: Interwell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

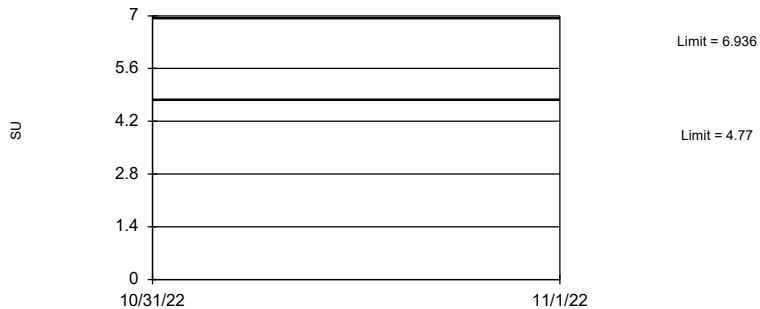
Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 66 background values. 40.91% NDs. Annual per-constituent alpha = 0.002659. Individual comparison alpha = 0.0004437 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 2/3/2023 2:33 PM View: Interwell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit Interwell Parametric



Background Data Summary: Mean=5.853, Std. Dev.=0.637, n=66. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9836, critical = 0.948. Kappa = 1.7 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001253. Assumes 3 future values.

Constituent: pH, field Analysis Run 2/3/2023 2:33 PM View: Interwell PL
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE H
UTL

Upper Tolerance Limits

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 12:20 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg.N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00317	n/a	n/a	n/a	63	68.25	n/a	0.0395	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.00628	n/a	n/a	n/a	63	30.16	n/a	0.0395	NP Inter(normality)
Barium, total (mg/L)	n/a	0.5643	n/a	n/a	n/a	63	0	ln(x)	0.05	Inter
Beryllium, total (mg/L)	n/a	0.001123	n/a	n/a	n/a	63	6.349	ln(x)	0.05	Inter
Cadmium, total (mg/L)	n/a	0.004	n/a	n/a	n/a	61	32.79	n/a	0.04377	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.002329	n/a	n/a	n/a	62	14.52	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.0748	n/a	n/a	n/a	63	0	n/a	0.0395	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	4.605	n/a	n/a	n/a	63	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	n/a	66	40.91	n/a	0.03387	NP Inter(normality)
Lead, total (mg/L)	n/a	0.003384	n/a	n/a	n/a	63	52.38	n/a	0.0395	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.394	n/a	n/a	n/a	63	1.587	n/a	0.0395	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000033	n/a	n/a	n/a	63	60.32	n/a	0.0395	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.00243	n/a	n/a	n/a	62	67.74	n/a	0.04158	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.00835	n/a	n/a	n/a	63	39.68	n/a	0.0395	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.001251	n/a	n/a	n/a	63	87.3	n/a	0.0395	NP Inter(NDs)

FIGURE I
GWPS

WELSH LANDFILL 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	0.56	2
Beryllium, Total (mg/L)	0.004	0.0011	0.004
Cadmium, Total (mg/L)	0.005	0.004	0.005
Chromium, Total (mg/L)	0.1	0.0023	0.1
Cobalt, Total (mg/L)	n/a	0.075	0.075
Combined Radium, Total (pCi/L)	5	4.61	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	0.0084	0.05
Thallium, Total (mg/L)	0.002	0.0013	0.002

*MCL = Maximum Contaminant Level

*GWPS = Groundwater Protection Standard

FIGURE J
Confidence Intervals

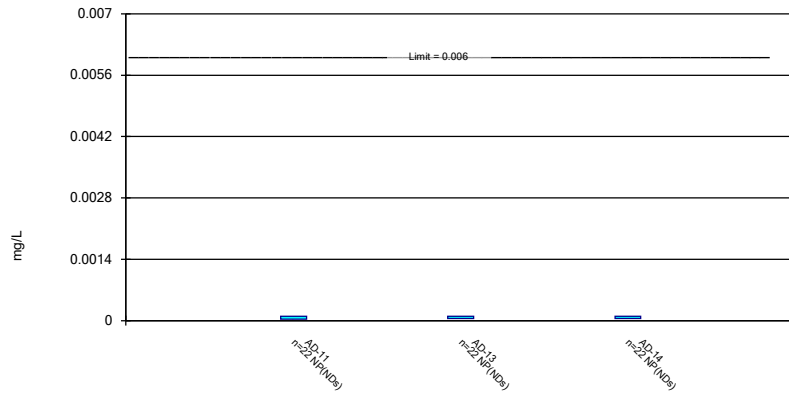
Confidence Interval - All Results (No Significant)

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/3/2023, 2:38 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-11	0.0001	0.00003	0.006	No	22	63.64	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-13	0.0001	0.00005	0.006	No	22	59.09	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-14	0.0001	0.00005	0.006	No	22	63.64	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-11	0.0026	0.00055	0.01	No	22	27.27	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-13	0.005	0.00052	0.01	No	22	31.82	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-14	0.005	0.00039	0.01	No	22	31.82	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-11	0.02537	0.01392	2	No	22	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-13	0.05739	0.02668	2	No	22	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-14	0.04303	0.02974	2	No	22	0	None	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-11	0.002693	0.001155	0.004	No	22	0	None	x^(1/3)	0.01	Param.
Beryllium, total (mg/L)	AD-13	0.0007683	0.0004638	0.004	No	22	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-14	0.0008229	0.0004168	0.004	No	22	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-11	0.0003904	0.0002658	0.005	No	22	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-13	0.0001413	0.00007211	0.005	No	22	18.18	Kaplan-Meier	ln(x)	0.01	Param.
Cadmium, total (mg/L)	AD-14	0.001679	0.0006122	0.005	No	22	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-11	0.0007493	0.000306	0.1	No	21	0	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-13	0.00064	0.00031	0.1	No	21	14.29	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-14	0.0006939	0.0003839	0.1	No	22	9.091	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-11	0.02111	0.01307	0.075	No	22	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-13	0.006906	0.003712	0.075	No	22	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-14	0.01448	0.006229	0.075	No	22	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-11	2.767	1.73	5	No	22	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-13	2.847	1.864	5	No	22	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-14	2.645	1.34	5	No	22	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-11	1.195	0.418	4	No	22	13.64	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-13	0.5972	0.3461	4	No	23	13.04	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-14	0.23	0.083	4	No	23	47.83	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-11	0.005	0.00069	0.0034	No	22	31.82	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-13	0.005	0.0001	0.0034	No	22	31.82	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-14	0.005	0.00013	0.0034	No	22	40.91	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-11	0.0335	0.02014	0.39	No	22	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-13	0.03058	0.01397	0.39	No	22	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-14	0.01525	0.01107	0.39	No	21	0	None	No	0.01	Param.
Mercury, total (mg/L)	AD-11	0.00002258	0.00000624	0.002	No	22	27.27	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-13	0.000007451	0.000002806	0.002	No	22	45.45	Kaplan-Meier	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-14	0.0001063	0.00001343	0.002	No	22	13.64	None	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-11	0.001519	0.0002	0.0024	No	22	81.82	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-13	0.0008705	0.0005	0.0024	No	22	59.09	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-14	0.0006	0.000497	0.0024	No	22	72.73	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-11	0.001796	0.001191	0.05	No	22	18.18	Kaplan-Meier	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	AD-13	0.001416	0.0006588	0.05	No	22	13.64	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-14	0.002801	0.001993	0.05	No	22	9.091	None	No	0.01	Param.
Thallium, total (mg/L)	AD-11	0.001317	0.00013	0.002	No	21	23.81	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-13	0.0002	0.00019	0.002	No	22	63.64	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-14	0.0005	0.00028	0.002	No	22	59.09	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

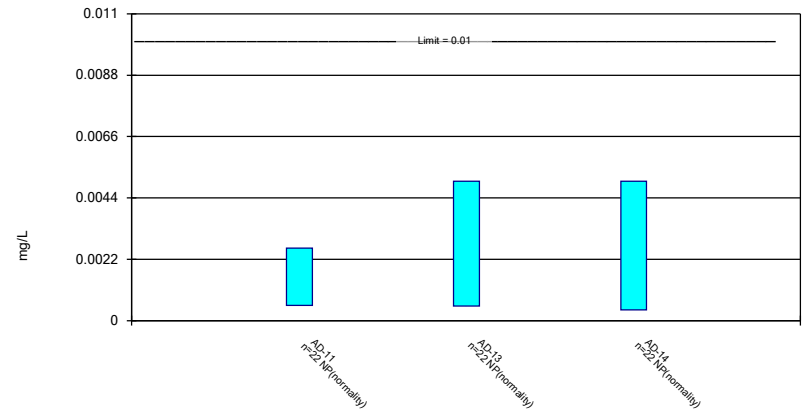
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

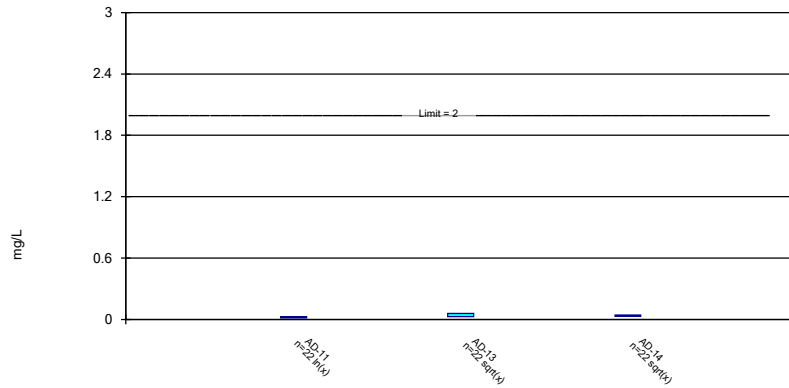
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

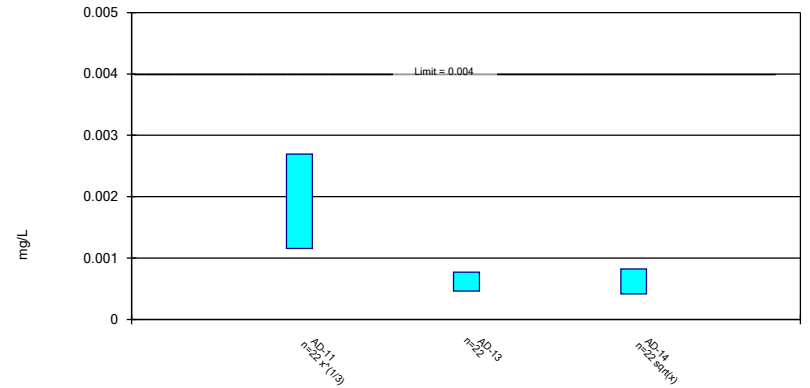
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

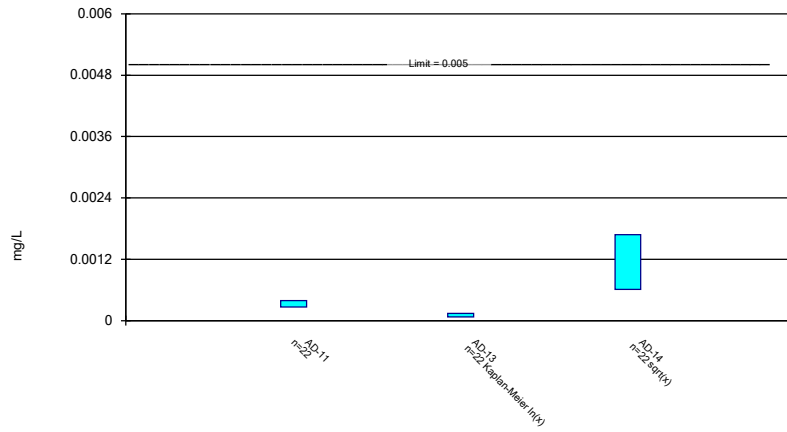
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Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

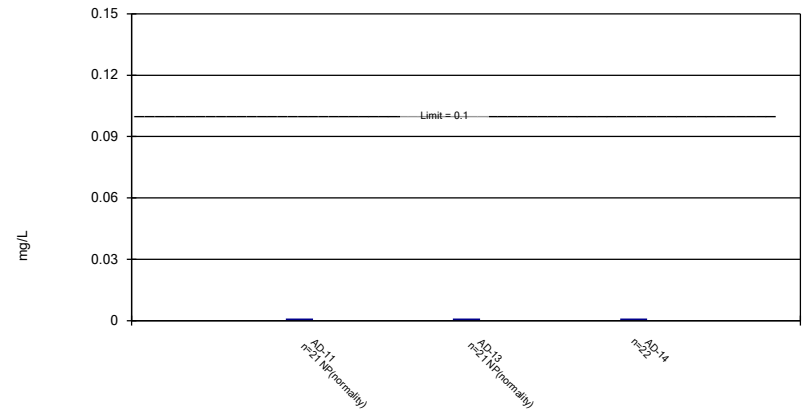
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

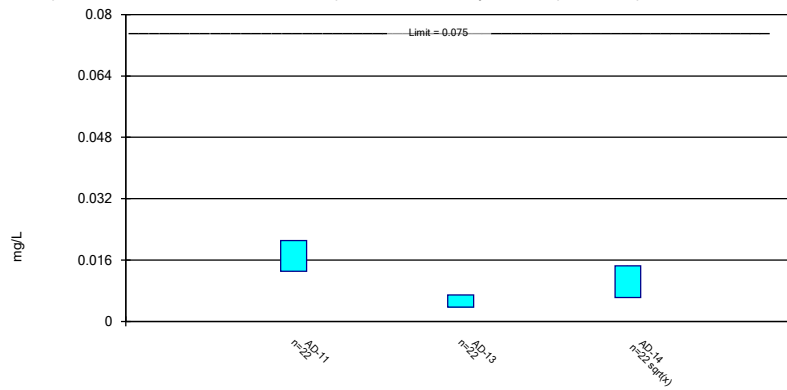
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

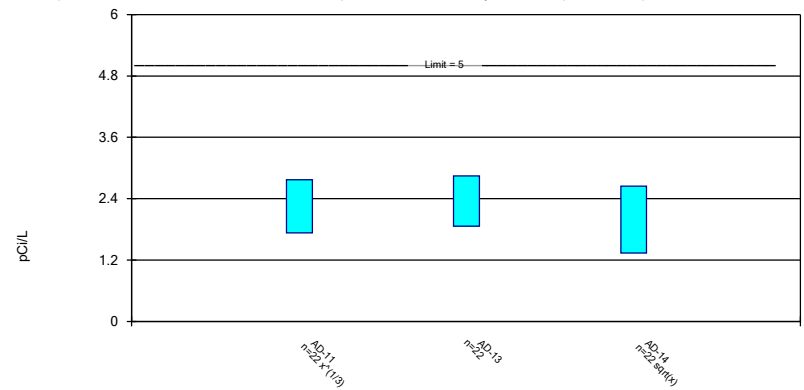
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

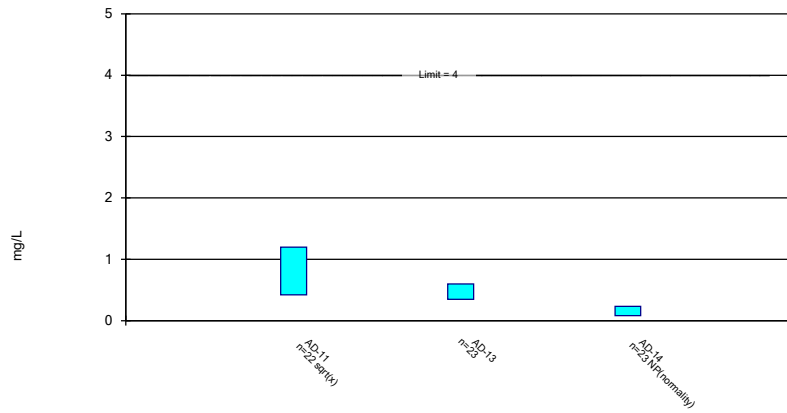
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

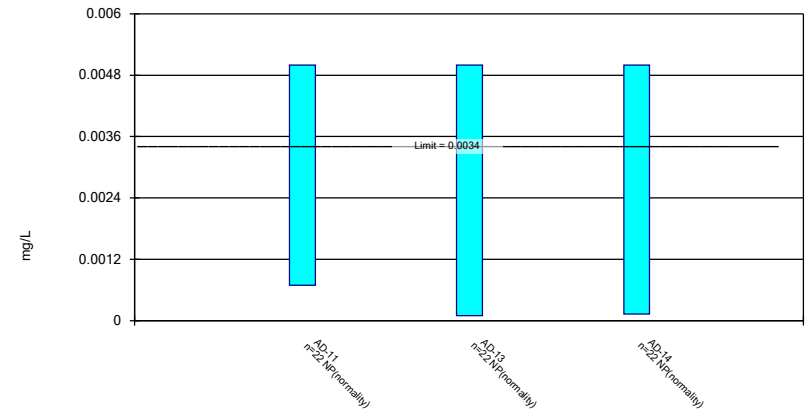
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

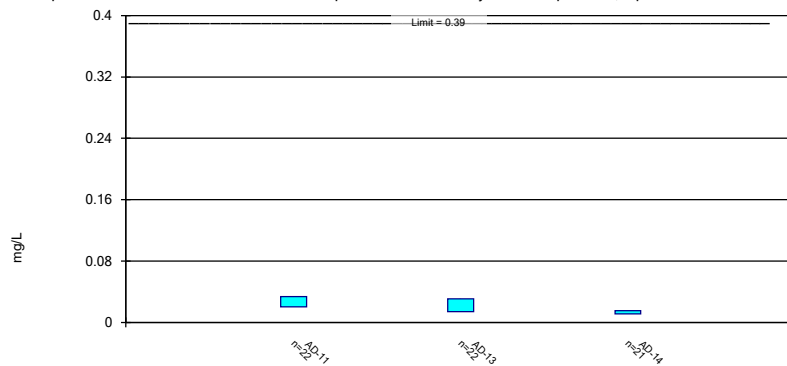
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

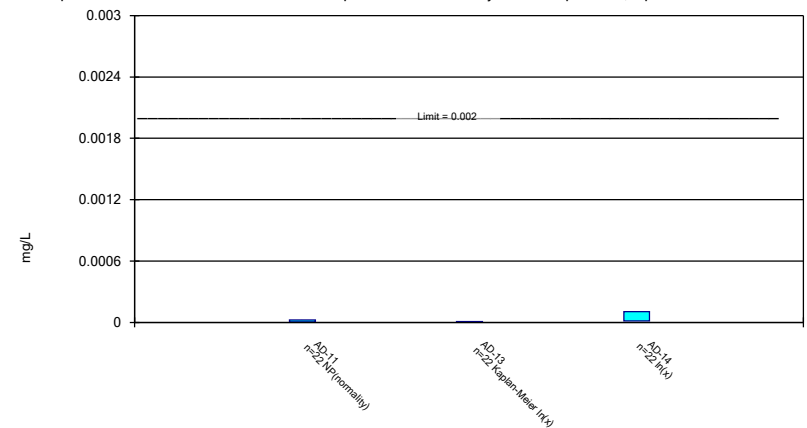
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

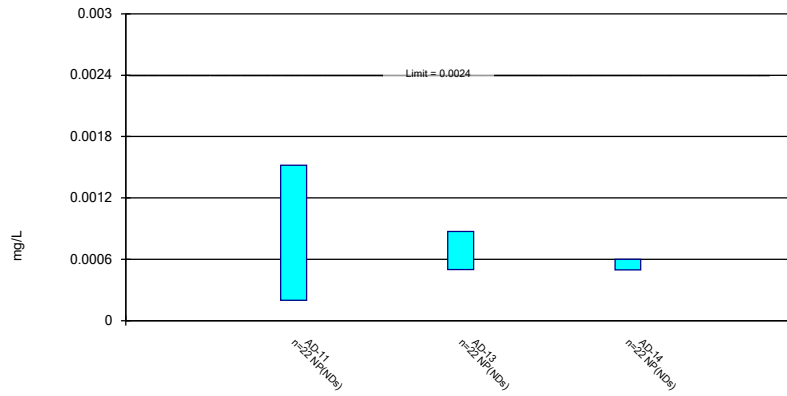
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

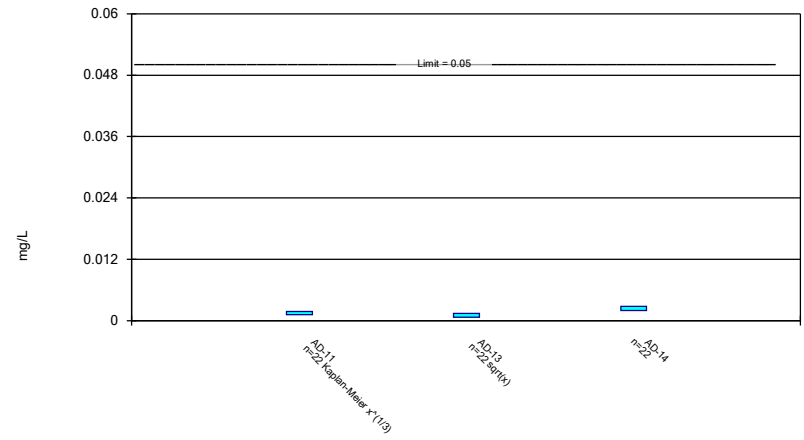
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

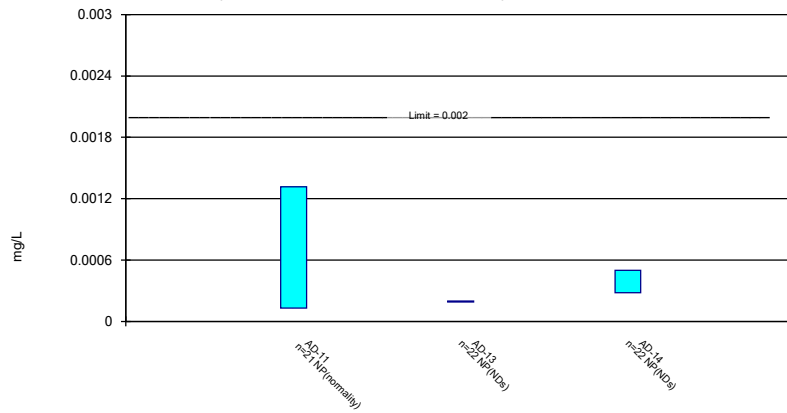
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

STATISTICAL ANALYSIS SUMMARY, LANDFILL

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Project Number: CHA8500B

October 3, 2023

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LIST OF TABLES

Table 1:	Groundwater Data Summary
Table 2:	Appendix IV Groundwater Protection Standards
Table 3:	Appendix III Data Summary

LIST OF ATTACHMENTS

Attachment A:	Certification by Qualified Professional Engineer
Attachment B:	Data Quality Review Memorandum
Attachment C:	Statistical Analysis Output

ACRONYMS AND ABBREVIATIONS

CCR	coal combustion residuals
GWPS	groundwater protection standard
LF	Landfill
LPL	lower prediction limit
QA/QC	quality assurance and quality control
SSI	statistically significant increase
SSL	statistically significant level
SU	standard units
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
UPL	upper prediction limit

1. EXECUTIVE SUMMARY

In accordance with Texas Commission on Environmental Quality (TCEQ) 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 Landfill (LF) at the Welsh Power Plant in Pittsburg, Texas. The Welsh Landfill is an existing CCR unit. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, total dissolved solids (TDS), and sulfate at the LF. An alternative source was not identified at the time, so assessment monitoring was initiated and GWPSs were set in accordance with § 352.951(b). Two assessment monitoring events were conducted at the LF in February and June 2023 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

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 a statistically significant level (SSL) above previously established GWPS. No SSLs were identified; however, concentrations of Appendix III parameters remained above background. Therefore, 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.

2. LANDFILL EVALUATION

2.1 Data Validation and QA/QC

During the assessment monitoring program in 2023, two sets of samples (February 2023 and June 2023) were collected for analysis. Samples were collected from each background and compliance well during the June 2023 event, whereas samples were collected only from the compliance well locations during the February 2023 event. Samples from both events were analyzed for all 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. Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks, continuing calibration verification samples, and laboratory fortified blanks.

A data quality review was completed to assess if the data met the objectives outlined in TCEQ Draft Technical Guidance No. 32 related to groundwater sampling and analysis (TCEQ 2020). As noted in the review memorandum (Attachment B), the data were determined usable for supporting project objectives. 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.9.6.36 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

2.2 Statistical Analysis

Statistical analyses for the LF were conducted in accordance with the Statistical Analysis Plan (Geosyntec 2021), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment C.

The data obtained in February 2023 and June 2023 were screened for potential outliers. No outliers were identified for these events.

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 ($\alpha = 0.01$), but nonparametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the nondetect frequency was too high). An SSL was concluded if the lower confidence limit was above the GWPS (i.e., if the entire confidence interval was above the GWPS). Calculated confidence limits are shown in Attachment C. 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 or the maximum contaminant level (Geosyntec 2023).

No SSLs were identified at the Welsh LF.

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 were above background concentrations. Data collected during the June 2023 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) or, in the case of pH, values below the lower prediction limits (LPLs) were noted:

- Boron concentrations were above the interwell UPL of 0.801 mg/L at AD-11 (0.969 mg/L), AD-13 (1.22 mg/L), and AD-14 (1.26 mg/L).
- pH values were below the interwell LPL of 4.8 standard units (SU) at AD-11 (4.0 SU) and AD-13 (4.6 SU).
- Sulfate concentrations were above the intrawell UPL of 269 mg/L at AD-14 (367 mg/L).
- TDS concentrations were above the intrawell UPL of 527 mg/L at AD-14 (610 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the initial (June 2023) sample was above the UPL or below the LPL. Based on these results, concentrations of boron, sulfate and TDS appear to be above background concentrations, and pH values appear to be below background values. Therefore, the unit will remain in assessment monitoring.

2.3 Conclusions

An annual and semiannual assessment monitoring event were conducted in accordance with the TCEQ CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that prevented data usage. A review of outliers identified no potential outliers in the February or June 2023 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 were above background levels. Boron, sulfate, and TDS results were above and, in the case of pH, were below background levels at select downgradient wells.

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

3. REFERENCES

Geosyntec. 2021. Statistical Analysis Plan – J. Robert Welsh Plant. Geosyntec Consultants, Inc. September.

Geosyntec. 2023. Statistical Analysis Summary – Landfill, J. Robert Welsh Plant. Geosyntec Consultants, Inc. March.

TCEQ. 2020. Draft Technical Guidance No. 32. Coal Combustion Residuals Groundwater Monitoring and Corrective Action. Texas Commission on Environmental Quality. May.

TABLES

**Table 1. Groundwater Data Summary
Statistical Analysis Summary
Welsh Plant - Landfill**

Parameter	Unit	AD-1	AD-5	AD-11		AD-13		AD-14		AD-17
		Background	Background	Compliance		Compliance		Compliance		Background
		6/6/2023	6/6/2023	2/6/2023	6/5/2023	2/6/2023	6/5/2023	2/6/2023	6/5/2023	6/6/2023
Antimony	µg/L	0.041 J1	0.010 J1	0.02 J1	0.020 J1	0.03 J1	0.016 J1	0.03 J1	0.020 J1	1.00 U1
Arsenic	µg/L	0.21	4.30	0.56	0.66	0.37	0.37	0.25	1.13	1.1
Barium	µg/L	83.4	45.5	28.6	11.2	70.8	11.9	35.8	20.9	19.6
Beryllium	µg/L	1.11	0.055	1.25	1.02	0.182	0.403	0.460	2.56	0.11 J1
Boron	mg/L	0.729	0.030 J1	1.21	0.969	1.02	1.22	1.06	1.26	0.10 J1
Cadmium	µg/L	0.034	0.02 U1	0.282	0.244	0.079	0.115	0.359	4.73	0.20 U1
Calcium	mg/L	6.59	26.5	15.8	7.50	16.5 M1	4.24	9.63	10.8	150
Chloride	mg/L	3.03	16.1	9.63	10.8	4.85	8.39	1.77	11.5	35.6
Chromium	µg/L	0.35	0.24 J1	0.38	0.57	0.41	0.48	0.31	0.83	1.1 J1
Cobalt	µg/L	2.67	9.47	12.9	12.1	2.87	5.09	4.17	38.7	36.8
Combined Radium	pCi/L	0.95	1.72	4.05	3.69	3.55	1.64	3.07	2.34	1.42
Fluoride	mg/L	0.24	0.15	0.69	0.51	0.39	0.11	0.15	0.50	0.15 U1
Lead	µg/L	0.37	0.20 U1	0.88	0.94	0.08 J1	0.35	0.16 J1	0.60	0.7 J1
Lithium	mg/L	0.0081	0.106	0.0213	0.0185	0.0147	0.0232	0.00940	0.021	0.254
Mercury	µg/L	0.002 J1	0.005 U1	0.007	0.012	0.002 J1	0.004 J1	0.005 U1	0.500	0.003 J1
Molybdenum	µg/L	0.5 U1	0.5 U1	0.1 J1	0.5 U1	0.2 J1	0.5 U1	0.2 J1	0.5 U1	5 U1
Selenium	µg/L	10.1	0.06 J1	1.36	1.58	0.39 J1	0.49 J1	3.24	2.44	0.50 J1
Sulfate	mg/L	91.1	114	368	413	138	184	89.6	367	1,190
Thallium	µg/L	0.04 J1	0.20 U1	0.16 J1	0.14 J1	0.07 J1	0.14 J1	0.06 J1	0.33	2.0 U1
Total Dissolved Solids	mg/L	210	280	620	670	280	350	230	610	1,510
pH	SU	4.91	5.80	5.02	3.97	5.48	4.64	4.77	5.34	5.33

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U1: Non-detect value. For statistical analysis, parameters that were not detected were replaced with the reporting limit.

J1: Estimated value. Parameter was detected in concentrations below the reporting limit.

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

**Table 2. Appendix IV Groundwater Protection Standards
Statistical Analysis Summary
Welsh Plant - Landfill**

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00317	0.00600
Arsenic, Total (mg/L)	0.0100	0.00628	0.0100
Barium, Total (mg/L)	2.00	0.564	2.00
Beryllium, Total (mg/L)	0.00400	0.00112	0.00400
Cadmium, Total (mg/L)	0.00500	0.00400	0.00500
Chromium, Total (mg/L)	0.100	0.00233	0.100
Cobalt, Total (mg/L)	n/a	0.0748	0.0748
Combined Radium, Total (pCi/L)	5.00	4.61	5.00
Fluoride, Total (mg/L)	4.00	0.583	4.00
Lead, Total (mg/L)	n/a	0.00338	0.00338
Lithium, Total (mg/L)	n/a	0.394	0.394
Mercury, Total (mg/L)	0.00200	0.0000330	0.00200
Molybdenum, Total (mg/L)	n/a	0.00243	0.00243
Selenium, Total (mg/L)	0.0500	0.00835	0.0500
Thallium, Total (mg/L)	0.00200	0.00125	0.00200

Notes:

1. Calculated UTL (Upper Tolerance Limit) represents site-specific background values.
2. Grey cells indicate the GWPS is based on the calculated UTL. Either the UTL is higher than the MCL or an MCL does not exist.

GWPS: Groundwater Protection Standard

MCL: Maximum Contaminant Level

mg/L: milligrams per liter

pCi/L: picocuries per liter

n/a: not applicable

**Table 3. Appendix III Data Summary
Statistical Analysis Summary
Welsh - Landfill**

Analyte	Unit	Description	AD-11	AD-13	AD-14
			6/5/2023	6/5/2023	6/5/2023
Boron	mg/L	Interwell Background Value (UPL)	0.801		
		Analytical Result	0.969	1.22	1.26
Calcium	mg/L	Intrawell Background Value (UPL)	24.5	40.7	26.9
		Analytical Result	7.50	4.24	10.8
Chloride	mg/L	Intrawell Background Value (UPL)	13.7	21.3	11.5
		Analytical Result	10.8	8.39	11.5
Fluoride	mg/L	Interwell Background Value (UPL)	0.583		
		Analytical Result	0.51	0.11	0.50
pH	SU	Interwell Background Value (UPL)	6.9		
		Interwell Background Value (LPL)	4.8		
		Analytical Result	4.0	4.6	5.3
Sulfate	mg/L	Intrawell Background Value (UPL)	745	365	269
		Analytical Result	413	184	367
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1,150	656	527
		Analytical Result	670	350	610

Notes:

1. Bold values exceed the background value.

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Welsh Landfill 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

10.04.2023

Date

ATTACHMENT B
Data Quality Review Memorandum

Memorandum

Date: September 22, 2023
To: David Miller (AEP)
Copies to: Rebecca Jones (AEP)
From: Allison Kreinberg (Geosyntec)
Subject: Data Quality Review – Welsh Power Plant
February 2023 Sampling Event

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the Welsh Power Plant, located in Pittsburg, Texas in February 2023. The groundwater samples were collected to comply 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”). 40 CFR 257 Appendix III and IV constituents were analyzed.

The following sample data groups (SDGs) were associated with the groundwater samples collected during the February 2023 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 230430
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 230470

The data included in these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32¹ prior to submittal of this data to TCEQ.

The following data quality issues were identified:

- Mercury data for SDG 230470 had an inconsistent number of significant figures reported between the electronic data deliverable and the published laboratory report. The published

¹ TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

laboratory report for SDG 230470 was reissued with the appropriate number of significant figures for mercury.

- As reported in SDG 230470, beryllium, boron, chromium, cobalt, lead, and lithium were detected in the equipment blank sample “EQUIPMENT BLANK” collected on 2/13/2023. The detected beryllium concentration in the equipment blank (0.011 µg/L) was more than 10% of the detected value in sample AD-8 (0.021 µg/L), which could result in high bias in the AD-8 beryllium results. The detected chromium concentration in the equipment blank (0.27 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The detected lead concentration in the equipment blank (0.37 µg/L) was more than 10% of the detected values for lead in all groundwater samples, which could result in high bias for all groundwater lead results.
- As reported in SDG 230430, the relative percent difference (RPD) for bromide concentrations from parent sample “AD-11” and duplicate sample “DUPLICATE” was 33%. The AD-11 bromide results should be considered estimated.
- As reported in SDG 230470, the RPD for chromium concentrations from parent sample (AD-11) and duplicate sample “DUPLICATE” was 46%. The AD-11 chromium results should be considered estimated.
- As reported in SDG 230470, the matrix spike duplicate (MSD) recovery for calcium (63.6%), sodium (26.4%), and strontium (69.6%) were below the acceptable limit of 75%. The associated sample (AD-8) was flagged M1: the associated matrix spike (MS) or MSD recovery was outside acceptance limits. The AD-8 calcium, sodium, and strontium results should be considered estimated.
- As reported in SDG 230470, the MSD recovery for calcium (135%), sodium (232%), and strontium (145%) were above the acceptable limit of 125%. The associated sample (AD-13) was flagged M1: the associated matrix spike (MS) or MSD recovery was outside acceptance limits. The AD-13 calcium, sodium, and strontium results should be considered estimated.

Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.

Memorandum

Date: October 3, 2023
To: David Miller (AEP)
Copies to: Rebecca Jones (AEP)
From: Allison Kreinberg (Geosyntec)
Subject: Data Quality Review – Welsh Power Plant
June 2023 Sampling Event

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the Welsh Power Plant, located in Pittsburg, Texas in February 2023. The groundwater samples were collected to comply 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”). 40 CFR 257 Appendix III and IV constituents were analyzed.

The following sample data groups (SDGs) were associated with the groundwater samples collected during the June 2023 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231693
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231696
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231698
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231716
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231719
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 231720

The data included in these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32¹ prior to submittal of this data to TCEQ.

¹ TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

The following data quality issues were identified:

- Mercury data for SDGs 231716, 231719, and 231720 had an inconsistent number of significant figures reported between the electronic data deliverables and the published laboratory reports. The published laboratory reports for SDGs 231716, 231719, and 231720 were reissued with the appropriate number of significant figures for mercury.
- As reported in SDG 231716, calcium, chromium, and cobalt were detected in the equipment blank sample “EB-BACKGROUND” collected on 6/6/2023. The detected chromium concentration in the equipment blank (0.26 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 231719, calcium, chromium, and cobalt were detected in the equipment blank sample “EQUIPMENT BLANK-PBAP” collected on 6/5/2023. The estimated detected chromium concentration in the equipment blank (0.29 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 231720, antimony, beryllium, calcium, chromium, and cobalt were detected in the equipment blank sample “EQUIPMENT BLANK-LANDFILL” collected on 6/5/2023. The estimated detected antimony concentration in the equipment blank (0.025 µg/L) was more than 10% of the detected values for antimony in all groundwater samples, which could result in high bias for all groundwater antimony results. The estimated detected chromium concentration in the equipment blank (0.22 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 231716, barium, beryllium, calcium, chromium, cobalt, and lead were detected in the field blank sample “FIELD BLANK - BACKGROUND” collected on 6/6/2023. The detected beryllium concentration in the field blank (0.020 µg/L) was more than 10% of the detected value in samples AD-5 (0.055 µg/L) and AD-17 (estimated value of 0.11 µg/L), which could result in high bias in the AD-5 and AD-17 beryllium results. The detected chromium concentration in the field blank (0.27 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results. The detected lead concentration in the field blank (0.22 µg/L) was more than 10% of the detected values in samples AD-1 (0.37 µg/L) and AD-17 (estimated value of 0.7 µg/L), which could result in high bias in the AD-1 and AD-17 lead results.

- As reported in SDG 231719, calcium, chromium, and cobalt were detected in the field blank sample “FIELD BLANK - PBAP” collected on 6/6/2023. The estimated detected chromium concentration in the field blank (0.23 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 231720, calcium, chromium, and cobalt were detected in the field blank sample “FIELD BLANK - LANDFILL” collected on 6/5/2023. The detected chromium concentration in the field blank (0.30 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 231716, the relative percent difference (RPD) for lead concentrations from parent sample “AD-1” and duplicate sample “DUPLICATE-BACKGROUND” was 25%. The AD-1 lead result should be considered estimated.
- As reported in SDG 231719, the RPD for chromium concentrations from parent sample “AD-8” and duplicate sample “DUPLICATE - PBAP” was 41%. The AD-8 chromium result should be considered estimated. The RPD for lead concentrations from parent sample “AD-8” and duplicate sample “DUPLICATE - PBAP” was 96%. The AD-8 lead result should be considered estimated.
- The quality control data provided with SDG 231716 noted that the recovery on the matrix spike for radium-228 associated with sample “AD-1” had a low recovery, which resulted in poor precision for the matrix spike (MS)/matrix spike duplicate (MSD) pair. The radium-228 result for sample “AD-1” was not qualified in the provided laboratory report. The laboratory report should be amended to note the poor precision for the MSD.

Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.

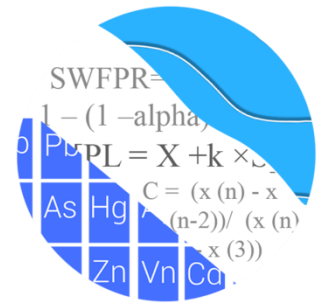
ATTACHMENT C

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

September 5, 2023

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
500 W. Wilson Bridge Road, Suite 250
Worthington, OH 43085



Re: Welsh Landfill – February & June 2023 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 February and June 2023 Assessment Monitoring report for American Electric Power Inc.'s Welsh Landfill. 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. Below is a list of the monitoring well network, as provided by Geosyntec Consultants. Note that originally the network included upgradient well AD-18; however, further research, reportedly, identified that this well was not providing adequate representation of the groundwater quality upgradient of this site and exhibited different chemical properties from the neighboring upgradient wells. Therefore, data from this well is no longer included in the statistical analysis.

- **Upgradient wells:** AD-1, AD-5, and AD-17
- **Downgradient wells:** AD-11, AD-13, and AD-14

Note that according to Geosyntec Consultants, the upgradient wells were not sampled in February 2023, but were sampled during the June 2023 sample event.

Data were sent electronically, and the statistical analysis was reviewed by Andrew Collins, Project Manager 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. Note that while dilution factors for antimony, molybdenum, and thallium resulted in elevated reporting limits at upgradient well AD-17 for the respective June 2023 observations, no changes occurred in Groundwater Protection Standards.

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.

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 tolerance 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, 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.

Summary of Background Update – Conducted in February 2023

Outlier Analysis

Prior to evaluating Appendix IV parameters, background (upgradient) data were screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. 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.

Tukey's outlier test on pooled upgradient well data through October/November 2022 identified outliers for chromium, fluoride, lead, and mercury. The values identified by Tukey's test, with the exception of the highest value for chromium at AD-17, were either similar to concentrations upgradient of the facility or were lower than the respective Maximum Contaminant Level (MCL); therefore, these values were not flagged as outliers. Previously flagged values were confirmed by visual screening and Tukey's outlier test. The highest value for chromium at upgradient well AD-17, molybdenum in upgradient well AD-1, and two highest values for cadmium in upgradient well AD-17 remain flagged in order to maintain statistical limits that are conservative (i.e., lower) from a regulatory perspective.

Additionally, downgradient well data through October/November 2022 were screened through visual screening using time series graphs. Since the downgradient well data are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is

particular justification for excluding them. No additional outliers among downgradient wells were flagged.

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data through October/November 2022 for Appendix IV parameters (Figure D). These limits are updated on an annual basis and will be updated again during the Fall 2023 sample event. Parametric tolerance limits are calculated, with a target of 95% confidence and 95% coverage, when data follow a normal or transformed-normal distribution. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were constructed using the highest background measurement. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

The upper tolerance limits were compared to the Maximum Contaminant Levels (MCLs) and background limits 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 E).

Evaluation of Appendix IV Parameters – February & June 2023

Time series plots were used to visually identify potential outliers in downgradient wells during the February and June 2023 sample events. When suspected outliers are identified, Tukey's outlier test is used to formally test whether measurements are statistically significant. As mentioned above, high outliers are 'cautiously' flagged in the downgradient wells when measurements are clearly much different from remaining data within a given well. 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 additional suspected outliers were identified.


Confidence intervals were then constructed with data through June 2023 on downgradient wells for each of the Appendix IV parameters and compared to the GWPS (i.e., the highest limit of the MCL or background limit as discussed above). When data followed a normal or transformed-normal distribution, parametric confidence intervals were used for Appendix IV parameters. Nonparametric confidence intervals, which use the largest and smallest order statistics depending on the sample size as interval limits,

were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% non-detects. The lower confidence limit, which is constructed with 99% confidence for parametric confidence intervals, is compared to the GWPS prepared as described above. The confidence level associated with nonparametric confidence intervals is dependent upon the number samples available.

Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No exceedances were noted for any of the well/constituent pairs. A summary of the confidence interval results follows this letter (Figure F).

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

For Groundwater Stats Consulting,



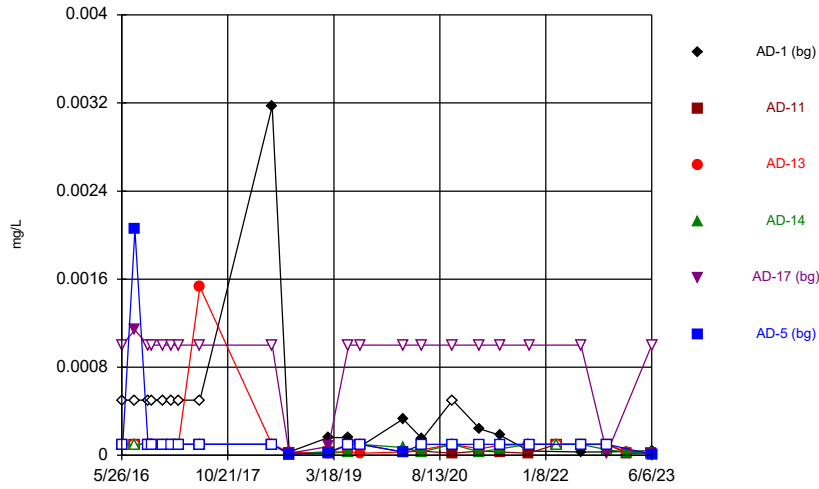
Tristan Clark
Groundwater Analyst



Andrew Collins
Project Manager

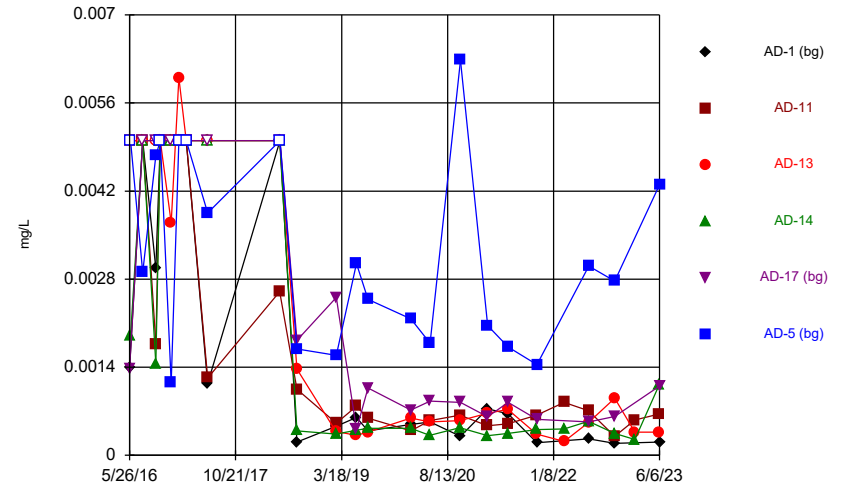
FIGURE A
Time Series

Time Series



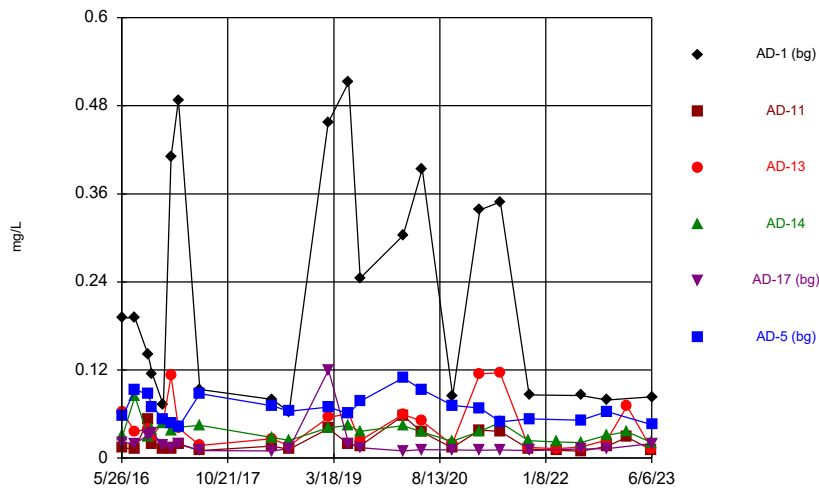
Constituent: Antimony, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



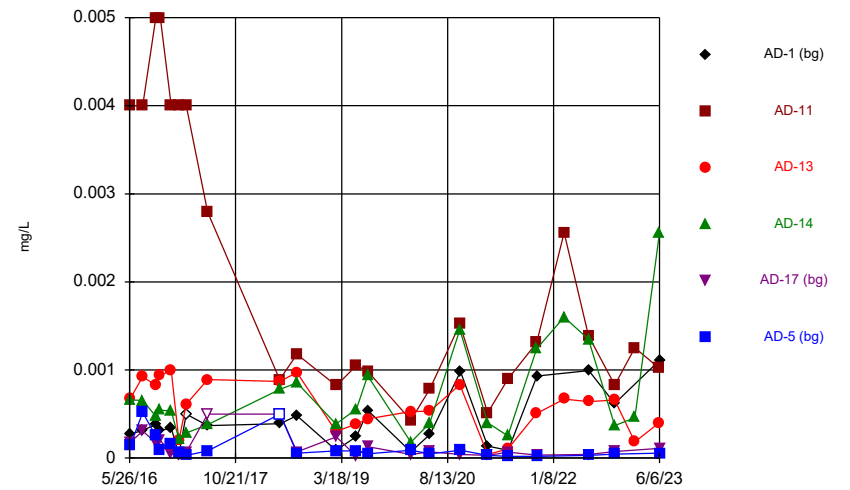
Constituent: Arsenic, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



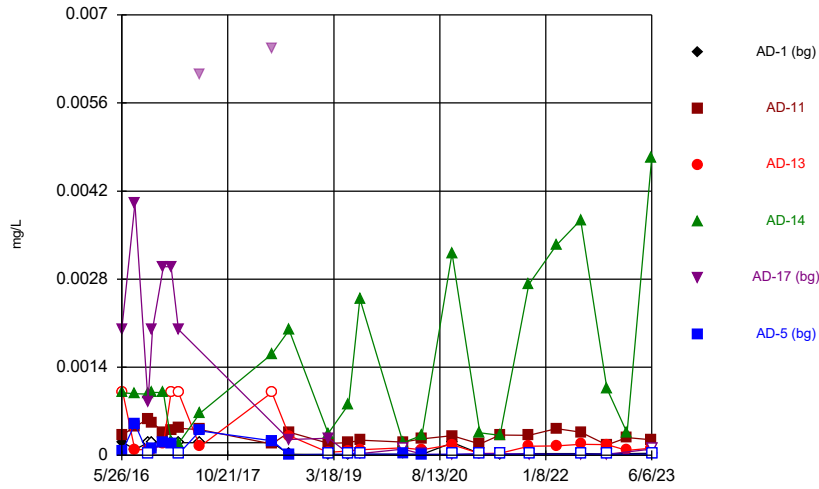
Constituent: Barium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



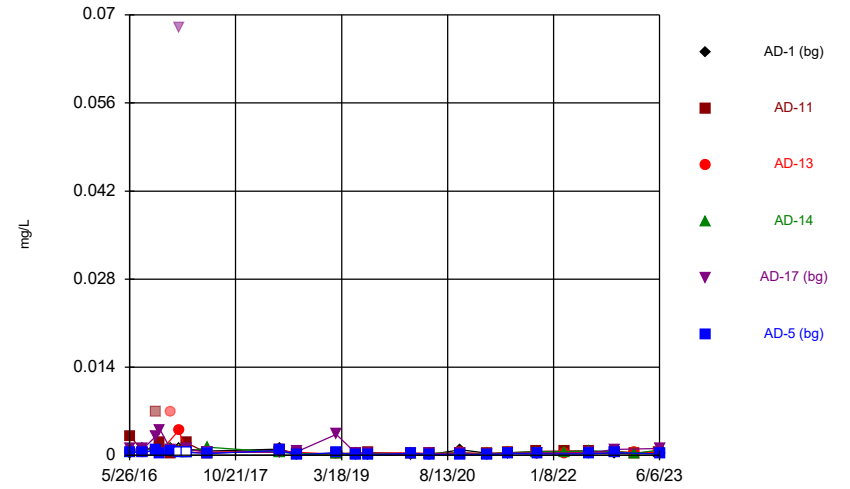
Constituent: Beryllium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



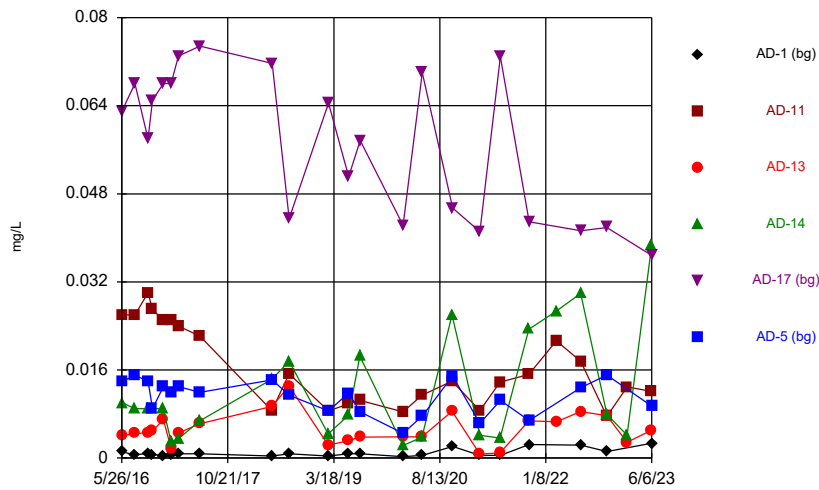
Constituent: Cadmium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



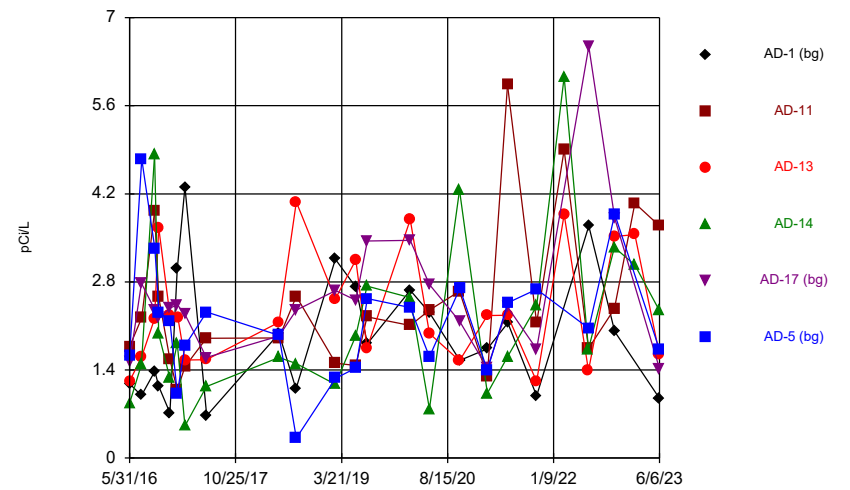
Constituent: Chromium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



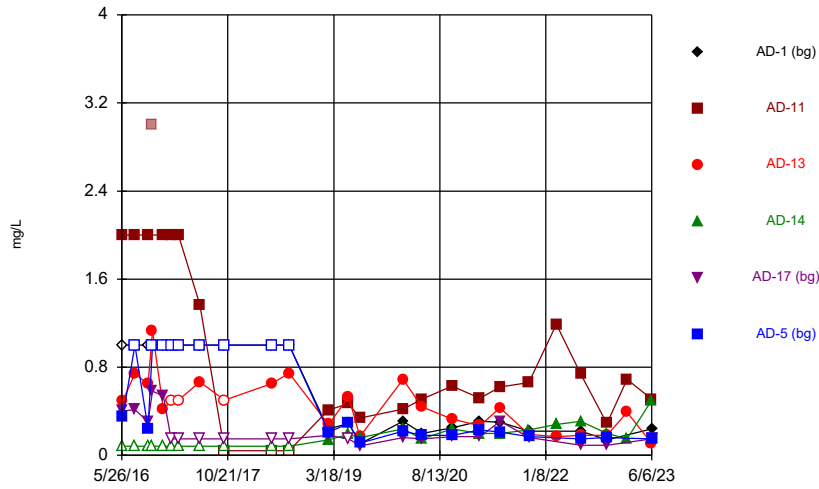
Constituent: Cobalt, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



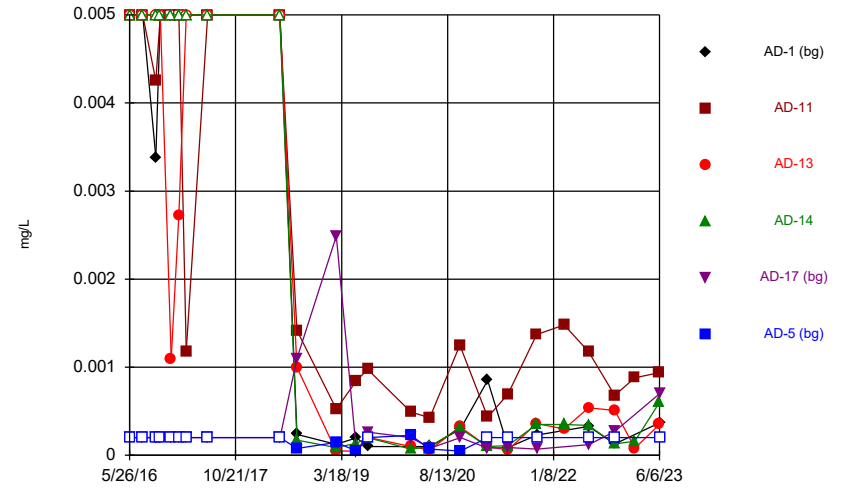
Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2023 4:25 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



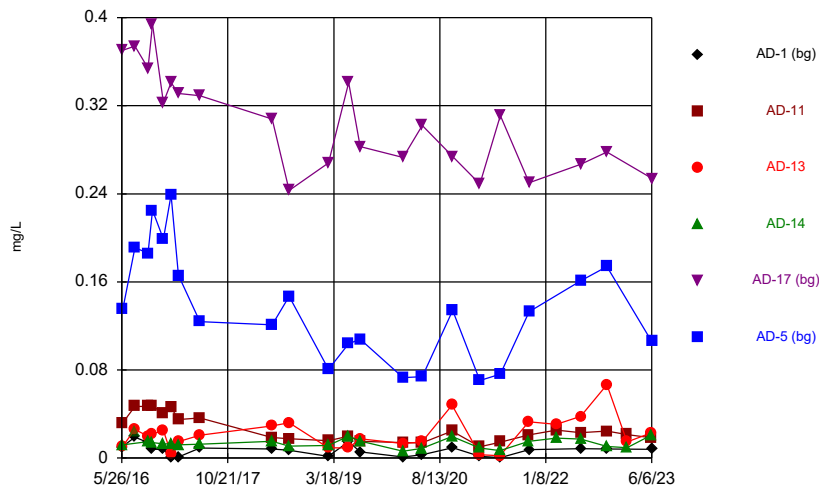
Constituent: Fluoride, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



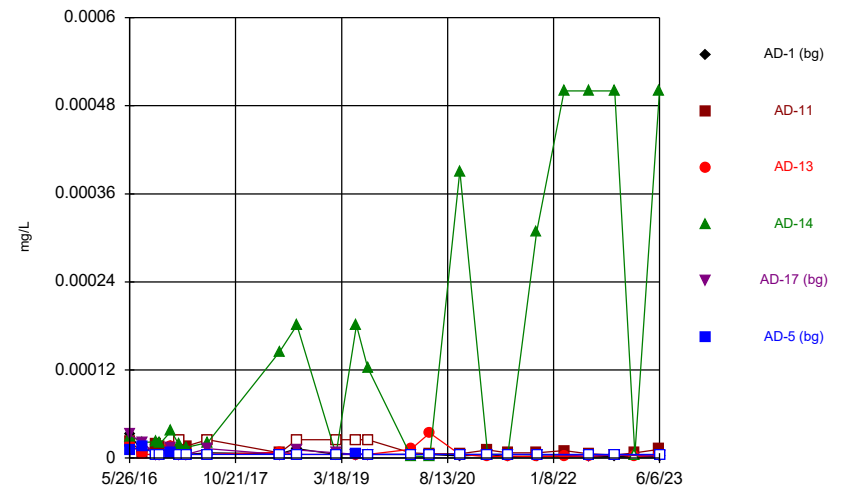
Constituent: Lead, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



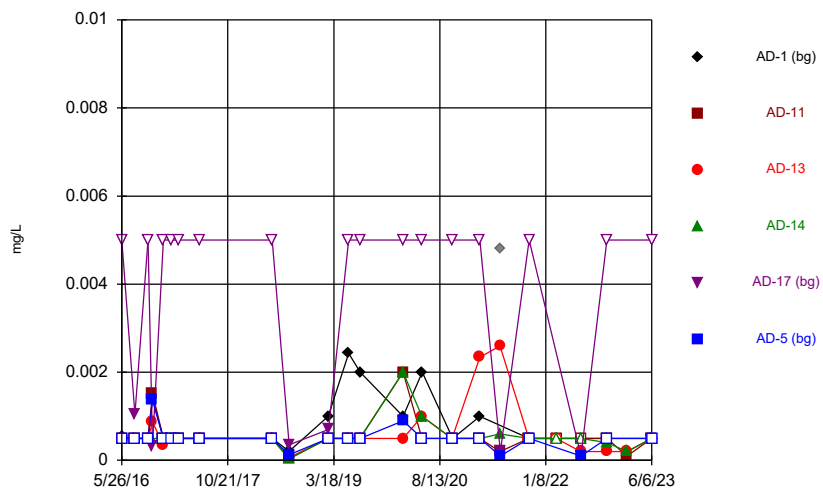
Constituent: Lithium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



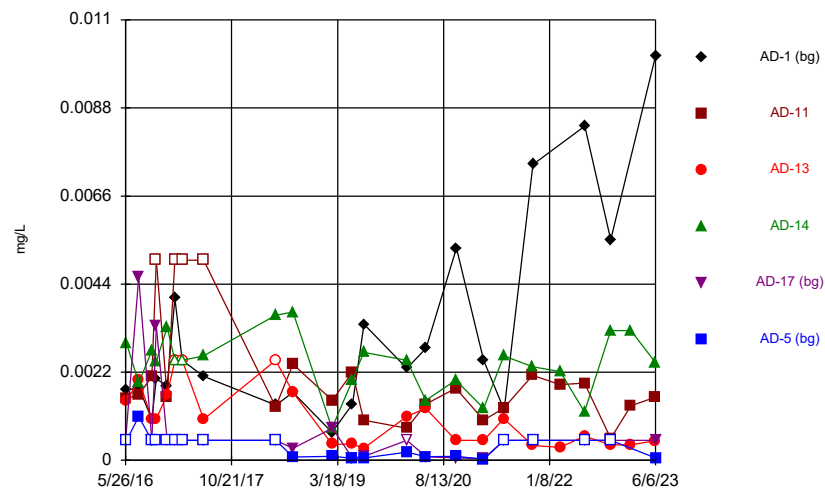
Constituent: Mercury, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



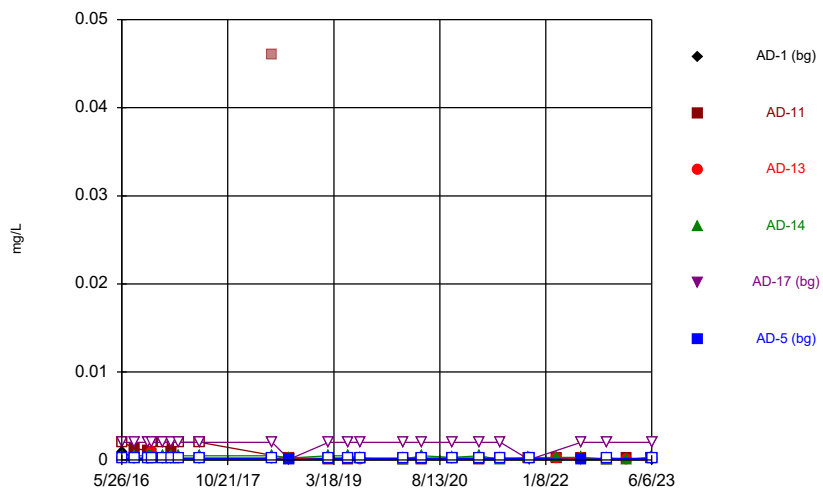
Constituent: Molybdenum, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



Constituent: Selenium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

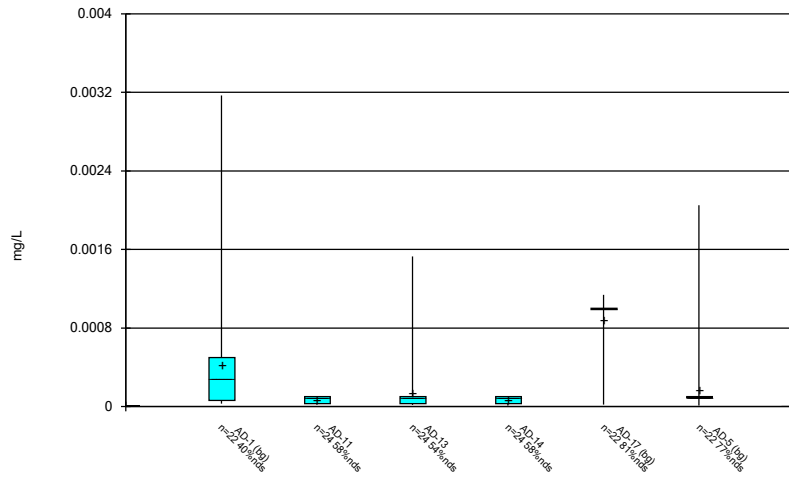
Time Series



Constituent: Thallium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV
 Welsh Landfill Client: Geosyntec Data: Welsh LF

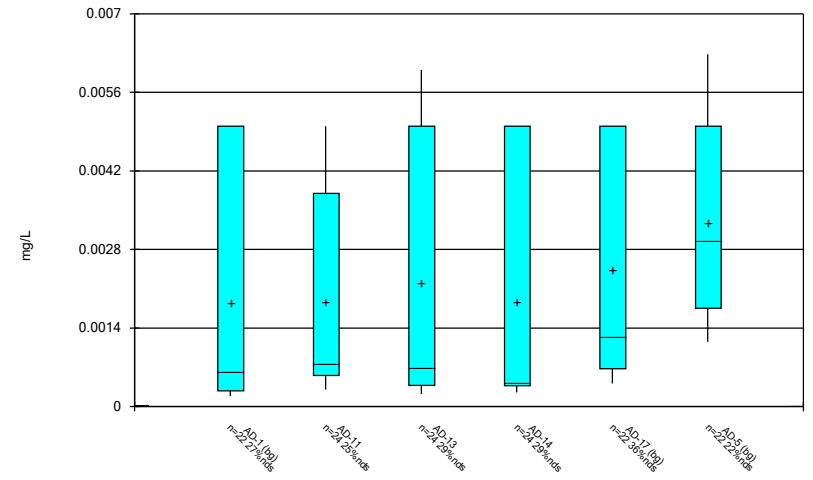
FIGURE B
Box Plots

Box & Whiskers Plot



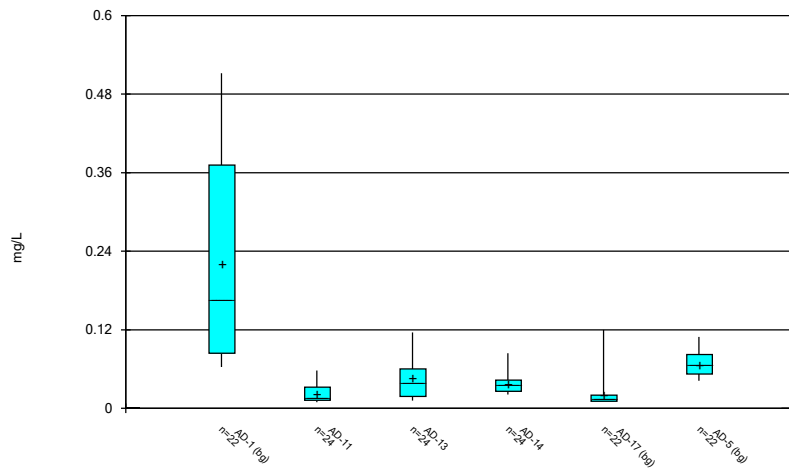
Constituent: Antimony, total Analysis Run 9/1/2023 4:26 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



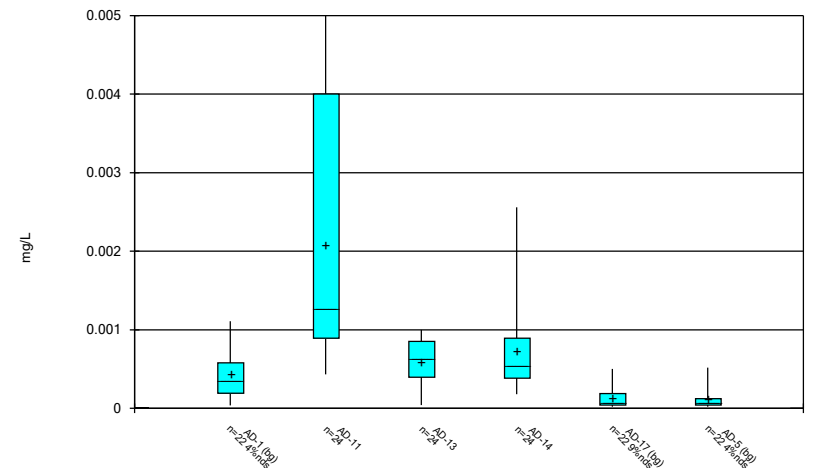
Constituent: Arsenic, total Analysis Run 9/1/2023 4:26 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



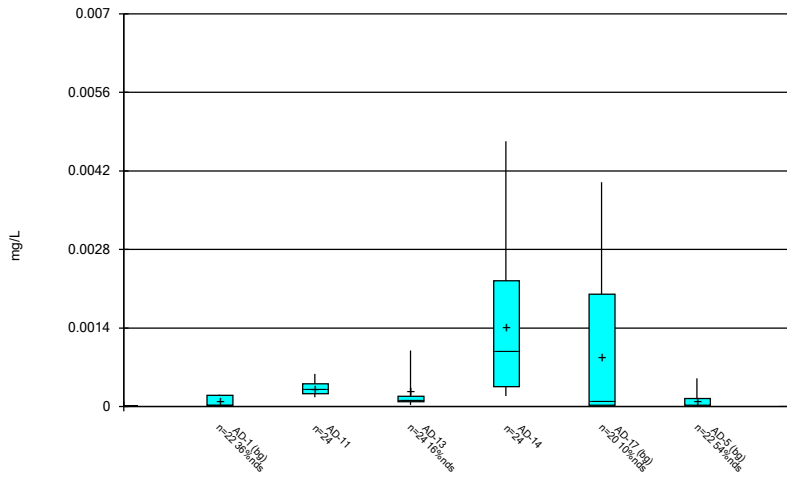
Constituent: Barium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



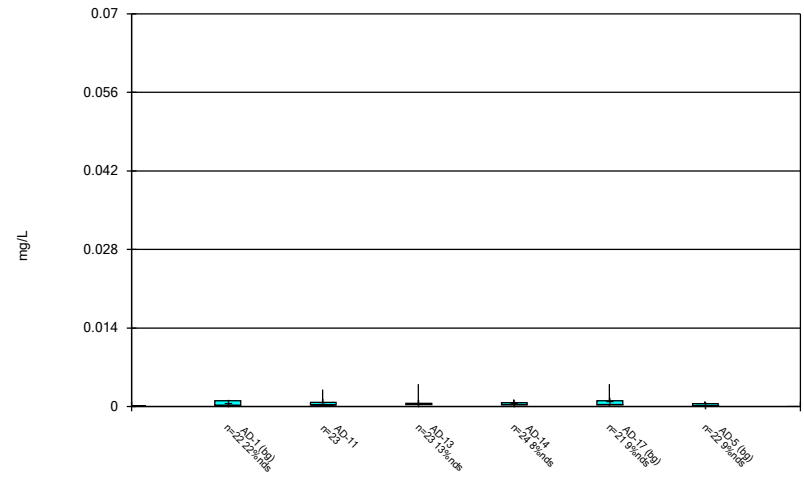
Constituent: Beryllium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



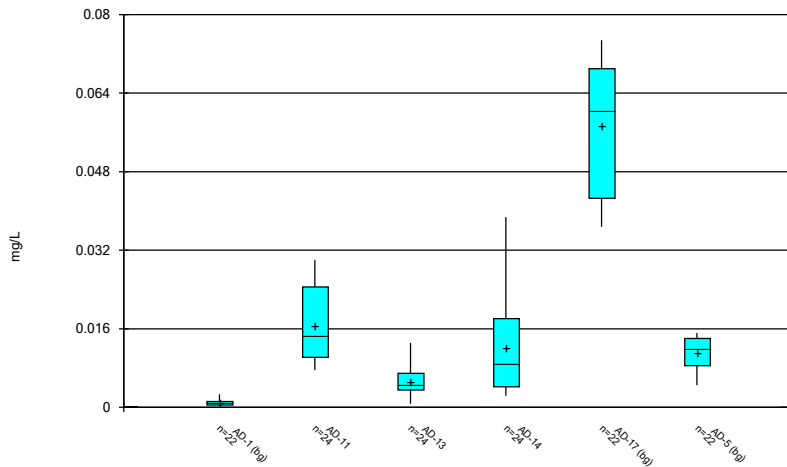
Constituent: Cadmium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



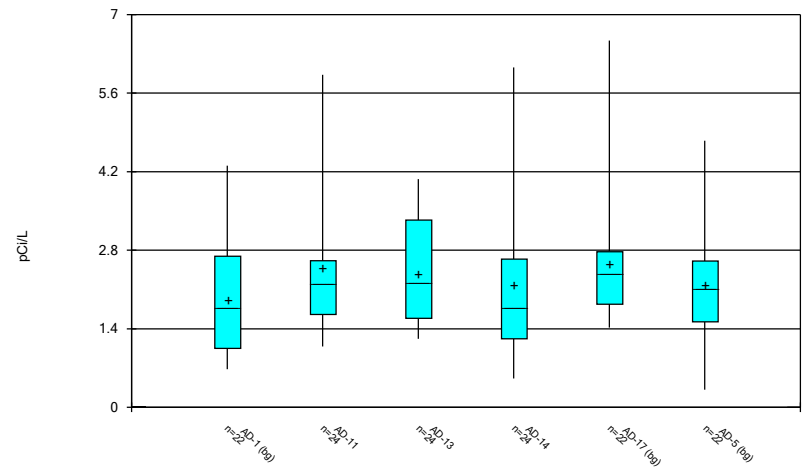
Constituent: Chromium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



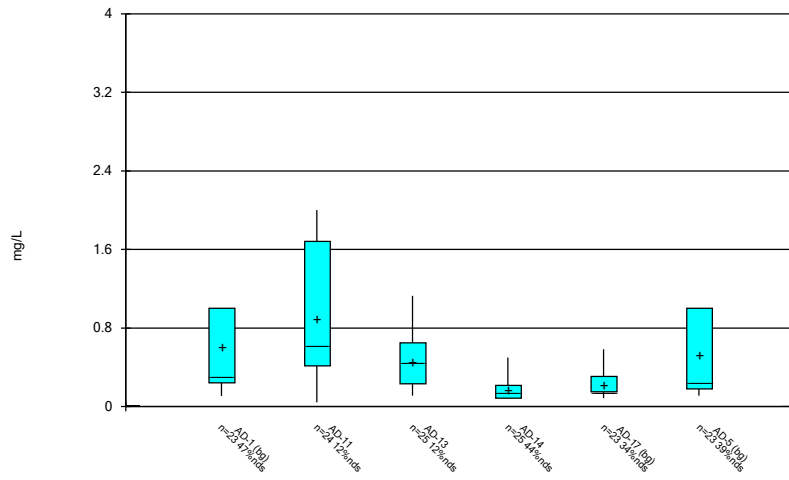
Constituent: Cobalt, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



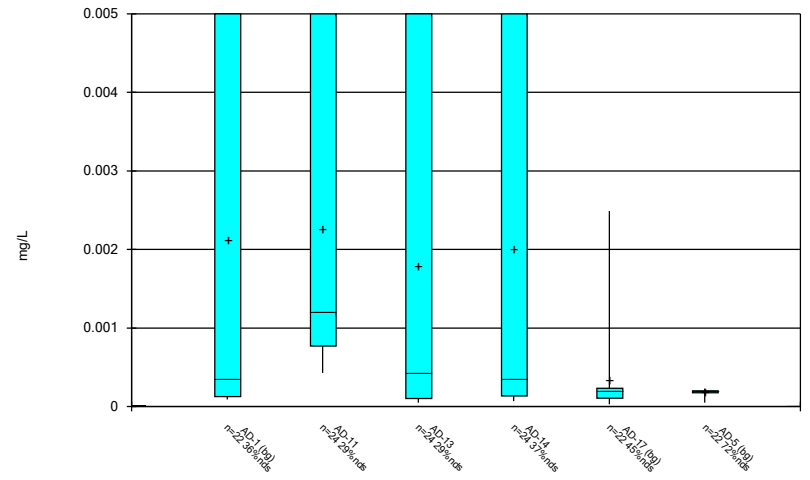
Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



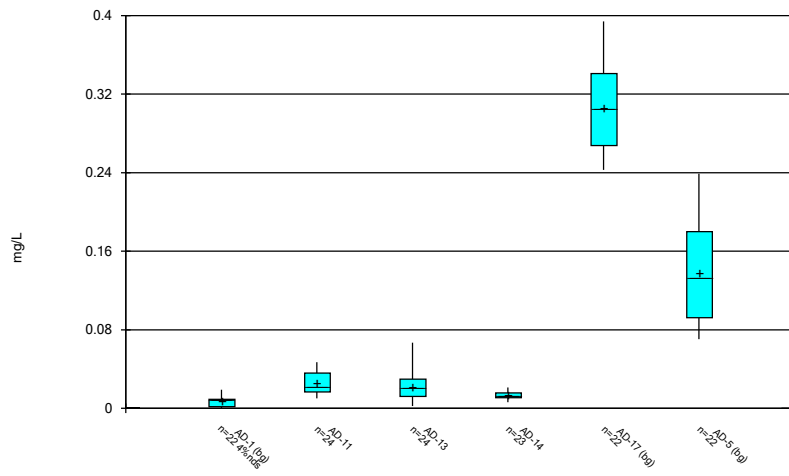
Constituent: Fluoride, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



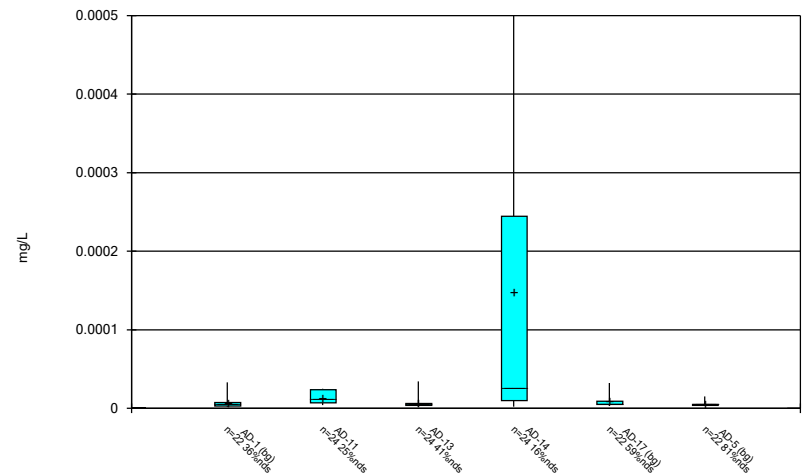
Constituent: Lead, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



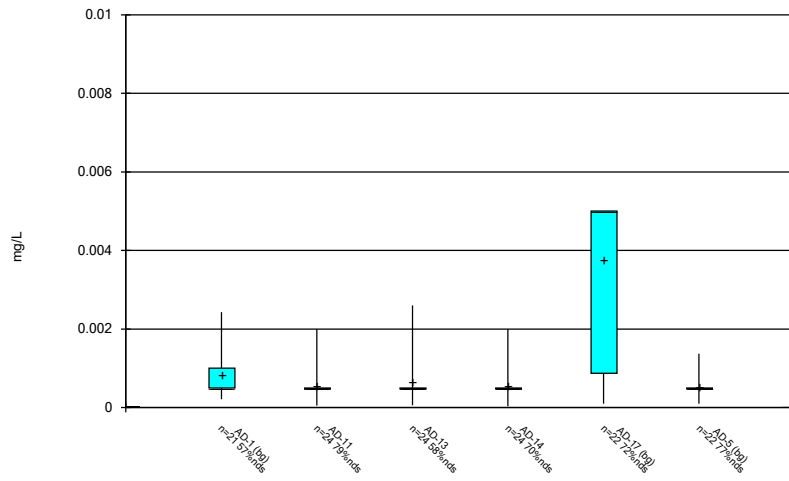
Constituent: Lithium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



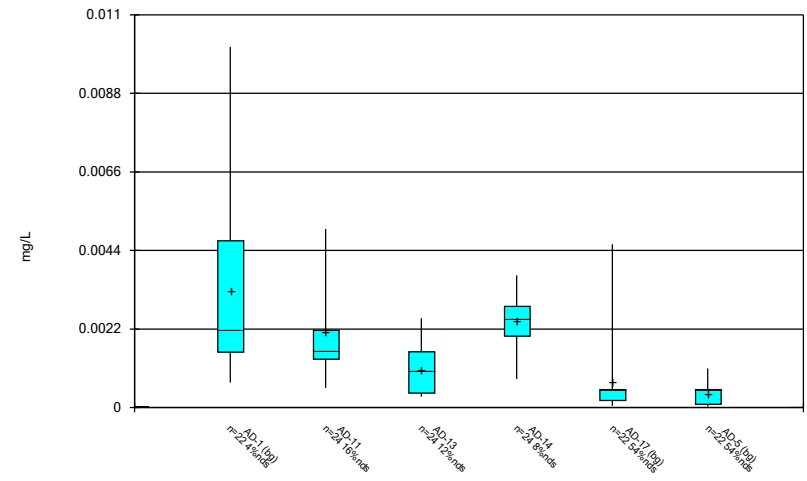
Constituent: Mercury, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



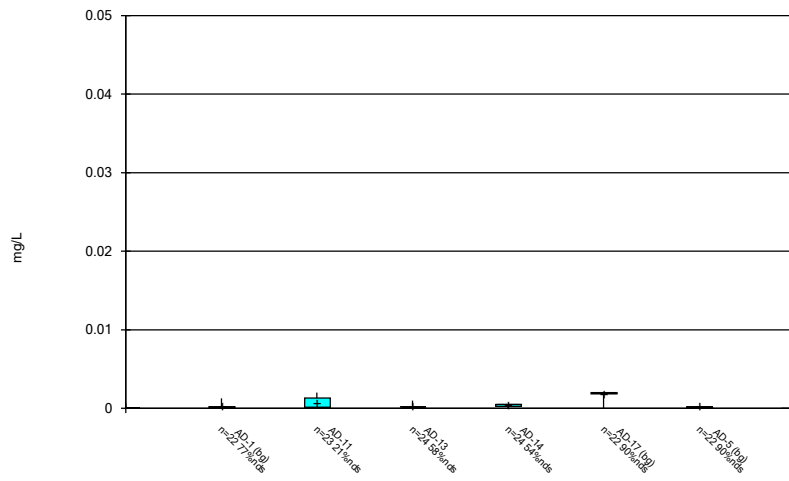
Constituent: Molybdenum, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE C
Outlier Summary

Outlier Summary

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 9/1/2023, 4:28 PM

	AD-17 Cadmium, total (mg/L)	AD-11 Chromium, total (mg/L)	AD-13 Chromium, total (mg/L)	AD-17 Chromium, total (mg/L)	AD-11 Fluoride, total (mg/L)	AD-14 Lithium, total (mg/L)	AD-1 Molybdenum, total (mg/L)	AD-11 Thallium, total (mg/L)
7/29/2016					0.024 (o)			
9/30/2016	0.007 (o)							
10/21/2016				3 (o)				
12/14/2016		0.007 (o)						
1/20/2017			0.068 (O)					
6/8/2017	0.00606 (o)							
5/23/2018							0.046 (o)	
5/24/2018	0.00646 (o)							
6/2/2021						0.0048 (o)		

FIGURE D
UTLs

Upper Tolerance Limits

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 12:20 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg.N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00317	n/a	n/a	n/a	63	68.25	n/a	0.0395	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.00628	n/a	n/a	n/a	63	30.16	n/a	0.0395	NP Inter(normality)
Barium, total (mg/L)	n/a	0.5643	n/a	n/a	n/a	63	0	ln(x)	0.05	Inter
Beryllium, total (mg/L)	n/a	0.001123	n/a	n/a	n/a	63	6.349	ln(x)	0.05	Inter
Cadmium, total (mg/L)	n/a	0.004	n/a	n/a	n/a	61	32.79	n/a	0.04377	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.002329	n/a	n/a	n/a	62	14.52	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.0748	n/a	n/a	n/a	63	0	n/a	0.0395	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	4.605	n/a	n/a	n/a	63	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	n/a	66	40.91	n/a	0.03387	NP Inter(normality)
Lead, total (mg/L)	n/a	0.003384	n/a	n/a	n/a	63	52.38	n/a	0.0395	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.394	n/a	n/a	n/a	63	1.587	n/a	0.0395	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000033	n/a	n/a	n/a	63	60.32	n/a	0.0395	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.00243	n/a	n/a	n/a	62	67.74	n/a	0.04158	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.00835	n/a	n/a	n/a	63	39.68	n/a	0.0395	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.001251	n/a	n/a	n/a	63	87.3	n/a	0.0395	NP Inter(NDs)

FIGURE E
GWPS

WELSH LANDFILL 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	0.56	2
Beryllium, Total (mg/L)	0.004	0.0011	0.004
Cadmium, Total (mg/L)	0.005	0.004	0.005
Chromium, Total (mg/L)	0.1	0.0023	0.1
Cobalt, Total (mg/L)	n/a	0.075	0.075
Combined Radium, Total (pCi/L)	5	4.61	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	0.0084	0.05
Thallium, Total (mg/L)	0.002	0.0013	0.002

*MCL = Maximum Contaminant Level

*GWPS = Groundwater Protection Standard

FIGURE F
Confidence Interval

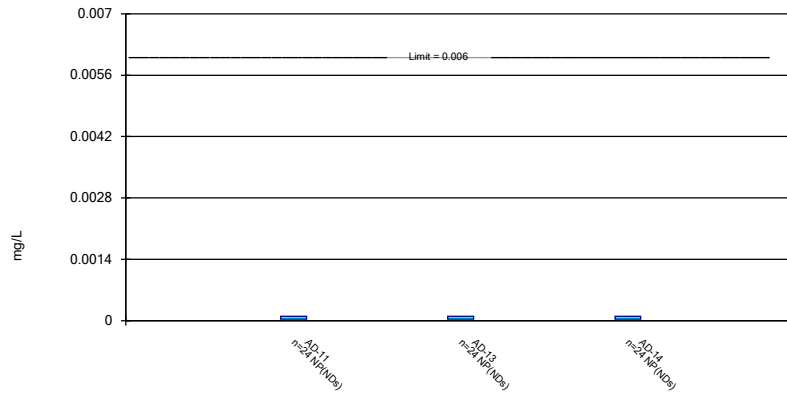
Confidence Interval - All Results (No Significant)

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 9/1/2023, 4:30 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-11	0.0001	0.00003	0.006	No	24	58.33	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-13	0.0001	0.00003	0.006	No	24	54.17	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-14	0.0001	0.00003	0.006	No	24	58.33	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-11	0.0026	0.00055	0.01	No	24	25	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-13	0.005	0.00038	0.01	No	24	29.17	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-14	0.001894	0.00039	0.01	No	24	29.17	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-11	0.0248	0.01412	2	No	24	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-13	0.05614	0.02679	2	No	24	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-14	0.04186	0.02939	2	No	24	0	None	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-11	0.00235	0.001084	0.004	No	24	0	None	ln(x)	0.01	Param.
Beryllium, total (mg/L)	AD-13	0.0007359	0.0004422	0.004	No	24	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-14	0.0009096	0.0004348	0.004	No	24	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-11	0.0003801	0.0002652	0.005	No	24	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-13	0.0001364	0.00007444	0.005	No	24	16.67	Kaplan-Meier	ln(x)	0.01	Param.
Cadmium, total (mg/L)	AD-14	0.00178	0.0006429	0.005	No	24	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-11	0.00071	0.00032	0.1	No	23	0	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-13	0.0005816	0.00032	0.1	No	23	13.04	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-14	0.0006877	0.0003953	0.1	No	24	8.333	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-11	0.02042	0.01299	0.075	No	24	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-13	0.006671	0.003725	0.075	No	24	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-14	0.01536	0.006477	0.075	No	24	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-11	2.938	1.844	5	No	24	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-13	2.846	1.905	5	No	24	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-14	2.655	1.43	5	No	24	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-11	1.135	0.4332	4	No	24	12.5	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-13	0.5742	0.3337	4	No	25	12	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-14	0.23	0.083	4	No	25	44	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-11	0.004253	0.00069	0.0034	No	24	29.17	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-13	0.002727	0.0001	0.0034	No	24	29.17	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-14	0.005	0.00013	0.0034	No	24	37.5	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-11	0.03117	0.01948	0.39	No	24	0	None	sqrt(x)	0.01	Param.
Lithium, total (mg/L)	AD-13	0.02958	0.01441	0.39	No	24	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-14	0.01546	0.01121	0.39	No	23	0	None	No	0.01	Param.
Mercury, total (mg/L)	AD-11	0.00002258	0.00000624	0.002	No	24	25	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-13	0.00000673	0.000004	0.002	No	24	41.67	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-14	0.00006069	0.00001079	0.002	No	24	16.67	Kaplan-Meier	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-11	0.001519	0.0002	0.0024	No	24	79.17	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-13	0.0008705	0.0005	0.0024	No	24	58.33	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-14	0.0006	0.000497	0.0024	No	24	70.83	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-11	0.001753	0.001178	0.05	No	24	16.67	Kaplan-Meier	ln(x)	0.01	Param.
Selenium, total (mg/L)	AD-13	0.001326	0.0006303	0.05	No	24	12.5	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-14	0.002811	0.002056	0.05	No	24	8.333	None	No	0.01	Param.
Thallium, total (mg/L)	AD-11	0.001317	0.00013	0.002	No	23	21.74	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-13	0.0002	0.00019	0.002	No	24	58.33	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-14	0.0005	0.000242	0.002	No	24	54.17	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

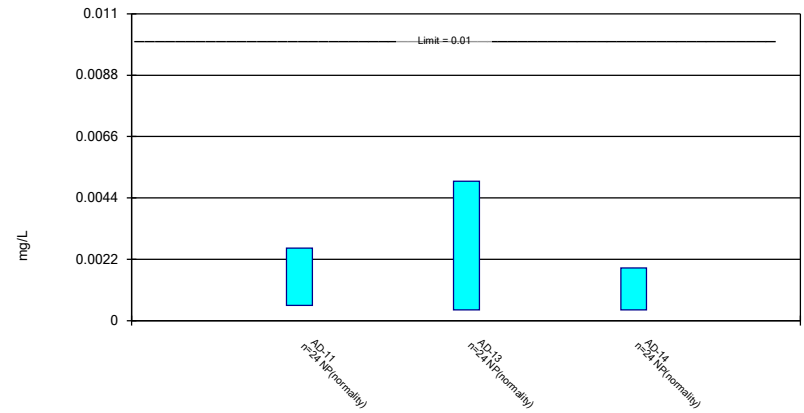
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Constituent: Antimony, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

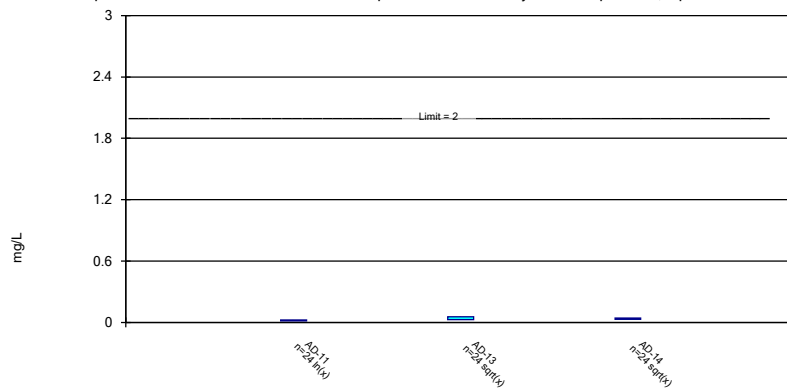
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Constituent: Arsenic, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

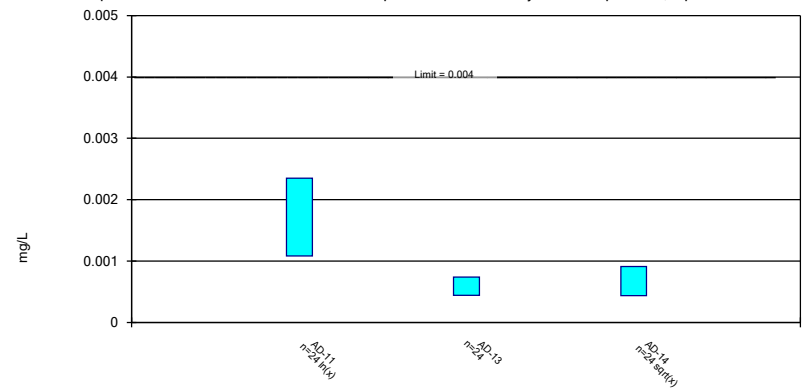
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

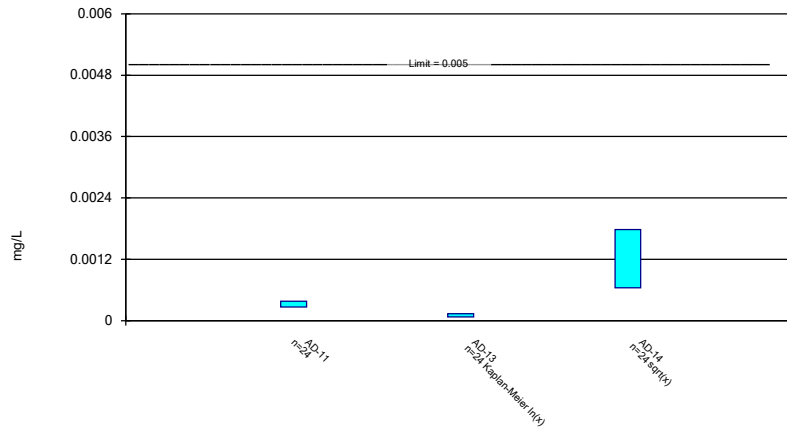
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

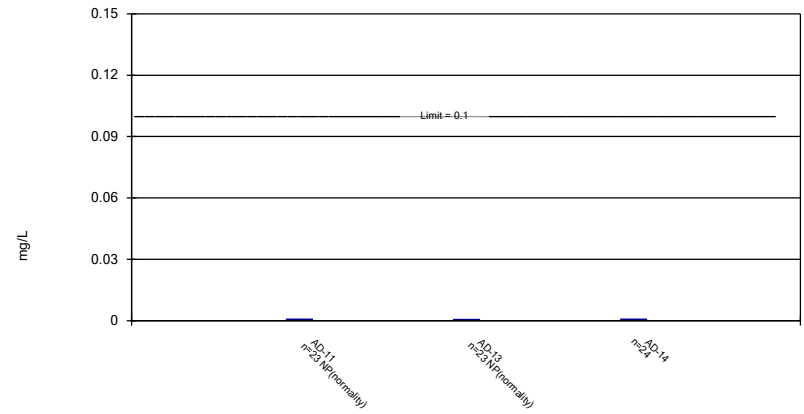
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

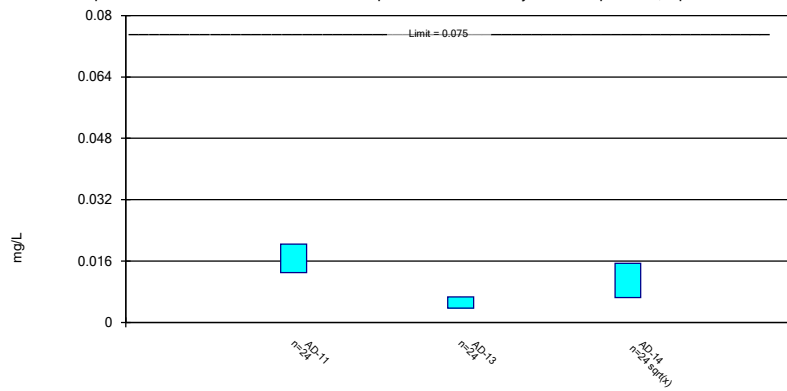
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

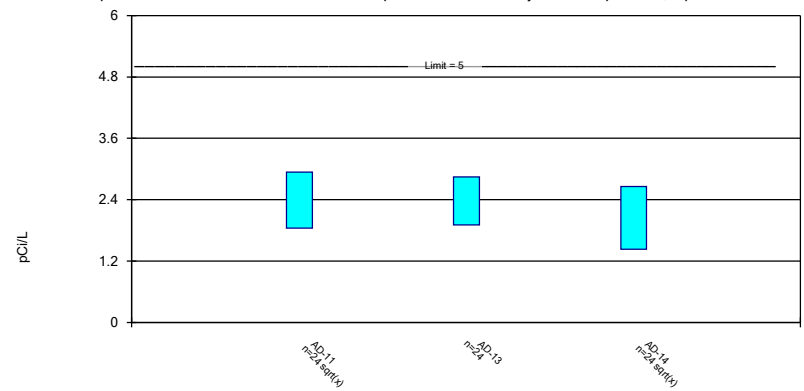
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

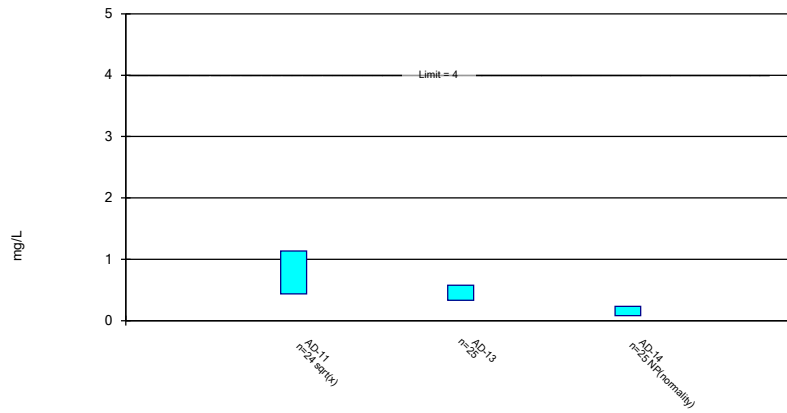
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

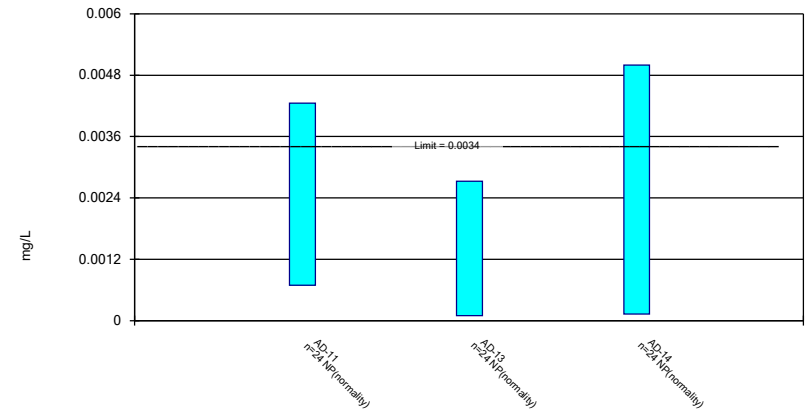
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

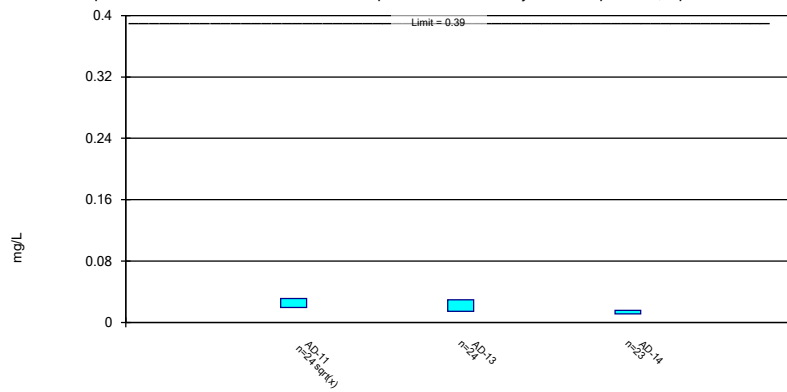
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

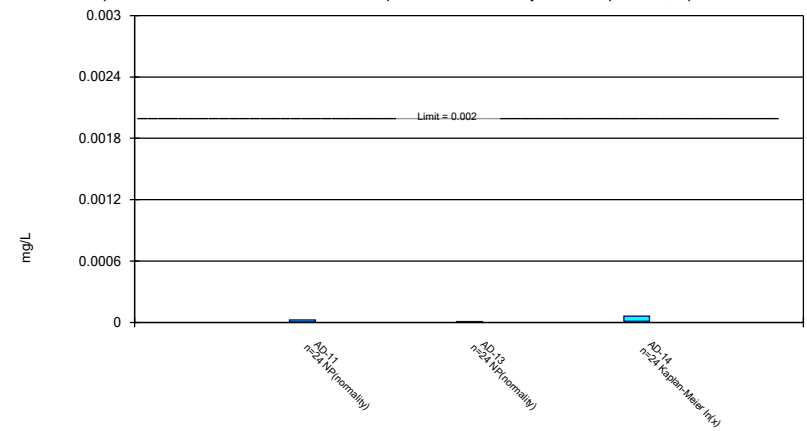
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

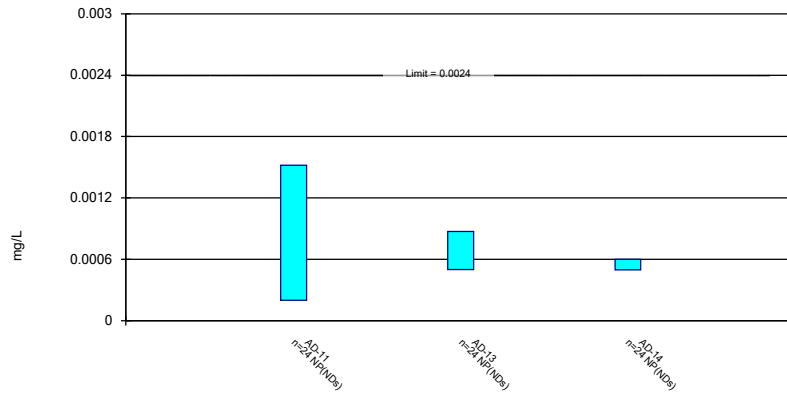
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

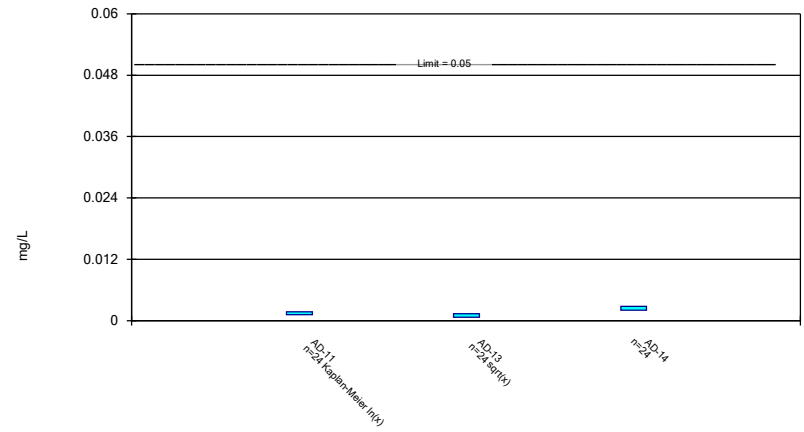
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

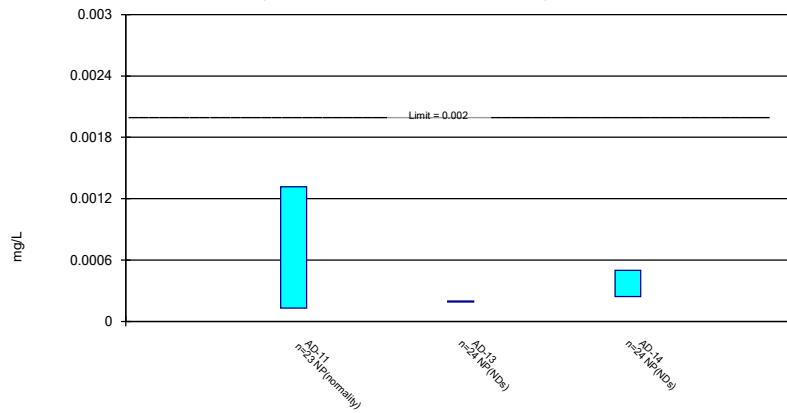
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

STATISTICAL ANALYSIS SUMMARY, LANDFILL

J. Robert Welsh Plant Pittsburg, Texas

Prepared for

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January 23, 2024

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ACRONYMS AND ABBREVIATIONS

CCR	coal combustion residual
GWPS	groundwater protection standard
LPL	lower prediction limit
mg/L	milligram per liter
PQL	practical quantitation limit
QA/QC	quality assurance/quality control
SSI	statistically significant increase
SSL	statistically significant level
SU	standard units
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
UPL	upper prediction limit

1. EXECUTIVE SUMMARY

In accordance with Texas Commission on Environmental Quality (TCEQ) 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 Landfill, an existing CCR unit at the Welsh Power Plant in Pittsburg, Texas. Recent groundwater monitoring results were used to identify concentrations of Appendix IV constituents that are above site-specific groundwater protection standards (GWPSs).

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were identified for boron, total dissolved solids (TDS), and sulfate at the Landfill. An alternative source was not identified following the detection monitoring event, so assessment monitoring was initiated and GWPSs were set in accordance with § 352.951(b) (Geosyntec 2018). A semiannual sampling event for Appendix III parameters and Appendix IV parameters, as required by § 352.951(a), was completed in October 2023. The results of the October 2023 assessment sampling event are documented in this report.

Before the statistical analyses were conducted, the 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 that would impact data usability were identified.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were reestablished for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameter data at the compliance wells to assess whether any were present at statistically significant levels (SSLs) above the corresponding GWPS. No SSLs were identified; however, concentrations of Appendix III parameters remained above background. Therefore, the unit will remain in assessment monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

2. LANDFILL EVALUATION

2.1 Data Validation and QA/QC

During the October 2023 assessment monitoring event, one set of samples was collected for analysis from each background and compliance well. Samples from October 2023 were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected from this assessment monitoring event may be found in Table 1.

Chemical analysis was completed by a National Environmental Laboratory Accreditation Program–certified analytical laboratory. The laboratory completed analysis of quality assurance and quality control (QA/QC) samples such as laboratory reagent blanks, continuing calibration verification samples, and laboratory fortified blanks.

A data quality review was completed to assess whether the data met the objectives outlined in TCEQ Draft Technical Guidance No. 32 related to groundwater sampling and analysis (TCEQ 2020). As noted in the review memorandum (Attachment B), the data were determined usable for supporting project objectives. 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.10.0.15 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

2.2 Statistical Analysis

Statistical analyses for the landfill were conducted in accordance with the December 2021 Statistical Analysis Plan (Geosyntec 2021). Time series plots and results for all completed statistical tests are provided in Attachment C. The data obtained in October 2023 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 § 352.951(b) and the Statistical Analysis Plan (Geosyntec 2021). The established GWPS was set to whichever was greater of the background concentration and the maximum contaminant level for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit was calculated using data that were pooled from the background wells and collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for barium, beryllium, chromium, and combined radium. Nonparametric tolerance limits were calculated for arsenic, cadmium, cobalt, fluoride, lithium, and selenium, due to apparent nonnormal distributions, and for antimony, lead, mercury, molybdenum, and thallium, due to a high nondetect frequency. Upper 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 ($\alpha = 0.01$), but nonparametric

confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the nondetect frequency was too high). An SSL was concluded if the lower confidence limit was above the GWPS (i.e., if the entire confidence interval was above the GWPS). The calculated confidence limits (Attachment C) were compared to the GWPS provided in Table 2.

No SSLs were identified at the Welsh Landfill.

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPLs) were previously established for all Appendix III parameters following the background monitoring period (Geosyntec 2018). Intrawell tests were used to evaluate potential SSIs for calcium, chloride, sulfate, and TDS, whereas interwell tests were used to evaluate potential SSIs for boron, fluoride, and pH. Interwell and intrawell prediction limits are updated periodically during the assessment monitoring period as sufficient data become available.

For intrawell tests, insufficient data was available to compare against the existing background dataset, and so the prediction limits were not updated for the intrawell tests at this time. The intrawell prediction limits were previously calculated using historical data through June 2022 (Geosyntec 2023). The established intrawell prediction limits were used to evaluate potential SSIs for calcium, chloride, sulfate, and TDS.

Prediction limits for the interwell tests were calculated using data collected through the October 2023 assessment monitoring event. New background well data were tested for outliers before being added to the background data set. Background well data were also evaluated for statistically significant trends using the Sen's Slope/Mann-Kendall trend test, and the results are included in Attachment C. The boron, fluoride, and pH prediction limits were calculated using a one-of-two retesting procedure, as during detection monitoring.

After the revised background set was established, a parametric or nonparametric analysis was selected based on the distribution of the data and the frequency of nondetect data. Estimated results under the reporting limit (i.e., practical quantitation limit [PQL]) but above the method detection limit (i.e., "J-flagged" data) were considered detections and the estimated results were used in the statistical analyses. Nonparametric analyses were selected for data sets with at least 50% nondetect data or data sets that could not be normalized. Parametric analyses were selected for data sets (either transformed or untransformed) that passed the Shapiro-Wilk/Shapiro-Francia test for normality. The Kaplan-Meier nondetect adjustment was applied to data sets with between 15% and 50% nondetect data. For data sets with fewer than 15% nondetect data, nondetect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or nonparametric) and transformation (where applicable) for each background data set are shown in Attachment C.

Interwell UPLs were updated for boron, fluoride, and pH, and lower prediction limits (LPLs) were also updated for pH using historical data through October 2023. Intrawell UPLs were previously established for calcium, chloride, sulfate, and TDS using the historical data through June 2022. The updated prediction limits are summarized in Table 3. The prediction limits were calculated for a one-of-two retesting procedure: If at least one sample in a series of two is not above the UPL (or, in the case of pH, is neither less than the LPL nor greater than the UPL), then it can be concluded that an SSI has not occurred. In practice, where the initial result is not above the UPL

(or, in the case of pH, is neither less than the LPL nor greater than the UPL), a second sample will not be collected. The retesting procedures allowed for an acceptably high statistical power that could detect changes at compliance wells for constituents evaluated using intrawell prediction limits.

2.2.4 Evaluation of Potential Appendix III SSIs

The Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells were above background concentrations. Data collected during the October 2023 assessment monitoring event from each compliance well were compared to calculated prediction limits to assess whether the results were statistically above background limits. The results from this event and the prediction limits are summarized in Table 3. The following were detected above the UPLs, or, in the case of pH, below the LPLs:

- Boron concentrations were detected above the interwell UPL of 0.901 milligrams per liter (mg/L) at AD-11 (1.41 mg/L), AD-13 (0.961 mg/L), and AD-14 (1.57 mg/L).
- Fluoride concentrations were detected above the interwell UPL of 0.583 mg/L at AD-11 (0.69 mg/L).
- pH values were below the interwell LPL of 4.8 standard units (SU) at AD-11 (4.1 SU) and at AD-14 (4.6 SU).
- Sulfate concentrations were detected above the intrawell UPL of 269 mg/L at AD-14 (404 mg/L).
- TDS concentrations were detected above the intrawell UPL of 527 mg/L at AD-14 (670 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the October 2023 sample was above the UPL or, in the case of pH, below the LPL. Based on this evaluation, concentrations of boron, fluoride, sulfate, and TDS appear to be above background concentrations, and pH values appear to be below background values. Therefore, the unit will remain in assessment monitoring.

2.3 Conclusions

A semiannual assessment monitoring event was conducted in accordance with the TCEQ CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that prevented data usage. A review of outliers identified no potential outliers in the October 2023 data. GWPSs were reestablished for 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 was above the GWPS. No SSLs were identified. Appendix III results were compared to calculated prediction limits, with values above the UPL detected for boron, fluoride, sulfate, and TDS and with results below the LPL for pH.

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

3. REFERENCES

Geosyntec. 2018. Statistical Analysis Summary – Landfill, J. Robert Welsh Plant, Pittsburg, Texas. Geosyntec Consultants, Inc. January.

Geosyntec. 2021. Statistical Analysis Plan – J. Robert Welsh Plant. Geosyntec Consultants, Inc. December.

Geosyntec. 2023. Statistical Analysis Summary – Landfill, J. Robert Welsh Plant. Geosyntec Consultants, Inc. March.

TCEQ. 2020. Draft Technical Guidance No. 32. Coal Combustion Residuals Groundwater Monitoring and Corrective Action. Texas Commission on Environmental Quality. May.

TABLES

**Table 1. Groundwater Data Summary
Statistical Analysis Summary
Welsh Plant – Landfill**

Parameter	Unit	AD-1	AD-5	AD-11	AD-13	AD-14	AD-17
		Background	Background	Compliance	Compliance	Compliance	Background
		10/4/2023	10/4/2023	10/3/2023	10/3/2023	10/3/2023	10/4/2023
Antimony	µg/L	0.029 J1	0.1 U1	0.015 J1	0.016 J1	0.014 J1	1 U1
Arsenic	µg/L	0.19	2.94	0.85	0.86	0.81	0.5 J1
Barium	µg/L	80.0	63.9	12.8	19.7	16.7	11.8
Beryllium	µg/L	1.06	0.049 J1	1.44 M1	0.566	2.34	0.5 U1
Boron	mg/L	0.901	0.042 J1	1.41	0.961	1.57	0.14 J1
Cadmium	µg/L	0.027	0.02 U1	0.385	0.150	5.99	0.2 U1
Calcium	mg/L	6.56	35.2	10.5	6.73	12.9	176 M1
Chloride	mg/L	3.03	17.5	10.6	10.9	11.4	37.9
Chromium	µg/L	0.38	0.30	0.57	0.57	0.69	1.3 J1
Cobalt	µg/L	2.25	12.8	16.9	6.56	44.8	41.2
Combined Radium	pCi/L	1.86	3.57	2.9	2.42	3.28	2.05
Fluoride	mg/L	0.2	0.17	0.69	0.15	0.46	0.06 J1
Lead	µg/L	0.44	0.2 U1	1.48	0.56	0.62	2 U1
Lithium	mg/L	0.0103	0.143	0.0283 M1	0.0477	0.0213	0.305 M1
Mercury	µg/L	0.002 J1	0.005 U1	0.006	0.005 U1	0.530	0.005 U1
Molybdenum	µg/L	0.5 U1	0.5 U1	0.5 U1	0.2 J1	0.5 U1	5 U1
Selenium	µg/L	9.26	0.05 J1	2.36	0.42 J1	3.28	5 U1
Sulfate	mg/L	80.7	132	490	181	404	1,180
Thallium	µg/L	0.05 J1	0.2 U1	0.20	0.16 J1	0.42	2 U1
Total Dissolved Solids	mg/L	200	290	750	360	670	1,520
pH	SU	5.3	6.6	4.1	5.3	4.6	5.8

Notes:

J1: Estimated value. Parameter was detected in concentrations below the reporting limit.

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

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U1: Non-detect value. For statistical analysis, parameters that were not detected were replaced with the reporting limit.

µg/L: micrograms per liter

**Table 2. Appendix IV Groundwater Protection Standards
Statistical Analysis Summary
Welsh Plant – Landfill**

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00317	0.00600
Arsenic, Total (mg/L)	0.0100	0.00628	0.0100
Barium, Total (mg/L)	2.00	0.510	2.00
Beryllium, Total (mg/L)	0.00400	0.00108	0.00400
Cadmium, Total (mg/L)	0.00500	0.00400	0.00500
Chromium, Total (mg/L)	0.100	0.00227	0.100
Cobalt, Total (mg/L)	n/a	0.0748	0.0748
Combined Radium, Total (pCi/L)	5.00	4.51	5.00
Fluoride, Total (mg/L)	4.00	0.583	4.00
Lead, Total (mg/L)	n/a	0.00338	0.00338
Lithium, Total (mg/L)	n/a	0.394	0.394
Mercury, Total (mg/L)	0.00200	0.0000330	0.00200
Molybdenum, Total (mg/L)	n/a	0.00243	0.00243
Selenium, Total (mg/L)	0.0500	0.01010	0.0500
Thallium, Total (mg/L)	0.00200	0.00125	0.00200

Notes:

1. Calculated UTL (upper tolerance limit) represents site-specific background values.
2. Grey cells indicate the GWPS is based on the calculated UTL. Either the UTL is higher than the MCL or an MCL does not exist.

GWPS: groundwater protection standard

MCL: maximum contaminant level

mg/L: milligrams per liter

n/a: not applicable

pCi/L: picocuries per liter

**Table 3. Appendix III Data Summary
Statistical Analysis Summary
Welsh Plant – Landfill**

Analyte	Unit	Description	AD-11	AD-13	AD-14
			10/3/2023	10/3/2023	10/3/2023
Boron	mg/L	Interwell Background Value (UPL)	0.901		
		Analytical Result	1.41	0.961	1.57
Calcium	mg/L	Intrawell Background Value (UPL)	24.5	40.7	26.9
		Analytical Result	10.5	6.73	12.9
Chloride	mg/L	Intrawell Background Value (UPL)	13.7	21.3	11.5
		Analytical Result	10.6	10.9	11.4
Fluoride	mg/L	Interwell Background Value (UPL)	0.583		
		Analytical Result	0.69	0.15	0.46
pH	SU	Interwell Background Value (UPL)	6.9		
		Interwell Background Value (LPL)	4.8		
		Analytical Result	4.1	5.3	4.6
Sulfate	mg/L	Intrawell Background Value (UPL)	745	365	269
		Analytical Result	490	181	404
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1,150	656	527
		Analytical Result	750	360	670

Notes:

1. Bold values exceed the background value.

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Welsh Landfill CCR management area and that the requirements of § 352.951(a) have been met.

David Anthony Miller

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

Texas

Licensing State

01.24.2024

Date

ATTACHMENT B

Data Quality Review Memorandum

Memorandum

Date: January 12, 2024
To: David Miller (AEP)
Copies to: Rebecca Jones (AEP)
From: Allison Kreinberg (Geosyntec)
Subject: Data Quality Review – Welsh Power Plant
October 2023 Sampling Event

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the Welsh Power Plant, located in Pittsburg, Texas in October 2023. The groundwater samples were collected to comply 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”). 40 CFR 257 Appendix III and IV constituents were analyzed.

The following sample data groups (SDGs) were associated with the groundwater samples collected during the October 2023 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233091
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233092
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233093
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233117
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233118
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 233119

The data included in these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32¹ prior to submittal of this data to TCEQ.

¹ TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

The following data quality issues were identified:

- As reported in SDG 233117, chromium and cobalt were detected in the equipment blank sample “EB-BACKGROUND” collected on 10/4/2023. The detected chromium concentration in the equipment blank (0.51 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 233118, calcium, lithium, chromium, and cobalt were detected in the equipment blank sample “EQUIPMENT BLANK-PBAP” collected on 10/3/2023. The detected chromium concentration in the equipment blank (0.37 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 233119, boron, calcium, chromium, and cobalt were detected in the equipment blank sample “EQUIPMENT BLANK-LF” collected on 10/3/2023. The estimated detected chromium concentration in the equipment blank (0.29 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 233117, chromium and cobalt were detected in the field blank sample “FIELD BLANK - BACKGROUND” collected on 10/4/2023. The detected chromium concentration in the field blank (0.35 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 233118, lithium, chromium, and cobalt were detected in the field blank sample “FIELD BLANK - PBAP” collected on 10/3/2023. The detected chromium concentration in the field blank (0.35 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.
- As reported in SDG 233119, boron, lithium, beryllium, chromium, and cobalt were detected in the field blank sample “FIELD BLANK - LF” collected on 10/3/2023. The detected chromium concentration in the field blank (0.31 µg/L) was more than 10% of the detected values for chromium in all groundwater samples, which could result in high bias for all groundwater chromium results.

- As reported in SDG 233117, the relative percent difference (RPD) for antimony concentrations from parent sample “AD-1” and duplicate sample “DUPLICATE-BACKGROUND” was 29%. The AD-1 antimony result should be considered estimated.
- The quality control data provided with SDG 233117 noted that the recovery on the matrix spike duplicate for calcium and lithium associated with sample “AD-17” had low recoveries. The calcium and lithium results for sample “AD-17” were qualified with “M1: the associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits”.
- The quality control data provided with SDG 233119 noted that the recovery on the matrix spike duplicate for beryllium and lithium associated with sample “AD-11” had low recoveries. The beryllium and lithium results for sample “AD-11” were qualified with “M1: the associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits”.

Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.

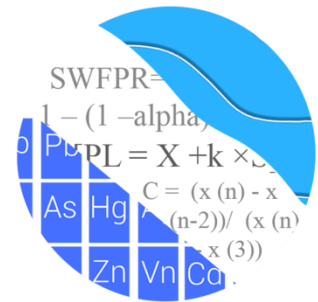
ATTACHMENT C

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

January 4, 2024

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
500 W. Wilson Bridge Road, Suite 250
Worthington, OH 43085



Re: Welsh Landfill - Assessment Monitoring Event & Background Update 2023

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 2023 groundwater data for American Electric Power Inc.'s Welsh Landfill. 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 Residuals (CCR) program in 2016. Below is a list of the monitoring wells, as provided by Geosyntec Consultants. Note that originally the network included upgradient well AD-18; however, further research, reportedly, identified that this well was not providing adequate representation of the groundwater quality upgradient of this site and exhibited different chemical properties from the neighboring upgradient wells. Therefore, data from this well are no longer included in the statistical analysis.

- **Upgradient wells:** AD-1, AD-5, and AD-17
- **Downgradient wells:** AD-11, AD-13, and AD-14

Data were sent electronically, and the statistical analysis was reviewed by Andrew Collins, Project Manager for Groundwater Stats Consulting. The analysis was conducted according to the Statistical Analysis Plan prepared by GSC and approved by Dr. Kirk Cameron with MacStat Consulting.

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 on the Outlier Summary following this letter (Figure C). These values are plotted in a lighter font and disconnected symbol on the time series graphs.

Due to varying detection limits in background data sets, a substitution of the most recent reporting limit is used for all non-detects. Note that for calculation of intrawell prediction limits, substitution of the most recent reporting limit is performed separately for each well/parameter pair. In some cases, the reporting limit provided by the laboratory contains varying limits for a given parameter; therefore, the substitution may differ from well to well. This generally gives the most conservative limit in each case. Reporting limit changes may occur depending on laboratory capabilities and in the case of fluoride, elevated historic reporting limits were replaced by the most recent reporting limit of 0.15 mg/L and was substituted across all non-detects for all wells.

Summary of Statistical Methods

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

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 non-detects, 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. Non-detects are handled as follows:

- 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, 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 prediction limits are used on data containing greater than 50% non-detects.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits will be necessary to accommodate these types of changes. In the interwell case, newer data may be included in background during each sample event after screening the upgradient well data for any new outliers. Data will also be periodically evaluated for statistically significant trends, and earlier data may be deselected prior to construction of statistical limits so that limits represent present-day conditions.

In the intrawell case, data for all wells and constituents are re-evaluated when a minimum of 4 new data points are available to determine whether earlier concentrations are representative of present-day groundwater quality. In some cases, as well, the earlier portion of data are deselected prior to construction of limits in order to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though the data are

excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

Summary of Background Screening Conducted December 2017

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.

As a result of the screening, intrawell prediction limits were determined to be most appropriate for calcium, chloride, sulfate, and TDS while interwell prediction limits were appropriate for boron, fluoride, and pH. A summary of those findings was included with the report.

Appendix III Background Update Summary – Conducted in December 2023

Outlier Analysis

Prior to updating interwell prediction limits for the Fall 2023 analysis, data were evaluated using Tukey's outlier test and visual screening on pooled upgradient well data for boron, fluoride, and pH. Results of the outlier tests follow this report (Figure C).

Tukey's outlier test on pooled upgradient well data did not identify any outliers for boron, fluoride, or pH among upgradient wells; therefore, no measurements were flagged as outliers. A list of all flagged values follows this report (Figure C).

For parameters which use intrawell prediction limits (calcium, chloride, sulfate, and TDS), values were not re-evaluated for new outliers as these records had insufficient samples for updating background during this evaluation period.

Intrawell – Prediction Limits

Intrawell prediction limits, combined with a 1-of-2 resample plan, are constructed using historical data through June 2022 for calcium, chloride, sulfate, and TDS. A summary of the limits follows this letter (Figure D). No comparisons of the October 2023 observations were performed in this analysis.

Interwell – Trend Test Evaluation

For parameters which are tested using interwell prediction limits, the Sen's Slope/Mann-Kendall trend test was used to test data in upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable at the 99% confidence level (Figure E). Statistically significant trends were identified for the following well/constituent pairs:

Increasing

- Boron: AD-1 (upgradient)

Decreasing

- pH: AD-17 (upgradient)

Although statistically significant trends were identified for boron in upgradient well AD-1 and pH in upgradient well AD-17, the magnitudes of the trends are marginal relative to the respective concentrations; therefore, no adjustments were required for these well/constituent pairs at this time. Therefore, all data from upgradient wells were used to construct interwell prediction limits for boron, fluoride, and pH.

Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells through October 2023 for boron, fluoride, and pH (Figure F). 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. No comparison of the October 2023 compliance observations was performed in this analysis.

Evaluation of Appendix IV Parameters – October 2023

Outlier Analysis

Prior to evaluating Appendix IV parameters, upgradient well data are screened through both visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. All flagged values may be seen on the Outlier Summary following this letter (Figure C). Note that due to elevated reporting limits in upgradient well AD-17 for antimony, lead, molybdenum, selenium, and thallium during this event, the most recent respective reporting limit from other wells was for substituted across all wells for each of these constituents.

For the current analysis, Tukey's outlier test on pooled upgradient well data through October 2023 identified outliers for chromium, lead, and mercury. The values identified by Tukey's test, except for the highest value for chromium at AD-17, were either similar to concentrations upgradient of the facility or were lower than the respective Maximum Contaminant Level (MCL); therefore, these values were not flagged as outliers. Tukey's outlier test and visual screening confirmed the previously flagged highest measurement of chromium at AD-17 along with other flagged observations. No additional measurements were flagged among upgradient wells for Appendix IV parameters during this analysis.

Additionally, downgradient well data through October 2023 were screened through visual screening using time series graphs. Since the downgradient well data are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is particular justification for excluding them. No additional outliers among downgradient wells for Appendix IV parameters were flagged during this analysis. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data through October 2023 for Appendix IV parameters (Figure G). These limits are updated on an annual basis and will be updated again during the Fall 2024 sample event. Parametric tolerance limits are calculated, with a target of 95% confidence and 95% coverage, when data follow a normal or transformed-normal distribution. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were constructed using the highest

background measurement. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

These background limits were compared to the Maximum Contaminant Levels (MCLs) as shown 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 H).

Confidence Intervals

Confidence intervals were then constructed using data through October 2023 on downgradient wells for each of the Appendix IV parameters and compared to the GWPS, (i.e., the highest limit of the MCL or background limit as discussed above). These intervals were constructed as either parametric or nonparametric confidence intervals depending on the data distribution and percentage of non-detects. When data followed a normal or transformed-normal distribution, parametric confidence intervals were used for Appendix IV parameters. Nonparametric confidence intervals were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% non-detects. The lower confidence limit, which is constructed with 99% confidence for parametric confidence intervals, is compared to the GWPS prepared as described above. The confidence level associated with nonparametric confidence intervals is dependent upon the number samples available.

Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete graphical results of the confidence intervals follow this letter (Figure I). No statistical exceedances were identified.

Trend Test Evaluation – Appendix IV

When confidence interval exceedances are identified in downgradient wells, data are further evaluated using the Sen's Slope/Mann Kendall trend test to determine whether concentrations are statistically increasing, decreasing, or stable at the 95% confidence level. Utilizing the 95% confidence level for trend tests readily identifies significant trends and is more sensitive than the 99% confidence level without drastically increasing the false negative rate. Upgradient wells are included in the trend analyses for all parameters found to exceed their confidence interval in downgradient wells. When similar patterns exist upgradient of the site, it is an indication of variability in groundwater which may be

unrelated to practices at the site. Since no confidence interval exceedances were identified, trend tests were not required.

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

For Groundwater Stats Consulting,



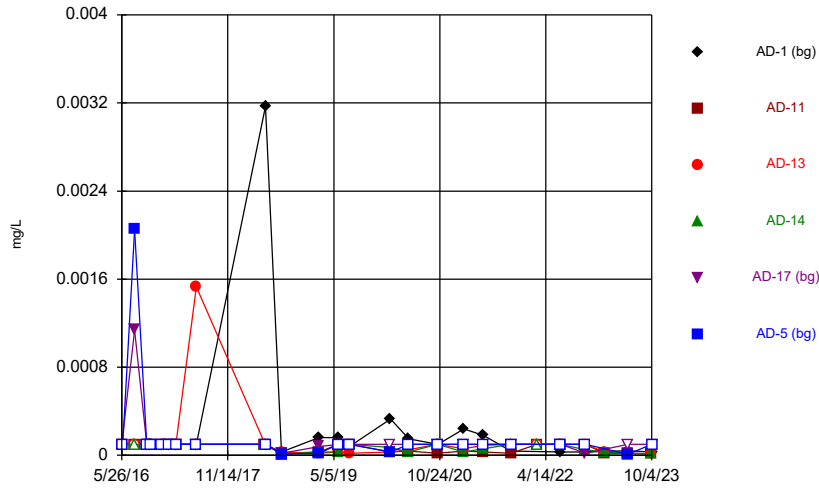
Kristina L. Rayner
Senior Statistician



Andrew Collins
Project Manager

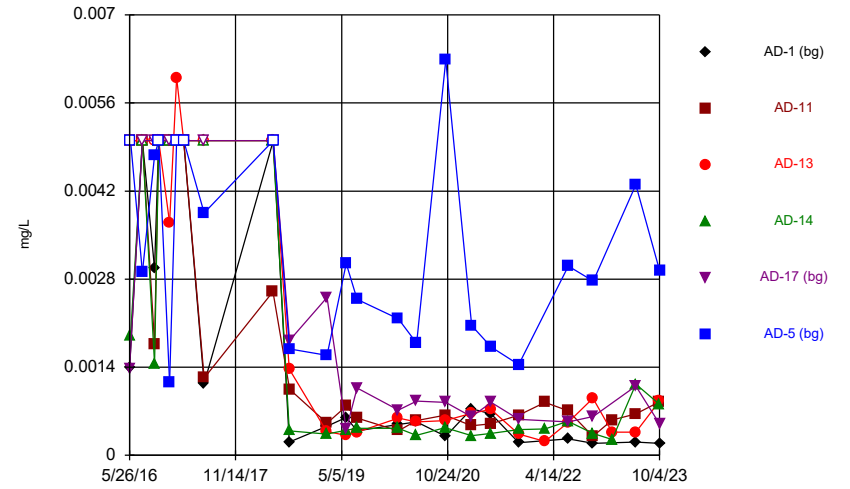
FIGURE A
Time Series

Time Series



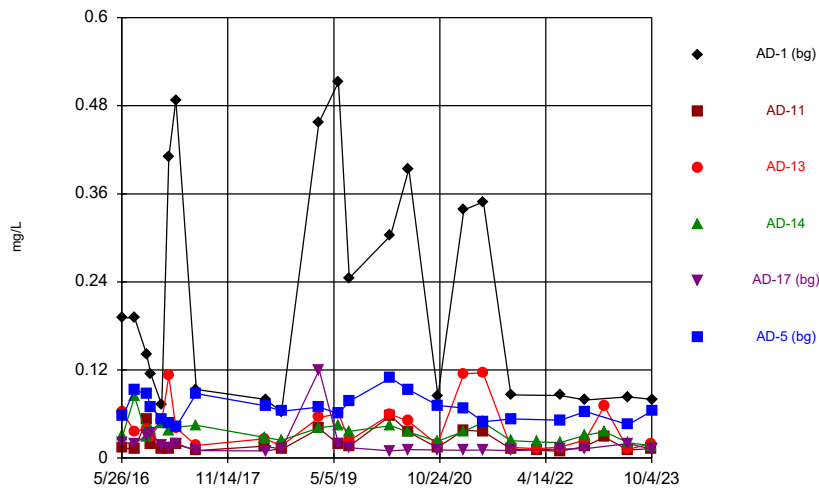
Constituent: Antimony, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



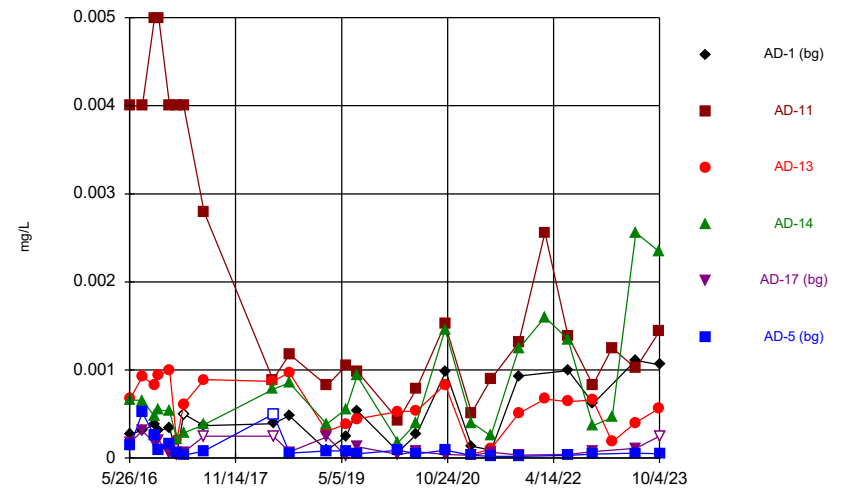
Constituent: Arsenic, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



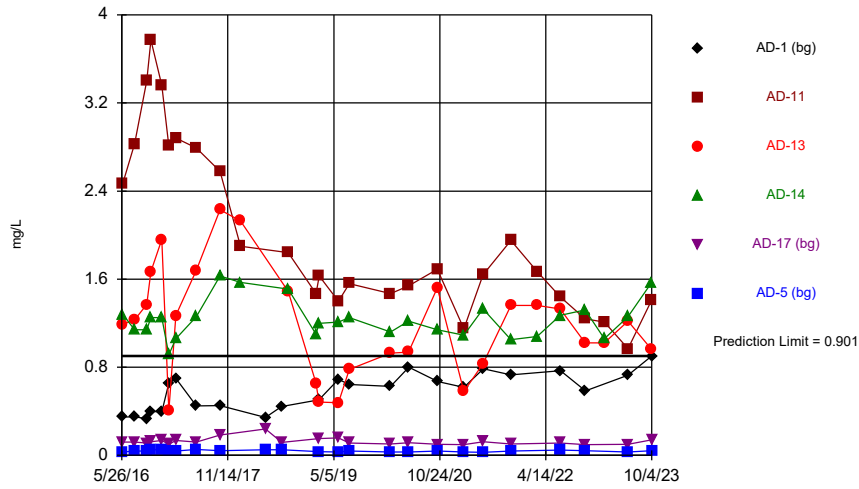
Constituent: Barium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



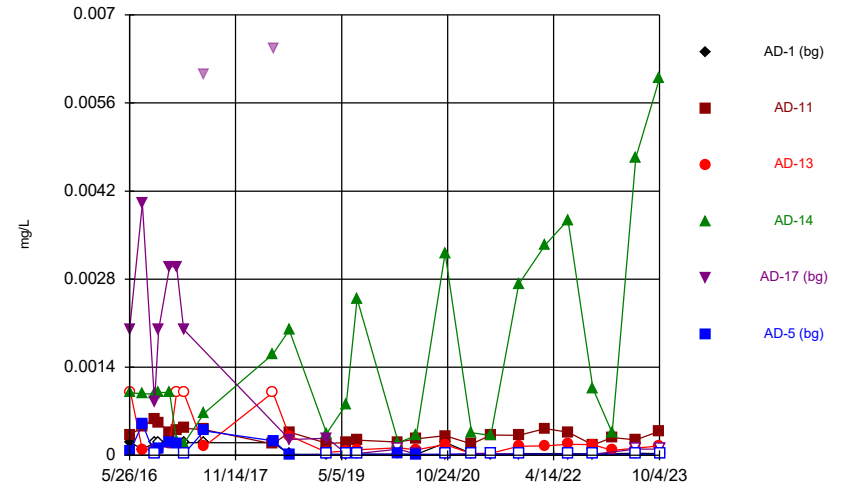
Constituent: Beryllium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



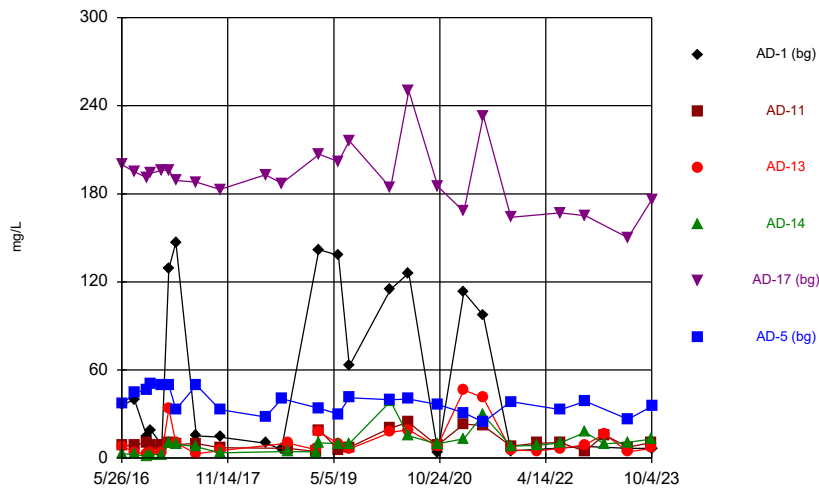
Constituent: Boron, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



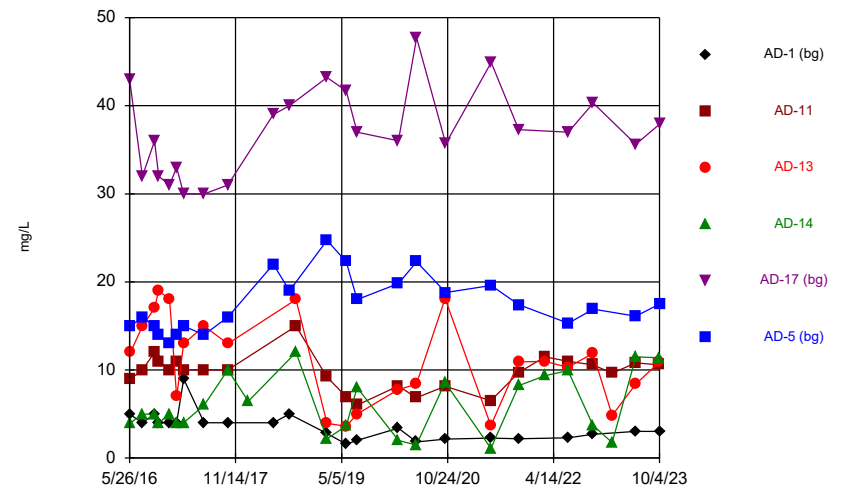
Constituent: Cadmium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



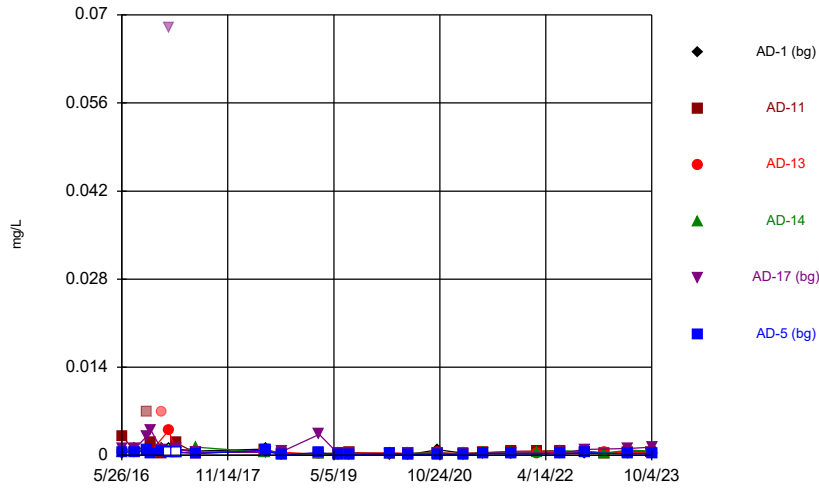
Constituent: Calcium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



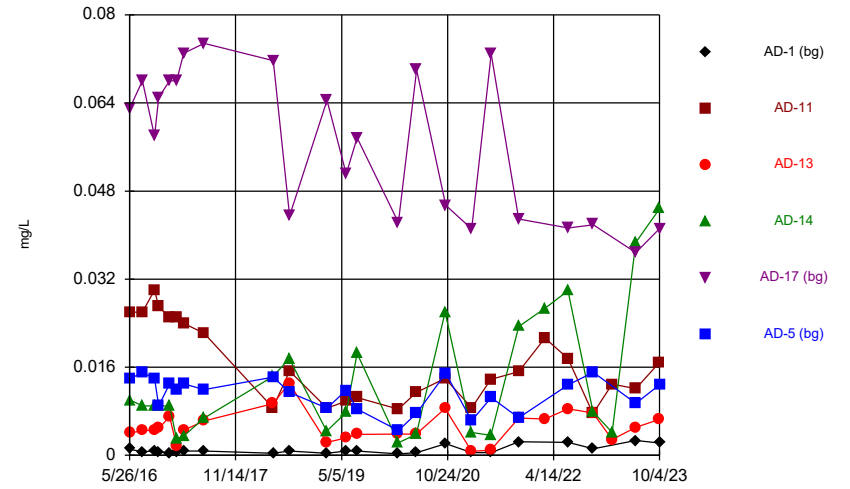
Constituent: Chloride, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



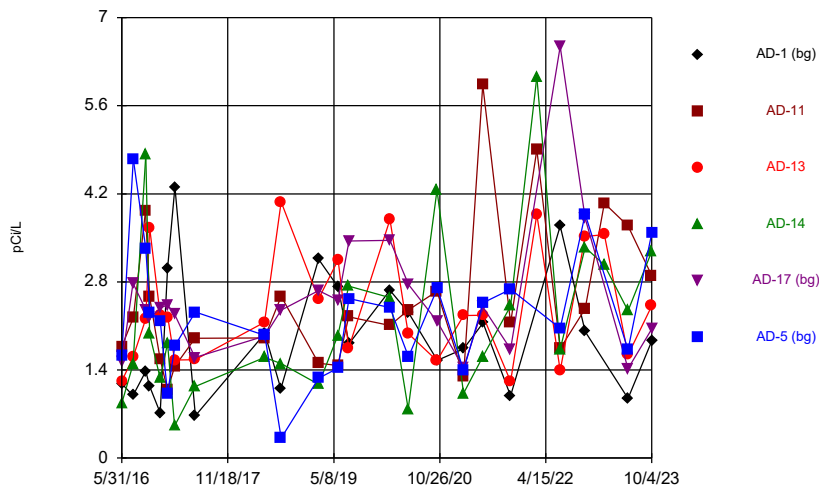
Constituent: Chromium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



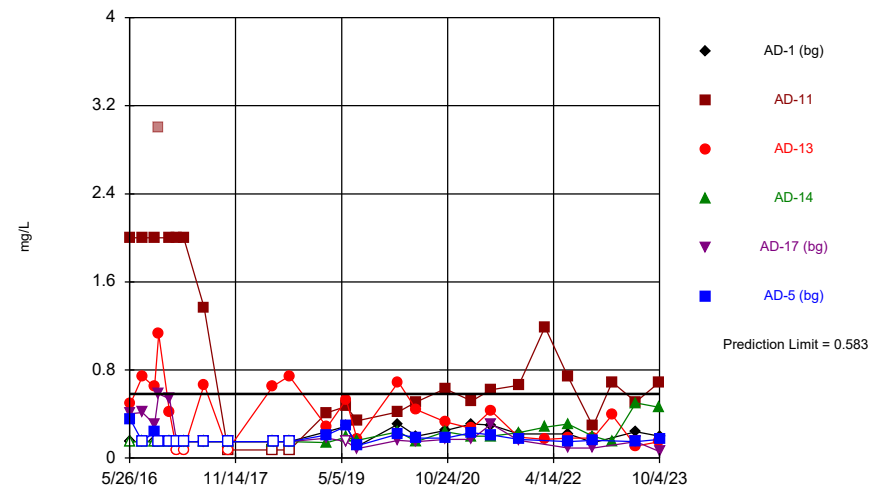
Constituent: Cobalt, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



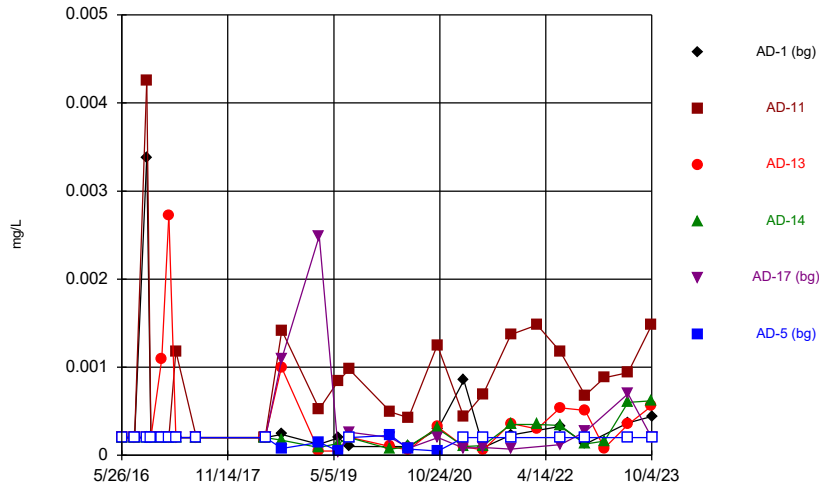
Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



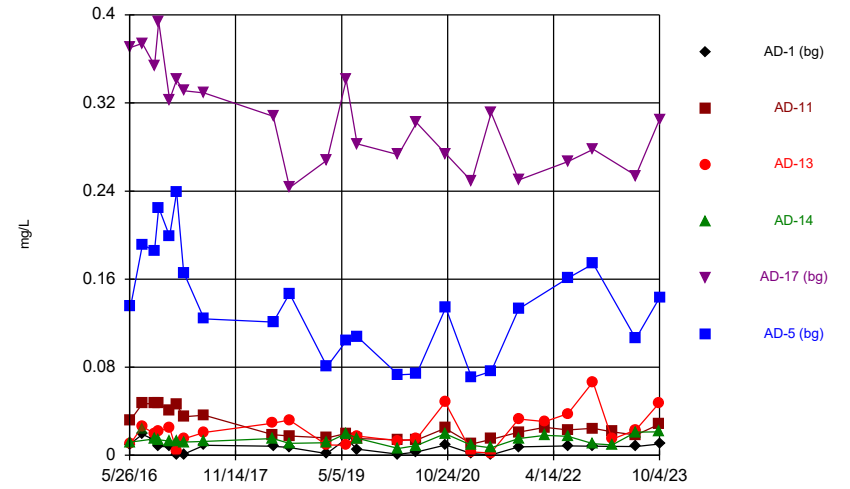
Constituent: Fluoride, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF
Prediction Limit = 0.583

Time Series



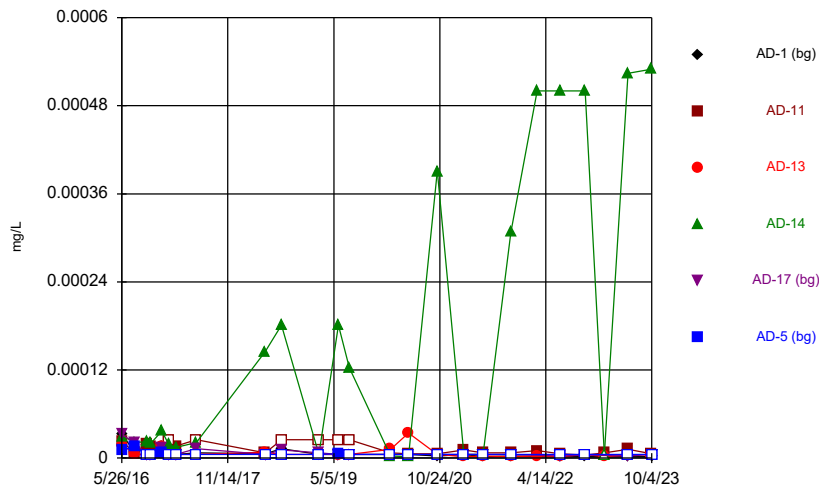
Constituent: Lead, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



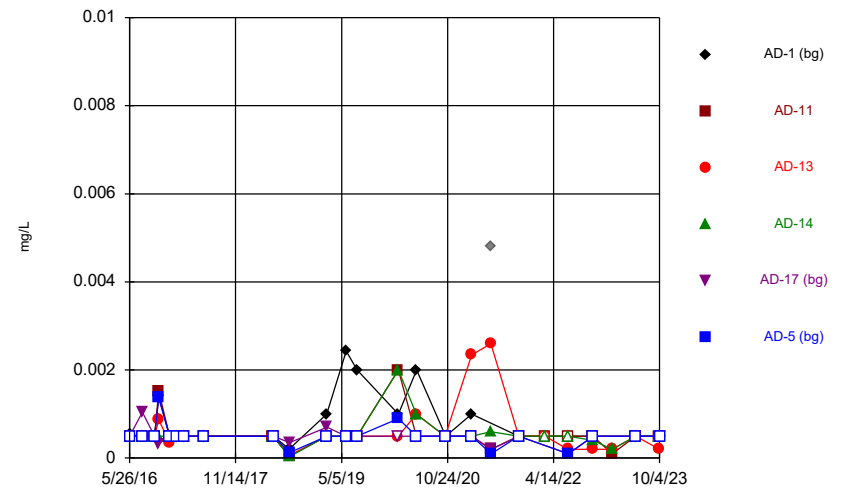
Constituent: Lithium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



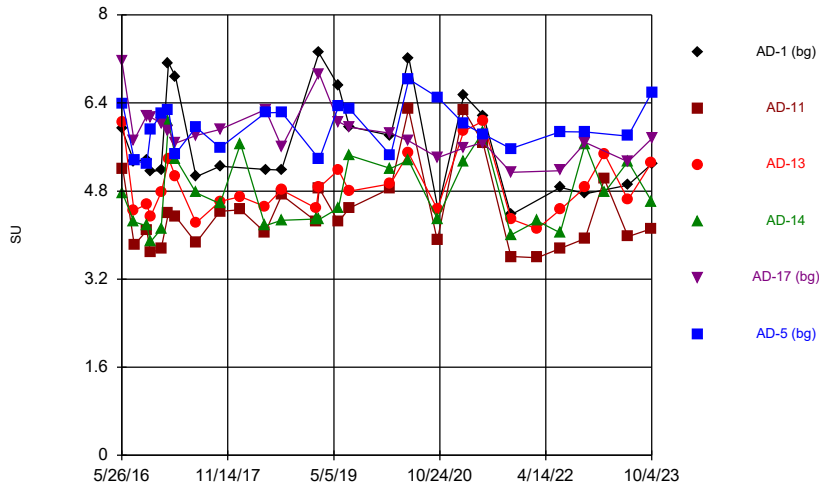
Constituent: Mercury, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



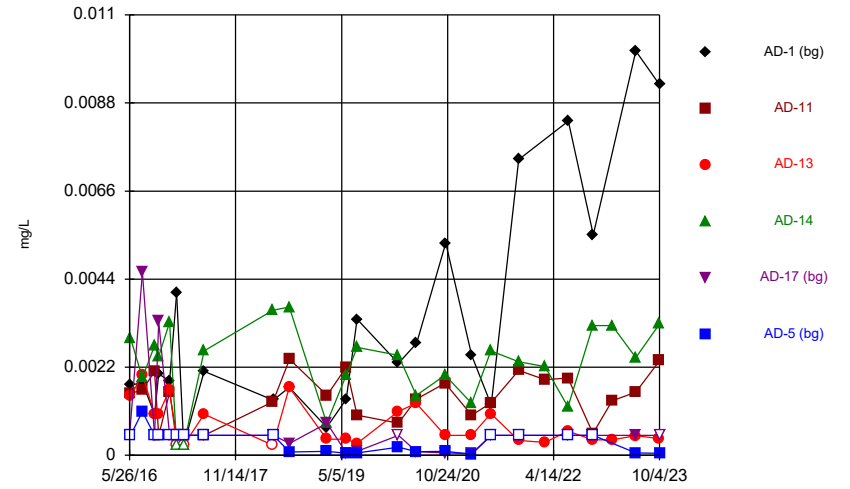
Constituent: Molybdenum, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



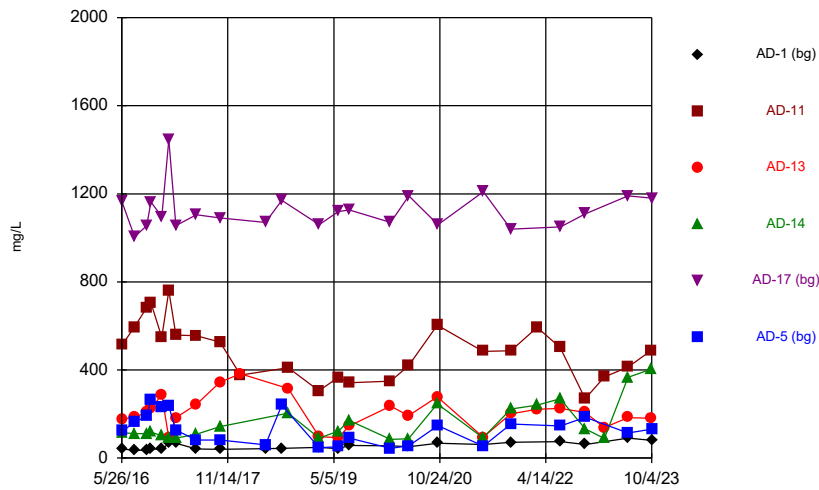
Constituent: pH, field Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



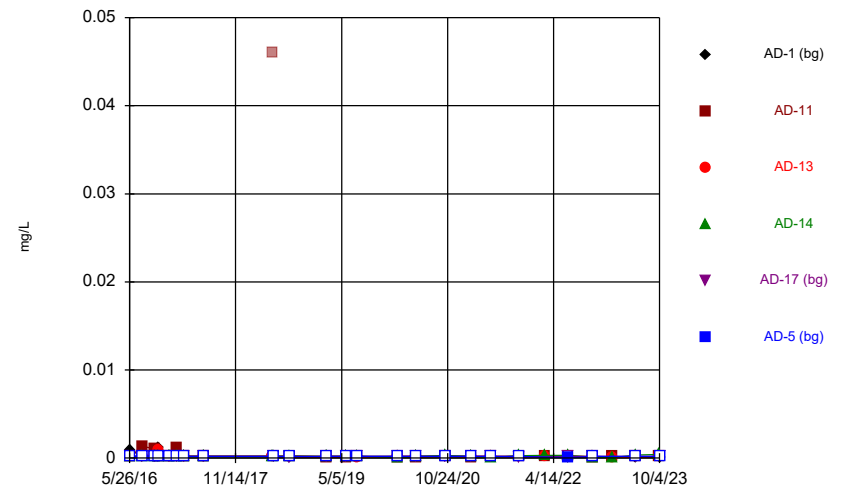
Constituent: Selenium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



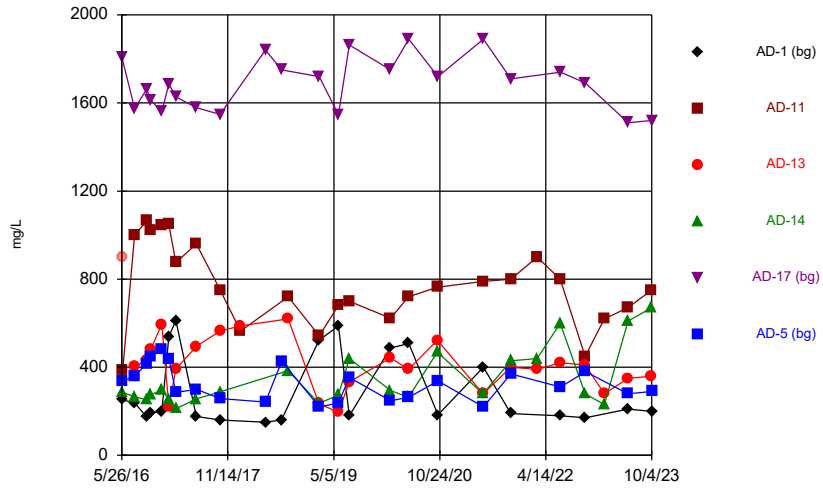
Constituent: Sulfate, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



Constituent: Thallium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

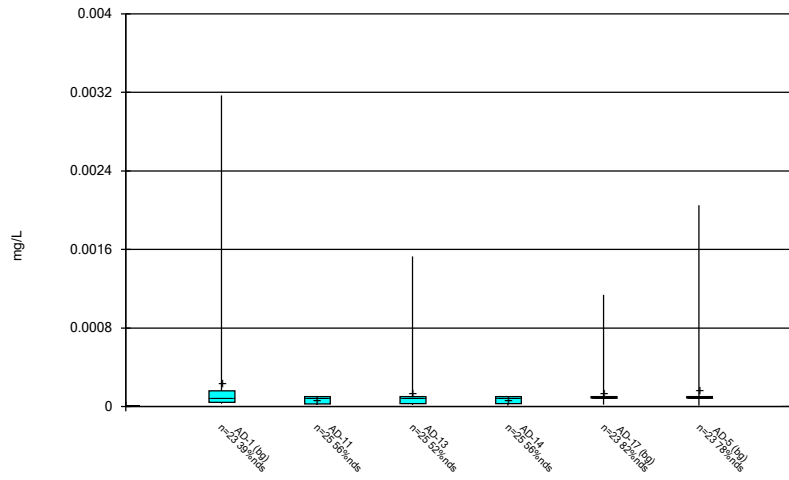
Time Series



Constituent: Total Dissolved Solids Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

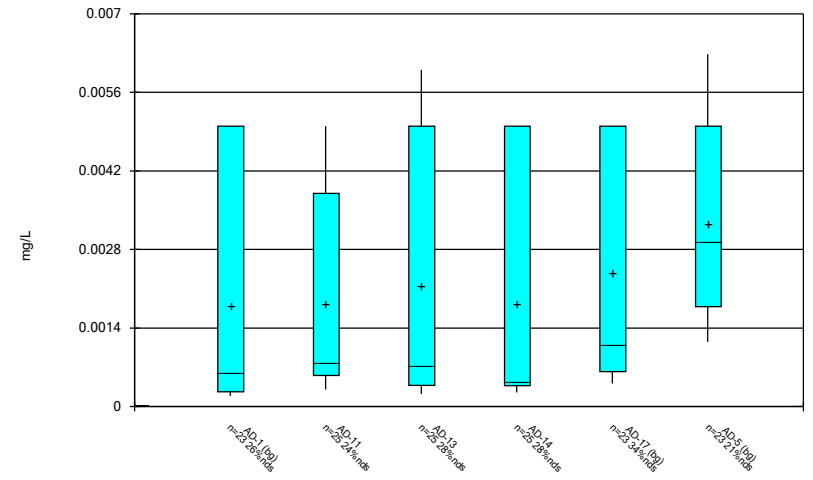
FIGURE B
Box Plots

Box & Whiskers Plot



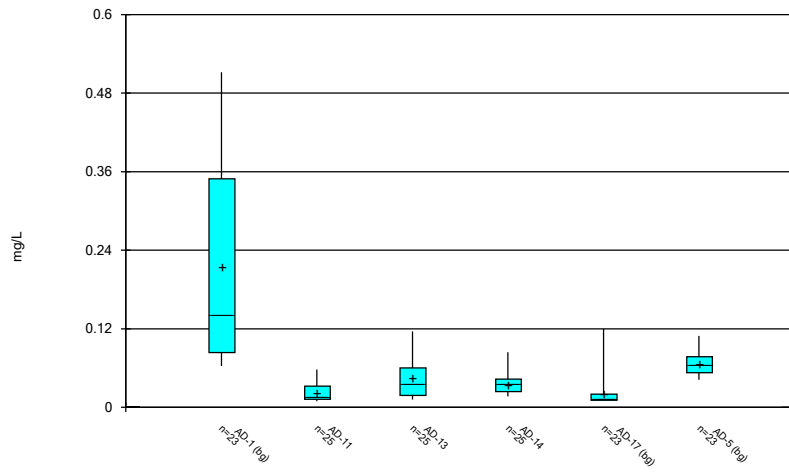
Constituent: Antimony, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



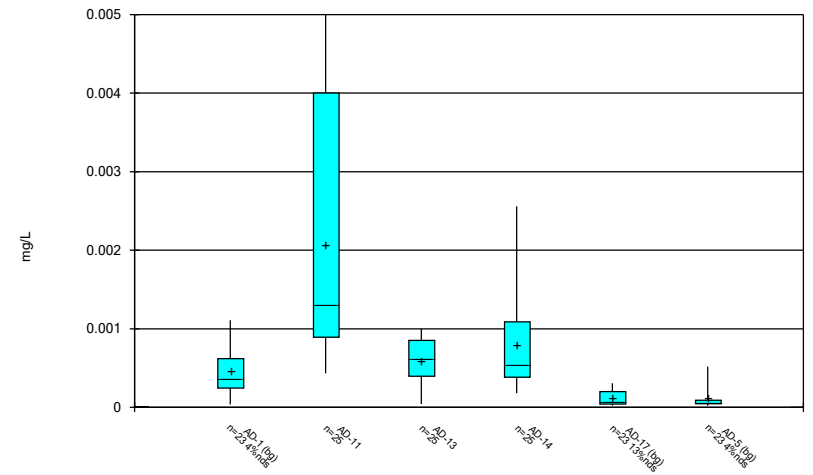
Constituent: Arsenic, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



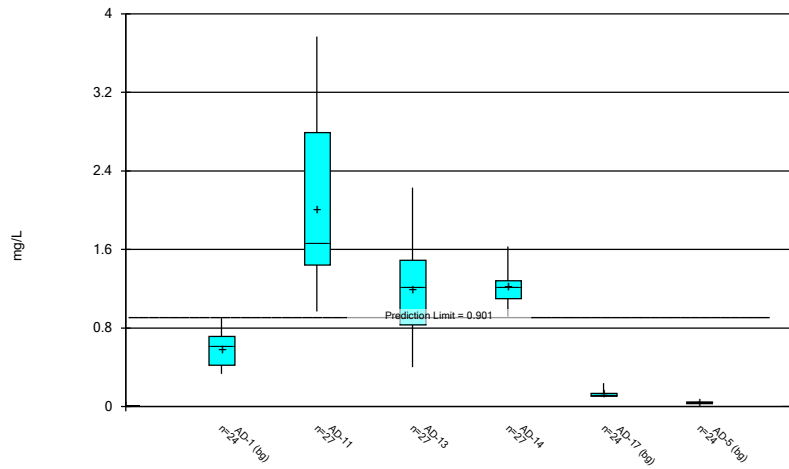
Constituent: Barium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



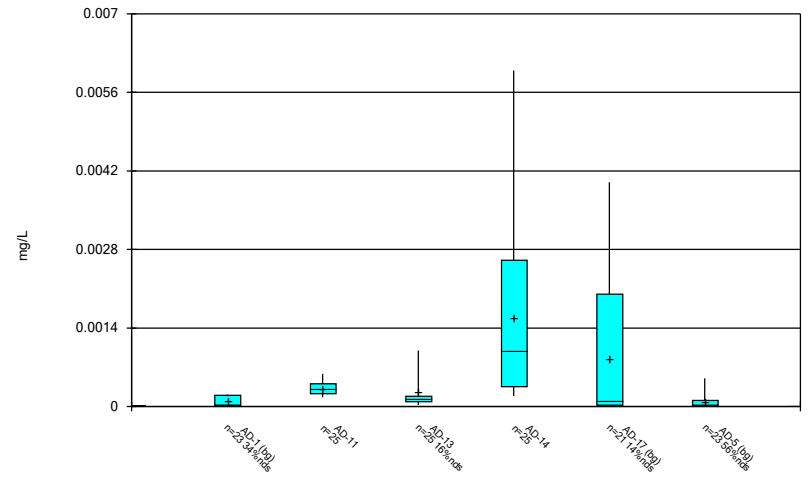
Constituent: Beryllium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



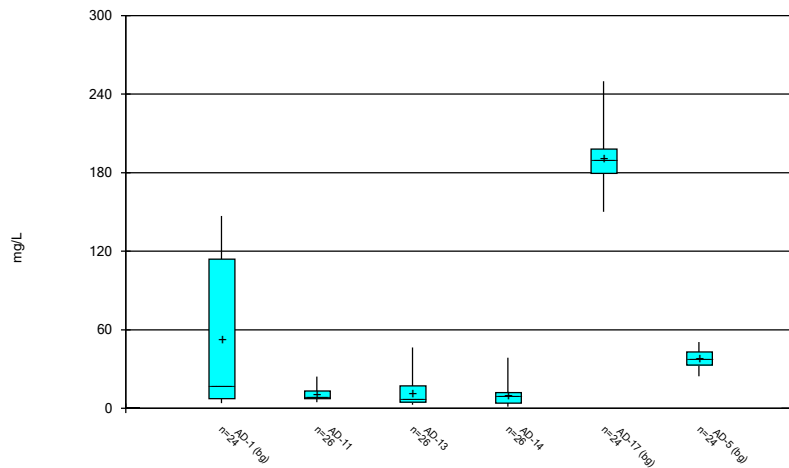
Constituent: Boron, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
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Box & Whiskers Plot



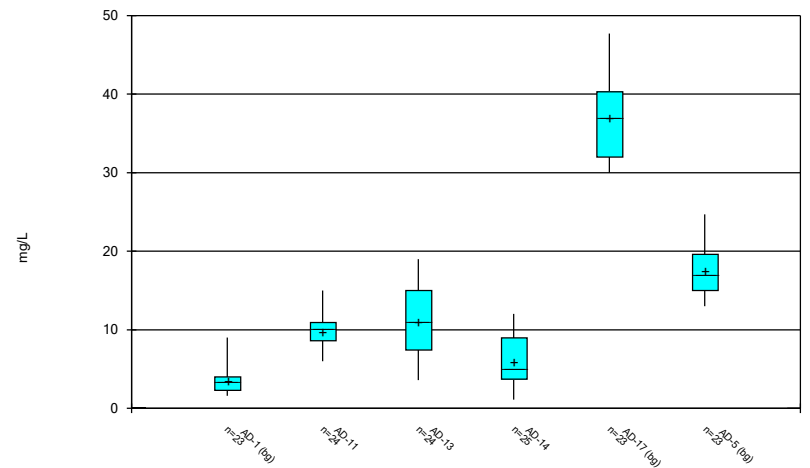
Constituent: Cadmium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



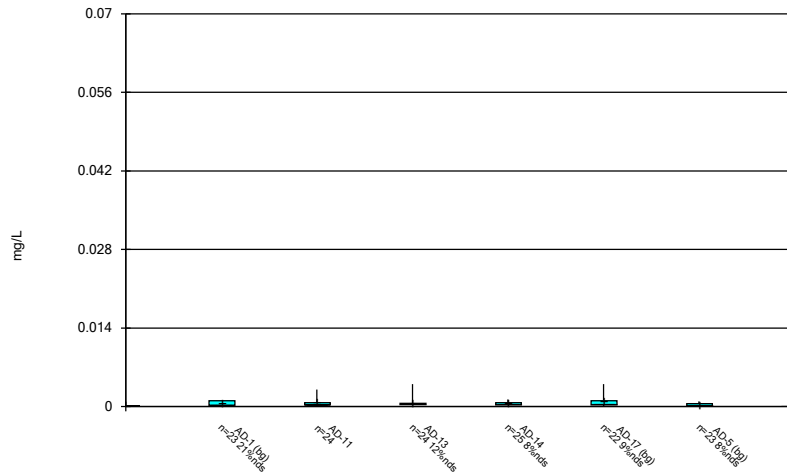
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 Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



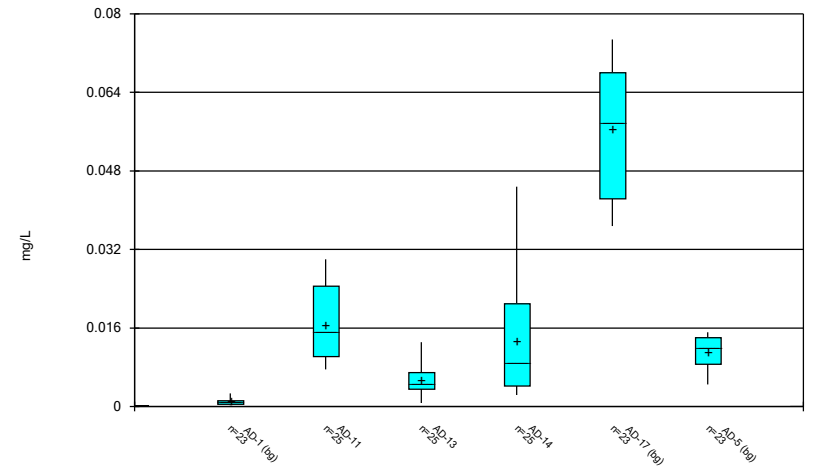
Constituent: Chloride, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



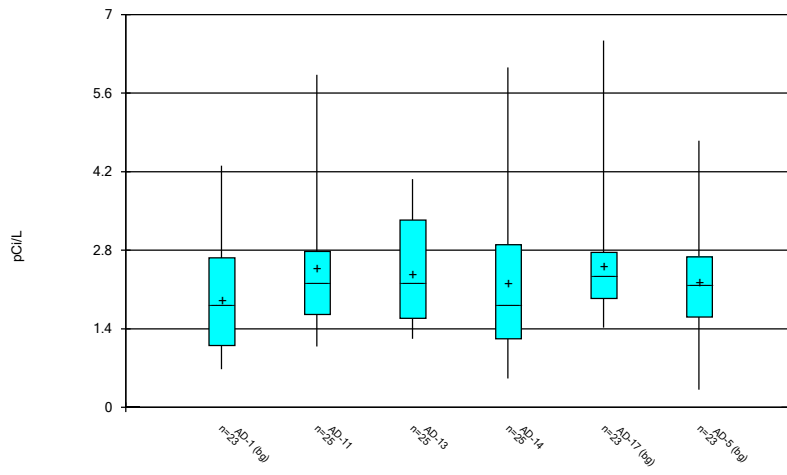
Constituent: Chromium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



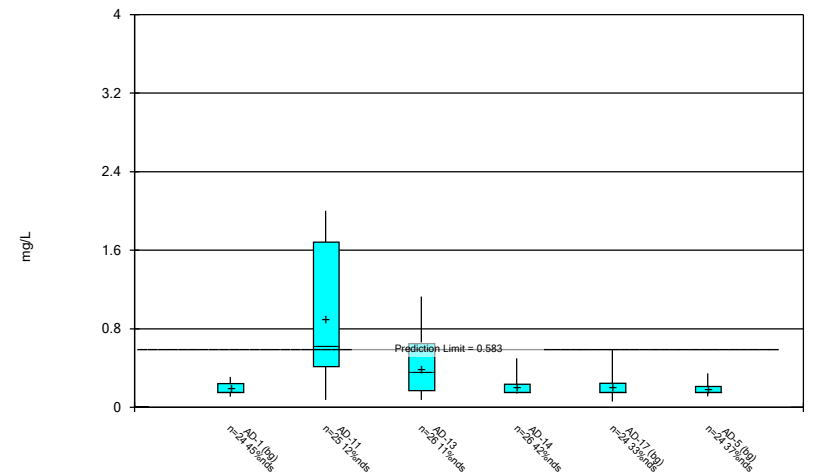
Constituent: Cobalt, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



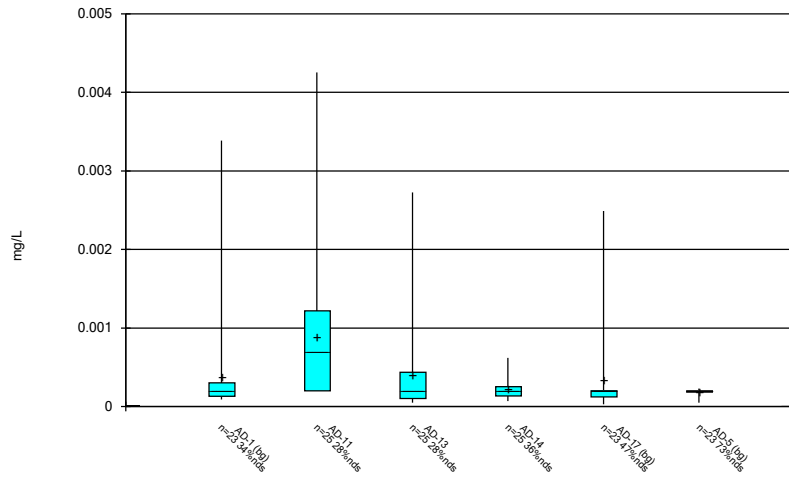
Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



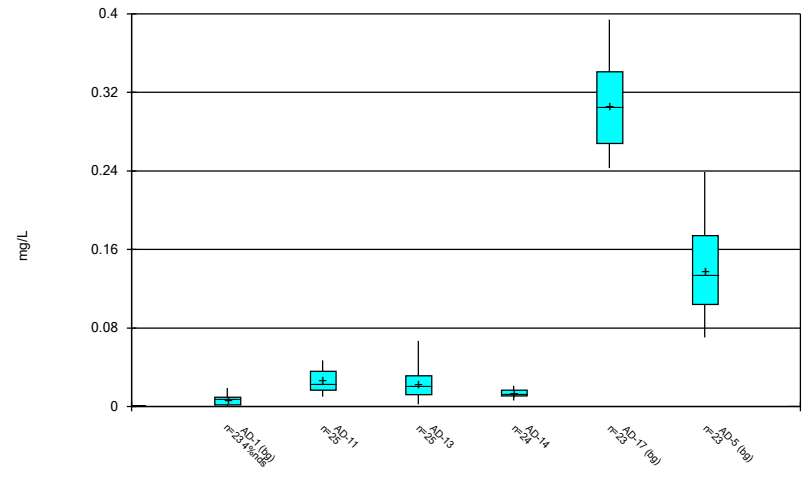
Constituent: Fluoride, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



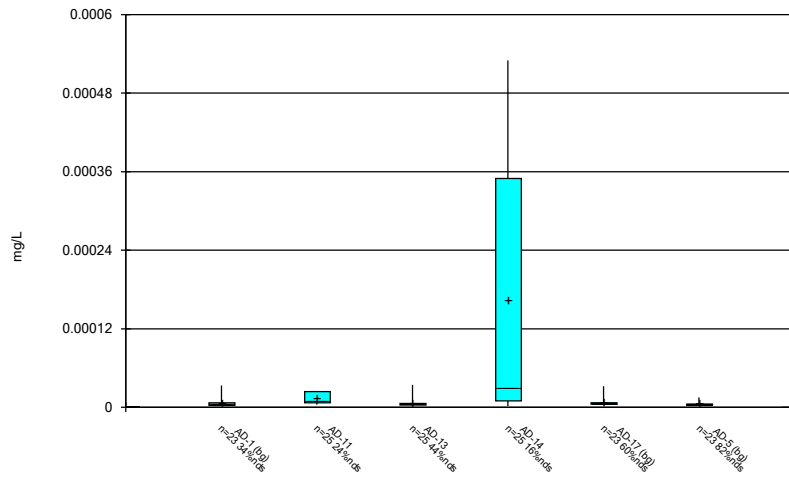
Constituent: Lead, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



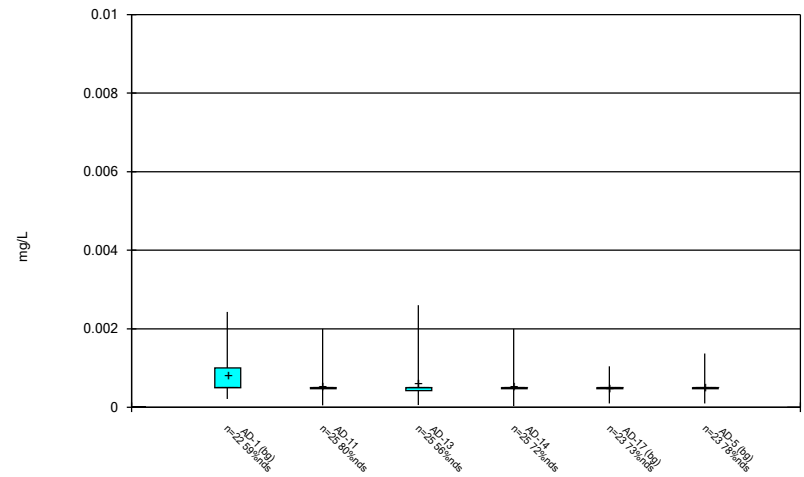
Constituent: Lithium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



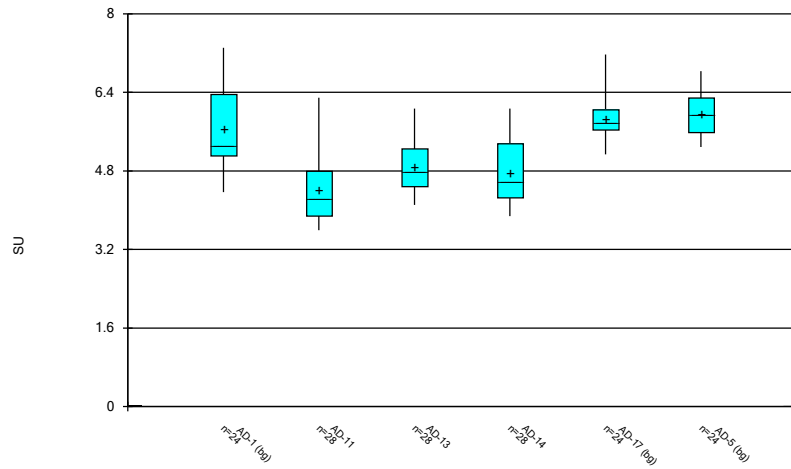
Constituent: Mercury, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



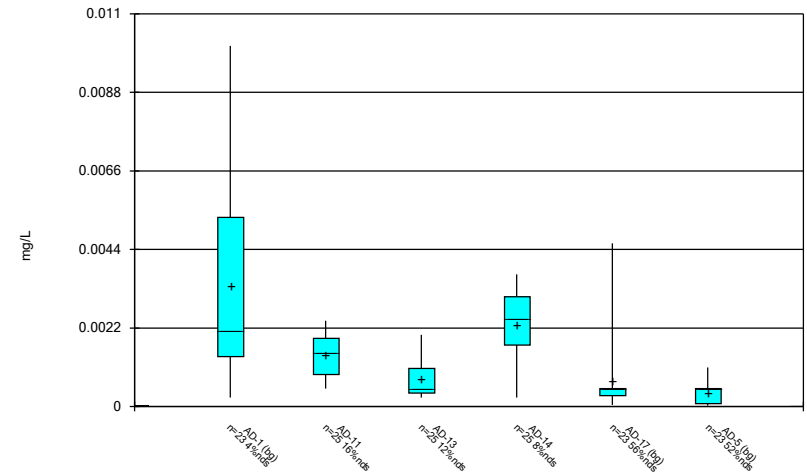
Constituent: Molybdenum, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



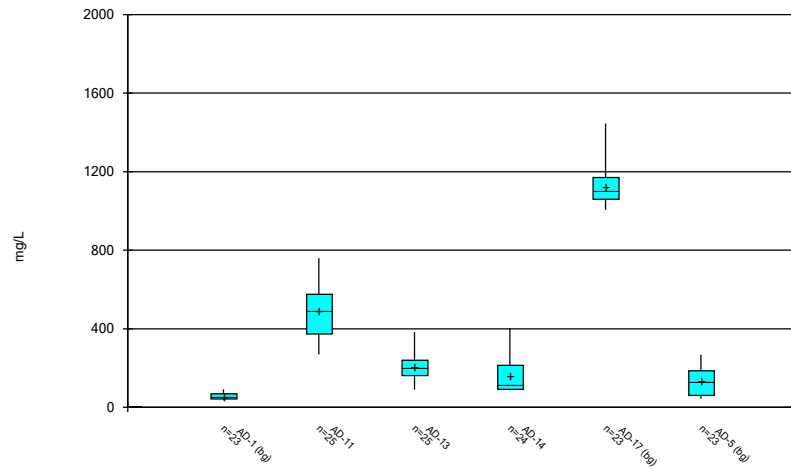
Constituent: pH, field Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



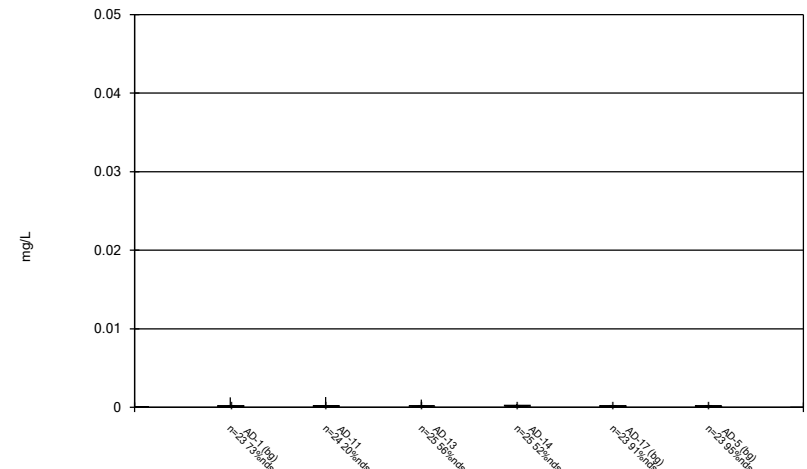
Constituent: Selenium, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



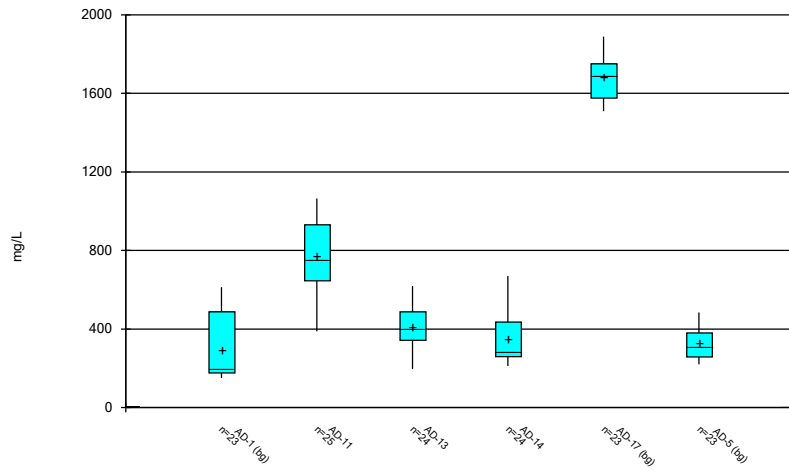
Constituent: Sulfate, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE C

Outlier Summary and Tukey's Outlier Test

Outlier Summary

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 12/21/2023, 2:49 PM

AD-17 Cadmium, total (mg/L) AD-11 Chromium, total (mg/L) AD-13 Chromium, total (mg/L) AD-17 Chromium, total (mg/L) AD-11 Fluoride, total (mg/L) AD-14 Lithium, total (mg/L) AD-1 Molybdenum, total (mg/L) AD-11 Thallium, total (mg/L) AD-13 Total Dissolved Solids (mg/L)

5/31/2016								900 (o)
7/29/2016				0.024 (o)				
9/30/2016	0.007 (o)							
10/21/2016			3 (o)					
12/14/2016		0.007 (o)						
1/20/2017			0.068 (O)					
6/8/2017	0.00606 (o)							
5/23/2018						0.046 (o)		
5/24/2018	0.00646 (o)							
6/2/2021				0.0048 (o)				

Tukey's Outlier Test - Upgradient Wells - Significant Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:03 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Chromium, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.068	NP	NaN	69	0.001542	0.008147	In(x)	ShapiroFrancia
Lead, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.003384,0.0001,0.0001,0.0001,0.000852,0.00009,0.	NP	NaN	69	0.0002942	0.0004942	In(x)	ShapiroFrancia
Mercury, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.000033,0.00001773,0.00001521,0.000013,0.000013,	NP	NaN	69	0.00006897	0.00005806	In(x)	ShapiroFrancia

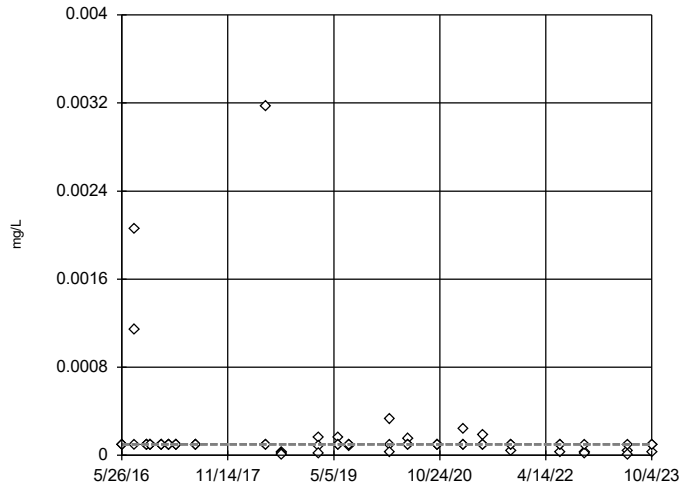
Tukey's Outlier Test - Upgradient Wells - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:03 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-1,AD-17,AD-5	n/a	n/a	NP	NaN	69	0.0001833	0.0004535	unknown	ShapiroFrancia
Arsenic, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.002468	0.001942	x^(1/3)	ShapiroFrancia
Barium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.1007	0.1227	ln(x)	ShapiroFrancia
Beryllium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.0002223	0.0002643	ln(x)	ShapiroFrancia
Boron, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	72	0.2484	0.2585	ln(x)	ShapiroFrancia
Cadmium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.0004765	0.001273	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.068	NP	NaN	69	0.001542	0.008147	ln(x)	ShapiroFrancia
Cobalt, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.02294	0.02555	x^(1/3)	ShapiroFrancia
Combined Radium 226 + 228 (pCi/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	2.228	1.03	x^(1/3)	ShapiroFrancia
Fluoride, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	72	0.1961	0.09322	ln(x)	ShapiroFrancia
Lead, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.003384,0.0001,0.0001,0.0001,0.0001,0.000852,0.00009,0.	NP	NaN	69	0.0002942	0.0004942	ln(x)	ShapiroFrancia
Lithium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.1501	0.1285	sqrt(x)	ShapiroFrancia
Mercury, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.000033,0.00001773,0.00001521,0.000013,0.000013,	NP	NaN	69	0.00006897	0.00005806	ln(x)	ShapiroFrancia
Molybdenum, total (mg/L)	AD-1,AD-17,AD-5	n/a	n/a	NP	NaN	69	0.0006621	0.000648	unknown	ShapiroFrancia
pH, field (SU)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	72	5.833	0.6322	x^(1/3)	ShapiroFrancia
Selenium, total (mg/L)	AD-1,AD-17,AD-5	No	n/a	NP	NaN	69	0.001489	0.002216	ln(x)	ShapiroFrancia
Thallium, total (mg/L)	AD-1,AD-17,AD-5	n/a	n/a	NP	NaN	69	0.0002082	0.000166	unknown	ShapiroFrancia

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

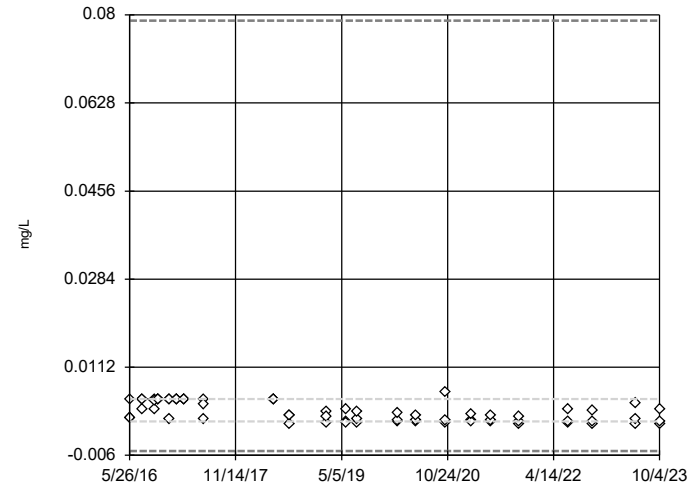


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

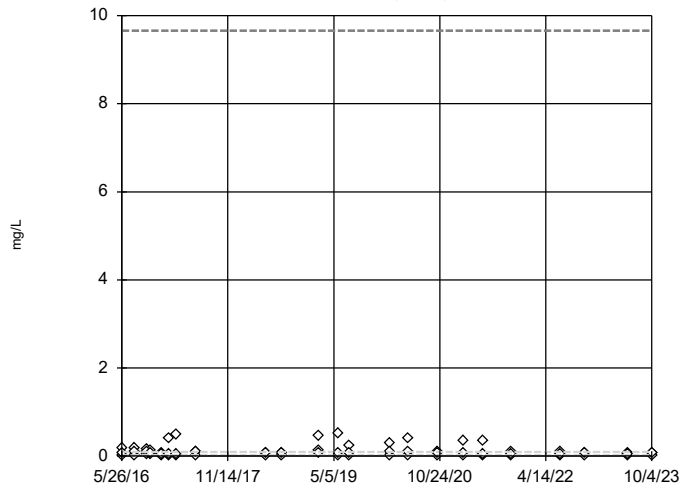


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.07888, low cutoff = -0.005163, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

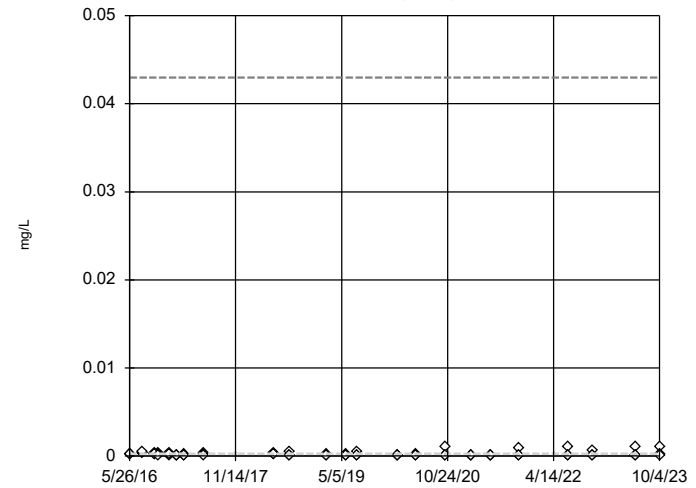


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.659, low cutoff = 0.0001907, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

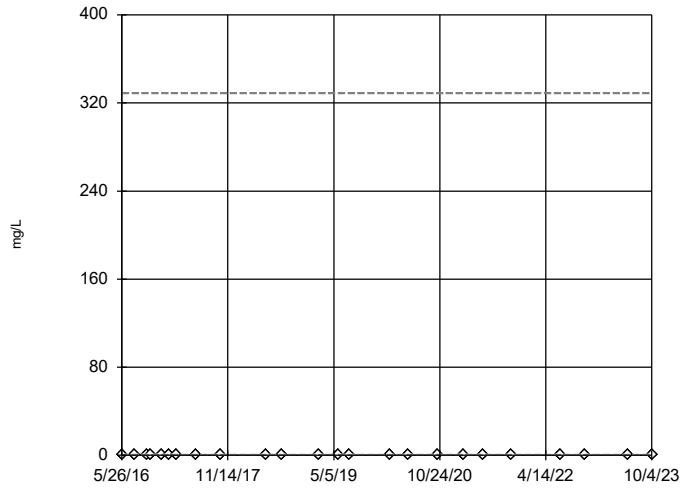


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.04297, low cutoff = 3.1e-7, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

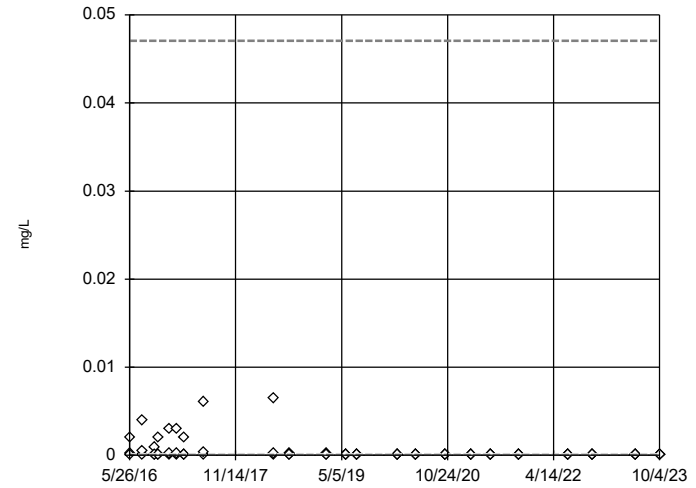


n = 72
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 329, low cutoff = 0.00005813, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

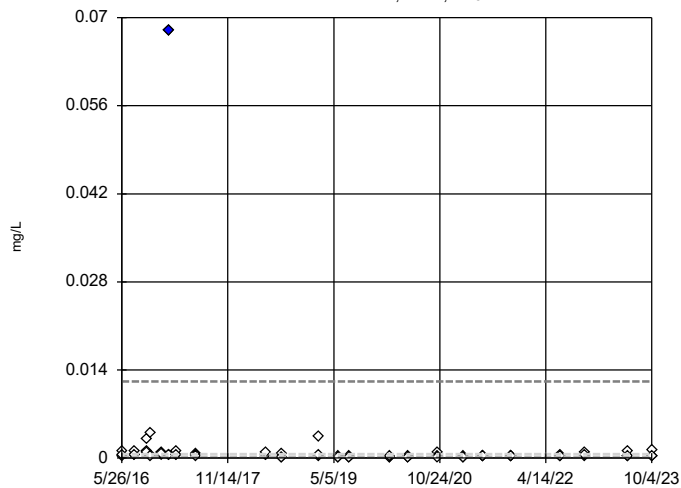


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.04705, low cutoff = 5.9e-8, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

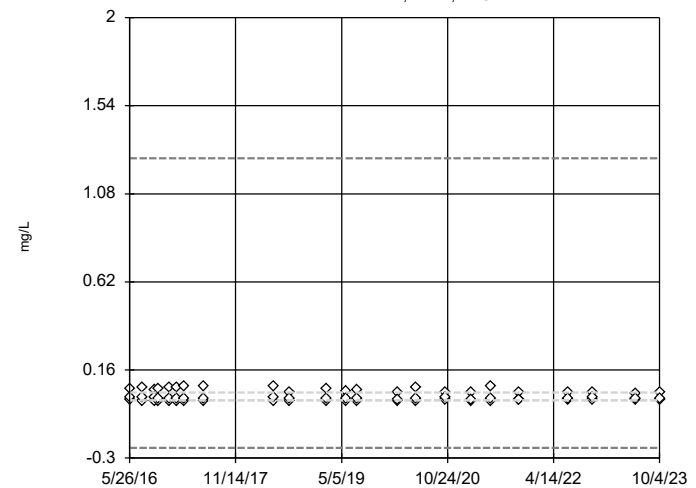


n = 69
 Outlier is drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01217, low cutoff = 0.00001221, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

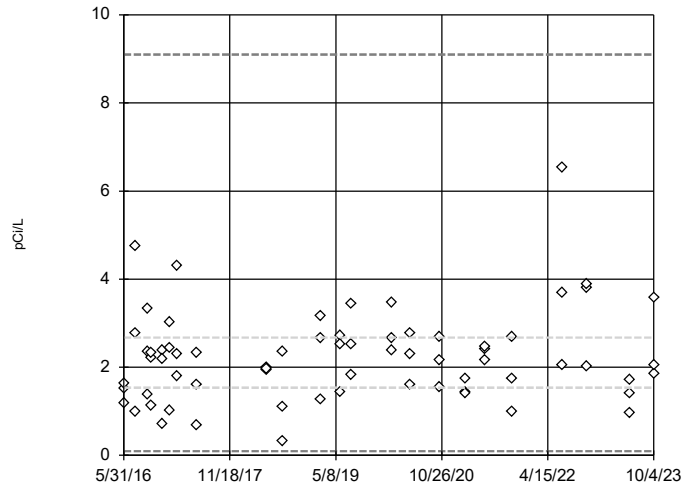


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1.265, low cutoff = -0.2468, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

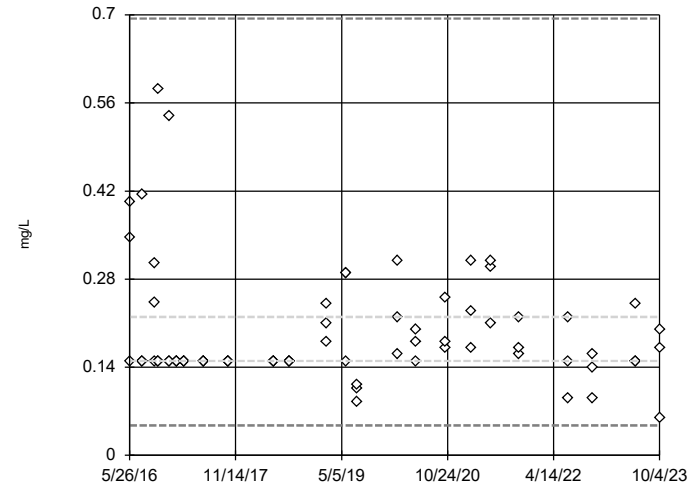


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.099, low cutoff = 0.09387, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

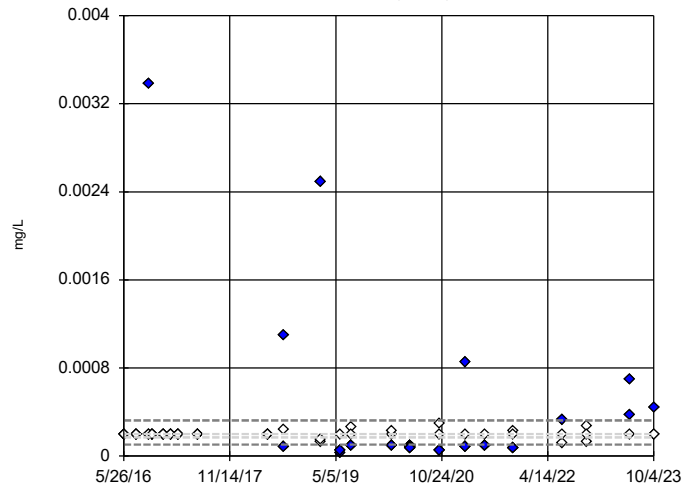


n = 72
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.6941, low cutoff = 0.04754, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

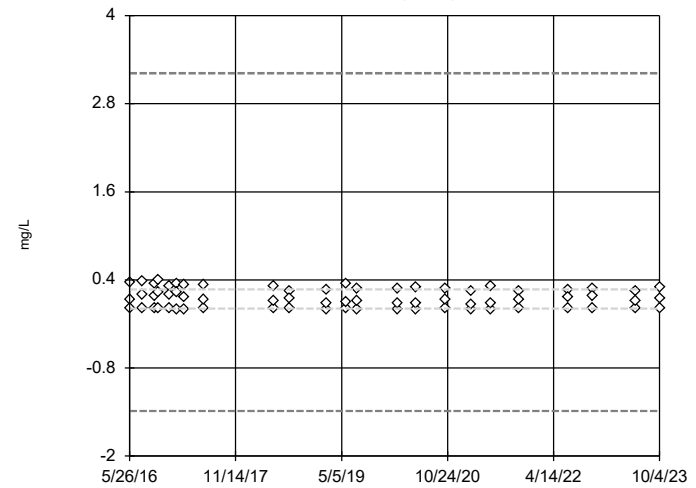


n = 69
 Outliers are drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0003247, low cutoff = 0.0001049, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

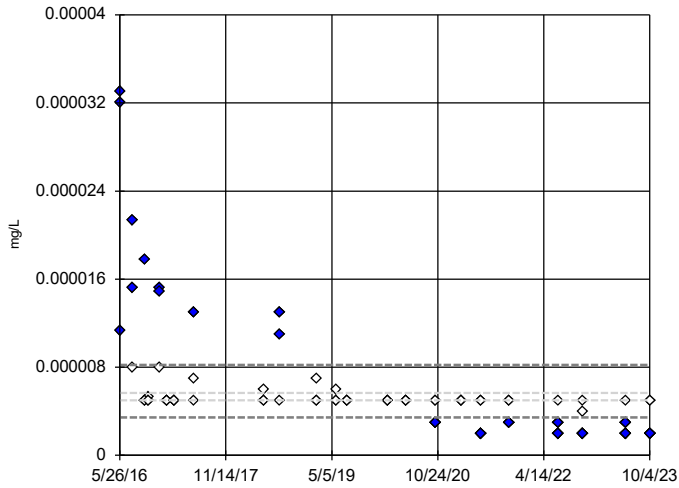


n = 69
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 3.215, low cutoff = -1.386, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

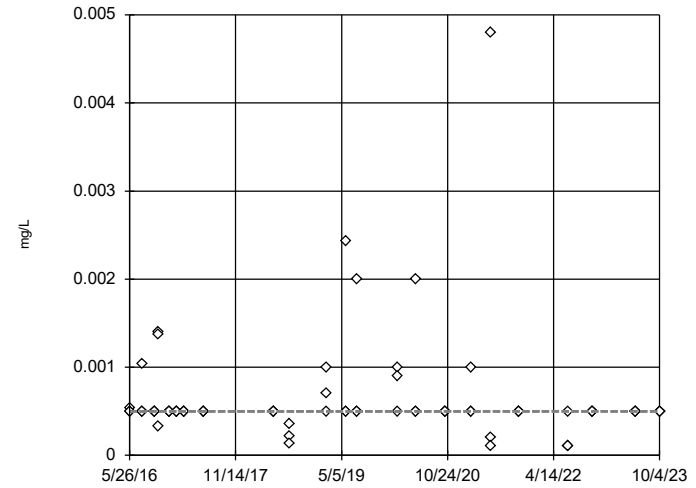


n = 69
 Outliers are drawn as solid. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.000008212, low cutoff = 0.000003446, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

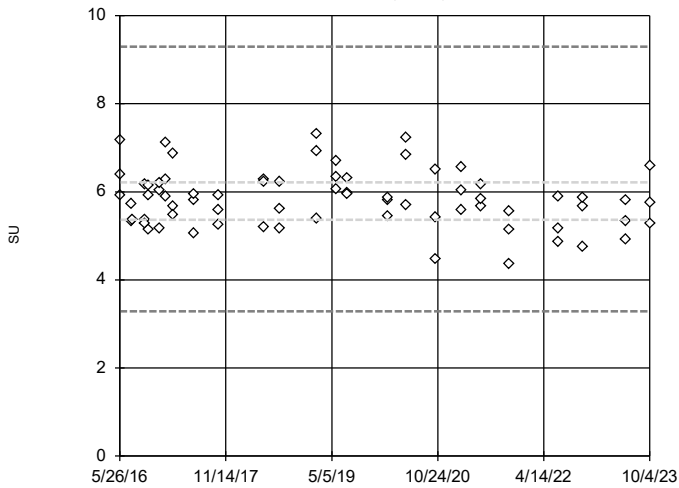


n = 69
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Molybdenum, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5

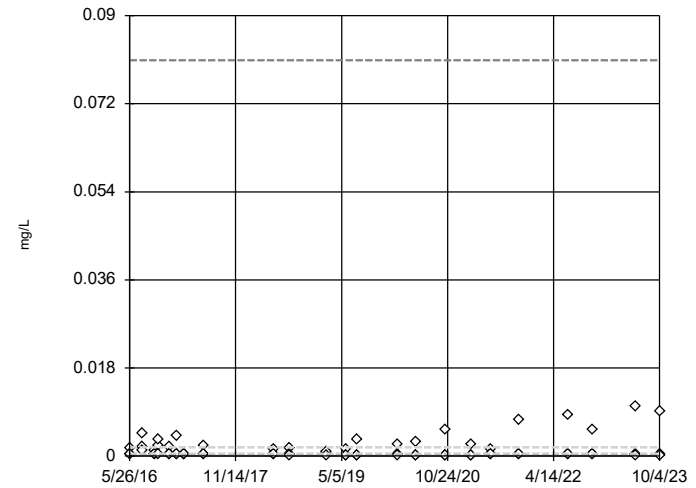


n = 72
 No outliers found. Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 9.293, low cutoff = 3.286, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background

AD-1,AD-17,AD-5



n = 69
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.08087, low cutoff = 0.00001102, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
 Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE D
Intrawell PLs

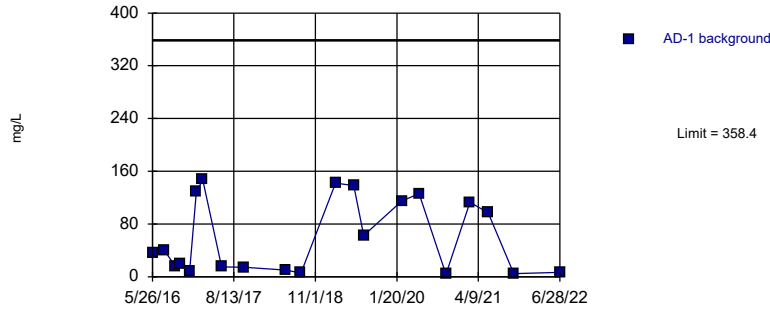
Appendix III Intrawell Prediction Limit - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:18 AM

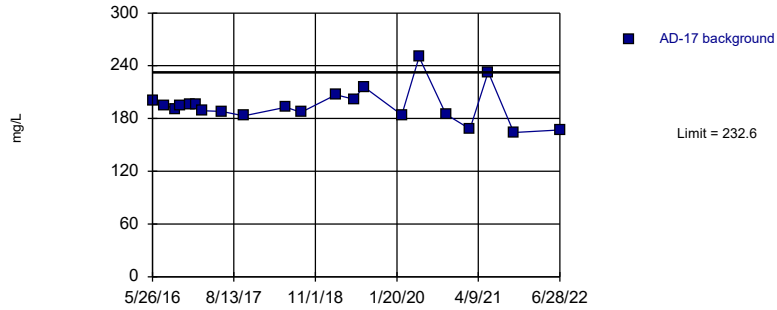
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-1	358.4	n/a	n/a	1 future	n/a	21	3.437	1.3	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-11	24.51	n/a	n/a	1 future	n/a	22	2.332	0.4638	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-13	40.74	n/a	n/a	1 future	n/a	22	2.15	0.833	0	None	ln(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-14	26.85	n/a	n/a	1 future	n/a	22	2.88	1.231	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-17	232.6	n/a	n/a	1 future	n/a	21	194.7	20.17	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-5	53.13	n/a	n/a	1 future	n/a	21	38.6	7.729	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-1	6.989	n/a	n/a	1 future	n/a	20	1.862	0.413	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-11	13.65	n/a	n/a	1 future	n/a	20	9.606	2.138	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-13	21.31	n/a	n/a	1 future	n/a	20	11.49	5.192	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-14	11.54	n/a	n/a	1 future	n/a	21	5.71	3.1	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-17	46.83	n/a	n/a	1 future	n/a	20	36.88	5.261	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	AD-5	23.96	n/a	n/a	1 future	n/a	20	17.56	3.38	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-1	76.11	n/a	n/a	1 future	n/a	20	51.68	12.91	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-11	744.7	n/a	n/a	1 future	n/a	21	509.3	125.2	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-13	364.5	n/a	n/a	1 future	n/a	21	211	81.64	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-14	269	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Sulfate, total (mg/L)	AD-17	1445	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Sulfate, total (mg/L)	AD-5	267.7	n/a	n/a	1 future	n/a	20	129.5	73.02	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-1	612	n/a	n/a	1 future	n/a	20	n/a	n/a	0	n/a	n/a	0.004291	NP Intra (normality) 1 of 2
Total Dissolved Solids (mg/L)	AD-11	1147	n/a	n/a	1 future	n/a	21	798	185.4	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-13	655.6	n/a	n/a	1 future	n/a	20	420.1	124.5	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-14	526.7	n/a	n/a	1 future	n/a	20	5.744	0.2761	0	None	ln(x)	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-17	1921	n/a	n/a	1 future	n/a	20	1704	114.5	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	AD-5	484	n/a	n/a	1 future	n/a	20	328	82.5	0	None	No	0.002505	Param Intra 1 of 2

Prediction Limit

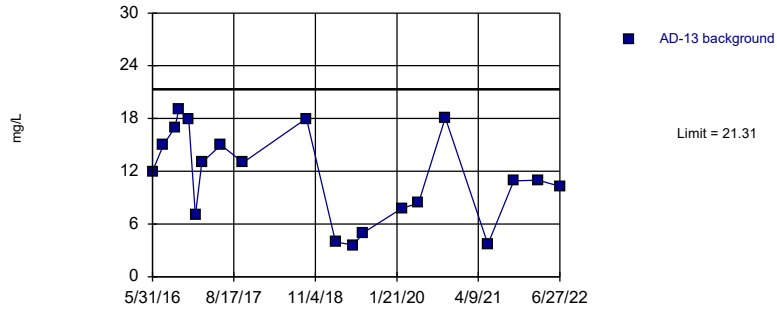
Intrawell Parametric, AD-1 (bg)



Prediction Limit
Intrawell Parametric, AD-17 (bg)



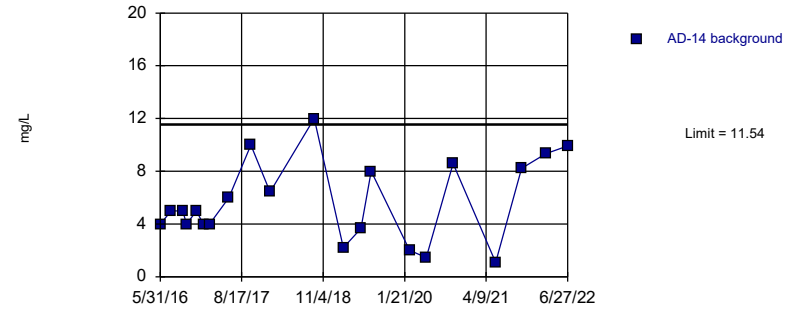
Prediction Limit Intrawell Parametric, AD-13



Background Data Summary: Mean=11.49, Std. Dev.=5.192, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9315, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

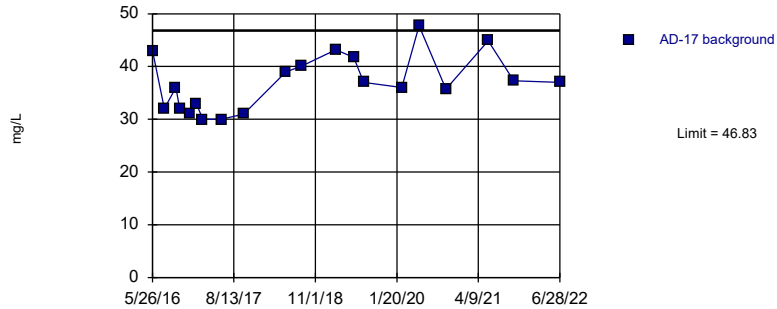
Prediction Limit Intrawell Parametric, AD-14



Background Data Summary: Mean=5.71, Std. Dev.=3.1, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9514, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

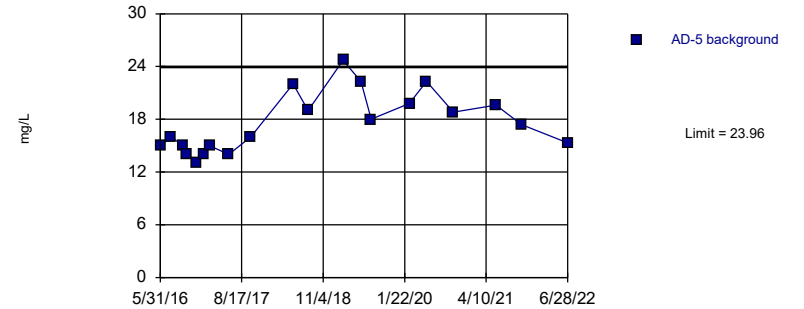
Prediction Limit Intrawell Parametric, AD-17 (bg)



Background Data Summary: Mean=36.88, Std. Dev.=5.261, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9435, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

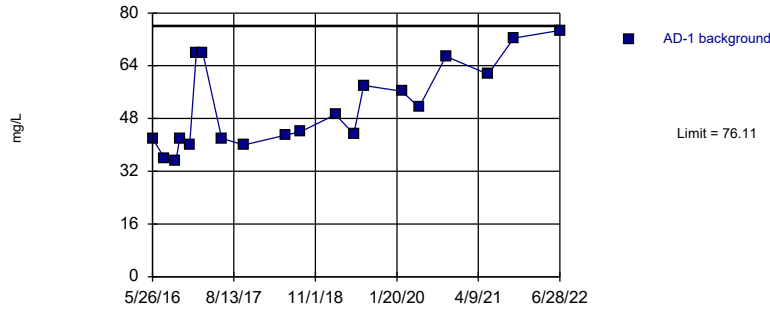
Prediction Limit Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=17.56, Std. Dev.=3.38, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9265, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

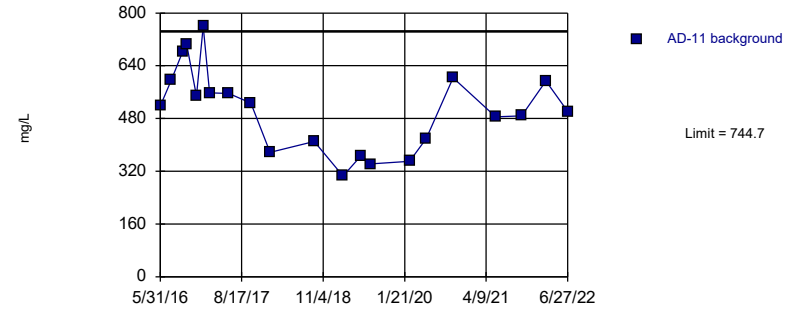
Prediction Limit
Intrawell Parametric, AD-1 (bg)



Background Data Summary: Mean=51.68, Std. Dev.=12.91, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8957, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

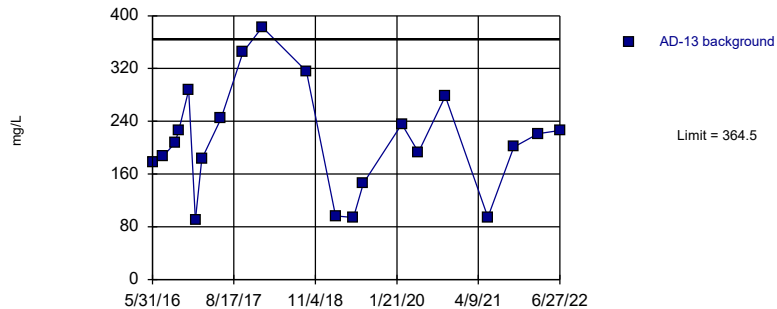
Prediction Limit
Intrawell Parametric, AD-11



Background Data Summary: Mean=509.3, Std. Dev.=125.2, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9698, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

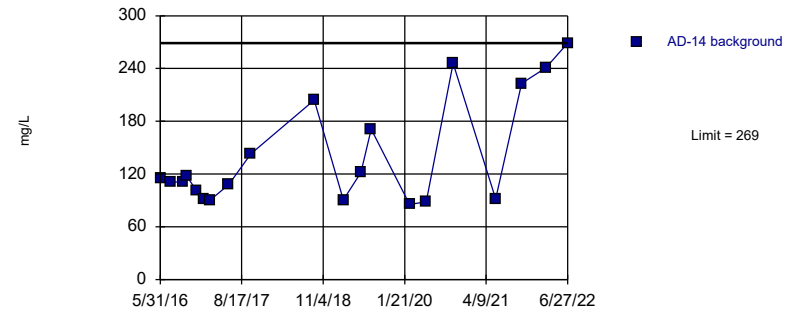
Prediction Limit
Intrawell Parametric, AD-13



Background Data Summary: Mean=211, Std. Dev.=81.64, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9558, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit
Intrawell Non-parametric, AD-14

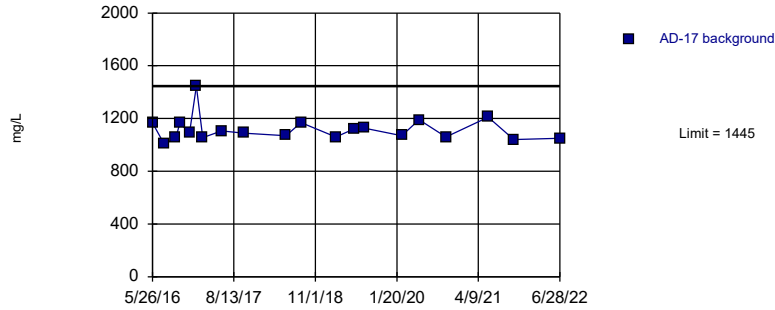


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Well-constituent pair annual alpha = 0.008564. Individual comparison alpha = 0.004291 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Non-parametric, AD-17 (bg)

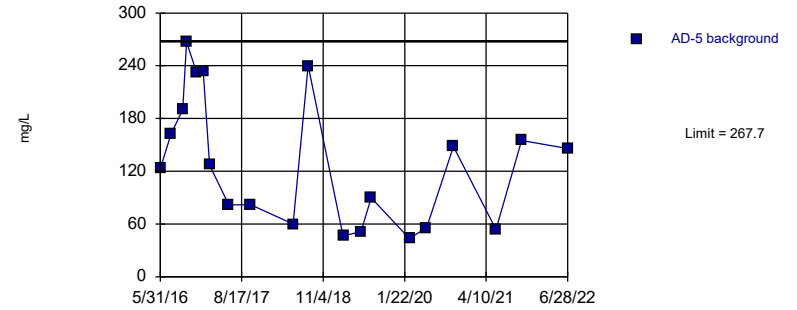


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Well-constituent pair annual alpha = 0.008564. Individual comparison alpha = 0.004291 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Parametric, AD-5 (bg)

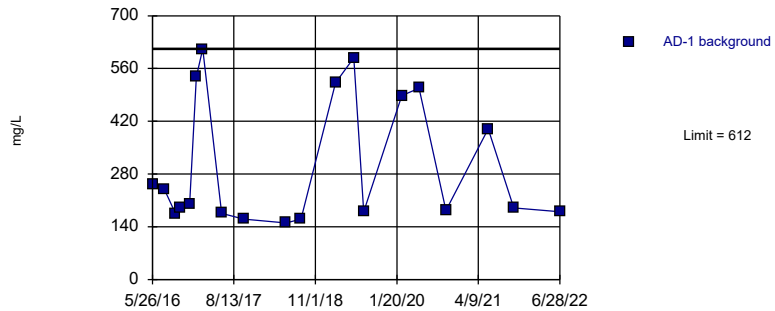


Background Data Summary: Mean=129.5, Std. Dev.=73.02, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9061, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

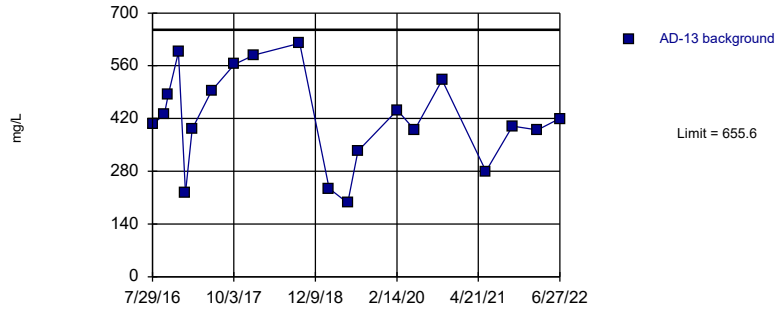
Constituent: Sulfate, total Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit

Intrawell Non-parametric, AD-1 (bg)



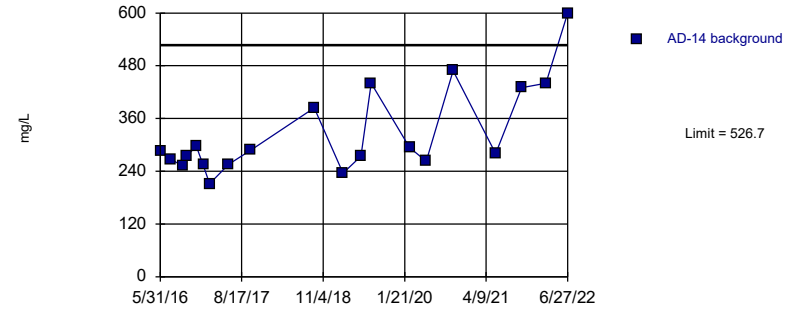
Prediction Limit
Intrawell Parametric, AD-13



Background Data Summary: Mean=420.1, Std. Dev.=124.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.868. Kappa = 1.892 (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 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

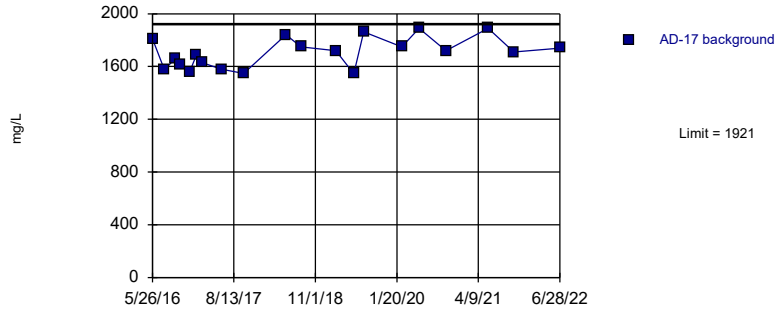
Prediction Limit
Intrawell Parametric, AD-14



Background Data Summary (based on natural log transformation): Mean=5.744, Std. Dev.=0.2761, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.868. Kappa = 1.892 (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 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

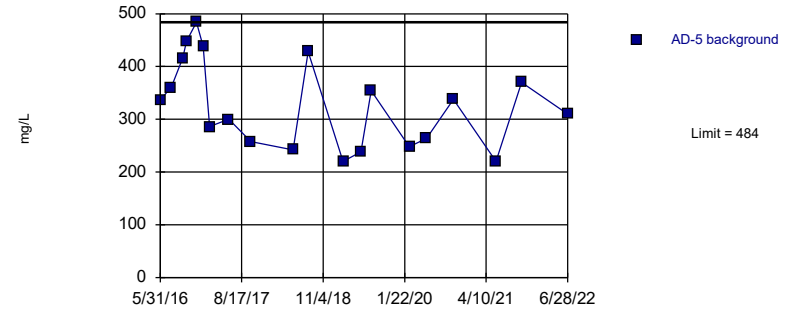
Prediction Limit
Intrawell Parametric, AD-17 (bg)



Background Data Summary: Mean=1704, Std. Dev.=114.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9349, critical = 0.868. Kappa = 1.892 (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 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit
Intrawell Parametric, AD-5 (bg)



Background Data Summary: Mean=328, Std. Dev.=82.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9369, critical = 0.868. Kappa = 1.892 (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 1/3/2024 10:17 AM View: PLs Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE E
Upgradient Trend Tests

Trend Tests - Upgradient Wells - Significant Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:10 AM

<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)	0.06535	158	105	Yes	24	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-17 (bg)	-0.106	-131	-105	Yes	24	0	n/a	n/a	0.01	NP

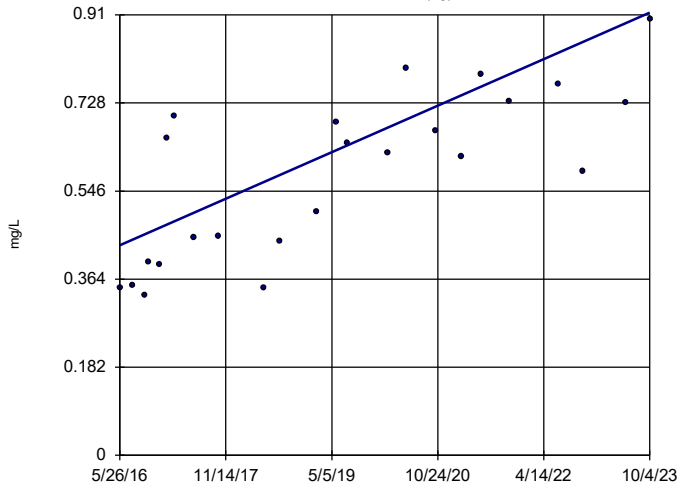
Trend Tests - Upgradient Wells - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:10 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-1 (bg)	0.06535	158	105	Yes	24	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-17 (bg)	-0.002581	-69	-105	No	24	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-5 (bg)	-0.0004336	-47	-105	No	24	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-1 (bg)	0.009608	85	105	No	24	45.83	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-17 (bg)	-0.01751	-97	-105	No	24	33.33	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-5 (bg)	0	10	105	No	24	37.5	n/a	n/a	0.01	NP
pH, field (SU)	AD-1 (bg)	-0.07871	-47	-105	No	24	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-17 (bg)	-0.106	-131	-105	Yes	24	0	n/a	n/a	0.01	NP
pH, field (SU)	AD-5 (bg)	0.03886	32	105	No	24	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

AD-1 (bg)

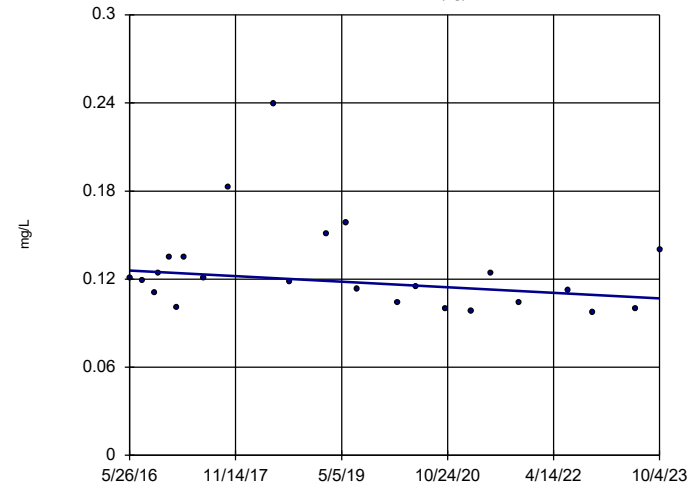


n = 24
 Slope = 0.06535 units per year.
 Mann-Kendall statistic = 158
 critical = 105
 Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

AD-17 (bg)

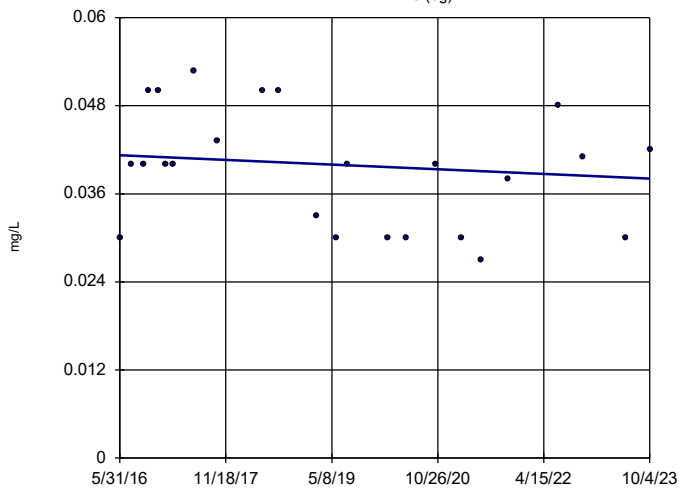


n = 24
 Slope = -0.002581 units per year.
 Mann-Kendall statistic = -69
 critical = -105
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

AD-5 (bg)

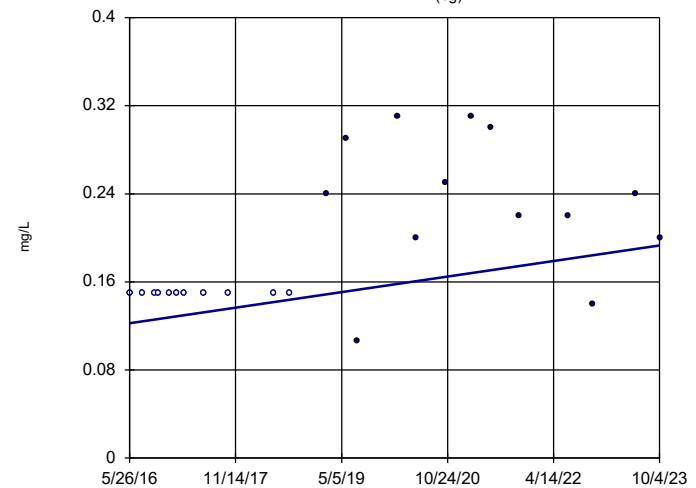


n = 24
 Slope = -0.0004336 units per year.
 Mann-Kendall statistic = -47
 critical = -105
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

AD-1 (bg)

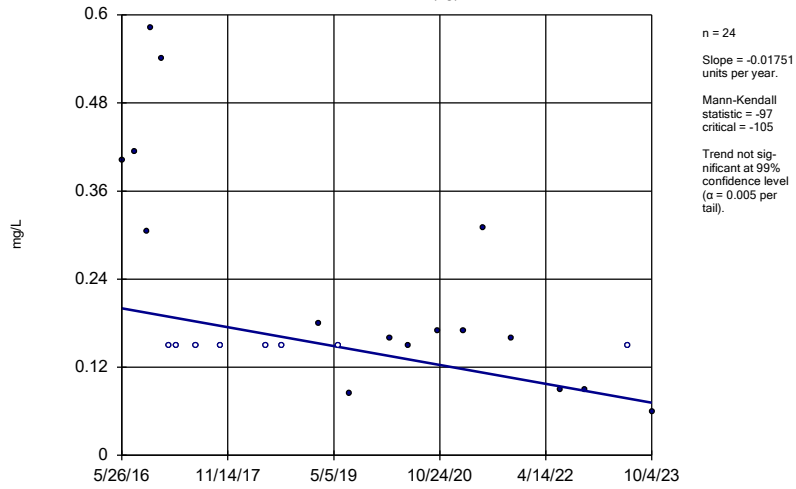


n = 24
 Slope = 0.009608 units per year.
 Mann-Kendall statistic = 85
 critical = 105
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

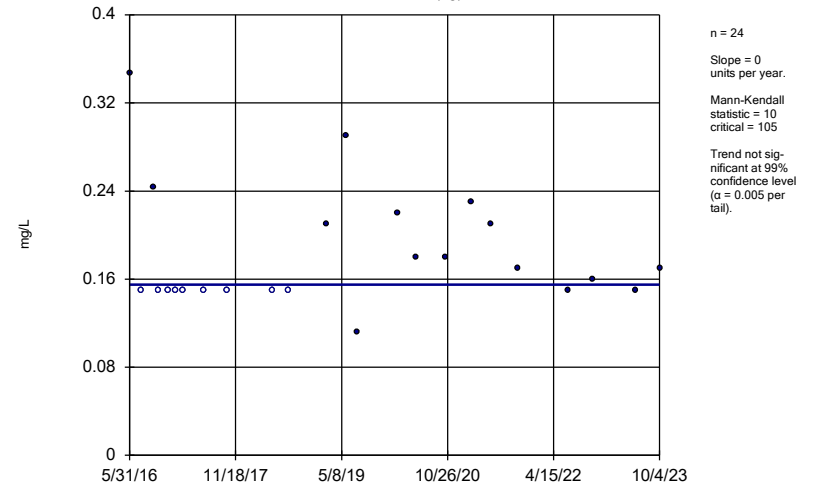
AD-17 (bg)



Constituent: Fluoride, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

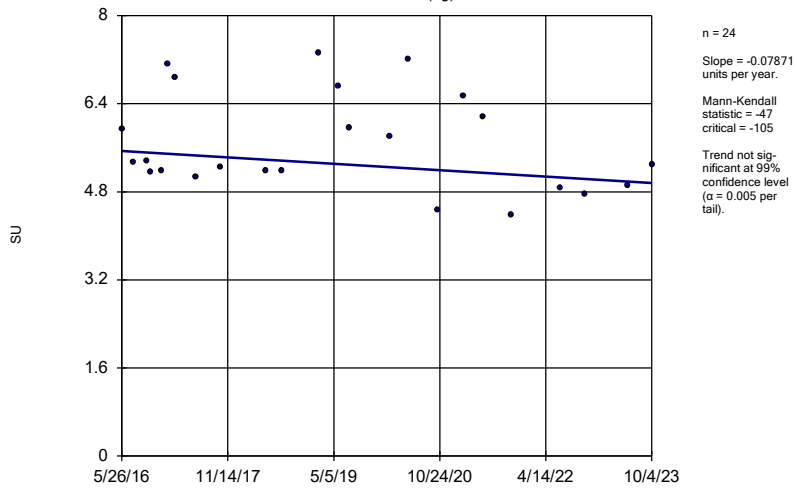
AD-5 (bg)



Constituent: Fluoride, total Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

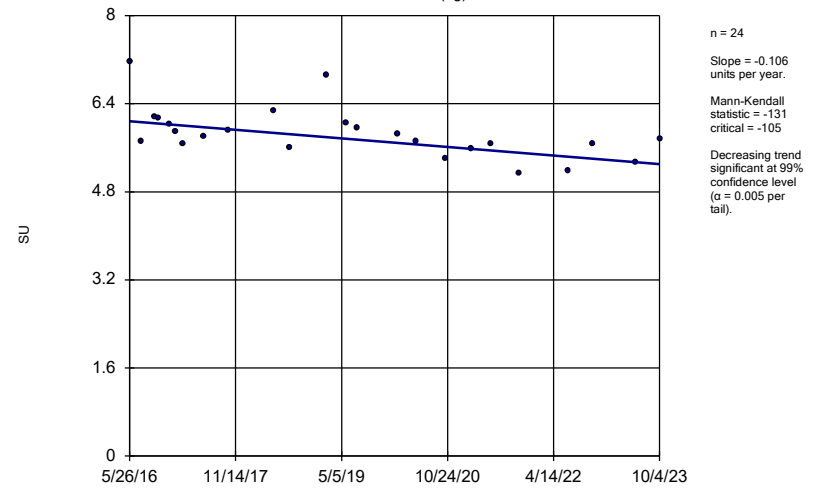
AD-1 (bg)



Constituent: pH, field Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

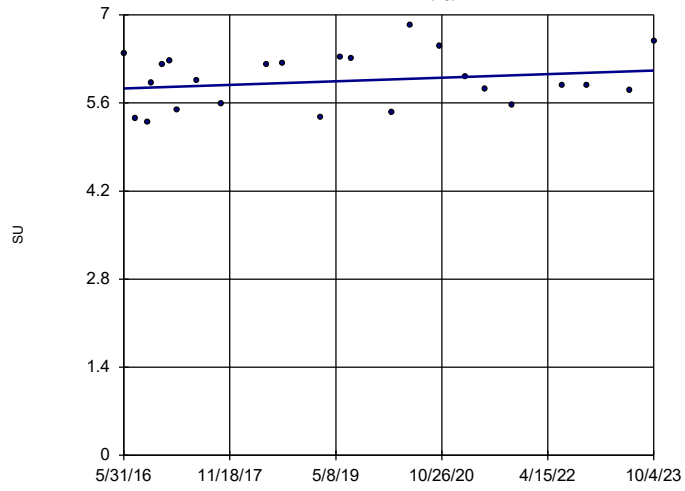
AD-17 (bg)



Constituent: pH, field Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sen's Slope Estimator

AD-5 (bg)



n = 24
Slope = 0.03886
units per year.
Mann-Kendall
statistic = 32
critical = 105
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: pH, field Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

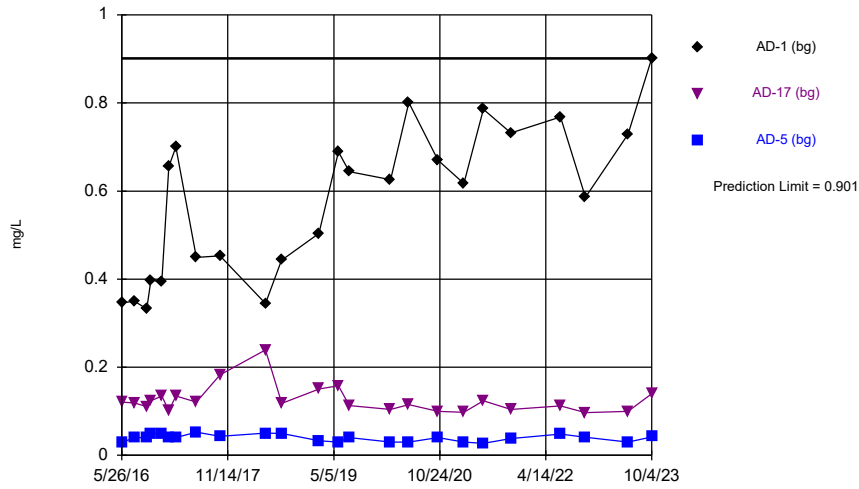
FIGURE F
Interwell PLs

Appendix III Interwell Prediction Limits - All Results

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/3/2024, 10:24 AM

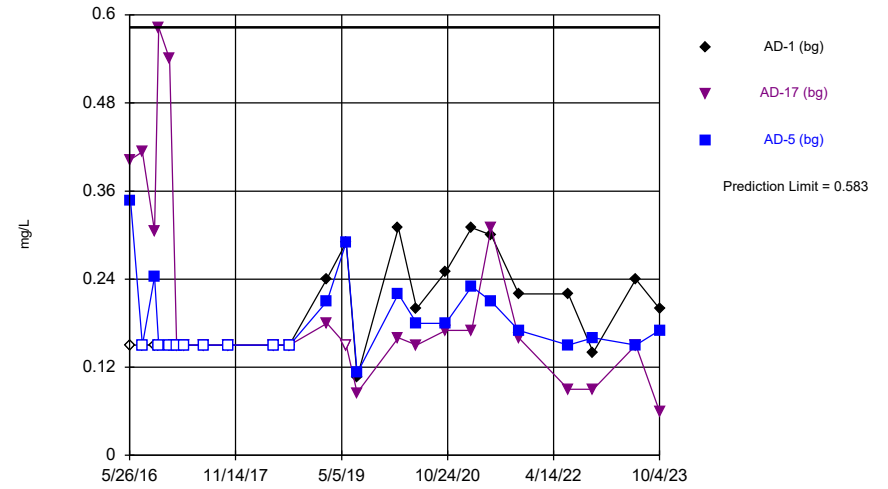
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	0.901	n/a	n/a	3 future	n/a	72	n/a	n/a	0	n/a	n/a	0.0003715	NP Inter (normality) 1 of 2
Fluoride, total (mg/L)	n/a	0.583	n/a	n/a	3 future	n/a	72	n/a	n/a	38.89	n/a	n/a	0.0003715	NP Inter (normality) 1 of 2
pH, field (SU)	n/a	6.905	4.761	n/a	3 future	n/a	72	5.833	0.6322	0	None	No	0.001253	Param Inter 1 of 2

Time Series



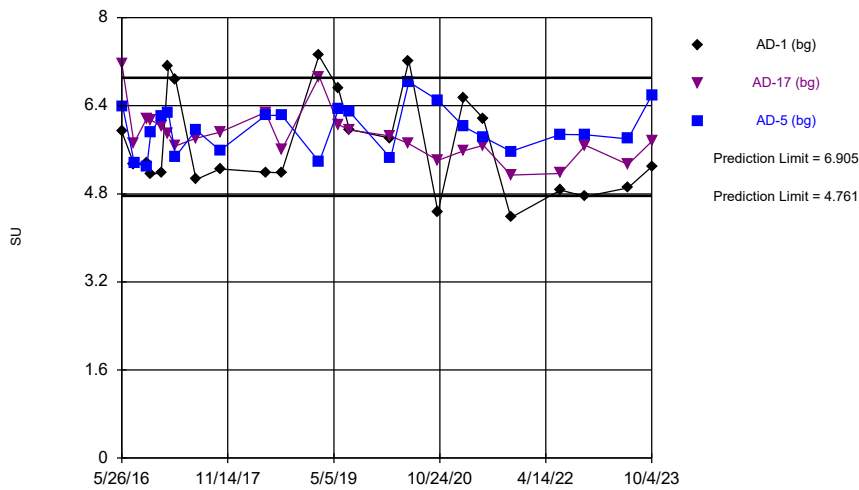
Constituent: Boron, total Analysis Run 1/3/2024 10:29 AM View: Time Series - Interwell PLs
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



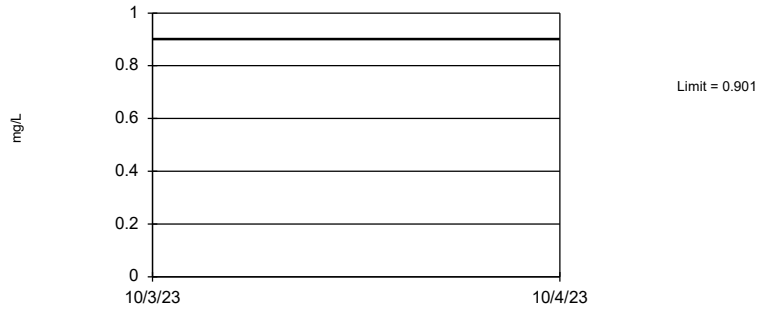
Constituent: Fluoride, total Analysis Run 1/3/2024 10:30 AM View: Time Series - Interwell PLs
Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series



Constituent: pH, field Analysis Run 1/3/2024 10:30 AM View: Time Series - Interwell PLs
Welsh Landfill Client: Geosyntec Data: Welsh LF

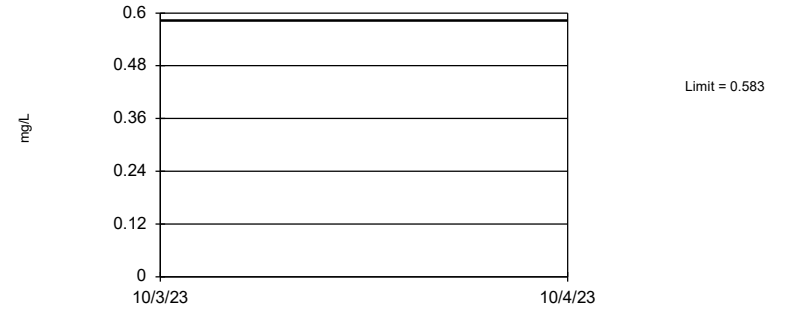
Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 72 background values. Annual per-constituent alpha = 0.002227. Individual comparison alpha = 0.0003715 (1 of 2). Assumes 3 future values.

Constituent: Boron, total Analysis Run 1/3/2024 10:23 AM View: PLs Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

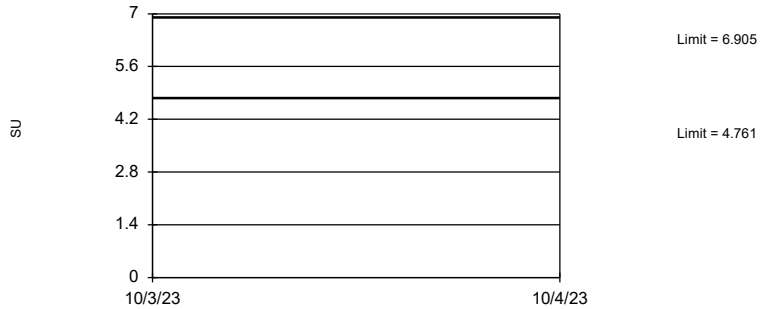
Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 72 background values. 38.89% NDs. Annual per-constituent alpha = 0.002227. Individual comparison alpha = 0.0003715 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 1/3/2024 10:23 AM View: PLs Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Prediction Limit Interwell Parametric



Background Data Summary: Mean=5.833, Std. Dev.=0.6322, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9855, critical = 0.954. Kappa = 1.695 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001253. Assumes 3 future values.

Constituent: pH, field Analysis Run 1/3/2024 10:23 AM View: PLs Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

FIGURE G
UTLs

Upper Tolerance Limits Summary Table

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/4/2024, 2:30 PM

<u>Constituent</u>	<u>Upper Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony, total (mg/L)	0.00317	69	n/a	n/a	66.67	n/a	n/a	0.02904	NP Inter(NDs)
Arsenic, total (mg/L)	0.00628	69	n/a	n/a	27.54	n/a	n/a	0.02904	NP Inter(normality)
Barium, total (mg/L)	0.5101	69	-2.889	1.114	0	None	ln(x)	0.05	Inter
Beryllium, total (mg/L)	0.001084	69	-8.991	1.088	7.246	None	ln(x)	0.05	Inter
Cadmium, total (mg/L)	0.004	67	n/a	n/a	35.82	n/a	n/a	0.03217	NP Inter(normality)
Chromium, total (mg/L)	0.002274	68	-7.915	0.9181	13.24	None	ln(x)	0.05	Inter
Cobalt, total (mg/L)	0.0748	69	n/a	n/a	0	n/a	n/a	0.02904	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	4.509	69	1.455	0.3362	0	None	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	0.583	72	n/a	n/a	38.89	n/a	n/a	0.02489	NP Inter(normality)
Lead, total (mg/L)	0.003384	69	n/a	n/a	52.17	n/a	n/a	0.02904	NP Inter(NDs)
Lithium, total (mg/L)	0.394	69	n/a	n/a	1.449	n/a	n/a	0.02904	NP Inter(normality)
Mercury, total (mg/L)	0.000033	69	n/a	n/a	59.42	n/a	n/a	0.02904	NP Inter(NDs)
Molybdenum, total (mg/L)	0.00243	68	n/a	n/a	70.59	n/a	n/a	0.03056	NP Inter(NDs)
Selenium, total (mg/L)	0.0101	69	n/a	n/a	37.68	n/a	n/a	0.02904	NP Inter(normality)
Thallium, total (mg/L)	0.001251	69	n/a	n/a	86.96	n/a	n/a	0.02904	NP Inter(NDs)

FIGURE H
GWPS

WELSH LANDFILL 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	0.51	2
Beryllium, Total (mg/L)	0.004	0.0011	0.004
Cadmium, Total (mg/L)	0.005	0.004	0.005
Chromium, Total (mg/L)	0.1	0.0023	0.1
Cobalt, Total (mg/L)	n/a	0.075	0.075
Combined Radium, Total (pCi/L)	5	4.51	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	0.01	0.05
Thallium, Total (mg/L)	0.002	0.0013	0.002

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

FIGURE I
Confidence Intervals

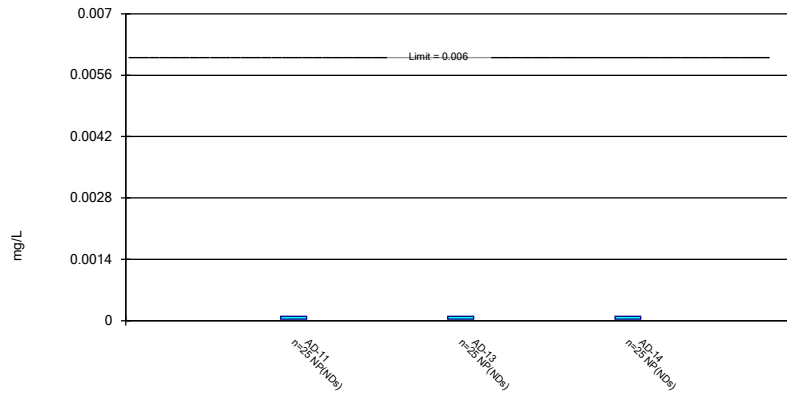
Confidence Interval Summary Table - All Results (No Significant)

Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 1/4/2024, 2:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-11	0.0001	0.00003	0.006	No 25	0.0000674	0.00003795	56	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-13	0.0001	0.00003	0.006	No 25	0.0001289	0.000294	52	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-14	0.0001	0.00003	0.006	No 25	0.00007096	0.00003554	56	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-11	0.0026	0.00056	0.01	No 25	0.001826	0.001881	24	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-13	0.005	0.00038	0.01	No 25	0.002152	0.002192	28	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-14	0.001894	0.00039	0.01	No 25	0.001827	0.002055	28	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-11	0.0286	0.0123	2	No 25	0.02159	0.01379	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-13	0.05449	0.02636	2	No 25	0.04404	0.03189	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-14	0.04104	0.02848	2	No 25	0.03558	0.0137	0	None	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-11	0.002301	0.001098	0.004	No 25	0.002067	0.001523	0	None	ln(x)	0.01	Param.
Beryllium, total (mg/L)	AD-13	0.0007286	0.0004477	0.004	No 25	0.0005881	0.0002818	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-14	0.0009873	0.0004589	0.004	No 25	0.0007947	0.0006346	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-11	0.0003804	0.0002699	0.005	No 25	0.0003251	0.0001109	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-13	0.000177	0.000085	0.005	No 25	0.0002618	0.0003339	16	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-14	0.001995	0.0006953	0.005	No 25	0.001585	0.001566	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-11	0.00071	0.00032	0.1	No 24	0.0006931	0.0006758	0	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-13	0.0005816	0.00032	0.1	No 24	0.0006053	0.0007395	12.5	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-14	0.000688	0.0004068	0.1	No 25	0.0005474	0.0002821	8	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-11	0.02026	0.01316	0.075	No 25	0.01671	0.007119	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-13	0.006668	0.003838	0.075	No 25	0.005253	0.002839	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-14	0.01692	0.006909	0.075	No 25	0.01349	0.0118	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-11	2.937	1.881	5	No 25	2.493	1.177	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-13	2.827	1.928	5	No 25	2.377	0.9025	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-14	2.88	1.546	5	No 25	2.213	1.338	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-11	1.116	0.4643	4	No 25	0.8912	0.6987	12	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-13	0.5246	0.2618	4	No 26	0.3932	0.2696	11.54	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-14	0.23	0.15	4	No 26	0.2039	0.09326	42.31	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-11	0.0009958	0.0004215	0.0034	No 25	0.0008763	0.0008405	28	Kaplan-Meier	x^(1/3)	0.01	Param.
Lead, total (mg/L)	AD-13	0.0002902	0.00008866	0.0034	No 25	0.0003949	0.0005557	28	Kaplan-Meier	ln(x)	0.01	Param.
Lead, total (mg/L)	AD-14	0.0002156	0.0001095	0.0034	No 25	0.0002255	0.0001391	36	Kaplan-Meier	x^(1/3)	0.01	Param.
Lithium, total (mg/L)	AD-11	0.03221	0.02044	0.39	No 25	0.02633	0.01181	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-13	0.03072	0.01533	0.39	No 25	0.02302	0.01543	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-14	0.01586	0.01148	0.39	No 24	0.01367	0.004297	0	None	No	0.01	Param.
Mercury, total (mg/L)	AD-11	0.00002258	0.00000624	0.002	No 25	0.00001352	0.000007964	24	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-13	0.00000515	0.000004	0.002	No 25	0.0000069	0.000006887	44	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-14	0.00008121	0.00001322	0.002	No 25	0.0001637	0.0002031	16	Kaplan-Meier	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-11	0.001519	0.0002	0.0024	No 25	0.0005548	0.0003908	80	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-13	0.0008705	0.0005	0.0024	No 25	0.000621	0.0005913	56	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-14	0.0006	0.000497	0.0024	No 25	0.0005491	0.0003398	72	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-11	0.001707	0.001089	0.05	No 25	0.001415	0.0006136	16	Kaplan-Meier	No	0.01	Param.
Selenium, total (mg/L)	AD-13	0.0009184	0.0004611	0.05	No 25	0.0007679	0.0005271	12	None	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	AD-14	0.002768	0.001807	0.05	No 25	0.002288	0.0009636	8	None	No	0.01	Param.
Thallium, total (mg/L)	AD-11	0.0002	0.00013	0.002	No 24	0.0002937	0.0003564	20.83	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-13	0.0002	0.00019	0.002	No 25	0.0002184	0.0001621	56	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-14	0.000242	0.00012	0.002	No 25	0.0002129	0.00008221	52	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

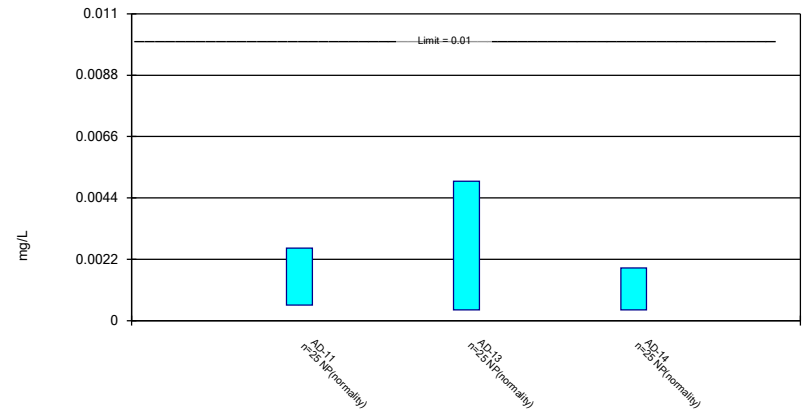
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

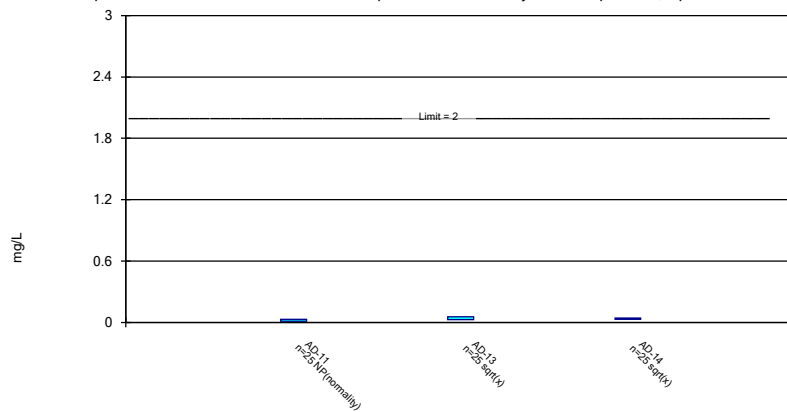
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

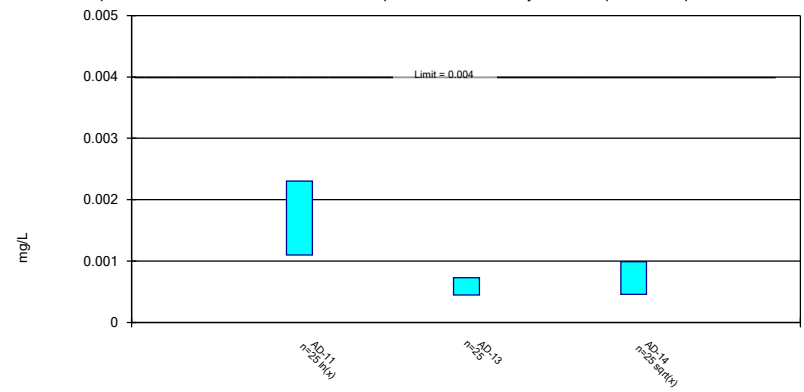
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

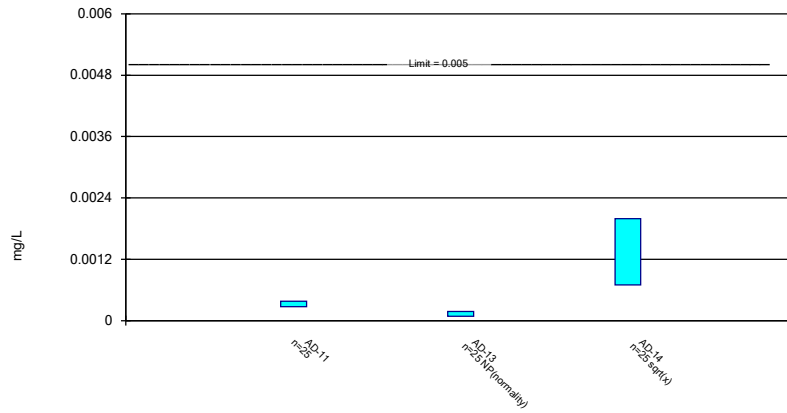
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

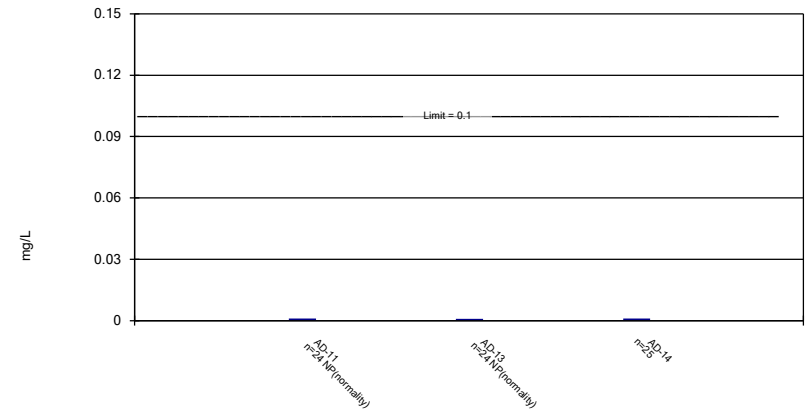
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

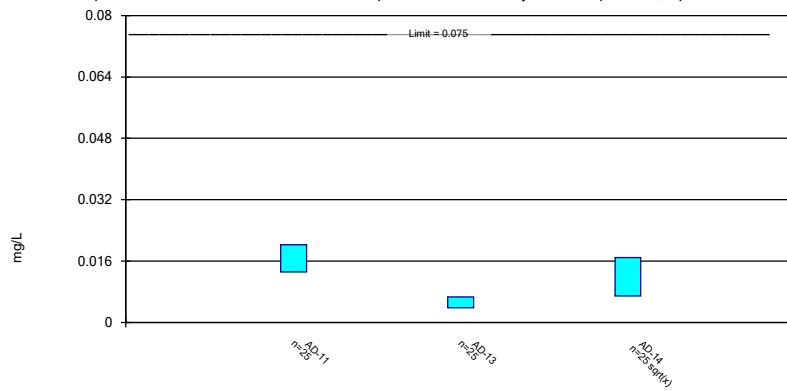
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

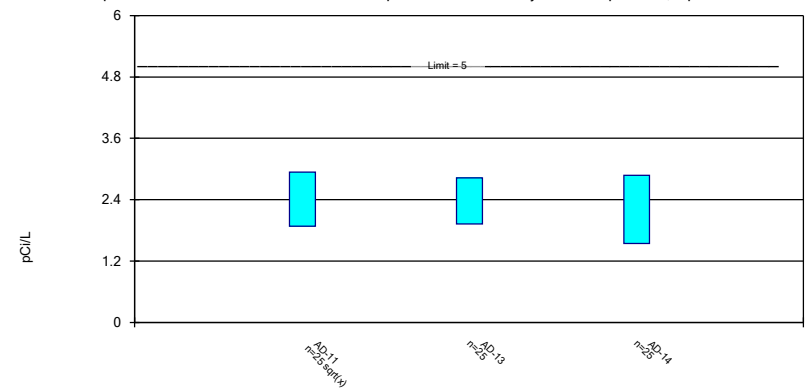
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

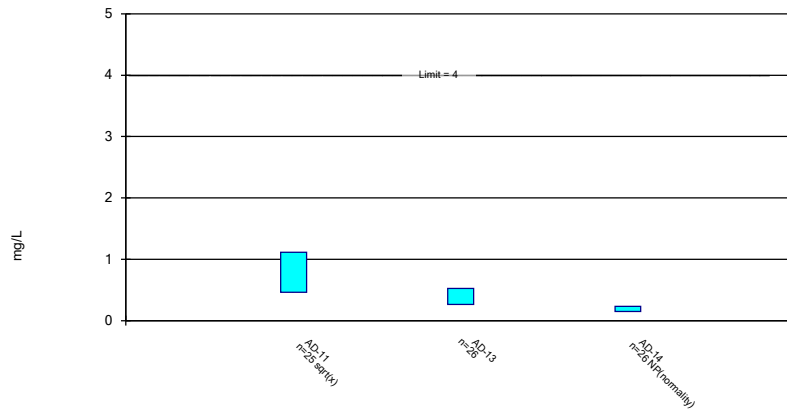
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
 Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

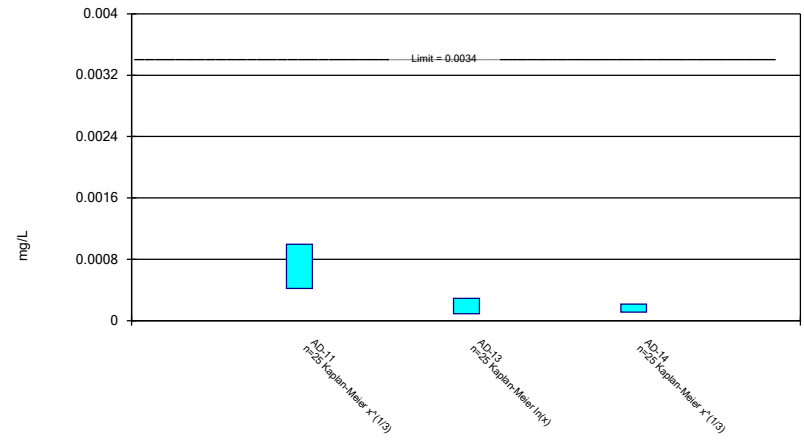
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

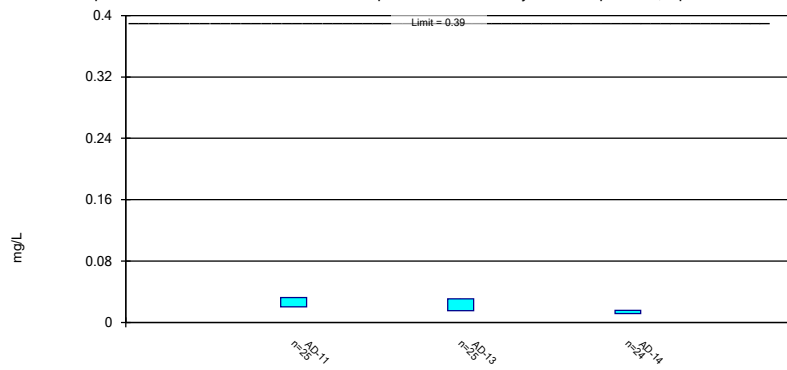
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

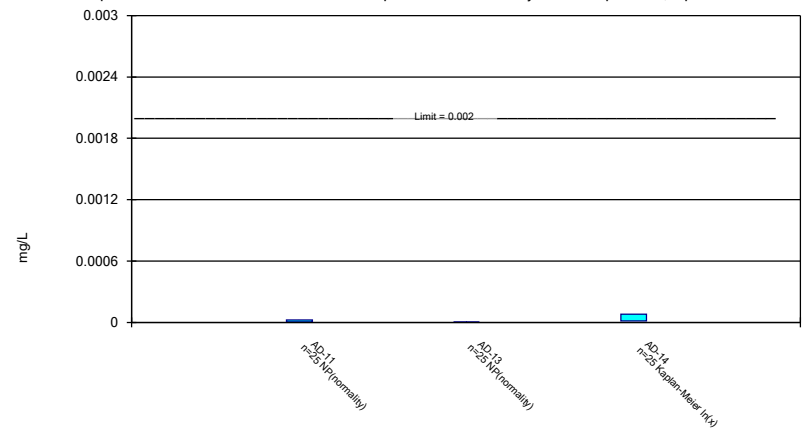
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric and Non-Parametric (NP) Confidence Interval

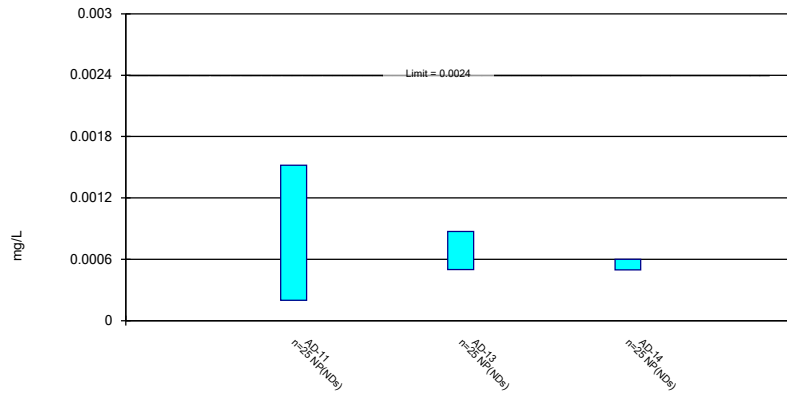
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

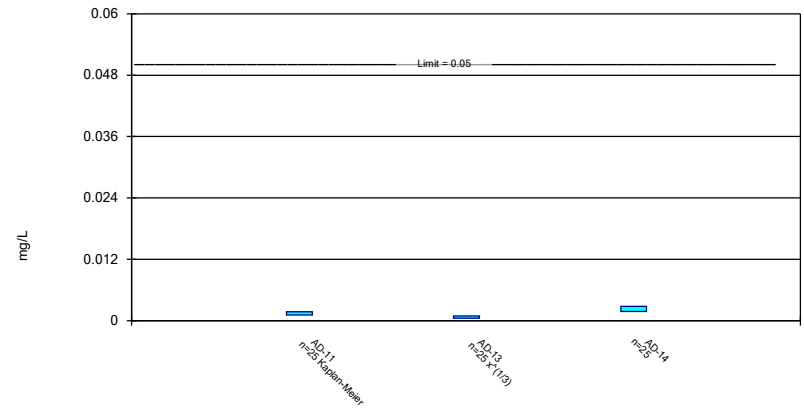
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Parametric Confidence Interval

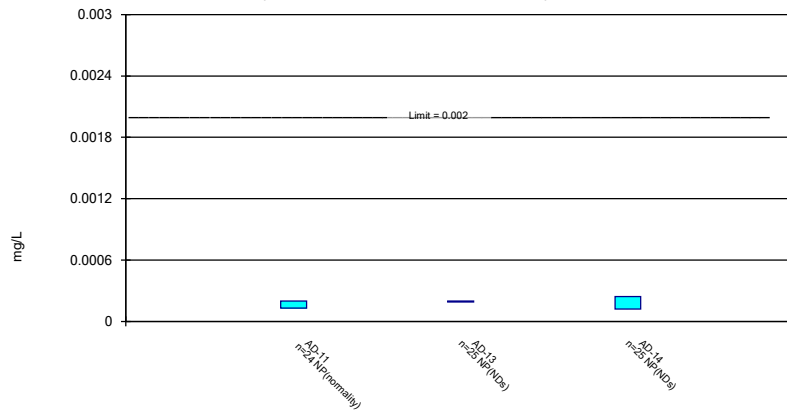
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals
Welsh Landfill Client: Geosyntec Data: Welsh LF

APPENDIX 3 NA

Alternate source demonstration(s) 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.

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: AEP WASH PP

Sampling Contractor: EAGLE

Sampling Period: FEBRUARY 2023

Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-13	✓	✓	✓	✓	✓	✓	✓	13.48
AD-09	✓	✓	✓	✓	✓	✓	✓	12.75
AD-08	✓	✓	✓	✓	✓	✓	✓	19.95
AD-05	✓	✓	✓	✓	✓	✓	✓	17.83
AD-06	✓	✓	✓	✓	✓	✓	✓	13.17
AD-12	✓	✓	✓	✓	✓	✓	✓	17.31
AD-01	✓	✓	✓	✓	✓	✓	✓	
AD-02	✓	✓	✓	✓	✓	✓	✓	
AD-03	✓	✓	✓	✓	✓	✓	✓	PAD BROKEN
AD-07	✓	✓	✓	✓	✓	✓	✓	
AP-16R	✓	✓	✓	✓	✓	✓	✓	
AD-04C	✓	✓	✓	✓	✓	✓	✓	

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 WUSH PP Sampling Period: FEBRUARY 2023
 Sampling Contractor: FACT Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-04b	✓	✓	✓	✓	✓	✓	✓	6.67
AD-04	✓	✓	✓	✓	✓	✓	✓	15.90
AD-04a	✓	✓	✓	✓	✓	✓	✓	15.94
AD-17	✓	✓	✓	✓	✓	✓	✓	23.33
AD-18	✓	✓	✓	✓	✓	✓	✓	5.71
AD-22				✓	✓	✓	✓	4.66 NO LOCK NO LABEL
AD-23	✓	✓	✓	✓	✓	✓	✓	9.34

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: 2-6-23
 Sampling Contractor: Fagk Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-15	✓	✓	✓	✓	✓	✓	✓	
AD-16	✓	✓	✓	✓	✓	✓	✓	DTW 19.26
AD-11	✓	✓	✓	✓	✓	✓	✓	
AD-14	✓	✓	✓	✓	✓	✓	✓	

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

June 2023

Facility: Wells Sampling Period: _____
 Sampling Contractor: Esgk Signature: [Signature]

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
AD-15	✓	✓	✓	✓	✓	✓	✓	DTW = Depth to Water
AD-11	✓	✓	✓	✓	✓	✓	✓	vegetation around well overgrown
AD-14	✓	✓	✓	✓	✓	✓	✓	vegetation around well overgrown
AD-10	✓	✓	✓	✓	✓	✓	✓	DTW - 15.61 overgrown
AD-16R	✓	✓	✓	✓	✓	✓	✓	
AD-3	✓	✓	✓	✓	✓	✓	✓	No ballards
AD-2	✓	✓	✓	✓	✓	✓	✓	DTW - 15.01 No ballards
AD-17	✓	✓	✓	✓	✓	✓	✓	DTW 7.03
AD-18	✓	✓	✓	✓	✓	✓	✓	DTW 10.94
AD-22	✓	✓	✓	✓	✓	✓	✓	DTW 12.01
AD-23	✓	✓	✓	✓	✓	✓	✓	

*Not all wells will be vented, especially flush mounted wells. If that is the case, please note "flush mount well" in the comments.

CCR Groundwater Monitoring Well Inspection Form

Facility: WFLSH PP Sampling Period: JUNE 2023
 Sampling Contractor: CAOIL Environmental Signature: [Handwritten Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, and Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-13	✓	✓	✓	✓	✓	✓	✓	
AD-08	✓	✓	✓	✓	✓	✓	✓	
AD-04C	✓	✓	✓	✓	✓	✓	✓	
AD-04	✓	✓	✓	✓	✓	✓	✓	17.52
AD-04A	✓	✓	✓	✓	✓	✓	✓	17.61
AD-04B	✓	✓	✓	✓	✓	✓	✓	8.63
AD-07	✓	✓	✓	✓	✓	✓	✓	17.23
AD-12	✓	✓	✓	✓	✓	✓	✓	
AD-06	✓	✓	✓	✓	✓	✓	✓	13.13
AD-05	✓	✓	✓	✓	✓	✓	✓	
AD-09	✓	✓	✓	✓	✓	✓	✓	
AD-01	✓	✓	✓	✓	✓	✓	✓	NOT MOUNTED

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.

Facility Name	Welsh
Sample by	Matt Hamilton

Sample Location ID: AD-15

Depth to water, feet (TOC)	21.67
Measured Total Depth, feet (TOC)	49.15

Depth to water date: 6-5-23

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
928	21.85	280	4.03	325	623	1.73	260	23.34
933	22.02	280	4.05	165	458	1.68	285	23.33
938	22.11	280	4.14	145	354	1.21	268	23.42
943	22.15	280	4.17	152	145	0.55	286	23.50
948	22.17	280	4.15	158	137	0.87	284	23.55
953	22.18	280	4.23	164	136	0.79	275	23.65
958	22.18	280	4.27	170	135	0.74	775	23.71
1003	22.15	280	4.30	179	130	0.70	271	23.73
1008	22.15	280	4.32	182	131	0.67	265	23.76
1013	22.15	280	4.33	183	132	0.66	268	23.77

Total volume purged	
Sample appearance	Turbid
Sample time	1015
Sample date	6-5-23

CCR Groundwater Monitoring Well Inspection Form

Facility: AEP WASH PP Sampling Period: OCTOBER 2023
 Sampling Contractor: EA&C Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-13	✓	✓	✓	✓	✓	✓	✓	
AD-09	✓	✓	✓	✓	✓	✓	✓	
AD-08	✓	✓	✓	✓	✓	✓	✓	
AD-07	✓	✓	✓	✓	✓	✓	✓	16.99
AD-05	✓	✓	✓	✓	✓	✓	✓	
AD-04c	✓	✓	✓	✓	✓	✓	✓	
AD-04b	✓	✓	✓	✓	✓	✓	✓	9.90
AD-04	✓	✓	✓	✓	✓	✓	✓	18.62
AD-04a	✓	✓	✓	✓	✓	✓	✓	18.71
AD-01	✓	✓	✓		✓	✓	✓	OVERGROWN
AD-12	✓	✓	✓		✓	✓	✓	OVERGROWN
AD-06	✓	✓	✓		✓	✓	✓	OVERGROWN

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 Contractor: Eagle

Sampling Period: Oct 2023
 Signature: [Signature]

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
AD-15	/	/	/	/	/	/	/	
AD-16	/	/	/	/	/	/	/	
AD-11	/	/	/	/	/	/	/	
AD-14	/	/	/	/	/	/	/	
AD-17	/	/	/	/	/	/	/	
AD-18	/	/	/	/	/	/	/	
AD-16R	/	/	/	/	/	/	/	
AD-3	/	/	/	/	/	/	/	No Barriers
AD-2	/	/	/	/	/	/	/	No Barriers
AD-22	/	/	/	/	/	/	/	
AD-23	/	/	/	/	/	/	/	

*Not all wells will be vented, especially flush mounted wells. If that is the case, please note "flush mount well" in the comments.



Water Analysis Report

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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-8 (PBAP)

Customer Description:

Lab Number: 230470-001

Preparation:

Date Collected: 02/06/2023 11:28 EST

Date Received: 02/13/2023 10:30 EST

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	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Arsenic	0.28	µg/L	1	0.10	0.03		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Barium	32.5	µg/L	1	0.20	0.05		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Beryllium	0.021	µg/L	1	0.050	0.007	J1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Boron	1.16	mg/L	1	0.050	0.009		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Cadmium	0.031	µg/L	1	0.020	0.004		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Calcium	24.6	mg/L	1	0.05	0.02	M1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Cobalt	5.08	µg/L	1	0.020	0.003		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Lithium	0.0821	mg/L	1	0.00020	0.00005		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Magnesium	10.8	mg/L	1	0.10	0.02		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	02/24/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Potassium	3.94	mg/L	1	0.10	0.02		GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Sodium	53.3	mg/L	1	0.20	0.05	M1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Strontium	0.274	mg/L	1	0.0020	0.0004	M1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.74	pCi/L	0.28	0.38		ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	75.6	%						
Radium-228	1.73	pCi/L	0.18	0.52		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	68.5	%						

* 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

Reissued

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

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-9 (PBAP)	Customer Description:
Lab Number: 230470-002	Preparation:
Date Collected: 02/06/2023 10:30 EST	Date Received: 02/13/2023 10:30 EST

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	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Arsenic	0.33	µg/L	1	0.10	0.03		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Barium	49.0	µg/L	1	0.20	0.05		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Beryllium	1.60	µg/L	1	0.050	0.007		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Boron	0.337	mg/L	1	0.050	0.009		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Cadmium	0.379	µg/L	1	0.020	0.004		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Calcium	12.4	mg/L	1	0.05	0.02		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Chromium	0.58	µg/L	1	0.20	0.04		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Cobalt	22.1	µg/L	1	0.020	0.003		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Lead	0.18	µg/L	1	0.20	0.05	J1	GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Lithium	0.181	mg/L	1	0.00020	0.00005		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Magnesium	6.23	mg/L	1	0.10	0.02		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	02/24/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Potassium	3.02	mg/L	1	0.10	0.02		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Selenium	0.46	µg/L	1	0.50	0.09	J1	GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Sodium	45.3	mg/L	1	0.20	0.05		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Strontium	0.198	mg/L	1	0.0020	0.0004		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4
Thallium	0.28	µg/L	1	0.20	0.04		GES	02/15/2023 09:42	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.24	pCi/L	0.21	0.26		ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	88.8	%						
Radium-228	1.81	pCi/L	0.20	0.58		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	68.4	%						

* 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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-11 (LF)

Customer Description:

Lab Number: 230470-003

Preparation:

Date Collected: 02/06/2023 11:37 EST

Date Received: 02/13/2023 10:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.02	µg/L	1	0.10	0.02	J1	GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.56	µg/L	1	0.10	0.03		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Barium	28.6	µg/L	1	0.20	0.05		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Beryllium	1.25	µg/L	1	0.050	0.007		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Boron	1.21	mg/L	1	0.050	0.009		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.282	µg/L	1	0.020	0.004		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Calcium	15.8	mg/L	1	0.05	0.02		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Cobalt	12.9	µg/L	1	0.020	0.003		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Lead	0.88	µg/L	1	0.20	0.05		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0213	mg/L	1	0.00020	0.00005		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Magnesium	9.90	mg/L	1	0.10	0.02		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Mercury	7	ng/L	1	5	2		JAB	02/24/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Potassium	2.13	mg/L	1	0.10	0.02		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Selenium	1.36	µg/L	1	0.50	0.09		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Sodium	130	mg/L	1	0.20	0.05		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.240	mg/L	1	0.0020	0.0004		GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.16	µg/L	1	0.20	0.04	J1	GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	3.62	pCi/L	0.36	0.24	P1	ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	86.8	%						
Radium-228	0.43	pCi/L	0.19	0.63		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	71.6	%						

* 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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-13 (LF)

Customer Description:

Lab Number: 230470-004

Preparation:

Date Collected: 02/06/2023 12:03 EST

Date Received: 02/13/2023 10:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.03	µg/L	1	0.10	0.02	J1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Arsenic	0.37	µg/L	1	0.10	0.03		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Barium	70.8	µg/L	1	0.20	0.05		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Beryllium	0.182	µg/L	1	0.050	0.007		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Boron	1.02	mg/L	1	0.050	0.009		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.079	µg/L	1	0.020	0.004		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Calcium	16.5	mg/L	1	0.05	0.02	M1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Cobalt	2.87	µg/L	1	0.020	0.003		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.0147	mg/L	1	0.00020	0.00005		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Magnesium	6.32	mg/L	1	0.10	0.02		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Mercury	2	ng/L	1	5	2	J1	JAB	02/24/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Potassium	1.69	mg/L	1	0.10	0.02		GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Selenium	0.39	µg/L	1	0.50	0.09	J1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Sodium	55.5	mg/L	1	0.20	0.05	M1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Strontium	0.198	mg/L	1	0.0020	0.0004	M1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	02/15/2023 10:44	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.33	pCi/L	0.29	0.26		ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.5	%						
Radium-228	1.22	pCi/L	0.19	0.59		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	68.7	%						

* 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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-14 (LF)

Customer Description:

Lab Number: 230470-005

Preparation:

Date Collected: 02/06/2023 12:32 EST

Date Received: 02/13/2023 10:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.03	µg/L	1	0.10	0.02	J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Barium	35.8	µg/L	1	0.20	0.05		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.460	µg/L	1	0.050	0.007		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Boron	1.06	mg/L	1	0.050	0.009		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.359	µg/L	1	0.020	0.004		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Calcium	9.63	mg/L	1	0.05	0.02		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Cobalt	4.17	µg/L	1	0.020	0.003		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Lead	0.16	µg/L	1	0.20	0.05	J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.00940	mg/L	1	0.00020	0.00005		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Magnesium	5.30	mg/L	1	0.10	0.02		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	03/01/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Potassium	0.50	mg/L	1	0.10	0.02		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Selenium	3.24	µg/L	1	0.50	0.09		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Sodium	34.4	mg/L	1	0.20	0.05		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Strontium	0.178	mg/L	1	0.0020	0.0004		GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Thallium	0.06	µg/L	1	0.20	0.04	J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.82	pCi/L	0.17	0.27		ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	90.8	%						
Radium-228	2.25	pCi/L	0.21	0.64		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	72.5	%						

* 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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: AD-15 (PBAP)

Customer Description:

Lab Number: 230470-006

Preparation:

Date Collected: 02/06/2023 10:57 EST

Date Received: 02/13/2023 10:30 EST

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	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Arsenic	3.26	µg/L	1	0.10	0.03		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Barium	73.9	µg/L	1	0.20	0.05		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Beryllium	0.162	µg/L	1	0.050	0.007		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Boron	0.174	mg/L	1	0.050	0.009		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Calcium	2.70	mg/L	1	0.05	0.02		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Cobalt	2.77	µg/L	1	0.020	0.003		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.00373	mg/L	1	0.00020	0.00005		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Magnesium	3.54	mg/L	1	0.10	0.02		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	03/01/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Potassium	0.75	mg/L	1	0.10	0.02		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Selenium	0.45	µg/L	1	0.50	0.09	J1	GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Sodium	24.9	mg/L	1	0.20	0.05		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Strontium	0.0386	mg/L	1	0.0020	0.0004		GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	02/15/2023 11:04	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.61	pCi/L	0.14	0.23		ST	02/23/2023 12:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.3	%						
Radium-228	1.16	pCi/L	0.28	0.89		TTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	59.6	%						

* 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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: DUPLICATE

Customer Description:

Lab Number: 230470-007

Preparation:

Date Collected: 02/06/2023 10:15 EST

Date Received: 02/13/2023 10:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.02	µg/L	1	0.10	0.02	J1	GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Arsenic	0.61	µg/L	1	0.10	0.03		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Barium	29.3	µg/L	1	0.20	0.05		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Beryllium	1.26	µg/L	1	0.050	0.007		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Boron	1.22	mg/L	1	0.050	0.009		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Cadmium	0.310	µg/L	1	0.020	0.004		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Calcium	16.1	mg/L	1	0.05	0.02		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Chromium	0.61	µg/L	1	0.20	0.04		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Cobalt	13.6	µg/L	1	0.020	0.003		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Lead	1.03	µg/L	1	0.20	0.05		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Lithium	0.0224	mg/L	1	0.00020	0.00005		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Magnesium	10.2	mg/L	1	0.10	0.02		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Mercury	7	ng/L	1	5	2		JAB	03/01/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Potassium	2.19	mg/L	1	0.10	0.02		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Selenium	1.44	µg/L	1	0.50	0.09		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Sodium	131	mg/L	1	0.20	0.05		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Strontium	0.251	mg/L	1	0.0020	0.0004		GES	02/15/2023 11:09	EPA 200.8-1994, Rev. 5.4
Thallium	0.16	µg/L	1	0.20	0.04	J1	GES	02/15/2023 11:09	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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

Customer Sample ID: EQUIPMENT BLANK

Customer Description:

Lab Number: 230470-008

Preparation:

Date Collected: 02/06/2023 12:14 EST

Date Received: 02/13/2023 10:30 EST

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	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Beryllium	0.011	µg/L	1	0.050	0.007	J1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Boron	0.017	mg/L	1	0.050	0.009	J1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Cobalt	0.011	µg/L	1	0.020	0.003	J1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Lead	0.37	µg/L	1	0.20	0.05		GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.00008	mg/L	1	0.00020	0.00005	J1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	03/01/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	02/15/2023 11:14	EPA 200.8-1994, Rev. 5.4

230470

Job Comments:

Report originally issued 3/10/23. Report reissued 10/28/23 to correct rounding errors on report and EDD.



Water Analysis Report

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

Reissued

Job ID: 230470

Customer: Welsh Power Station

Date Reported: 10/28/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

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.

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

P1 - The precision between duplicate results was above acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Jonathan Barnhill (318-673-3803)
 Contacts: Michael Ohlinger (614-836-4184)

Project Name: Welsh Annual Screening
 Contact Name: Jill Parker-Witt
 Contact Phone: (318) 673-3816

Sampler(s): Matt Hamilton Kenny McDonald

250 mL bottle, pH<2, HNO3	Field-filter 500 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-5°C	Three (six every 10hr) 1 L bottles, pH<2, HNO3	250 mL Glass bottle, HCL, PH<2
B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, Tl, Sr, Mg, Sr, and Na, K, Mg, Sr	dissolved Fe and Mn	TDS, F, Cl, SO ₄ and Br, Alkalinity	Ra-226, Ra-228	Hg

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.
2/6/2023	1028	G	GW	6
2/6/2023	930	G	GW	6
2/6/2023	1037	G	GW	9
2/6/2023	1103	G	GW	6
2/6/2023	1132	G	GW	6
2/6/2023	957	G	GW	6
2/6/2023	915	G	GW	3
2/6/2023	1114	G	GW	2

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	4	F4	1	4	2	Sample Specific Notes
AD-8 (PBAP)	2/6/2023	1028	G	GW	6	X		X	X	X	
AD-9 (PBAP)	2/6/2023	930	G	GW	6	X		X	X	X	
AD-11 (LF)	2/6/2023	1037	G	GW	9	X		X	X	X	
AD-13 (LF)	2/6/2023	1103	G	GW	6	X		X	X	X	
AD-14 (LF)	2/6/2023	1132	G	GW	6	X		X	X	X	
AD-15 (PBAP)	2/6/2023	957	G	GW	6	X		X	X	X	
DUPLICATE	2/6/2023	915	G	GW	3	X		X	X	X	
EQUIPMENT BLANK	2/6/2023	1114	G	GW	2	X		X	X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

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

Special Instructions/COC Requirements & Comments:

Relinquished by: <i>Matt Bomber</i>	Company: <i>Eagle</i>	Date/Time: <i>2/8/23 1200</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Michael Ohlinger</i>	Date/Time: <i>2/9/23 10:30AM</i>

2/8/23
2/9/23
2/13/23

230470- Met's

230430

Met's
2/13/23
10:30AM



Water Analysis Report

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

Job ID: 230430

Customer: Welsh Power Station

Date Reported: 02/17/2023

Customer Sample ID: AD-8 (PBAP)

Customer Description: TG-32

Lab Number: 230430-001

Preparation:

Date Collected: 02/06/2023 23:28 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	02/15/2023 23:27	EPA 300.1 -1997, Rev. 1.0
Chloride	19.5	mg/L	2	0.04	0.02		CRJ	02/15/2023 23:27	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.72	mg/L	2	0.06	0.02		CRJ	02/15/2023 23:27	EPA 300.1 -1997, Rev. 1.0
Sulfate	182	mg/L	10	2.0	0.3		CRJ	02/15/2023 15:46	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	10	mg/L	1	20	5	J1	MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	370	mg/L	1	50	20		SDW	02/10/2023 10:00	SM 2540C-2015

Customer Sample ID: AD-9 (PBAP)

Customer Description: TG-32

Lab Number: 230430-002

Preparation:

Date Collected: 02/06/2023 10:30 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	02/16/2023 01:38	EPA 300.1 -1997, Rev. 1.0
Chloride	15.5	mg/L	2	0.04	0.02		CRJ	02/16/2023 01:38	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	02/16/2023 01:38	EPA 300.1 -1997, Rev. 1.0
Sulfate	137	mg/L	25	5.0	0.8		CRJ	02/15/2023 16:52	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	6	mg/L	1	20	5	J1	MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		SDW	02/10/2023 10:10	SM 2540C-2015



Water Analysis Report

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

Job ID: 230430

Customer: Welsh Power Station

Date Reported: 02/17/2023

Customer Sample ID: AD-11 (LF)

Customer Description: TG-32

Lab Number: 230430-003

Preparation:

Date Collected: 02/06/2023 11:37 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.35	mg/L	2	0.10	0.02		CRJ	02/16/2023 02:11	EPA 300.1 -1997, Rev. 1.0
Chloride	9.63	mg/L	2	0.04	0.02		CRJ	02/16/2023 02:11	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.69	mg/L	2	0.06	0.02		CRJ	02/16/2023 02:11	EPA 300.1 -1997, Rev. 1.0
Sulfate	368	mg/L	25	5.0	0.8		CRJ	02/15/2023 17:25	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	11	mg/L	1	20	5	J1	MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	620	mg/L	1	50	20		SDW	02/10/2023 10:10	SM 2540C-2015

Customer Sample ID: AD-13 (LF)

Customer Description: TG-32

Lab Number: 230430-004

Preparation:

Date Collected: 02/06/2023 12:03 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	02/16/2023 00:00	EPA 300.1 -1997, Rev. 1.0
Chloride	4.85	mg/L	2	0.04	0.02		CRJ	02/16/2023 00:00	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.39	mg/L	2	0.06	0.02		CRJ	02/16/2023 00:00	EPA 300.1 -1997, Rev. 1.0
Sulfate	138	mg/L	10	2.0	0.3		CRJ	02/15/2023 17:58	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	36	mg/L	1	20	5		MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	280	mg/L	1	50	20		SDW	02/10/2023 10:16	SM 2540C-2015



Water Analysis Report

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

Job ID: 230430

Customer: Welsh Power Station

Date Reported: 02/17/2023

Customer Sample ID: AD-14 (LF)

Customer Description: TG-32

Lab Number: 230430-005

Preparation:

Date Collected: 02/06/2023 12:32 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.03	mg/L	2	0.10	0.02	J1	CRJ	02/16/2023 00:33	EPA 300.1 -1997, Rev. 1.0
Chloride	1.77	mg/L	2	0.04	0.02		CRJ	02/16/2023 00:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	02/16/2023 00:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	89.6	mg/L	2	0.40	0.06		CRJ	02/16/2023 00:33	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	29	mg/L	1	20	5		MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		SDW	02/10/2023 10:16	SM 2540C-2015

Customer Sample ID: AD-15 (PBAP)

Customer Description: TG-32

Lab Number: 230430-006

Preparation:

Date Collected: 02/06/2023 10:57 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.86	mg/L	2	0.10	0.02		CRJ	02/16/2023 03:50	EPA 300.1 -1997, Rev. 1.0
Chloride	27.5	mg/L	2	0.04	0.02		CRJ	02/16/2023 03:50	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.02		CRJ	02/16/2023 03:50	EPA 300.1 -1997, Rev. 1.0
Sulfate	9.85	mg/L	2	0.40	0.06		CRJ	02/16/2023 03:50	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	47	mg/L	1	20	5		MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		SDW	02/10/2023 10:28	SM 2540C-2015



Water Analysis Report

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

Job ID: 230430

Customer: Welsh Power Station

Date Reported: 02/17/2023

Customer Sample ID: DUPLICATE

Customer Description: TG-32

Lab Number: 230430-007

Preparation:

Date Collected: 02/06/2023 10:15 EST

Date Received: 02/09/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.35	mg/L	2	0.10	0.02		CRJ	02/16/2023 04:23	EPA 300.1 -1997, Rev. 1.0
Chloride	9.70	mg/L	2	0.04	0.02		CRJ	02/16/2023 04:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.70	mg/L	2	0.06	0.02		CRJ	02/16/2023 04:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	376	mg/L	25	5.0	0.8		CRJ	02/15/2023 20:09	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	10	mg/L	1	20	5	J1	MGK	02/13/2023 12:10	SM 2320B-2011
TDS, Filterable Residue	630	mg/L	1	50	20		SDW	02/10/2023 10:28	SM 2540C-2015

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.



Water Analysis Report

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

Job ID: 230430

Customer: Welsh Power Station

Date Reported: 02/17/2023

Data Qualifier Legend

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

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Jonathan Barnhill (318-673-3803)
 Contacts: Michael Ohlinger (614-336-4184)

Project Name: Weish Annual Screening
 Contact Name: Jill Parker-Witt
 Contact Phone: (318) 673-3816

Sampler(s): Matt Hamilton Kenny McDonald

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact: _____ Date: _____
 Analysis Turnaround Time (in Calendar Days): _____
 For Lab Use Only:
 COC/Order #: 230430

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials						Sample Specific Notes:			
						250 mL bottle, pH<2, HNO3	Field-filter 500 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6°C	Three (six every 10th*) 1 L bottles, pH<2, HNO3	250 mL Glass bottles, HCL ¹ , pH<2					
AD-8 (PBAP)	2/6/2023	1028	G	GW	6	B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL, and Na, K, Mg, Sr	disolved Fe and Mn	TDS, F, Cl, SO ₄ and Br, Alkalinity	Ra-226, Ra-228	X	X				
AD-9 (PBAP)	2/6/2023	930	G	GW	6					X	X				
AD-11 (LF)	2/6/2023	1037	G	GW	9					X	X				
AD-13 (LF)	2/6/2023	1103	G	GW	6					X	X				
AD-14 (LF)	2/6/2023	1132	G	GW	6					X	X				
AD-15 (PBAP)	2/6/2023	957	G	GW	6					X	X				
DUPLICATE	2/6/2023	915	G	GW	3					X	X				
EQUIPMENT BLANK	2/6/2023	1114	G	GW	2					X	X				
						F4						4	1	4	2

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: *Matt Hamilton* Date/Time: 2/8/23 1200
 Relinquished by: *Engle* Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Received in Laboratory by: *Michael Ohlinger* Date/Time: 2/9/23 10:30AM



WATER & WASTE SAMPLE RECEIPT FORM (Temp Gun i)

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

Plant/Customer Welsh Number of Plastic Containers: 7

Opened By MGK/TIP Number of Glass Containers: 0

Date/Time 2/9/23 Number of Mercury Containers: 0

Were all temperatures within 0-6°C? Y / N or N/A Initial: MGK on ice / no ice (IR Gun Ser# 221358900, Expir. 3/22/2024) - If No, specify each deviation: _____

Was container in good condition? Y / N Comments _____

Was Chain of Custody received? Y / N Comments _____

Requested turnaround: March 9, 23 If RUSH, who was notified? _____

pH (15 min) Cr⁶⁺ (pres) (24 hr) NO₂ or NO₃ (48 hr) ortho-PO₄ (48 hr) Hg-diss (pres) (48 hr)

Was COC filled out properly? Y / N Comments Metals and Radium were on coc but we did not receive them.

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: TIP 2/9/23

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# 230430 Initial & Date & Time : _____

Logged by MW Comments: Metal were on coc, but we did not receive them yet. MGK ALSO Radium.

Reviewed by TIP Palmer

COC does not indicate TG-32 Requirement - TIP 2/10/23

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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-11

Customer Description: TG-32

Lab Number: 231720-001

Preparation:

Date Collected: 06/05/2023 11:55 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.020	µg/L	1	0.100	0.008	J1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.66	µg/L	1	0.10	0.03		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Barium	11.2	µg/L	1	0.20	0.05		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Beryllium	1.02	µg/L	1	0.050	0.007		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Boron	0.969	mg/L	1	0.050	0.007		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.244	µg/L	1	0.020	0.004		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Calcium	7.50	mg/L	1	0.05	0.01		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.57	µg/L	1	0.30	0.07		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Cobalt	12.1	µg/L	1	0.020	0.005		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Lead	0.94	µg/L	1	0.20	0.05		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0185	mg/L	1	0.00030	0.00007		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Mercury	12	ng/L	1	5	2		JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Selenium	1.58	µg/L	1	0.50	0.04		GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.02	J1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.32	pCi/L	0.22	0.26	P1	TTP	06/30/2023 08:57	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.9	%						
Radium-228	2.37	pCi/L	0.26	0.81		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.4	%						

* 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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 231720-002

Preparation:

Date Collected: 06/05/2023 12:14 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.016	µg/L	1	0.100	0.008	J1	GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.37	µg/L	1	0.10	0.03		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Barium	11.9	µg/L	1	0.20	0.05		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Beryllium	0.403	µg/L	1	0.050	0.007		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Boron	1.22	mg/L	1	0.050	0.007		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.115	µg/L	1	0.020	0.004		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Calcium	4.24	mg/L	1	0.05	0.01		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.48	µg/L	1	0.30	0.07		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Cobalt	5.09	µg/L	1	0.020	0.005		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Lead	0.35	µg/L	1	0.20	0.05		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0232	mg/L	1	0.00030	0.00007		GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Selenium	0.49	µg/L	1	0.50	0.04	J1	GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.02	J1	GES	06/20/2023 15:02	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.94	pCi/L	0.20	0.24		TTP	06/30/2023 08:57	SW-846 9315-1986, Rev. 0
Carrier Recovery	79.3	%						
Radium-228	0.70	pCi/L	0.16	0.53		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.8	%						

* 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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-14

Customer Description: TG-32

Lab Number: 231720-003

Preparation:

Date Collected: 06/05/2023 12:58 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.020	µg/L	1	0.100	0.008	J1	GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Arsenic	1.13	µg/L	1	0.10	0.03		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Barium	20.9	µg/L	1	0.20	0.05		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Beryllium	2.56	µg/L	5	0.25	0.04		GES	06/20/2023 15:34	EPA 200.8-1994, Rev. 5.4
Boron	1.26	mg/L	1	0.050	0.007		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Cadmium	4.73	µg/L	1	0.020	0.004		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Calcium	10.8	mg/L	1	0.05	0.01		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Chromium	0.83	µg/L	1	0.30	0.07		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Cobalt	38.7	µg/L	1	0.020	0.005		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Lead	0.60	µg/L	1	0.20	0.05		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Lithium	0.0211	mg/L	5	0.0015	0.0004		GES	06/20/2023 15:34	EPA 200.8-1994, Rev. 5.4
Mercury	524	ng/L	100	500	200		JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Selenium	2.44	µg/L	1	0.50	0.04		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4
Thallium	0.33	µg/L	1	0.20	0.02		GES	06/20/2023 15:07	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.05	pCi/L	0.18	0.18		TTP	06/30/2023 08:57	SW-846 9315-1986, Rev. 0
Carrier Recovery	103	%						
Radium-228	1.29	pCi/L	0.16	0.46		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.6	%						

* 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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: DUPLICATE - LANDFILL

Customer Description: TG-32

Lab Number: 231720-004

Preparation:

Date Collected: 06/05/2023 12:22 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.021	µg/L	1	0.100	0.008	J1	GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Arsenic	0.70	µg/L	1	0.10	0.03		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Barium	11.5	µg/L	1	0.20	0.05		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Beryllium	1.26	µg/L	5	0.25	0.04		GES	06/20/2023 15:40	EPA 200.8-1994, Rev. 5.4
Boron	1.01	mg/L	1	0.050	0.007		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Cadmium	0.260	µg/L	1	0.020	0.004		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Calcium	7.88	mg/L	1	0.05	0.01		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Chromium	0.56	µg/L	1	0.30	0.07		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Cobalt	12.7	µg/L	1	0.020	0.005		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Lead	0.97	µg/L	1	0.20	0.05		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Lithium	0.0237	mg/L	5	0.0015	0.0004		GES	06/20/2023 15:40	EPA 200.8-1994, Rev. 5.4
Mercury	7	ng/L	1	5	2		JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Selenium	1.64	µg/L	1	0.50	0.04		GES	06/20/2023 15:12	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.02	J1	GES	06/20/2023 15:12	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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: EQUIPMENT BLANK - LANDFILL

Customer Description: TG-32

Lab Number: 231720-005

Preparation:

Date Collected: 06/05/2023 12:30 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.025	µg/L	1	0.100	0.008	J1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Beryllium	0.021	µg/L	1	0.050	0.007	J1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Calcium	0.02	mg/L	1	0.05	0.01	J1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Chromium	0.22	µg/L	1	0.30	0.07	J1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Cobalt	0.043	µg/L	1	0.020	0.005		GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	06/20/2023 15:17	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	06/20/2023 15:17	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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: FIELD BLANK - LANDFILL

Customer Description: TG-32

Lab Number: 231720-006

Preparation:

Date Collected: 06/05/2023 12:32 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Calcium	0.01	mg/L	1	0.05	0.01	J1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.30	0.07		GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Cobalt	0.031	µg/L	1	0.020	0.005		GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.35	pCi/L	0.11	0.20		TTP	06/30/2023 08:57	SW-846 9315-1986, Rev. 0
Carrier Recovery	106	%						
Radium-228	0.13	pCi/L	0.12	0.40	R7	ST	06/28/2023 15:20	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.8	%						

* 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.

231720

Job Comments:

Report originally issued 7/7/23. Report reissued 10/29/23 to correct rounding errors on report and EDD.



Water Analysis Report

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

Reissued

Job ID: 231720

Customer: Welsh Power Station

Date Reported: 10/29/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

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).

P1 - The precision between duplicate results was above acceptance limits.

R7 - The MDA exceeds the critical value of 0.95 pCi/L.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125

Contacts: Michael Ohlinger (614-830-4184)

Project Name: Welsh Landfill

Contact Name: Rebecca Jones

Contact Phone: (737) 330-3725

Sampler(s): Matt Hamilton Kenny McDonald

Sample Identification	Analysis Turnaround Time (in Calendar Days)		Sample Type		Matrix	# of Cont.	Site Contact:						Date:	COC/Order #:	
	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Sample Time			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 10hr*) 1 L bottles, pH<2, HNO ₃	125 mL PTFE lined bottle, HCl, pH<2	For Lab Use Only:			
							Mo, Se, TL Ba, Cd, Cr, Co, Pb, Bi, Ca, Li, Sb, As, B, Be, Fe, Ni, V, Zn	dissolved Fe and Mn	TDS, F, Cl, SO ₄	Ra-226, Ra-228	Hg				
AD-11	6/5/2023	1055	G	1055	GW	8	X					X			TG-32 needed
AD-13	6/5/2023	1114	G	1114	GW	5	X					X			
AD-14	6/5/2023	1158	G	1158	GW	5	X					X			
DUPLICATE - LANDFILL	6/5/2023	1122	G	1122	GW	2	X					X			
EQUIPMENT BLANK - LANDFILL	6/5/2023	1130	G	1130	GW	2	X					X			
FIELD BLANK - LANDFILL	6/5/2023	1132	G	1132	GW	5	X					X			
							4	F4	1	4	2				

Preservation Used: 1= Ice, 2= HCl; 3= H₂SO₄; 4=HNO₃; 5=NaOH; 6= Other

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

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>[Signature]</i>	Date/Time: 6-7-23 1600	Received by:	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: 6/9/23 1:30 PM

AEP 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 checked="" type="radio"/> FedEX	<input type="radio"/> USPS
Other _____				Other _____			
Plant/Customer <u>Welsh</u>				Number of Plastic Containers: <u>2 18</u>			
Opened By <u>MGK</u>				Number of Glass Containers: <u>6</u>			
Date/Time <u>6/9/23 1:30pm</u>				Number of Mercury Containers: <u>—</u>			
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice <input checked="" type="radio"/> no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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: MGK 6/9/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ **[OR]** Lab Rat,PN4801,LOT# X000RW0G21 Exp 11/15/2024

- 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# 231720 Initial & Date & Time : _____

Logged by MSB Comments: Missing AD-13 Radium
Samples, Did not receive
Fed Ex 7723 76474221
Reviewed by MGK Remaining bottles arrived 6/12/23msb

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.

Mercury Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Sulzmann	<i>S. Sulzmann</i>	Senior Chemist	06-21-23
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh
Reviewer Name: JA Beach
LRC Date: 06/20/2023
Laboratory Job Number: 231720
Prep Batch Number(s): PB23061504

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	YES	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh
Reviewer Name: JA Beach
LRC Date: 06/20/2023
Laboratory Job Number: 231720
Prep Batch Number(s): PB23061504

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

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 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

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Check, if applicable: [] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (printed) Signature Official Title Date

ICP-MS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?		
		Were all departures from standard conditions described in an exception report?		
R2	O, I	Sample and quality control (QC) identification		
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?		
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?		
R3	O, I	Test reports		
		Were all samples prepared and analyzed within holding times?		
		Other than those results < MQL, were all other raw values bracketed by calibration standards?		
		Were calculations checked by a peer or supervisor?		
		Were all analyte identifications checked by a peer or supervisor?		
		Were sample quantitation limits reported for all analytes not detected?		
		Were all results for soil and sediment samples reported on a dry weight basis?		
		Was % moisture (or solids) reported for all soil and sediment samples?		
		If required for the project, TICs reported?		
R4	O	Surrogate recovery data		
		Were surrogates added prior to extraction?		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?		
R5	O, I	Test reports/summary forms for blank samples		
		Were appropriate type(s) of blanks analyzed?		
		Were blanks analyzed at the appropriate frequency?		

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?		
		Were blank concentrations < MQL?		
R6	O, I	Laboratory control samples (LCS):		
		Were all COCs included in the LCS?		
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?		
		Were LCSs analyzed at the required frequency?		
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?		
		Was the LCSD RPD within QC limits?		
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
		Were the project/method specified analytes included in the MS and MSD?		
		Were MS/MSD analyzed at the appropriate frequency?		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		
		Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	Analytical duplicate data		
		Were appropriate analytical duplicates analyzed for each matrix?		
		Were analytical duplicates analyzed at the appropriate frequency?		
		Were RPDs or relative standard deviations within the laboratory QC limits?		
R9	O, I	Method quantitation limits (MQLs):		
		Are the MQLs for each method analyte included in the laboratory data package?		
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?		
		Are unadjusted MQLs included in the laboratory data package?		
R10	O, I	Other problems/anomalies		
		Are all known problems/anomalies/special conditions noted in this LRC and ER?		
		Were all necessary corrective actions performed for the reported data?		
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?		

ICP-MS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
		Were response factors and/or relative response factors for each analyte within QC limits?		
		Were percent RSDs or correlation coefficient criteria met?		
		Was the number of standards recommended in the method used for all analytes?		
		Were all points generated between the lowest and highest standard used to calculate the curve?		
		Are ICAL data available for all instruments used?		
		Has the initial calibration curve been verified using an appropriate second source standard?		
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
		Was the CCV analyzed at the method-required frequency?		
		Were percent differences for each analyte within the method-required QC limits?		
		Was the ICAL curve verified for each analyte?		
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?		
S3	O	Mass spectral tuning:		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	O	Internal standards (IS):		
		Were IS area counts and retention times within the method-required QC limits?		
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?		
		Were data associated with manual integrations flagged on the raw data?		

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
		Did dual column confirmation results meet the method-required QC?		
S7	O	Tentatively identified compounds (TICs):		
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?		
S8	I	Interference Check Sample (ICS) results:		
		Were percent recoveries within method QC limits?		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		
S10	O, I	Method detection limit (MDL) studies		
		Was a MDL study performed for each reported analyte?		
		Is the MDL either adjusted or supported by the analysis of DCSs?		
S11	O, I	Proficiency test reports:		
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?		
S12	O, I	Standards documentation		
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?		
S13	O, I	Compound/analyte identification procedures		
		Are the procedures for compound/analyte identification documented?		
S14	O, I	Demonstration of analyst competency (DOC)		
		Was DOC conducted consistent with NELAC Chapter 5C?		
		Is documentation of the analyst's competency up-to-date and on file?		
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
		Are all the methods used to generate the data documented, verified, and validated, where applicable?		
S16	O, I	Laboratory standard operating procedures (SOPs):		
		Are laboratory SOPs current and on file for each method performed?		



Water Analysis Report

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

Job ID: 231696

Customer: Welsh Power Station

Date Reported: 07/05/2023

Customer Sample ID: AD-11

Customer Description: TG-32

Lab Number: 231696-001

Preparation:

Date Collected: 06/05/2023 11:55 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.8	mg/L	2	0.04	0.01		CRJ	06/27/2023 21:35	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.51	mg/L	2	0.06	0.02		CRJ	06/27/2023 21:35	EPA 300.1 -1997, Rev. 1.0
Sulfate	413	mg/L	25	8	2		CRJ	06/28/2023 01:58	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	670	mg/L	1	50	20		ELT	06/08/2023 13:23	SM 2540C-2015

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 231696-002

Preparation:

Date Collected: 06/05/2023 12:14 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	8.39	mg/L	2	0.04	0.01		CRJ	06/28/2023 05:16	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.11	mg/L	2	0.06	0.02		CRJ	06/28/2023 05:16	EPA 300.1 -1997, Rev. 1.0
Sulfate	184	mg/L	10	3.0	0.6		CRJ	06/28/2023 01:25	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	350	mg/L	1	50	20		ELT	06/08/2023 13:29	SM 2540C-2015

Customer Sample ID: AD-14

Customer Description: TG-32

Lab Number: 231696-003

Preparation:

Date Collected: 06/05/2023 12:58 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	11.5	mg/L	2	0.04	0.01		CRJ	06/28/2023 04:43	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.50	mg/L	2	0.06	0.02		CRJ	06/28/2023 04:43	EPA 300.1 -1997, Rev. 1.0
Sulfate	367	mg/L	10	3.0	0.6		CRJ	06/28/2023 04:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	610	mg/L	1	50	20		ELT	06/08/2023 13:35	SM 2540C-2015



Water Analysis Report

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

Job ID: 231696

Customer: Welsh Power Station

Date Reported: 07/05/2023

Customer Sample ID: DUPLICATE - LANDFILL

Customer Description: TG-32

Lab Number: 231696-004

Preparation:

Date Collected: 06/05/2023 12:22 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	06/28/2023 07:27	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.50	mg/L	2	0.06	0.02		CRJ	06/28/2023 07:27	EPA 300.1 -1997, Rev. 1.0
Sulfate	415	mg/L	25	8	2		CRJ	06/28/2023 06:54	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	650	mg/L	1	50	20		ELT	06/08/2023 13:35	SM 2540C-2015

Customer Sample ID: FIELD BLANK - LANDFILL

Customer Description: TG-32

Lab Number: 231696-005

Preparation:

Date Collected: 06/05/2023 12:32 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	<0.01	mg/L	2	0.04	0.01	U1	CRJ	06/28/2023 06:21	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	06/28/2023 06:21	EPA 300.1 -1997, Rev. 1.0
Sulfate	<0.1	mg/L	2	0.6	0.1	U1	CRJ	06/28/2023 06:21	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	<20	mg/L	1	50	20	U1	ELT	06/08/2023 13:41	SM 2540C-2015



Water Analysis Report

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

Job ID: 231696

Customer: Welsh Power Station

Date Reported: 07/05/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

Data Qualifier Legend

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

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	Box	Bag	Envelope	PONY	UPS	<input checked="" type="radio"/> FedEX	USPS
Other _____							
Plant/Customer <u>Welsh Power Station</u>			Number of Plastic Containers: <u>5</u>				
Opened By <u>Misgina/Michael</u>			Number of Glass Containers: _____				
Date/Time <u>06/08/23 11:00 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>MLK</u> <input checked="" type="radio"/> on ice / no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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 property? Y / N Comments _____

Were samples labeled property? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: MLK 06/08/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ [OR] Lab Rat,PN4801,LOT# X000RWDG21 Exp 11/18/2024

- 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# 231696 Initial & Date & Time : _____

Logged by MSO 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.

Ion Chromatography Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

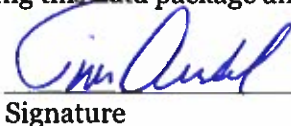
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim Arnold

Name (printed)



Signature

Chemist Principle

Official Title

6/30/23

Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Landfill
Reviewer Name: Tim Arnold
LRC Date: 6/30/23
Laboratory Job Number: 231696
Prep Batch Number(s): QC2306254

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Landfill
Reviewer Name: Tim Arnold
LRC Date: 6/30/23
Laboratory Job Number: 231696
Prep Batch Number(s): QC2306254

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

TDS Laboratory Review Checklist

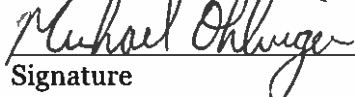
Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

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 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

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Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger		Chemist	7/5/2023
Name (printed)	Signature	Official Title	Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Landfill
Reviewer Name: Michael Ohlinger
LRC Date: 7/5/20223
Laboratory Job Number: 231696
Prep Batch Number(s): QC2306117

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

TDS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh Landfill

Reviewer Name: Michael Ohlinger

LRC Date: 7/5/2023

Laboratory Job Number: 231696

Prep Batch Number(s): QC2306117

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



Water Analysis Report

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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-1

Customer Description: TG-32

Lab Number: 231716-001

Preparation:

Date Collected: 06/06/2023 11:54 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.041	µg/L	1	0.100	0.008	J1	GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Barium	83.4	µg/L	1	0.20	0.05		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Beryllium	1.11	µg/L	1	0.050	0.007		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Boron	0.729	mg/L	1	0.050	0.007		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Cadmium	0.034	µg/L	1	0.020	0.004		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Calcium	6.59	mg/L	1	0.05	0.01		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.30	0.07		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Cobalt	2.67	µg/L	1	0.020	0.005		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Lead	0.37	µg/L	1	0.20	0.05		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Lithium	0.00805	mg/L	1	0.00030	0.00007		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Magnesium	3.20	mg/L	1	0.100	0.006		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Mercury	2	ng/L	1	5	2	J1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Potassium	0.989	mg/L	1	0.100	0.008		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Selenium	10.1	µg/L	1	0.50	0.04		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Sodium	35.5	mg/L	1	0.20	0.01		GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.02	J1	GES	06/20/2023 09:43	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.46	pCi/L	0.13	0.22		TTP	06/26/2023 15:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	90.8	%						
Radium-228	0.49	pCi/L	0.16	0.54		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	77.0	%						

* 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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-5

Customer Description: TG-32

Lab Number: 231716-002

Preparation:

Date Collected: 06/06/2023 10:00 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.010	µg/L	1	0.100	0.008	J1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Arsenic	4.30	µg/L	1	0.10	0.03		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Barium	45.5	µg/L	1	0.20	0.05		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Beryllium	0.055	µg/L	1	0.050	0.007		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Boron	0.030	mg/L	1	0.050	0.007	J1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Calcium	26.5	mg/L	1	0.05	0.01		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Chromium	0.24	µg/L	1	0.30	0.07	J1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Cobalt	9.47	µg/L	1	0.020	0.005		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Lithium	0.106	mg/L	1	0.00030	0.00007		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Magnesium	9.62	mg/L	1	0.100	0.006		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Potassium	2.69	mg/L	1	0.100	0.008		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Selenium	0.06	µg/L	1	0.50	0.04	J1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Sodium	25.4	mg/L	1	0.20	0.01		GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	06/20/2023 09:48	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.63	pCi/L	0.16	0.22		TTP	06/26/2023 16:02	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.6	%						
Radium-228	1.09	pCi/L	0.16	0.48		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	83.4	%						

* 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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 231716-003

Preparation:

Date Collected: 06/06/2023 12:34 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.08	µg/L	10	1.00	0.08	U1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Arsenic	1.1	µg/L	10	1.0	0.3		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Barium	19.6	µg/L	10	2.0	0.5		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Beryllium	0.11	µg/L	10	0.50	0.07	J1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Boron	0.10	mg/L	10	0.50	0.07	J1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.04	µg/L	10	0.20	0.04	U1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Calcium	150	mg/L	10	0.5	0.1		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Chromium	1.1	µg/L	10	3.0	0.7	J1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Cobalt	36.8	µg/L	10	0.20	0.05		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Lead	0.7	µg/L	10	2.0	0.5	J1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Lithium	0.254	mg/L	10	0.0030	0.0007		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Magnesium	46.0	mg/L	10	1.00	0.06		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<1	µg/L	10	5	1	U1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Potassium	7.43	mg/L	10	1.00	0.08		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Selenium	0.5	µg/L	10	5.0	0.4	J1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Sodium	40.2	mg/L	10	2.0	0.1		GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	10	2.0	0.2	U1	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.53	pCi/L	0.14	0.24		TTP	06/26/2023 16:02	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.9	%						
Radium-228	0.89	pCi/L	0.16	0.49		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.3	%						

* 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
Audinet: 210-4221

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: DUPLICATE - BACKGROUND

Customer Description: TG-32

Lab Number: 231716-004

Preparation:

Date Collected: 06/06/2023 13:00 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.033	µg/L	1	0.100	0.008	J1	GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Barium	86.5	µg/L	1	0.20	0.05		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Beryllium	1.10	µg/L	1	0.050	0.007		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Boron	0.768	mg/L	1	0.050	0.007		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.033	µg/L	1	0.020	0.004		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Calcium	6.99	mg/L	1	0.05	0.01		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.30	0.07		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Cobalt	2.88	µg/L	1	0.020	0.005		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Lead	0.53	µg/L	1	0.20	0.05		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.00790	mg/L	1	0.00030	0.00007		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Selenium	10.1	µg/L	1	0.50	0.04		GES	06/20/2023 09:59	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.02	J1	GES	06/20/2023 09:59	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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: EB - BACKGROUND

Customer Description: TG-32

Lab Number: 231716-005

Preparation:

Date Collected: 06/06/2023 12:25 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Calcium	0.02	mg/L	1	0.05	0.01	J1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.26	µg/L	1	0.30	0.07	J1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Cobalt	0.033	µg/L	1	0.020	0.005		GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	06/20/2023 10:04	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	06/20/2023 10:04	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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

Customer Sample ID: FIELD BLANK - BACKGROUND

Customer Description: TG-32

Lab Number: 231716-006

Preparation:

Date Collected: 06/06/2023 12:22 EDT

Date Received: 06/09/2023 13:30 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Barium	0.07	µg/L	1	0.20	0.05	J1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Beryllium	0.020	µg/L	1	0.050	0.007	J1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Calcium	0.02	mg/L	1	0.05	0.01	J1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.30	0.07	J1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Cobalt	0.037	µg/L	1	0.020	0.005		GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	06/20/2023 10:09	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	06/20/2023 10:09	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	0.11	0.19		TTP	06/26/2023 16:02	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.9	%						
Radium-228	-0.20	pCi/L	0.12	0.42		ST	06/29/2023 13:45	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	93.5	%						

* 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.

231716

Job Comments:

Report originally issued 7/7/23. Report reissued 10/29/23 to correct rounding errors on report and EDD.



Water Analysis Report

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

Reissued

Job ID: 231716

Customer: Welsh Power Station

Date Reported: 10/29/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

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).

Chain of Custody Record

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125

Contacts: Michael Ohlinger (614-836-4184)
 Project Name: Welsh Background
 Contact Name: Rebecca Jones
 Contact Phone: (737) 330-3725

Sampler(s): Matt Hamilton, Kenny McDonald



Program: Coal Combustion Residuals (CCR)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.	Analysis Turnaround Time (in Calendar Days) Routine (28 days)						Date:	COC/Order #:
					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	125 mL PTFE lined bottle, HCl, pH<2	Sample Specific Notes:		
AD-1	6/6/2023	1054	G	8	Mo, Se, TL	disolved Fe and Mn	TDS, F, Cl, SO ₄	Ra-226, Ra-228	X	X	Routine (28 days)	231716
AD-5	6/6/2023	900	G	5	As, Pb, Cr, Co, P, Ba, Cd, Cu, Ni, Zn, Mn, Fe, Al, Sb, Bi, Se, TL			X	X	TG-32 needed		
AD-17	6/6/2023	1134	G	5				X	X			
DUPLICATE - BACKGROUND	6/6/2023	1200	G	2				X	X			
EQUIPMENT BLANK - BACKGROUND	6/6/2023	1125	G	2				X	X			
FIELD BLANK - BACKGROUND	6/6/2023	1122	G	5				X	X			
F= filter in field												

Preservation Used: 1 = Ice, 2 = HCl; 3 = H₂SO₄; 4 = HNO₃; 5 = NaOH; 6 = Other

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

Special Instructions/QC Requirements & Comments:

Relinquished by: 	Company: Engk	Date/Time: 6-7-23 1600	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: 	Date/Time: 6/9/23 1:30 PM

AEP 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 checked="" type="radio"/> FedEX	<input type="radio"/> USPS
				Other _____			
Plant/Customer <u>Welsh</u>			Number of Plastic Containers: <u>18</u>				
Opened By <u>MSO/MLK</u>			Number of Glass Containers: <u>6</u>				
Date/Time <u>6/9/23 1:30pm</u>			Number of Mercury Containers: <u>-</u>				
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice / <input checked="" type="radio"/> no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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: MLK 6/9/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ [OR] Lab Rat,PN4801,LOT# X000RWDG21 Exp 11/15/2024

- 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# ~~2316~~ 231716 Initial & Date & Time: _____

Logged by MSO Comments: Missing AD-17 Radion
Likely from missing cooler FedEx

Reviewed by MLK 772376474221

at Missing sample arrived 6/12/23

MSO 6/12/23

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.

Mercury Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Suzann Sulzmann S. Sulzmann Senior Chemist 6.20.23
Name (printed) Signature Official Title Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh

Reviewer Name: Becky Podlasiak

LRC Date: 6/19/2023

Laboratory Job Number: 231716

Prep Batch Number(s): PB23061503

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh

Reviewer Name: Becky Podlasiak

LRC Date: 6/19/2023

Laboratory Job Number: 231716

Prep Batch Number(s): PB23061503

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

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 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
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 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
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 - (a) Samples associated with the MS/MSD clearly identified
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 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
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- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
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- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

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Name (printed)

Signature

Official Title

Date

ICP-MS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?		
		Were all departures from standard conditions described in an exception report?		
R2	O, I	Sample and quality control (QC) identification		
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?		
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?		
R3	O, I	Test reports		
		Were all samples prepared and analyzed within holding times?		
		Other than those results < MQL, were all other raw values bracketed by calibration standards?		
		Were calculations checked by a peer or supervisor?		
		Were all analyte identifications checked by a peer or supervisor?		
		Were sample quantitation limits reported for all analytes not detected?		
		Were all results for soil and sediment samples reported on a dry weight basis?		
		Was % moisture (or solids) reported for all soil and sediment samples?		
		If required for the project, TICs reported?		
R4	O	Surrogate recovery data		
		Were surrogates added prior to extraction?		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?		
R5	O, I	Test reports/summary forms for blank samples		
		Were appropriate type(s) of blanks analyzed?		
		Were blanks analyzed at the appropriate frequency?		

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?		
		Were blank concentrations < MQL?		
R6	O, I	Laboratory control samples (LCS):		
		Were all COCs included in the LCS?		
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?		
		Were LCSs analyzed at the required frequency?		
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?		
		Was the LCSD RPD within QC limits?		
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
		Were the project/method specified analytes included in the MS and MSD?		
		Were MS/MSD analyzed at the appropriate frequency?		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		
		Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	Analytical duplicate data		
		Were appropriate analytical duplicates analyzed for each matrix?		
		Were analytical duplicates analyzed at the appropriate frequency?		
		Were RPDs or relative standard deviations within the laboratory QC limits?		
R9	O, I	Method quantitation limits (MQLs):		
		Are the MQLs for each method analyte included in the laboratory data package?		
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?		
		Are unadjusted MQLs included in the laboratory data package?		
R10	O, I	Other problems/anomalies		
		Are all known problems/anomalies/special conditions noted in this LRC and ER?		
		Were all necessary corrective actions performed for the reported data?		
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?		

ICP-MS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
		Were response factors and/or relative response factors for each analyte within QC limits?		
		Were percent RSDs or correlation coefficient criteria met?		
		Was the number of standards recommended in the method used for all analytes?		
		Were all points generated between the lowest and highest standard used to calculate the curve?		
		Are ICAL data available for all instruments used?		
		Has the initial calibration curve been verified using an appropriate second source standard?		
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
		Was the CCV analyzed at the method-required frequency?		
		Were percent differences for each analyte within the method-required QC limits?		
		Was the ICAL curve verified for each analyte?		
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?		
S3	O	Mass spectral tuning:		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	O	Internal standards (IS):		
		Were IS area counts and retention times within the method-required QC limits?		
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?		
		Were data associated with manual integrations flagged on the raw data?		

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
		Did dual column confirmation results meet the method-required QC?		
S7	O	Tentatively identified compounds (TICs):		
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?		
S8	I	Interference Check Sample (ICS) results:		
		Were percent recoveries within method QC limits?		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		
S10	O, I	Method detection limit (MDL) studies		
		Was a MDL study performed for each reported analyte?		
		Is the MDL either adjusted or supported by the analysis of DCSs?		
S11	O, I	Proficiency test reports:		
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?		
S12	O, I	Standards documentation		
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?		
S13	O, I	Compound/analyte identification procedures		
		Are the procedures for compound/analyte identification documented?		
S14	O, I	Demonstration of analyst competency (DOC)		
		Was DOC conducted consistent with NELAC Chapter 5C?		
		Is documentation of the analyst's competency up-to-date and on file?		
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
		Are all the methods used to generate the data documented, verified, and validated, where applicable?		
S16	O, I	Laboratory standard operating procedures (SOPs):		
		Are laboratory SOPs current and on file for each method performed?		



Water Analysis Report

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

Job ID: 231698

Customer: Welsh Power Station

Date Reported: 07/05/2023

Customer Sample ID: AD-1

Customer Description: TG-32

Lab Number: 231698-001

Preparation:

Date Collected: 06/06/2023 11:54 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	3.03	mg/L	2	0.04	0.01		CRJ	06/28/2023 08:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.24	mg/L	2	0.06	0.02		CRJ	06/28/2023 08:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	91.1	mg/L	2	0.6	0.1		CRJ	06/28/2023 08:33	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	210	mg/L	1	50	20		ELT	06/12/2023 08:06	SM 2540C-2015

Customer Sample ID: AD-5

Customer Description: TG-32

Lab Number: 231698-002

Preparation:

Date Collected: 06/06/2023 10:00 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	16.1	mg/L	2	0.04	0.01		CRJ	06/28/2023 12:24	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	06/28/2023 12:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	114	mg/L	10	3.0	0.6		CRJ	06/28/2023 11:51	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	280	mg/L	1	50	20		ELT	06/12/2023 08:19	SM 2540C-2015

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 231698-003

Preparation:

Date Collected: 06/06/2023 12:34 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	35.6	mg/L	5	0.10	0.03		CRJ	06/28/2023 14:35	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.05	mg/L	5	0.15	0.05	U1	CRJ	06/28/2023 14:35	EPA 300.1 -1997, Rev. 1.0
Sulfate	1190	mg/L	50	15	3		CRJ	06/28/2023 14:02	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	1510	mg/L	2	100	40		ELT	06/12/2023 08:27	SM 2540C-2015



Water Analysis Report

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

Job ID: 231698

Customer: Welsh Power Station

Date Reported: 07/05/2023

Customer Sample ID: DUPLICATE - BACKGROUND

Customer Description: TG-32

Lab Number: 231698-004

Preparation:

Date Collected: 06/06/2023 13:00 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	3.05	mg/L	2	0.04	0.01		CRJ	06/28/2023 13:29	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.24	mg/L	2	0.06	0.02		CRJ	06/28/2023 13:29	EPA 300.1 -1997, Rev. 1.0
Sulfate	92.1	mg/L	2	0.6	0.1		CRJ	06/28/2023 13:29	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		ELT	06/12/2023 08:27	SM 2540C-2015

Customer Sample ID: FIELD BLANK - BACKGROUND

Customer Description: TG-32

Lab Number: 231698-005

Preparation:

Date Collected: 06/06/2023 12:22 EDT

Date Received: 06/08/2023 11:00 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	<0.01	mg/L	2	0.04	0.01	U1	CRJ	06/28/2023 15:47	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	06/28/2023 15:47	EPA 300.1 -1997, Rev. 1.0
Sulfate	<0.1	mg/L	2	0.6	0.1	U1	CRJ	06/28/2023 15:47	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	<20	mg/L	1	50	20	U1	ELT	06/12/2023 08:34	SM 2540C-2015



Water Analysis Report

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

Job ID: 231698

Customer: Welsh Power Station

Date Reported: 07/05/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

Data Qualifier Legend

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

AEP 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>Welsh Power Station</u>		Number of Plastic Containers: <u>5</u>	
Opened By <u>Misgina/Michael</u>		Number of Glass Containers: _____	
Date/Time <u>06/08/23 11:00 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>MBK</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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: MBK 06/08/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ [OR] Lab Rat,PN4801,LOT# X000RWDG21 Exp 11/15/2024

- 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# 231698 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by MBK _____

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.

Ion Chromatography Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim Arnold		Chemist Principle	6/30/23
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Background
Reviewer Name: Tim Arnold
LRC Date: 6/30/23
Laboratory Job Number: 231698
Prep Batch Number(s): QC2306254

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Background
Reviewer Name: Tim Arnold
LRC Date: 6/30/23
Laboratory Job Number: 231698
Prep Batch Number(s): QC2306254

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

TDS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
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 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger		Chemist	7/5/2023
Name (printed)	Signature	Official Title	Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Background
Reviewer Name: Michael Ohlinger
LRC Date: 7/5/2023
Laboratory Job Number: 231698
Prep Batch Number(s): QC2306119

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

TDS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh Background

Reviewer Name: Michael Ohlinger

LRC Date: 7/5/2023

Laboratory Job Number: 231698

Prep Batch Number(s): QC2306119

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



Water Analysis Report

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

Job ID: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-11

Customer Description: TG-32

Lab Number: 233119-001

Preparation:

Date Collected: 10/03/2023 11:15 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.015	µg/L	1	0.100	0.008	J1	GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.85	µg/L	1	0.10	0.03		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Barium	12.8	µg/L	1	0.20	0.05		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Beryllium	1.44	µg/L	1	0.050	0.007	M1	GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Boron	1.41	mg/L	1	0.050	0.007		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.385	µg/L	1	0.020	0.004		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Calcium	10.5	mg/L	1	0.05	0.01		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.57	µg/L	1	0.30	0.07		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Cobalt	16.9	µg/L	1	0.020	0.005		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Lead	1.48	µg/L	1	0.20	0.05		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0283	mg/L	1	0.00030	0.00007	M1	GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	1	5	2		RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.36	µg/L	1	0.50	0.04		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.20	µg/L	1	0.20	0.02		GES	10/17/2023 11:02	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.66	pCi/L	0.11	0.10	P1	TTP	10/31/2023 10:48	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.7	%						
Radium-228	2.24	pCi/L	0.22	0.64		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	69.7	%						

* 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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 233119-002

Preparation:

Date Collected: 10/03/2023 12:18 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.016	µg/L	1	0.100	0.008	J1	GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Arsenic	0.86	µg/L	1	0.10	0.03		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Barium	19.7	µg/L	1	0.20	0.05		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Beryllium	0.566	µg/L	1	0.050	0.007		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Boron	0.961	mg/L	1	0.050	0.007		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Cadmium	0.150	µg/L	1	0.020	0.004		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Calcium	6.73	mg/L	1	0.05	0.01		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Chromium	0.57	µg/L	1	0.30	0.07		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Cobalt	6.56	µg/L	1	0.020	0.005		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Lead	0.56	µg/L	1	0.20	0.05		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Lithium	0.0477	mg/L	1	0.00030	0.00007		GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Selenium	0.42	µg/L	1	0.50	0.04	J1	GES	10/17/2023 09:56	EPA 200.8-1994, Rev. 5.4
Thallium	0.16	µg/L	1	0.20	0.02	J1	GES	10/17/2023 09:56	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	0.11	0.10		TTP	10/31/2023 10:48	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	1.83	pCi/L	0.19	0.55		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.0	%						

* 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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-14

Customer Description: TG-32

Lab Number: 233119-003

Preparation:

Date Collected: 10/03/2023 12:09 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.014	µg/L	1	0.100	0.008	J1	GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.81	µg/L	1	0.10	0.03		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Barium	16.7	µg/L	1	0.20	0.05		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Beryllium	2.34	µg/L	1	0.050	0.007		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Boron	1.57	mg/L	1	0.050	0.007		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Cadmium	5.99	µg/L	1	0.020	0.004		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Calcium	12.9	mg/L	1	0.05	0.01		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.69	µg/L	1	0.30	0.07		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Cobalt	44.8	µg/L	1	0.020	0.005		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Lead	0.62	µg/L	1	0.20	0.05		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0213	mg/L	1	0.00030	0.00007		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Mercury	530	ng/L	10	50	20		RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Selenium	3.28	µg/L	1	0.50	0.04		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4
Thallium	0.42	µg/L	1	0.20	0.02		GES	10/17/2023 10:57	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.68	pCi/L	0.12	0.12		TTP	10/31/2023 10:48	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.4	%						
Radium-228	2.60	pCi/L	0.19	0.53		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	73.7	%						

* 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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: DUPLICATE - LANDFILL

Customer Description: TG-32

Lab Number: 233119-004

Preparation:

Date Collected: 10/03/2023 11:36 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.019	µg/L	1	0.100	0.008	J1	GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Arsenic	0.87	µg/L	1	0.10	0.03		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Barium	13.0	µg/L	1	0.20	0.05		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Beryllium	1.50	µg/L	1	0.050	0.007		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Boron	1.41	mg/L	1	0.050	0.007		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.358	µg/L	1	0.020	0.004		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Calcium	10.7	mg/L	1	0.05	0.01		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.30	0.07		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Cobalt	17.1	µg/L	1	0.020	0.005		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Lead	1.49	µg/L	1	0.20	0.05		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0290	mg/L	1	0.00030	0.00007		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	1	5	2		RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Selenium	2.53	µg/L	1	0.50	0.04		GES	10/17/2023 11:18	EPA 200.8-1994, Rev. 5.4
Thallium	0.22	µg/L	1	0.20	0.02		GES	10/17/2023 11:18	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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: EQUIPMENT BLANK - LF

Customer Description: TG-32

Lab Number: 233119-005

Preparation:

Date Collected: 10/03/2023 12:31 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Boron	0.01	mg/L	1	0.050	0.007	J1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Calcium	0.01	mg/L	1	0.05	0.01	J1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.30	0.07	J1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Cobalt	0.037	µg/L	1	0.020	0.005		GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	10/17/2023 11:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	10/17/2023 11:23	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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: FIELD BLANK - LF

Customer Description: TG-32

Lab Number: 233119-006

Preparation:

Date Collected: 10/03/2023 11:17 EDT

Date Received: 10/09/2023 12:00 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Beryllium	0.012	µg/L	1	0.050	0.007	J1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Boron	0.007	mg/L	1	0.050	0.007	J1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Calcium	<0.01	mg/L	1	0.05	0.01	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.30	0.07		GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Cobalt	0.038	µg/L	1	0.020	0.005		GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Lithium	0.00011	mg/L	1	0.00030	0.00007	J1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	10/17/2023 11:28	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	10/17/2023 11:28	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: 233119

Customer: Welsh Power Station

Date Reported: 11/15/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

Data Qualifier Legend

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

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

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

P1 - The precision between duplicate results was above acceptance limits.

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
<input checked="" type="checkbox"/> Cooler	<input type="checkbox"/> Box	<input type="checkbox"/> Bag	<input type="checkbox"/> Envelope	<input type="checkbox"/> PONY	<input checked="" type="checkbox"/> UPS	<input type="checkbox"/> FedEX	<input type="checkbox"/> USPS
				Other _____			
Plant/Customer <u>INELSH Power station</u>				Number of Plastic Containers: <u>18</u>			
Opened By <u>MISTINE</u>				Number of Glass Containers: _____			
Date/Time <u>10/09/23 11:30 AM</u>				Number of Mercury Containers: <u>5</u>			
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>MBK</u> on ice / <u>no ice</u>							
(IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</u>) - If No, specify each deviator: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>28 days</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? <u>Y</u> / N Comments _____							
Were samples labeled properly? <u>Y</u> / N Comments _____							
were correct containers used? <u>Y</u> / N Comments _____							
Was pH checked & Color Coding done? <u>Y</u> / N or N/A Initial & Date: <u>MBK 10/09/23</u>							
<u>pH paper (circle one):</u> MQuant,PN1.09535.0001.LOT# _____ [OR] Lab Rat,PN4801.LOT# <u>XXXXRWDG21 Exp 11/15/2024</u>							
- Was Add'l Preservative needed? Y / <u>N</u> If Yes: By whom & when: _____ (See Prep Book)							
Is sample filtration requested? Y / <u>N</u> Comments _____ (See Prep Book)							
Was the customer contacted? If Yes: Person Contacted: _____							
Lab ID# <u>233119</u> Initial & Date & Time: _____							
Logged by <u>M50</u> Comments: _____							
Reviewed by <u>MBK</u> _____							

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.

Mercury Laboratory Review Checklist

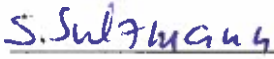
Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Sulzmann		Senior Chemist	11-02-2023
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh Power Station

Reviewer Name: Susann Sulzmann

LRC Date: 11-09-2023

Laboratory Job Number: 233119

Prep Batch Number(s): PB23101204,-205

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
R6	I	Were blank concentrations < MQL?	yes	
	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Power Station
Reviewer Name: Susann Sulzmann
LRC Date: 11-09-2023
Laboratory Job Number: 233119
Prep Batch Number(s): PB23101204,-205

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill		Lab Supervisor	11/8/2023
Name (printed)	Signature	Official Title	Date

ICP-MS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233119
Prep Batch Number(s): PB23101304 QC2310150

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

ICP-MS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233119
Prep Batch Number(s): PB23101304 QC2310150

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233119
Prep Batch Number(s): PB23101304 QC2310150

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is $CCB < 2.2 * MDL$.
ER3	Sample 233119-001 failed acceptance criteria on Matrix spike for Beryllium and Lithium

¹ Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



Water Analysis Report

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

Job ID: 233092

Customer: Welsh Power Station

Date Reported: 11/01/2023

Customer Sample ID: AD-11

Customer Description: TG-32

Lab Number: 233092-001

Preparation:

Date Collected: 10/03/2023 11:15 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	10/17/2023 06:50	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.69	mg/L	2	0.06	0.02		CRJ	10/17/2023 06:50	EPA 300.1 -1997, Rev. 1.0
Sulfate	490	mg/L	25	8	2		CRJ	10/16/2023 23:09	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	750	mg/L	1	50	20		ELT	10/06/2023 13:04	SM 2540C-2015

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 233092-002

Preparation:

Date Collected: 10/03/2023 12:18 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.9	mg/L	2	0.04	0.01		CRJ	10/17/2023 07:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	10/17/2023 07:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	181	mg/L	10	3.0	0.6		CRJ	10/16/2023 23:42	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	360	mg/L	1	50	20		ELT	10/06/2023 13:11	SM 2540C-2015

Customer Sample ID: AD-14

Customer Description: TG-32

Lab Number: 233092-003

Preparation:

Date Collected: 10/03/2023 12:09 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	11.4	mg/L	2	0.04	0.01		CRJ	10/17/2023 08:28	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.46	mg/L	2	0.06	0.02		CRJ	10/17/2023 08:28	EPA 300.1 -1997, Rev. 1.0
Sulfate	404	mg/L	10	3.0	0.6		CRJ	10/17/2023 00:15	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	670	mg/L	1	50	20		ELT	10/06/2023 13:11	SM 2540C-2015



Water Analysis Report

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

Job ID: 233092

Customer: Welsh Power Station

Date Reported: 11/01/2023

Customer Sample ID: DUPLICATE - LANDFILL

Customer Description: TG-32

Lab Number: 233092-004

Preparation:

Date Collected: 10/03/2023 11:36 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	10/17/2023 09:01	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.70	mg/L	2	0.06	0.02		CRJ	10/17/2023 09:01	EPA 300.1 -1997, Rev. 1.0
Sulfate	483	mg/L	25	8	2		CRJ	10/17/2023 00:47	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	760	mg/L	1	50	20		ELT	10/06/2023 13:31	SM 2540C-2015

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

AEP 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>Wet, h</u>		Number of Plastic Containers: <u>4</u>			
Opened By <u>MSO</u>		Number of Glass Containers: <u>-</u>			
Date/Time <u>10/6/23 9:50AM</u>		Number of Mercury Containers: <u>-</u>			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>MSO</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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: MSO 10/6/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ (OR) Lab Rat,PN4801,LOT# X000RWDG21 Exp 11/15/2024

- 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# 233092 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by mbk _____

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.

Ion Chromatography Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim Arnold		Principle Chemist	10/18/2023
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Tim Arnold
LRC Date: 10/18/2023
Laboratory Job Number: 233092
Prep Batch Number(s): QC2310136

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Tim Arnold
LRC Date: 10/18/2023
Laboratory Job Number: 233092
Prep Batch Number(s): QC2310136

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

TDS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger _____
Name (printed) Signature Official Title Date 11/1/23

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Landfill
Reviewer Name: Michael Ohlinger
LRC Date: 11/1/23
Laboratory Job Number: 233092
Prep Batch Number(s): QC2310085

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

TDS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Landfill
Reviewer Name: Michael Ohlinger
LRC Date: 11/1/23
Laboratory Job Number: 233092
Prep Batch Number(s): QC2310085

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



Water Analysis Report

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

Job ID: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-1

Customer Description: TG-32

Lab Number: 233117-001

Preparation:

Date Collected: 10/04/2023 11:11 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.029	µg/L	1	0.100	0.008	J1	GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Arsenic	0.19	µg/L	1	0.10	0.03		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Barium	80.0	µg/L	1	0.20	0.05		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Beryllium	1.06	µg/L	1	0.050	0.007		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Boron	0.901	mg/L	1	0.050	0.007		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Cadmium	0.027	µg/L	1	0.020	0.004		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Calcium	6.56	mg/L	1	0.05	0.01		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Chromium	0.38	µg/L	1	0.30	0.07		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Cobalt	2.25	µg/L	1	0.020	0.005		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Lead	0.44	µg/L	1	0.20	0.05		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Lithium	0.0103	mg/L	1	0.00030	0.00007		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Mercury	2	ng/L	1	5	2	J1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Selenium	9.26	µg/L	1	0.50	0.04		GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.02	J1	GES	10/17/2023 13:26	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.69	pCi/L	0.14	0.14		TTP	10/23/2023 17:45	SW-846 9315-1986, Rev. 0
Carrier Recovery	76.5	%						
Radium-228	1.17	pCi/L	0.15	0.47		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.6	%						

* 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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-5

Customer Description: TG-32

Lab Number: 233117-002

Preparation:

Date Collected: 10/04/2023 12:18 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Arsenic	2.94	µg/L	1	0.10	0.03		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Barium	63.9	µg/L	1	0.20	0.05		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.049	µg/L	1	0.050	0.007	J1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Boron	0.042	mg/L	1	0.050	0.007	J1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Calcium	35.2	mg/L	1	0.05	0.01		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.30	0.07		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Cobalt	12.8	µg/L	1	0.020	0.005		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.143	mg/L	1	0.00030	0.00007		GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.05	µg/L	1	0.50	0.04	J1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	10/17/2023 13:31	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.28	pCi/L	0.18	0.14		TTP	10/23/2023 17:45	SW-846 9315-1986, Rev. 0
Carrier Recovery	88.5	%						
Radium-228	2.29	pCi/L	0.21	0.62		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	75.4	%						

* 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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 233117-003

Preparation:

Date Collected: 10/04/2023 12:07 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.08	µg/L	10	1.00	0.08	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Arsenic	0.5	µg/L	10	1.0	0.3	J1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Barium	11.8	µg/L	10	2.0	0.5		GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.07	µg/L	10	0.50	0.07	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Boron	0.14	mg/L	10	0.50	0.07	J1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.04	µg/L	10	0.20	0.04	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Calcium	176	mg/L	10	0.5	0.1	M1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Chromium	1.3	µg/L	10	3.0	0.7	J1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Cobalt	41.2	µg/L	10	0.20	0.05		GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Lead	<0.5	µg/L	10	2.0	0.5	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Lithium	0.305	mg/L	10	0.0030	0.0007	M1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<1	µg/L	10	5	1	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Selenium	<0.4	µg/L	10	5.0	0.4	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	10	2.0	0.2	U1	GES	10/17/2023 13:36	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.65	pCi/L	0.12	0.12		TTP	10/23/2023 17:45	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.9	%						
Radium-228	1.40	pCi/L	0.21	0.66		ST	11/02/2023 17:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	70.7	%						

* 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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: DUPLICATE - BACKGROUND

Customer Description: TG-32

Lab Number: 233117-004

Preparation:

Date Collected: 10/04/2023 13:00 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.039	µg/L	1	0.100	0.008	J1	GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Arsenic	0.22	µg/L	1	0.10	0.03		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Barium	82.9	µg/L	1	0.20	0.05		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Beryllium	0.997	µg/L	1	0.050	0.007		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Boron	0.907	mg/L	1	0.050	0.007		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Cadmium	0.027	µg/L	1	0.020	0.004		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Calcium	6.77	mg/L	1	0.05	0.01		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.30	0.07		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Cobalt	2.39	µg/L	1	0.020	0.005		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Lead	0.45	µg/L	1	0.20	0.05		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Lithium	0.00980	mg/L	1	0.00030	0.00007		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Selenium	10.0	µg/L	1	0.50	0.04		GES	10/17/2023 13:51	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.02	J1	GES	10/17/2023 13:51	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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: EB - BACKGROUND

Customer Description: TG-32

Lab Number: 233117-005

Preparation:

Date Collected: 10/04/2023 10:49 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Calcium	<0.01	mg/L	1	0.05	0.01	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.30	0.07		GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Cobalt	0.085	µg/L	1	0.020	0.005		GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	RLP	10/12/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	10/17/2023 14:48	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	10/17/2023 14:48	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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

Customer Sample ID: FIELD BLANK - BACKGROUND

Customer Description: TG-32

Lab Number: 233117-006

Preparation:

Date Collected: 10/04/2023 12:10 EDT

Date Received: 10/04/2023 10:11 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.008	µg/L	1	0.100	0.008	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Boron	<0.007	mg/L	1	0.050	0.007	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Calcium	<0.01	mg/L	1	0.05	0.01	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.30	0.07		GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Cobalt	0.039	µg/L	1	0.020	0.005		GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007	mg/L	1	0.00030	0.00007	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Selenium	<0.04	µg/L	1	0.50	0.04	U1	GES	10/17/2023 14:53	EPA 200.8-1994, Rev. 5.4
Thallium	<0.02	µg/L	1	0.20	0.02	U1	GES	10/17/2023 14:53	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: 233117

Customer: Welsh Power Station

Date Reported: 11/15/2023

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

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.

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u> <input checked="" type="checkbox"/> Cooler <input type="checkbox"/> Box <input type="checkbox"/> Bag <input type="checkbox"/> Envelope			<u>Delivery Type</u> PONY <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> USPS Other _____		
Plant/Customer <u>Welsh Power Station</u>		Number of Plastic Containers: <u>18</u>			
Opened By <u>Mispha</u>		Number of Glass Containers: _____			
Date/Time <u>10/09/23 11:30 AM</u>		Number of Mercury Containers: <u>5</u>			
Were all temperatures within 0-6°C? Y / N or <input checked="" type="checkbox"/> N/A Initial: <u>MGLK</u> on ice / <input checked="" type="checkbox"/> no ice (IR Gun Ser# 2213689000, Expir. 03/24/2024) - If No, specify each deviation: _____					
Was container in good condition? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N Comments _____					
Was Chain of Custody received? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N Comments _____					
Requested turnaround: <u>28 days</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? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N Comments _____					
Were samples labeled properly? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N Comments _____					
Were correct containers used? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N Comments _____					
Was pH checked & Color Coding done? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N or N/A Initial & Date: <u>MGLK 10/09/23</u>					
<u>pH paper (circle one):</u> MQuant,PN1.09535.0001,LOT# _____ [OR] Lab Rat,PN4801.LOT# <u>XD06RWDG21 Exp 11/15/2024</u>					
- Was Add'l Preservative needed? Y / <input checked="" type="checkbox"/> N If Yes: By whom & when: _____ (See Prep Book)					
Is sample filtration requested? Y / <input checked="" type="checkbox"/> N Comments _____ (See Prep Book)					
Was the customer contacted? If Yes: Person Contacted: _____					
Lab ID# <u>233117</u>		Initial & Date & Time : _____			
Logged by <u>M50</u> Comments: _____					
Reviewed by <u>MGLK</u> _____					

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.

Mercury Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

<u>Susann Sulzmann</u>	<u>Susann Sulzmann</u>	<u>Senior Chemist</u>	<u>11-02-2023</u>
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Power Station
Reviewer Name: Susann Sulzmann
LRC Date: 11-03-2023
Laboratory Job Number: 233117
Prep Batch Number(s): PB23101204

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Power Station
Reviewer Name: Susann Sulzmann
LRC Date: 11-03-2023
Laboratory Job Number: 233117
Prep Batch Number(s): PB23101204

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
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- R2 Sample identification cross-reference
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 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill

Name (printed)

Signature

Lab Supervisor

Official Title

11/8/2023

Date

ICP-MS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233117
Prep Batch Number(s): PB23101209 QC2310150

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

ICP-MS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233117
Prep Batch Number(s): PB23101209 QC2310150

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

ICP-MS Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Jonathan Barnhill
LRC Date: 11/8/2023
Laboratory Job Number: 233117
Prep Batch Number(s): PB23101209 QC2310150

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is $CCB < 2.2 * MDL$.
ER3	Sample 233117-003 failed acceptance criteria on Matrix spike for Calcium and Lithium

¹ Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



Water Analysis Report

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

Job ID: 233093

Customer: Welsh Power Station

Date Reported: 11/02/2023

Customer Sample ID: AD-1

Customer Description:

Lab Number: 233093-001

Preparation:

Date Collected: 10/04/2023 11:11 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	3.03	mg/L	2	0.04	0.01		CRJ	10/17/2023 17:15	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	10/17/2023 17:15	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.7	mg/L	2	0.6	0.1		CRJ	10/17/2023 17:15	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	200	mg/L	1	50	20		ELT	10/09/2023 12:54	SM 2540C-2015

Customer Sample ID: AD-5

Customer Description:

Lab Number: 233093-002

Preparation:

Date Collected: 10/04/2023 12:18 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	17.5	mg/L	2	0.04	0.01		CRJ	10/17/2023 20:00	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	10/17/2023 20:00	EPA 300.1 -1997, Rev. 1.0
Sulfate	132	mg/L	10	3.0	0.6		CRJ	10/17/2023 18:21	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	290	mg/L	1	50	20		ELT	10/09/2023 12:54	SM 2540C-2015

Customer Sample ID: AD-17

Customer Description:

Lab Number: 233093-003

Preparation:

Date Collected: 10/04/2023 12:07 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	37.9	mg/L	5	0.10	0.03		CRJ	10/17/2023 20:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.06	mg/L	5	0.15	0.05	J1	CRJ	10/17/2023 20:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	1180	mg/L	50	15	3		CRJ	10/17/2023 18:54	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
TDS, Filterable Residue	1520	mg/L	2	100	40		ELT	10/09/2023 12:59	SM 2540C-2015



Water Analysis Report

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

Job ID: 233093

Customer: Welsh Power Station

Date Reported: 11/02/2023

Customer Sample ID: DUPLICATE - BACKGROUND

Customer Description:

Lab Number: 233093-004

Preparation:

Date Collected: 10/04/2023 13:00 EDT

Date Received: 10/06/2023 09:50 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	3.01	mg/L	2	0.04	0.01		CRJ	10/17/2023 17:48	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	10/17/2023 17:48	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.3	mg/L	2	0.6	0.1		CRJ	10/17/2023 17:48	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		ELT	10/09/2023 12:59	SM 2540C-2015

233093-001
Comments:

TG-32

233093-002
Comments:

TG-32

233093-003
Comments:

TG-32



Water Analysis Report

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

Job ID: 233093

Customer: Welsh Power Station

Date Reported: 11/02/2023

233093-004

Comments:

TG-32

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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

Data Qualifier Legend

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

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	Box	Bag	Envelope	PONY	UPS	<input checked="" type="radio"/> FedEx	USPS
Other _____							
Plant/Customer <u>Wet, h</u>			Number of Plastic Containers: <u>4</u>				
Opened By <u>MSO</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>10/6/23 9:50 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> <input checked="" type="radio"/> on ice / no ice (IR Gun Ser# <u>2213689000</u> , Expir. <u>03/24/2024</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: MSO 10/6/23

pH paper (circle one): MQuant,PN1.09535.0001,LOT# _____ [ORI Lab Rat,PN4801,LOT# X000RWDG21 Exp 11/15/2024]

- 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# 233093 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by MBIC _____

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.

Ion Chromatography Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim Arnold		Principle Chemist	10/18/2023
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh CCR

Reviewer Name: Tim Arnold

LRC Date: 10/18/2023

Laboratory Job Number: 233093

Prep Batch Number(s): QC2310142

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh CCR
Reviewer Name: Tim Arnold
LRC Date: 10/18/2023
Laboratory Job Number: 233093
Prep Batch Number(s): QC2310142

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

TDS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

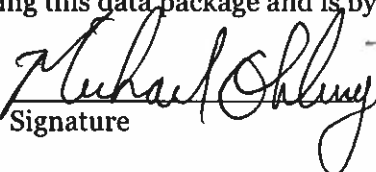
This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution factors
 - (c) Preparation methods
 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - (a) Samples associated with the MS/MSD clearly identified
 - (b) MS/MSD spiking amounts
 - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
 - (d) Calculated %Rs and relative percent differences (RPDs)
 - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - (a) The amount of analyte measured in the duplicate
 - (b) The calculated RPD
 - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger
Name (printed)


Signature

Chemist
Official Title

11/2/23
Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory
Project Name: Welsh Background
Reviewer Name: Michael Ohlinger
LRC Date: 11/2/23
Laboratory Job Number: 233093
Prep Batch Number(s): QC2310087

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	Sample and quality control (QC) identification		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	Test reports		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	Laboratory control samples (LCS):		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	Analytical duplicate data		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	Method quantitation limits (MQLs):		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	Other problems/anomalies		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

TDS Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Welsh Background

Reviewer Name: Michael Ohlinger

LRC Date: 11/2/23

Laboratory Job Number: 233093

Prep Batch Number(s): QC2310087

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	Mass spectral tuning:		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

