# **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:
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215



# **Table of Contents**

	<u>Pag</u>	<u>e</u>
I.	Overview	2
II.	Groundwater Monitoring Well Locations and Identification Numbers	4
III.	Monitoring Wells Installed or Decommissioned	4
IV.	Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction and Discussion	5
V.	Groundwater Quality Data Statistical Analysis	5
VI.	Alternate Source Demonstrations completed	6
VII.	Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency	6
VIII.	Other Information Required	6
IX.	Description of Any Problems Encountered and Actions Taken	6
X.	A Projection of Key Activities for the Upcoming Year	6

**Appendix 1:** Groundwater Data Tables and Figures

**Appendix 2:** Statistical Analyses

**Appendix 3:** Alternative Source Demonstrations - NA

**Appendix 4:** Notices for Monitoring Program Transitions - NA

**Appendix 5:** Well Installation/Decommissioning Logs- NA

**Appendix 6:** Groundwater monitoring field sheets and laboratory reports

#### **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 §352.951et 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 2<sup>nd</sup> 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:
  - o 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:
  - o Potential SSIs above background were identified for:
    - Boron at AD-11, AD-13, and AD-14
    - Fluoride at AD-11

- pH at AD-11and 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)

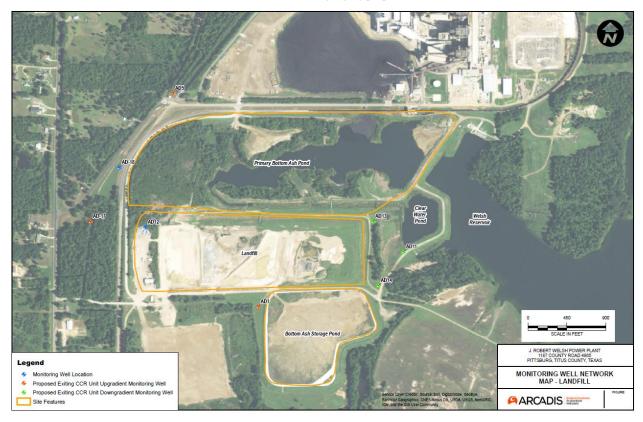
In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

# 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. <u>Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and</u> 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 §352.951et 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 2<sup>nd</sup> 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
  - o 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 1<sup>st</sup> semi-annual groundwater sampling event was conducted June 5-6, 2023 and certified October 3, 2023:

- o 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 2<sup>nd</sup> semi-annual groundwater sampling event was conducted October 3-4, 2023 and certified January 24, 2024:

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

No potential SSLs above GWPS were identified.

# VI. <u>Alternate Source Demonstrations completed</u>

No ASDs were conducted for this reporting period.

# VII. <u>Discussion About Transition Between Monitoring Requirements or Alternate</u> 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. <u>Description of Any Problems Encountered and Actions Taken</u>

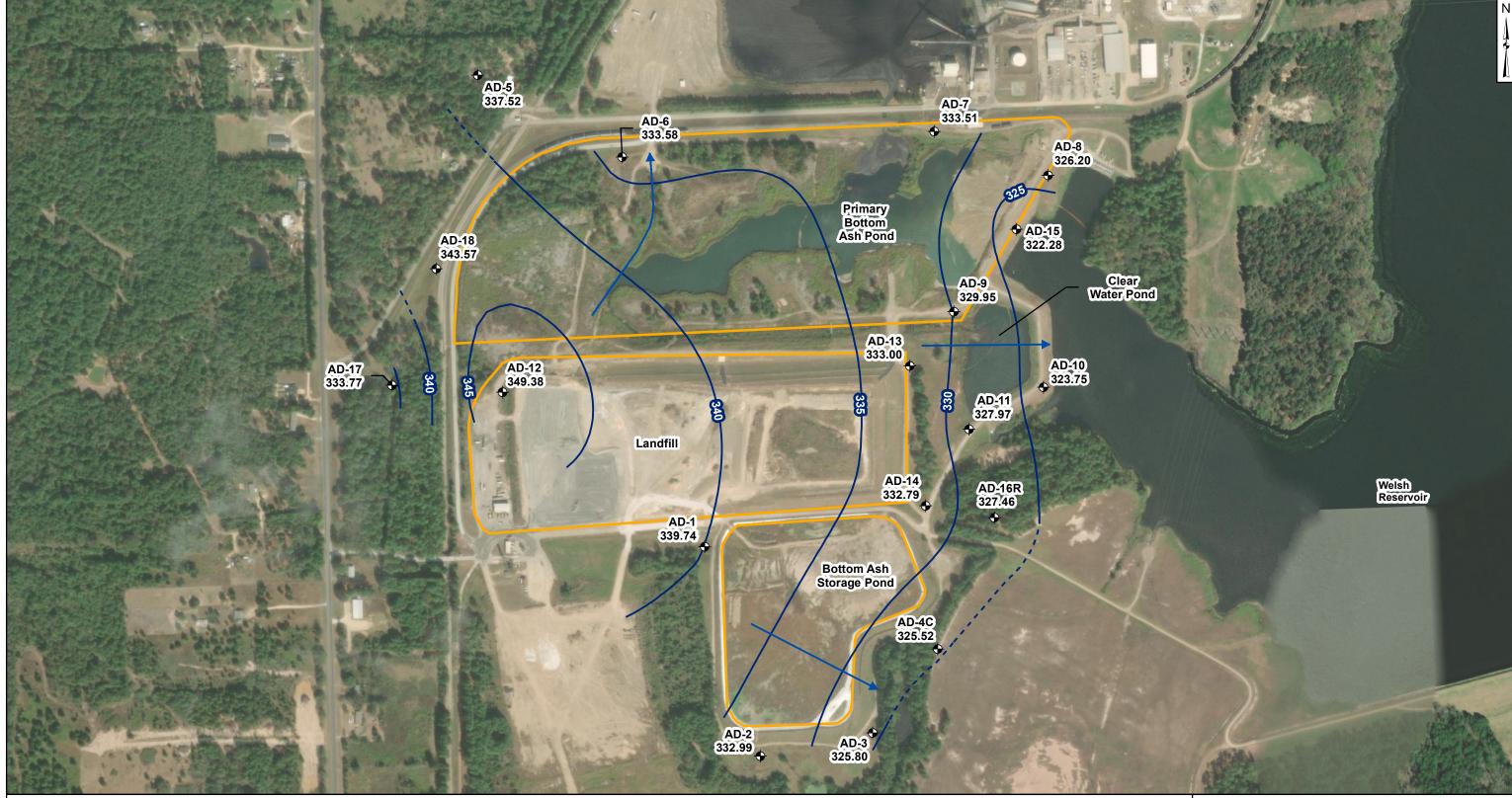
No significant problems were encountered.

# 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

- Monitoring well coordinates and water level data (collected on February 6 and 7, 2023) provided by AEP.
   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.



# **Groundwater Potentiometric Map** February 2023

AEP Welsh Power Plant Cason, Texas

Geosy	mtec <sup>©</sup>	Figure
con	sultants	4
Columbus, Ohio		

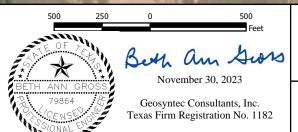


#### Legend

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

# Notes

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



# Groundwater Potentiometric Map June 2023

AEP Welsh Power Plant Cason, Texas

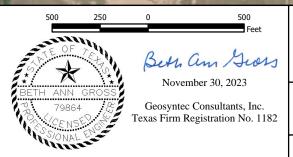
Geosy	Figure							
con	consultants							
Columbus, Ohio	۷							



#### Legend

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

- Monitoring well coordinates and water level data (collected on October 3 and 4, 2023) provided by AEP.
   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.



# Groundwater Potentiometric Map October 2023

AEP Welsh Power Plant Cason, Texas

Geosy	Figure	
con	sultants	2
Columbus, Ohio		

Table 1. Groundwater Elevation Data Summary Welsh Power Plant

Unit		All Units		Botto	om Ash Storage	Pond	Prima	ary Bottom Asl	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	ı				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:

<sup>1.</sup> Groundwater elevation measured in feet above mean sea level.

<sup>\*</sup>AD-16 prior to February 2017.

Table 1: Residence Time Calculation Summary Welsh Landfill

			202.	3-02	202.	3-06	2023-10		
CCR Management Unit	Monitoring Well	Well Diameter (inches)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	
	AD-1 <sup>[1]</sup>	2.0	2.6	23.2	3.1	19.8	2.0	31.0	
	AD-5 <sup>[1]</sup>	2.0	2.5	24.6	4.4	13.8	1.2	52.7	
Landfill	AD-11 <sup>[2]</sup>	2.0	4.8	12.8	3.3	18.4	2.2	27.5	
Landini	AD-13 <sup>[2]</sup>	2.0	4.4	13.8	3.2	19.2	2.7	22.5	
	AD-14 <sup>[2]</sup>	2.0	4.9	12.4	2.1	29.1	1.8	34.4	
	AD-17 <sup>[1]</sup>	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	pН	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

	Monitoring	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
<b>Collection Date</b>	Program	7	7		Ů	77	77	/7	Radium	77		7.		·		77
7/0 //0 01 /	5	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	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	pН	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	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
Collection Date	Program	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	Radium pCi/L	mg/L	μg/L	mg/L	μg/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 Welsh - LF Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	рН	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

<b>Collection Date</b>	Monitoring	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
Conection Date	Program	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	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 Welsh - LF Appendix III Constituents

<b>Collection Date</b>	Monitoring Program	Boron	Calcium	Chloride	Fluoride	рН	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

	Monitoring	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
<b>Collection Date</b>	Program	Antimony	Arsenic	Darium	Berymum	Caumum	Cironitum	Cobait	Radium	Tuoriac	Leau		Wiciculy	Willybuchum	Scienium	Thamum
	1 Togi am	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	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 Welsh - LF Appendix III Constituents

<b>Collection Date</b>	Monitoring Program	Boron	Calcium	Chloride	Fluoride	рН	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	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
Conection Date	Program	μg/L	μg/L	<u>μg/L</u>	μg/L	μg/L	μg/L	μg/L	pCi/L	mg/L	μg/L	mg/L	μg/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
Welsh - LF
Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pН	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

<b>Collection Date</b>	Monitoring	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
	Program	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	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

#### 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, 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. 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

<sup>&</sup>lt;sup>1</sup> Geosyntec. 2023. Statistical Analysis Summary – Landfill. J. Robert Welsh Plant, Pittsburg, Texas. Geosyntec Consultants, Inc. October.

2023 Reissued Data Evaluation – Welsh Landfill January 17, 2024 Page 2

semiannual assessment monitoring event.<sup>1</sup> 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

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





engineers | scientists | innovators

# 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



# **TABLE OF CONTENTS**

1.	EXE	ECUTIV	VE SUMMARY	1
2.			ASH POND EVALUATION	
	2.1		Validation and QA/QC	
	2.2	Statist	tical Analysis	2
		2.2.1	Establishment of GWPSs	2
		2.2.2	Evaluation of Potential Appendix IV SSLs	3
		2.2.3	Establishment of Appendix III Prediction Limits	3
			Evaluation of Potential Appendix III SSIs	
	2.3	Concl	lusions	4
3.	REF	EREN	CES	6

## 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 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<sup>TM</sup> 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-Francía 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.



# 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 Classific	cation	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
рН	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
Analyte	Oilit	Description	10/31/2022	10/31/2022	10/31/2022
Boron	mg/L	Interwell Background Value (UPL)	nd Value (UPL) 0.801		
Doron		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
рН	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

Bold values exceed the background value.

Background values are shaded gray.

# ATTACHMENT A Certification by Qualified Professional Engineer

# **Certification by Qualified Professional Engineer**

I certify that 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 Mill	ي ا	STATE OF TEL	
Printed Name of Licens	sed Professional Engineer		DAVID ANTHONY MILLER 112498
David Anth	ong Miller		SO ONAL ENGIN
Signature			
112498	Texas	03.20.202	23
License Number	Licensing State	Date	

# ATTACHMENT B Data Quality Review Memorandum



500 West Wilson Bridge Road, Suite 250 Worthington, Ohio 43085 PH 614.468.0415 FAX 614.468.0416 www.geosyntec.com

# 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

Data Quality Review – Welsh November 2022 Data January 18, 2023 Page 2

The data included in these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32<sup>1</sup> 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.

-

<sup>&</sup>lt;sup>1</sup> TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

Data Quality Review – Welsh November 2022 Data January 18, 2023 Page 3

- 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.

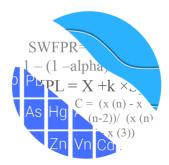
Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered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

o **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% nondetects (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-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**

# <u>Appendix III – Determination of Spatial Variation</u>

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.

# <u>Intrawell – Prediction Limits</u>

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.

# <u>Interwell – Trend Test Evaluation</u>

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).

# <u>Intrawell – Mann-Whitney Test</u>

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.

# <u>Interwell – Trend Test Evaluation</u>

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

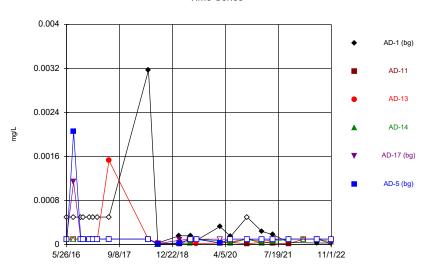
**Groundwater Analyst** 

Tristan Clark

Kristina L. Rayner Senior Statistician

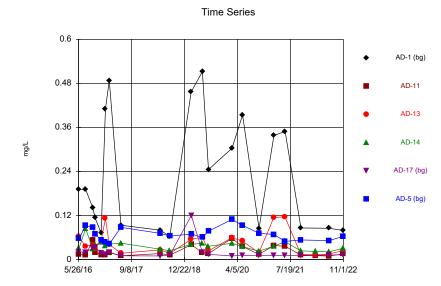
Kristina Rayner

# FIGURE A Time Series



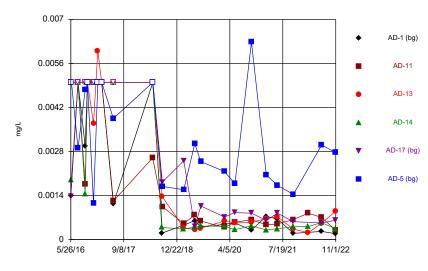
Constituent: Antimony, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot Welsh Landfill Client: Geosyntec Data: Welsh LF

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG



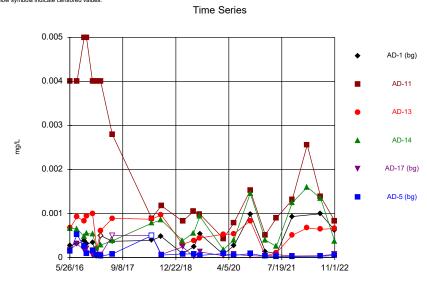
Constituent: Barium, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

### Time Series

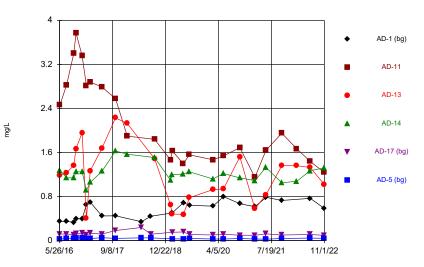


Constituent: Arsenic, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot Welsh Landfill Client: Geosyntec Data: Welsh LF

# Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



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



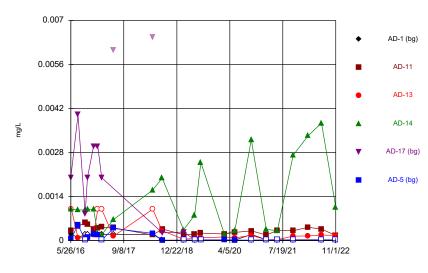
Constituent: Boron, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

# Time Series 300 AD-1 (bg) 240 AD-11 AD-13 180 AD-14 120 AD-17 (bg) AD-5 (bg) 60 5/26/16 9/8/17 12/22/18 4/5/20 7/19/21 11/1/22

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

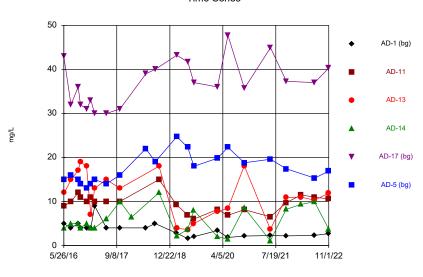
### Time Series



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

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

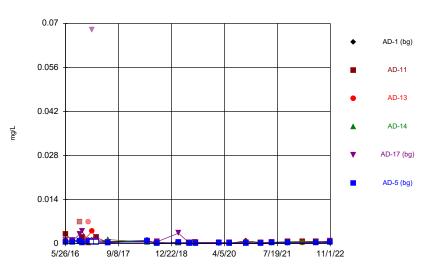
### Time Series



Constituent: Chloride, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot

Welsh Landfill Client: Geosyntec Data: Welsh LF





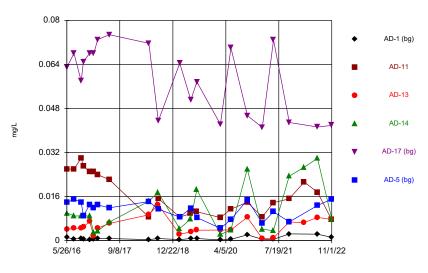
Constituent: Chromium, total Analysis Run 2/8/2023 7:59 PM View: Tlme Series & Box Plot Welsh Landfill Client: Geosyntec Data: Welsh LF

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

# Time Series AD-1 (bg) 5.6 AD-11 AD-13 4.2 AD-14 2.8 AD-17 (bg) AD-5 (bg) 5/31/16 9/12/17 12/25/18 4/7/20 7/20/21 11/1/22

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



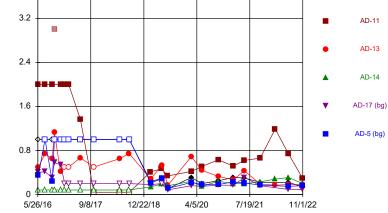
Constituent: Cobalt, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot Welsh Landfill Client: Geosyntec Data: Welsh LF

Time Series

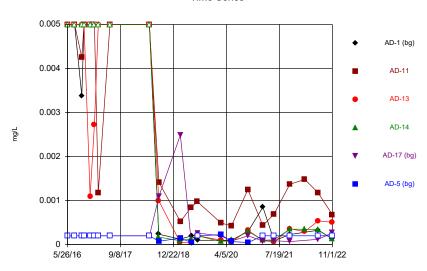
AD-1 (bg)

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

# 3.2

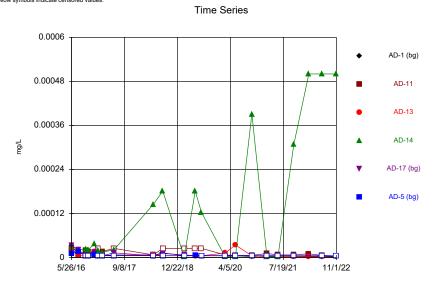


Constituent: Fluoride, total Analysis Run 2/8/2023 7:59 PM View: Tlme Series & Box Plot Welsh Landfill Client: Geosyntec Data: Welsh LF



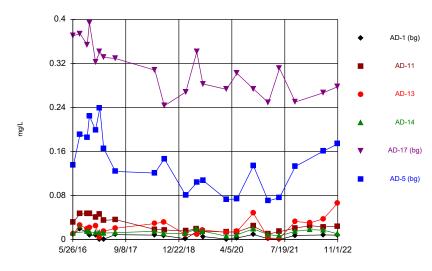
Constituent: Lead, total Analysis Run 2/8/2023 7:59 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

# Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



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

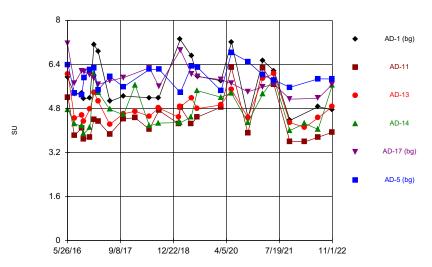


Constituent: Lithium, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

# Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

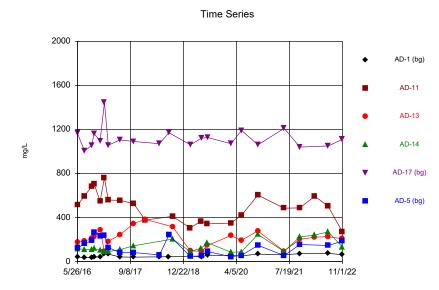
## Time Series 0.01 AD-1 (bg) 0.008 AD-11 AD-13 0.006 AD-14 mg/L 0.004 AD-17 (bg) AD-5 (bg) 0.002 5/26/16 9/8/17 12/22/18 4/5/20 7/19/21 11/1/22

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



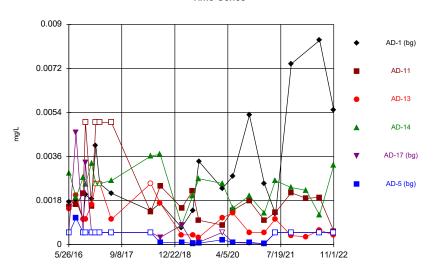
Constituent: pH, field Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG



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

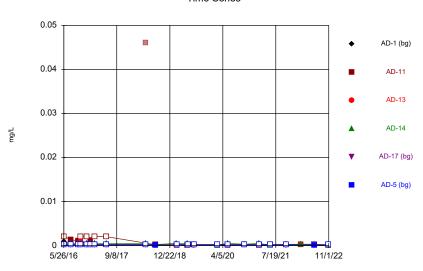
### Time Series



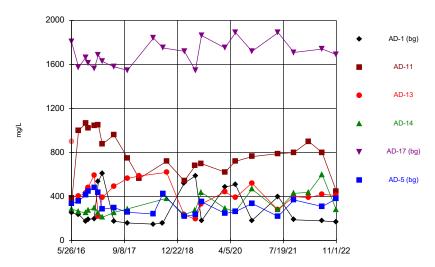
Constituent: Selenium, total Analysis Run 2/8/2023 7:59 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

# Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

### Time Series

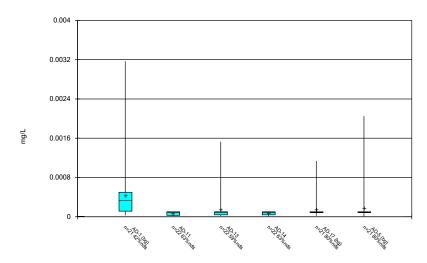


Constituent: Thallium, total Analysis Run 2/8/2023 7:59 PM View: Tlme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF



# FIGURE B Box Plots

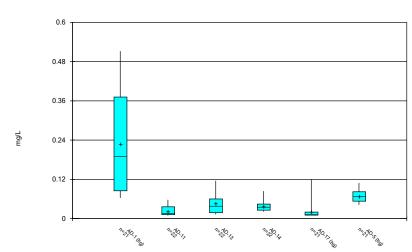
### Box & Whiskers Plot



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

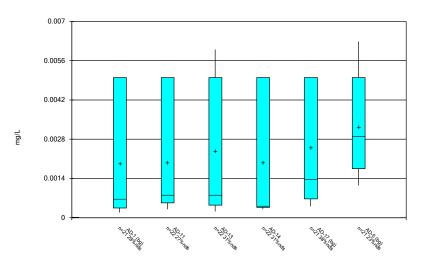
### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

### 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

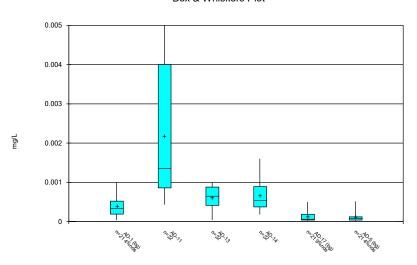
### Box & Whiskers Plot



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

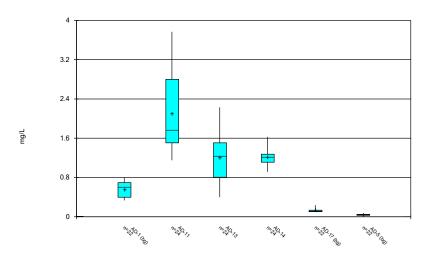
Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

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

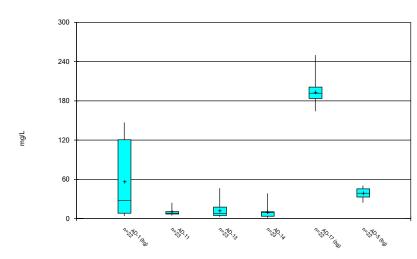
### Box & Whiskers Plot



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

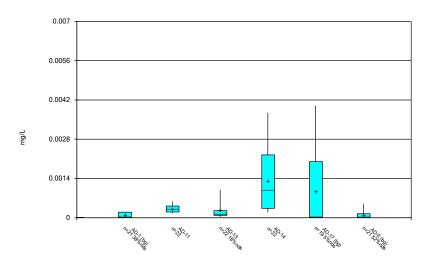
### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

### 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

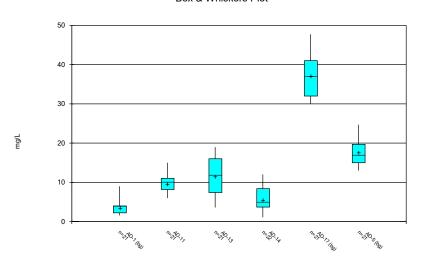
Box & Whiskers Plot



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

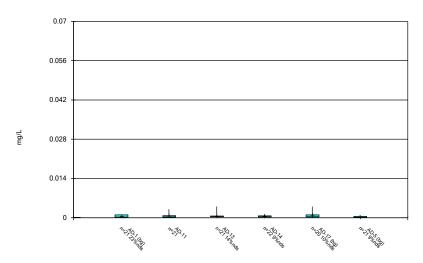
Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

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

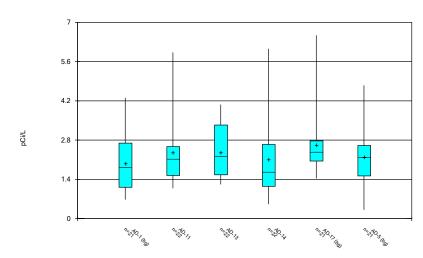
### Box & Whiskers Plot



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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

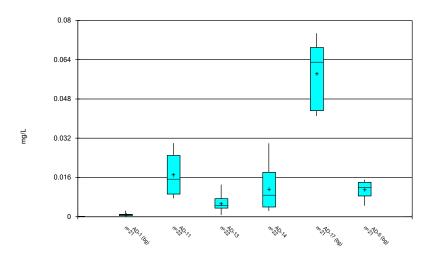
Box & Whiskers Plot



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

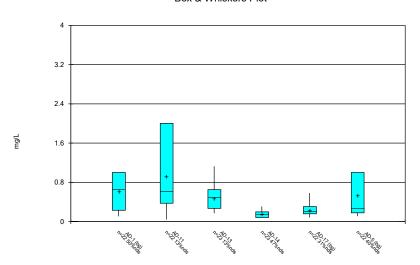
Box & Whiskers Plot



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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

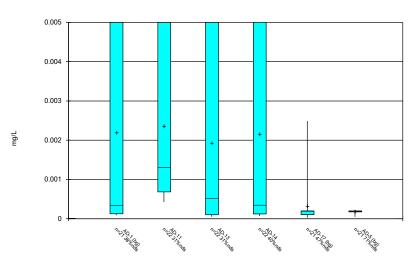
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 2/8/2023 8:00 PM View: Tlme Series & Box Plot

Welsh Landfill Client: Geosyntec Data: Welsh LF

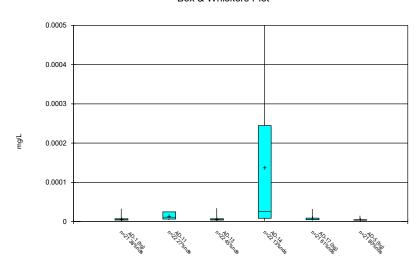




Constituent: Lead, total Analysis Run 2/8/2023 8:00 PM View: Time Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

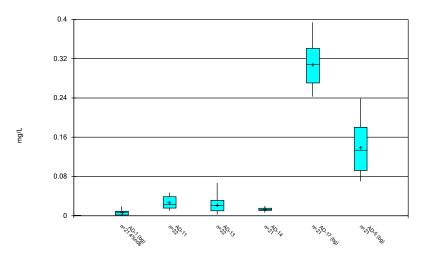
### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

### 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

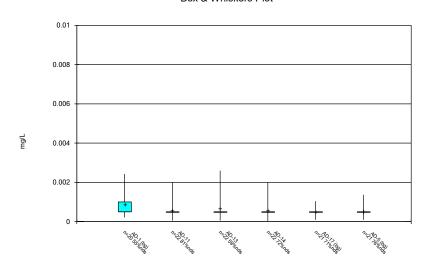
### Box & Whiskers Plot



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

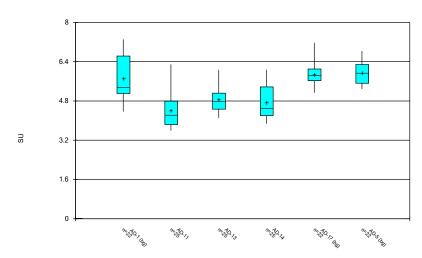
### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

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

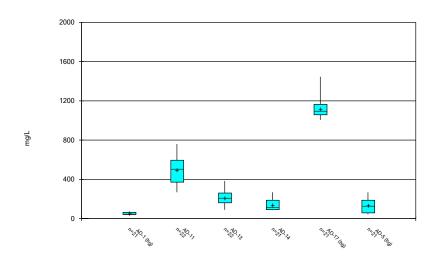
#### Box & Whiskers Plot



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

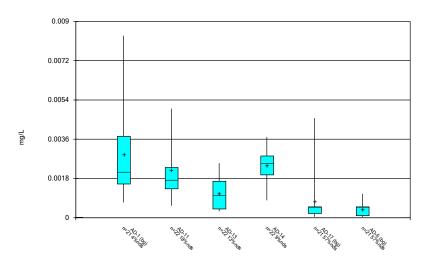
 ${\sf Sanitas^{\text{\tiny{IN}}}} \ {\sf v.9.6.36} \ {\sf Sanitas} \ {\sf software} \ {\sf utilized} \ {\sf by} \ {\sf Groundwater} \ {\sf Stats} \ {\sf Consulting.} \ {\sf UG}$ 

Box & Whiskers Plot



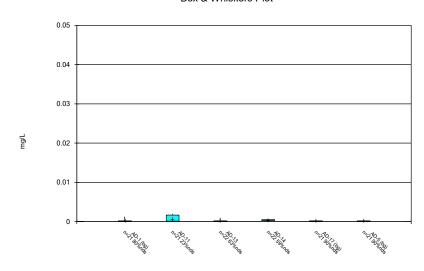
Constituent: Sulfate, total Analysis Run 2/8/2023 8:00 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



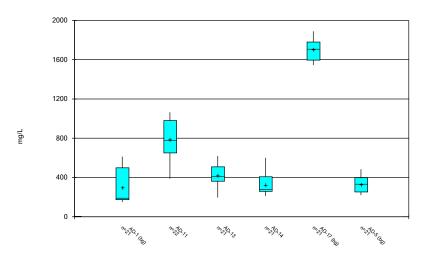
Constituent: Selenium, total Analysis Run 2/8/2023 8:00 PM View: TIme Series & Box Plot
Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot



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

#### Box & Whiskers Plot



# FIGURE C Outlier Summary and Tukey's Outlier Test

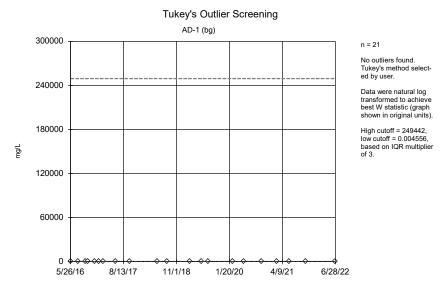
## **Outlier Sumary**

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

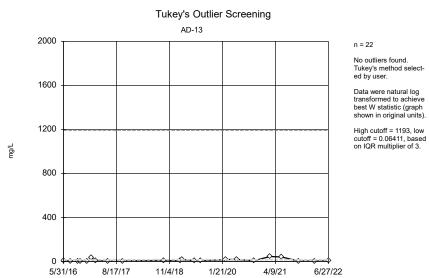
	AD-17 Cadmium, total (mg/L) AD-11 Chromium AD-11 Chromium	, total (mg/L) , 13 Chromium, total (mg/L) ,13 Chromium, total (mg/L) ,AD-17 Chromium, total (mg/L)	ig/L) ride, total (mg/L) AD-14 Lithium, total (mg/ AD-1 Moly	L) bdenum, total (mg/L) bdenum, total (mg/L) AD-11 Thallium, total (mg/L) AD-13 Total 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 (0)		
12/14/2016	0.0	07 (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 Lan	dfill Client: Geosyr	ntec [	Data: Welsh LF	Printed 2/1/2023, 10:52 AM					
Constituent	Well	Outlier	Value(s	Method	<u>Alpha</u>	N	<u>Mean</u>	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

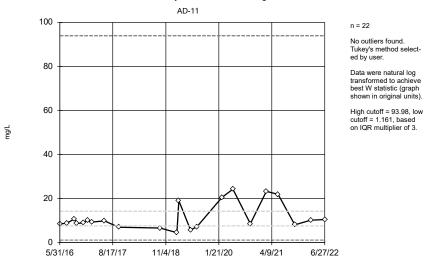


Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

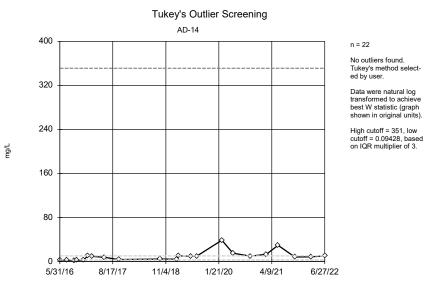


Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

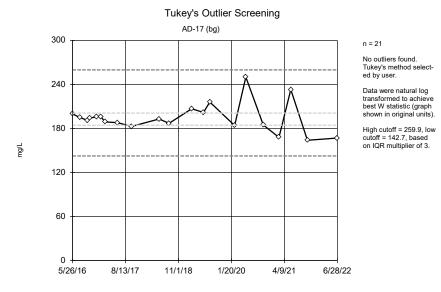
#### Tukey's Outlier Screening



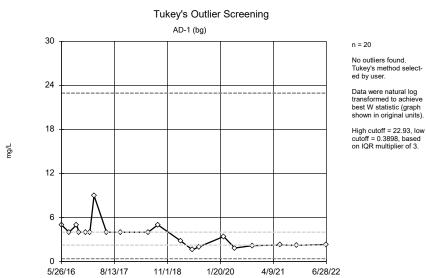
Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF



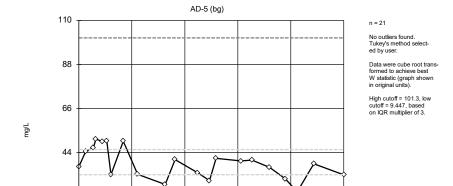
Constituent: Calcium, total Analysis Run 2/1/2023 10:48 AM View: Outlier Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF



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



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

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

1/22/20

4/10/21

11/4/18

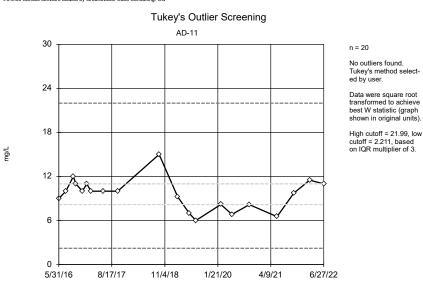
6/28/22

#### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

22

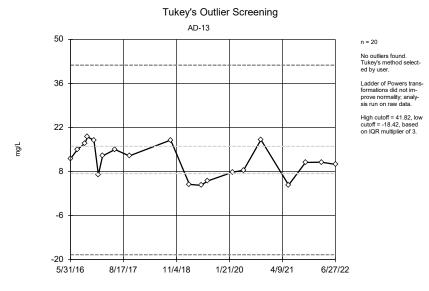
5/31/16

8/17/17

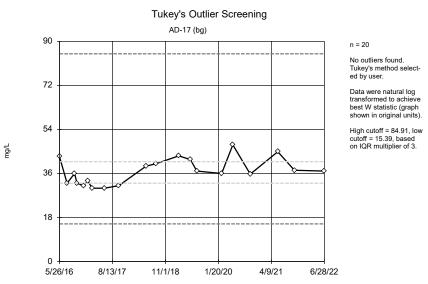


Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF

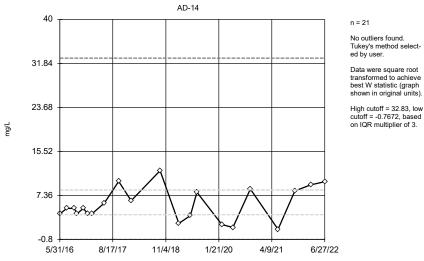


Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

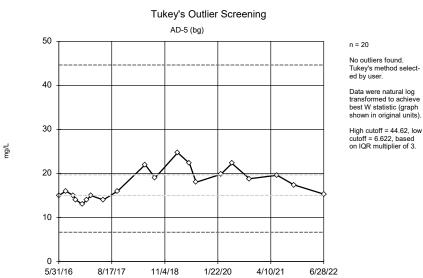


Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

## Tukey's Outlier Screening

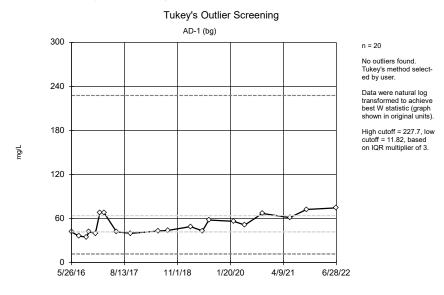


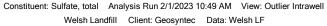
Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell
Welsh Landfill Client: Geosyntec Data: Welsh LF

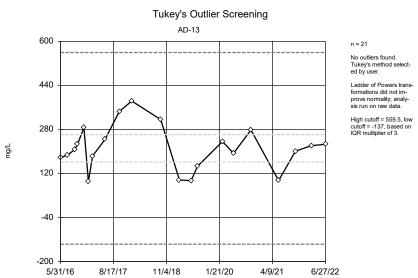


Constituent: Chloride, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF



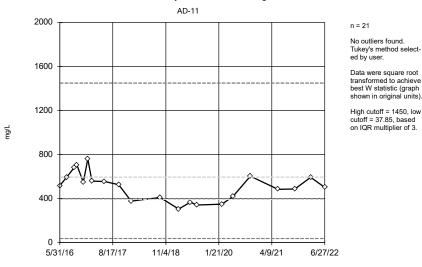




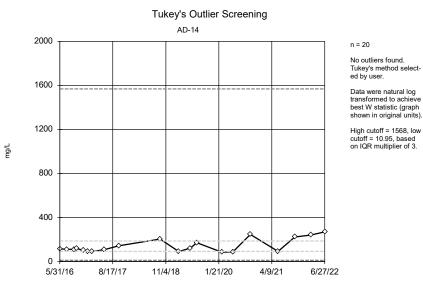
Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF

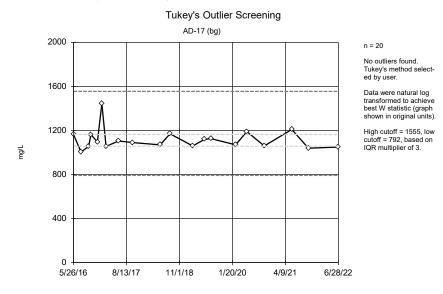
#### Tukey's Outlier Screening



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

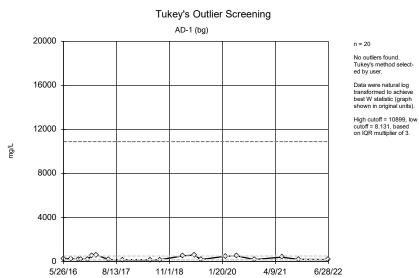


Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF



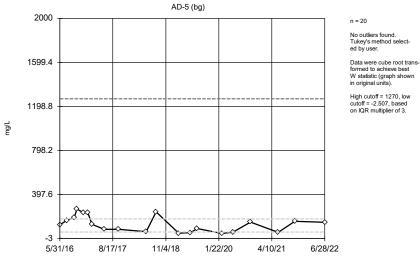
Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF



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



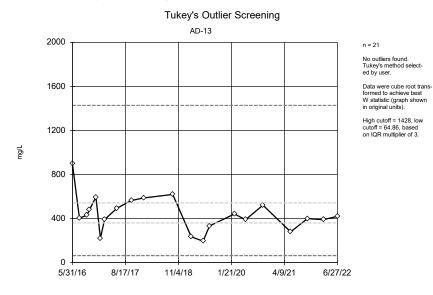
Constituent: Sulfate, total Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

#### Tukey's Outlier Screening AD-11 2000 n = 21 No outliers found. Tukey's method selected by user. 1560 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. 1120 mg/L 680 240 -200 5/31/16 8/17/17 11/4/18 1/21/20 4/9/21 6/27/22

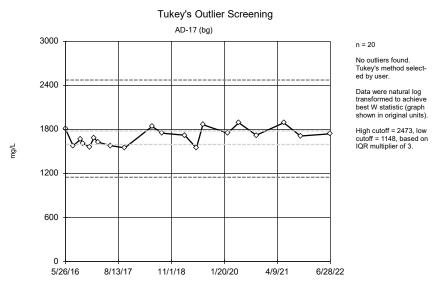
Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF



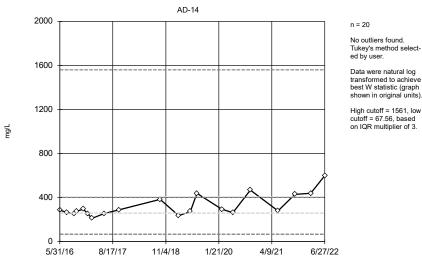
Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF



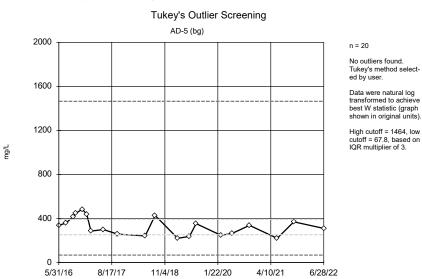
Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Tukey's Outlier Screening



Constituent: Total Dissolved Solids Analysis Run 2/1/2023 10:49 AM View: Outlier Intrawell

Welsh Landfill Client: Geosyntec Data: Welsh LF



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

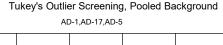
Welsh Landfill Client: Geosyntec Data: Welsh LF Printed 2/1/2023, 11:06 AM

Constituent	Well	Outlier	Value(s)	Method	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	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	ln(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	ln(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 <u>Well</u> Outlier Value(s) Method <u>Alpha</u> Std. Dev. <u>Distribution</u> Normality Test AD-1,AD-17,AD-5 NP NaN 0.0001947 Antimony, total (mg/L) 63 0.0004732 ShapiroFrancia n/a n/a unknown Arsenic, total (mg/L) AD-1,AD-17,AD-5 NP NaN 0.002556 0.001952 ShapiroFrancia No n/a ln(x) Barium, total (mg/L) AD-1,AD-17,AD-5 No n/a NP NaN 63 0.1055 0.1271 In(x) ShapiroFrancia Beryllium, total (mg/L) 0.0002176 0.0002374 AD-1.AD-17.AD-5 NP 63 ShapiroFrancia No n/a NaN In(x) Boron, total (mg/L) AD-1,AD-17,AD-5 No n/a NP NaN 0.2416 0.2468 In(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 0.068 NP NaN 63 0.00163 0.008526 ShapiroFrancia Yes In(x) Cobalt, total (mg/L) AD-1,AD-17,AD-5 NaN 0.02345 0.02626 ShapiroFrancia No n/a 63 x^(1/3) Combined Radium 226 + 228 (pCi/L) AD-1,AD-17,AD-5 No NP NaN 63 2.256 1.044 x^(1/3) ShapiroFrancia AD-1,AD-17,AD-5 0.583.0.5399.0.085.0.09.0.09 NP NaN 66 0.2197 0.08753 ShapiroFrancia Fluoride, total (mg/L) Yes In(x) AD-1,AD-17,AD-5 63 0.0002888 ShapiroFrancia Lead, total (mg/L) Yes 0.003384,0.000852,0.0011,0.00... NP NaN 0.0005141 ln(x) Lithium, total (mg/L) AD-1,AD-17,AD-5 No NP NaN 63 0.1513 0.1299 sqrt(x) ShapiroFrancia 0.000005973 ln(x) Mercury, total (mg/L) AD-1,AD-17,AD-5 Yes 0.000033,0.00001773,0.0000152... NP NaN 63 0.000007205 ShapiroFrancia AD-1,AD-17,AD-5 NaN 0.0006775 0.0006766 ShapiroFrancia Molybdenum, total (mg/L) n/a unknown pH, field (SU) AD-1,AD-17,AD-5 No n/a NP NaN 66 5.853 0.637 x^(1/3) ShapiroFrancia 0.001756 ShapiroFrancia AD-1.AD-17.AD-5 NP NaN 63 0.001306 Selenium, total (mg/L) No n/a ln(x) Total Dissolved Solids (mg/L) AD-1,AD-17,AD-5 No n/a NP NaN 777.3 671.7 ln(x) ShapiroFrancia

mg/L



n = 63

ed by user.

No outliers found. Tukey's method select-

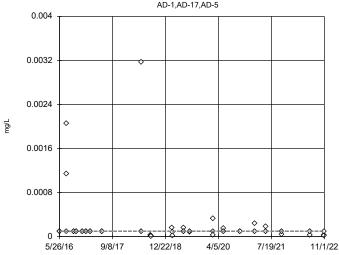
Data were natural log

transformed to achieve best W statistic (graph

shown in original units).

The results were invalidated, because the lower

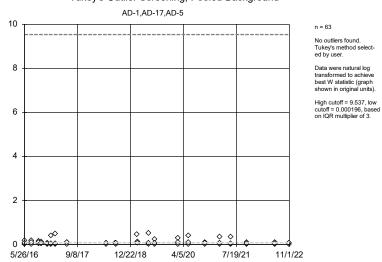
and upper quartiles are



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

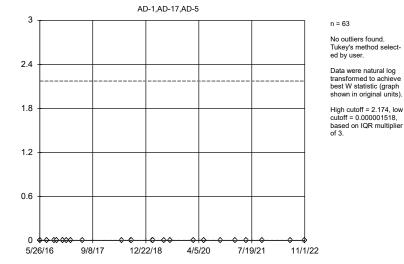
#### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

## Tukey's Outlier Screening, Pooled Background



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

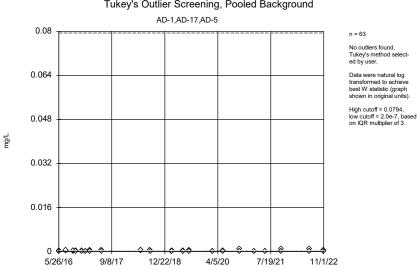
### Tukey's Outlier Screening, Pooled Background



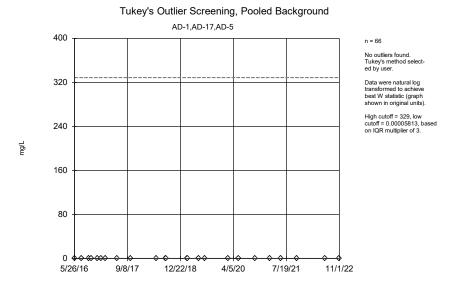
Constituent: Arsenic, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

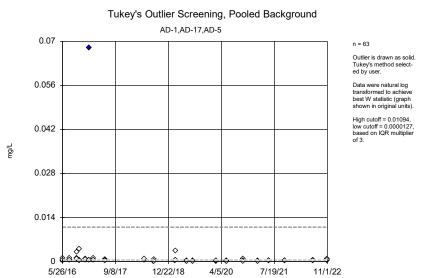
## Tukey's Outlier Screening, Pooled Background



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



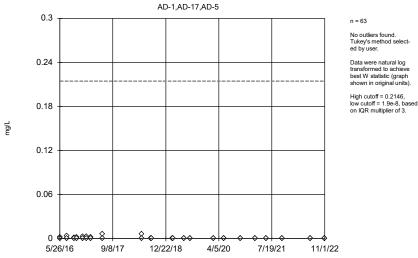
Constituent: Boron, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF



Constituent: Chromium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

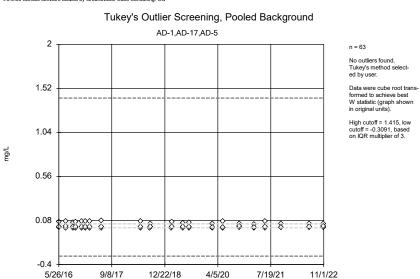
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Tukey's Outlier Screening, Pooled Background



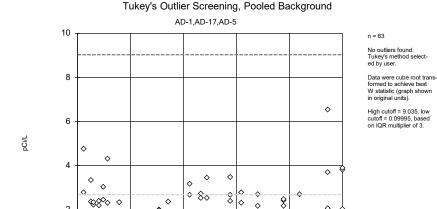
Constituent: Cadmium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF



Constituent: Cobalt, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF



12/25/18

Constituent: Combined Radium 226 + 228 Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF

4/7/20

**\$** 

 $\Diamond$ 

11/1/22

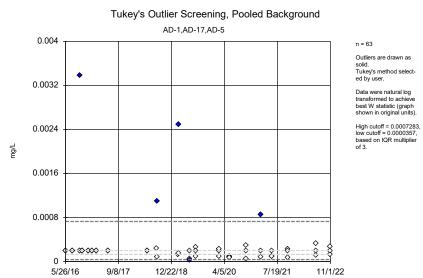
7/20/21

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

0

9/12/17

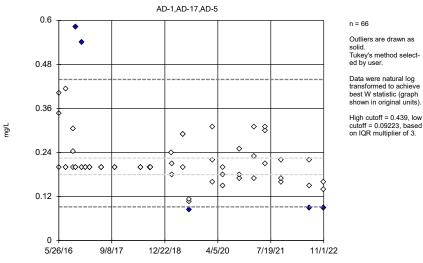
5/31/16



Constituent: Lead, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

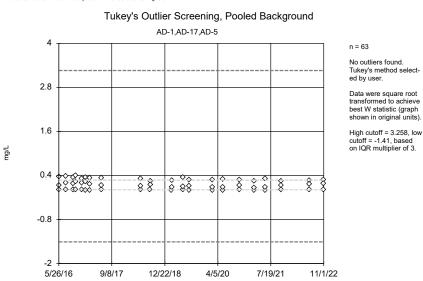
Welsh Landfill Client: Geosyntec Data: Welsh LF





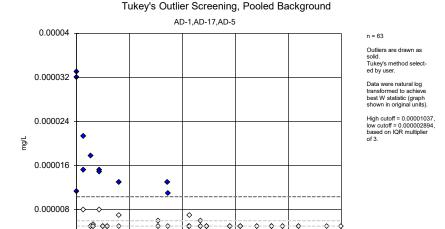
Constituent: Fluoride, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF



Constituent: Lithium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF



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

4/5/20

7/19/21

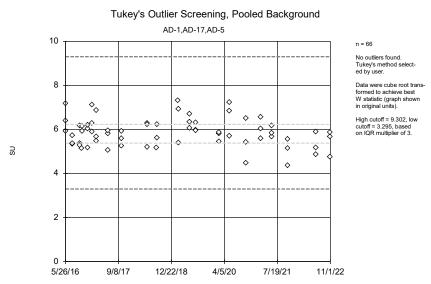
11/1/22

12/22/18

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

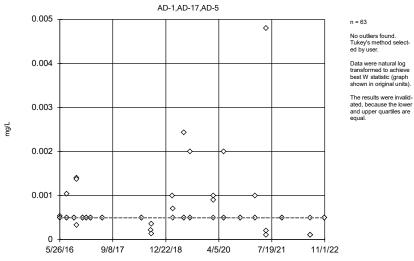
5/26/16

9/8/17



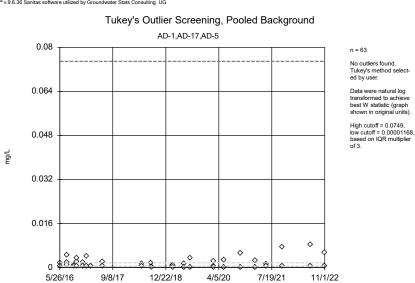
Constituent: pH, field Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell Welsh Landfill Client: Geosyntec Data: Welsh LF

Tukey's Outlier Screening, Pooled Background



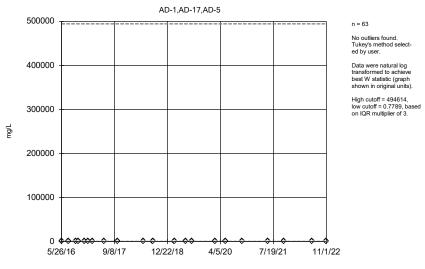
Constituent: Molybdenum, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG



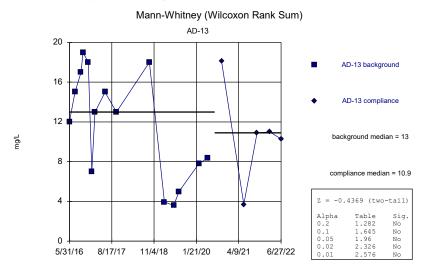
Constituent: Selenium, total Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell Welsh Landfill Client: Geosyntec Data: Welsh LF

### Tukey's Outlier Screening, Pooled Background



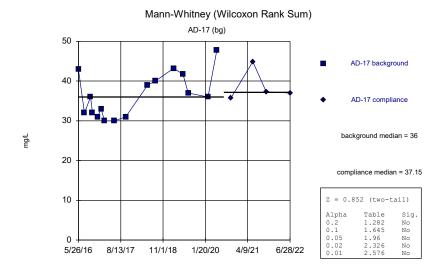
Constituent: Total Dissolved Solids Analysis Run 2/1/2023 11:00 AM View: Outlier Interwell Welsh Landfill Client: Geosyntec Data: Welsh LF

# FIGURE D Mann-Whitney

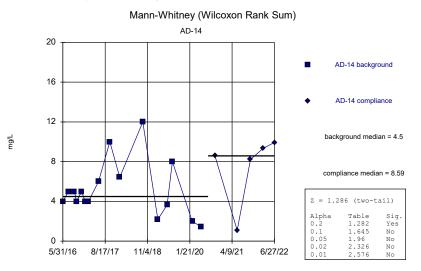


Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

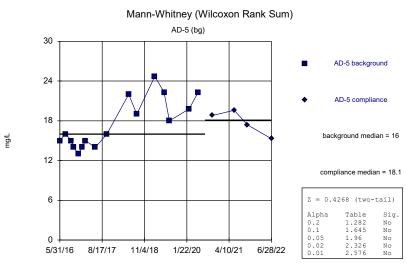


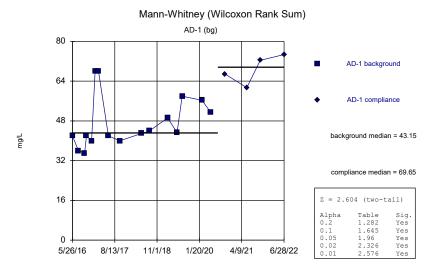
Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF



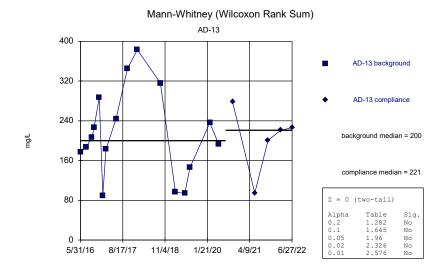
Constituent: Chloride, total Analysis Run 2/7/2023 12:55 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

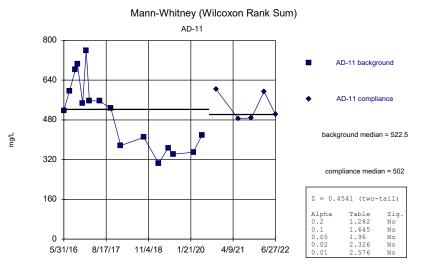




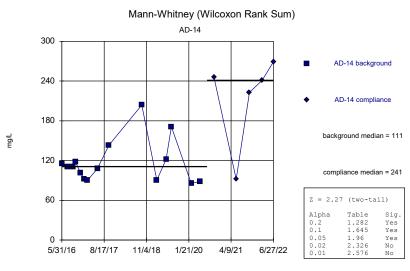
Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

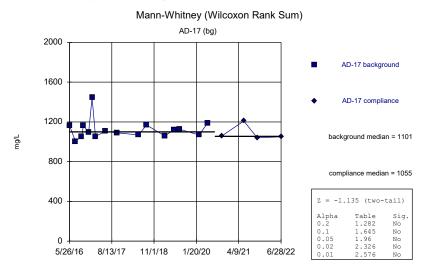


Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF



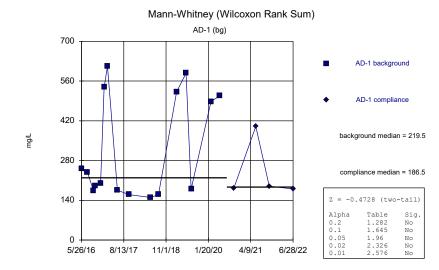
Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF



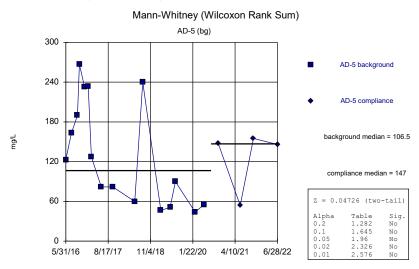


Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

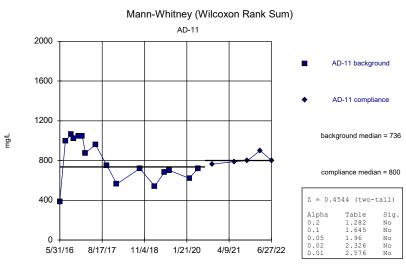


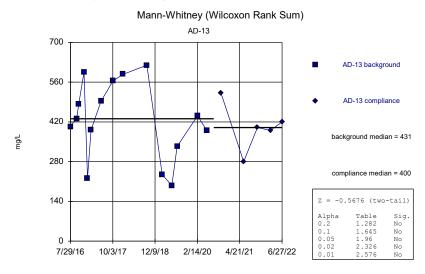
Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF



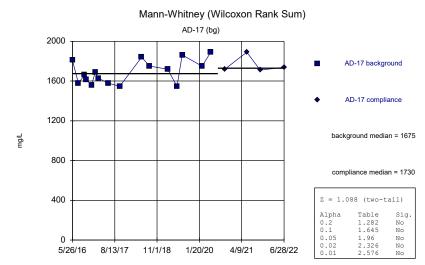
Constituent: Sulfate, total Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

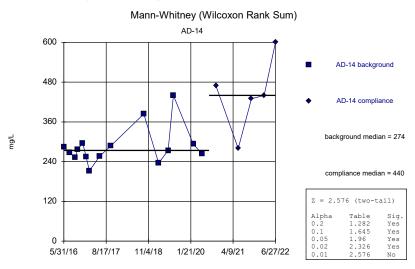




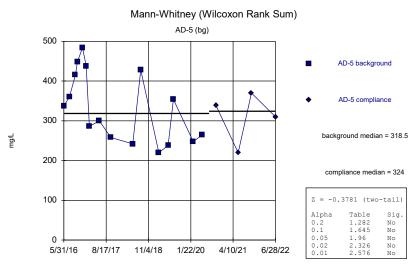
Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:56 PM View: Mann Whitney
Welsh Landfill Client: Geosyntec Data: Welsh LF



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



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



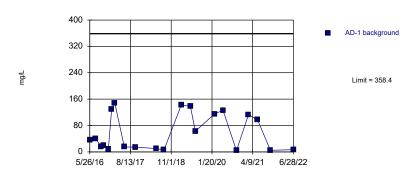
# FIGURE E Intrawell PL

## 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.	<u>Date</u>	Observ.	Sig.	Bg N	Bg Mea	n Std. De	<u>/. %N[</u>	OsND Adj.	Transforr	n 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)

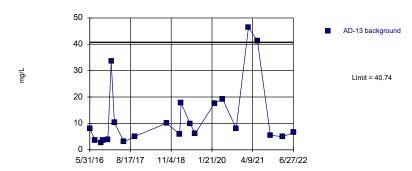


Background Data Summary (based on natural log transformation): Mean=3.437, Std. Dev.=1.3, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8865, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

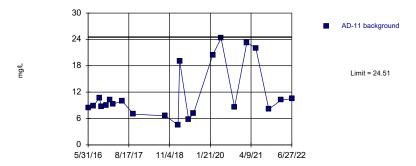
# Prediction Limit Intrawell Parametric, AD-13



Background Data Summary (based on natural log transformation): Mean=2.15, Std. Dev.=0.833, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9311, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

#### Prediction Limit

Intrawell Parametric, AD-11



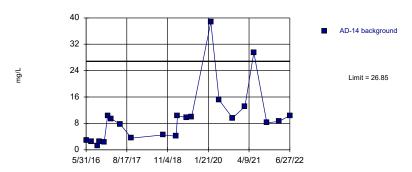
Background Data Summary (based on natural log transformation): Mean=2.332, Std. Dev=0.4638, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8975, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.005205. Assumes 1 future value.

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

## Prediction Limit

Intrawell Parametric, AD-14



Background Data Summary (based on square root transformation): Mean=2.88, Std. Dev.=1.231, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.891, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

# 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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

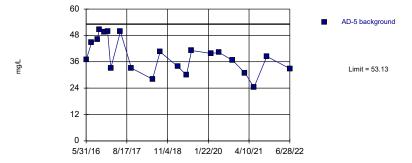
# Prediction Limit Intrawell Parametric, AD-1 (bg)



Background Data Summary (based on square root transformation): Mean=1.862, Std. Dev.=0.413, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.002505. Assumes 1 future value.

#### 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

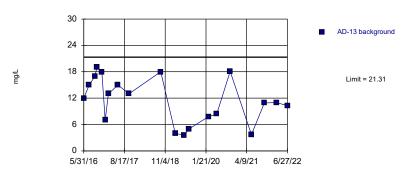
Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-11



Background Data Summary: Mean=9.606, Std. Dev.=2.138, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9494, 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.

## Prediction Limit Intrawell Parametric, AD-13

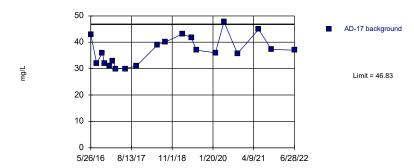


Background Data Summary: Mean=11.49, Std. Dev.=5.192, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9315, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

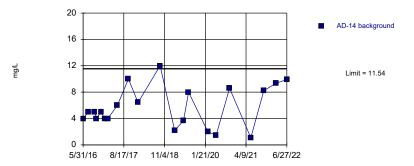
# Prediction Limit Intrawell Parametric, AD-17 (bg)



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.

#### 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

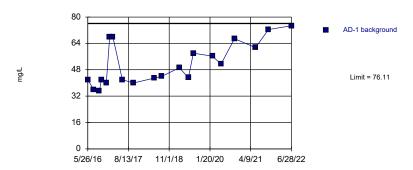
Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

# 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.

# Prediction Limit Intrawell Parametric, AD-1 (bg)

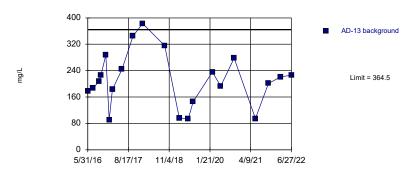


Background Data Summary: Mean=51.68, Std. Dev.=12.91, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8957, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

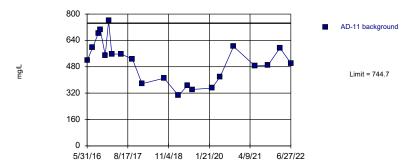
# Prediction Limit Intrawell Parametric, AD-13



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.

#### **Prediction Limit**

Intrawell Parametric, AD-11



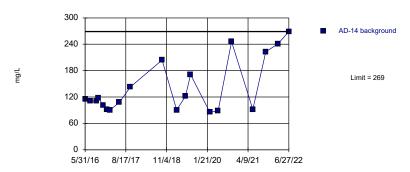
Background Data Summary: Mean=509.3, Std. Dev.=125.2, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9698, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

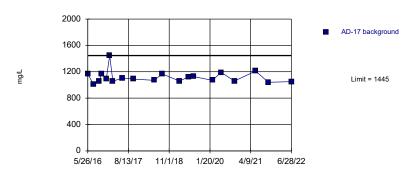
# Prediction Limit Intrawell Non-parametric, AD-14



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.

### Prediction Limit

Intrawell Non-parametric, AD-17 (bg)

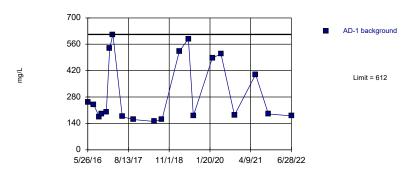


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Well-constituent pair annual alpha = 0.008564. Individual comparison alpha = 0.004291 (1 of 2). Assumes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

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

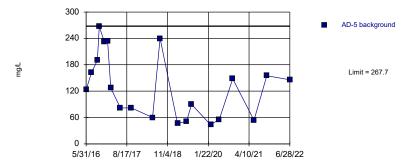
# Prediction Limit Intrawell Non-parametric, AD-1 (bg)



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

### 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.

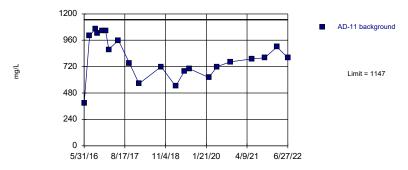
Constituent: Sulfate, total Analysis Run 2/7/2023 12:58 PM View: Intrawell PL

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

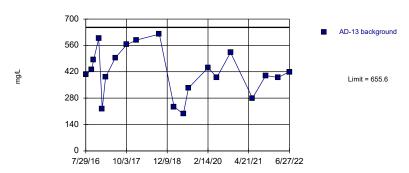
## Prediction Limit

Intrawell Parametric, AD-11



Background Data Summary: Mean=798, Std. Dev.=185.4, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9594, 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.

## Prediction Limit Intrawell Parametric, AD-13

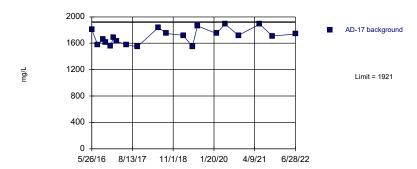


Background Data Summary: Mean=420.1, Std. Dev.=124.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:58 PM View: Intrawell PL Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

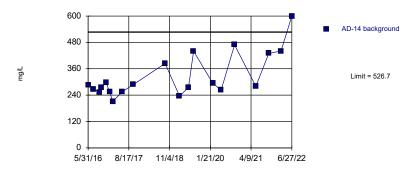
# Prediction Limit Intrawell Parametric, AD-17 (bg)



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.

#### Prediction Limit

Intrawell Parametric, AD-14

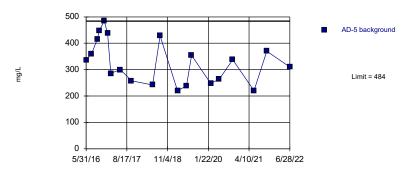


Background Data Summary (based on natural log transformation): Mean=5.744, Std. Dev.=0.2761, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.005205. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 2/7/2023 12:58 PM View: Intrawell PL Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

# 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.

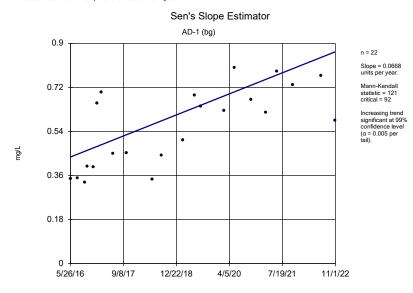
# FIGURE F Upgradient Trend Test

## Trend Test - Significant Results

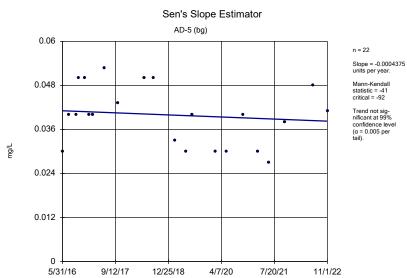
	Wels	h Landfill C	lient: Geosyntec	Data: Welsh	n LF Printe	ed 2/1/2	023, 11:	39 AM				
Constituent	Well		Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Boron, total (mg/L)	AD-1 (bg)		0.0668	121	92	Yes	22	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-1 (bg)		-0.1434	-128	-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

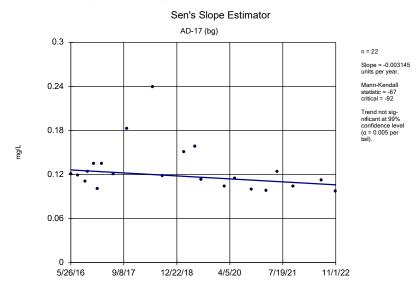
	Welsh Landfill Client: Geosynto	ec Data: Welsh	LF Printed	2/1/2	023, 11:	39 AM				
<u>Constituent</u> <u>Well</u>	Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	Method
Boron, total (mg/L) AD-1	(bg) 0.0668	121	92	Yes	22	0	n/a	n/a	0.01	NP
Boron, total (mg/L) AD-17	(bg) -0.003145	-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



Constituent: Boron, total Analysis Run 2/1/2023 11:37 AM View: Trend Test
Welsh Landfill Client: Geosyntec Data: Welsh LF

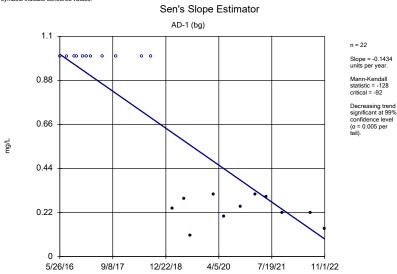


Constituent: Boron, total Analysis Run 2/1/2023 11:37 AM View: Trend Test
Welsh Landfill Client: Geosyntec Data: Welsh LF



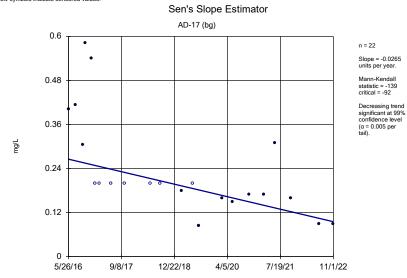
Constituent: Boron, total Analysis Run 2/1/2023 11:37 AM View: Trend Test
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



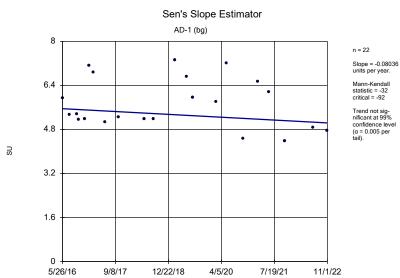
Constituent: Fluoride, total Analysis Run 2/1/2023 11:37 AM View: Trend Test
Welsh Landfill Client: Geosyntec Data: Welsh LF

Hollow symbols indicate censored values.



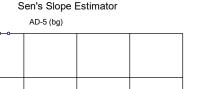
Constituent: Fluoride, total Analysis Run 2/1/2023 11:37 AM View: Trend Test Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG



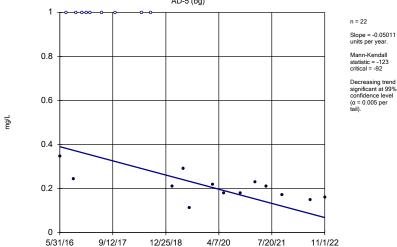
Constituent: pH, field Analysis Run 2/1/2023 11:37 AM View: Trend Test Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

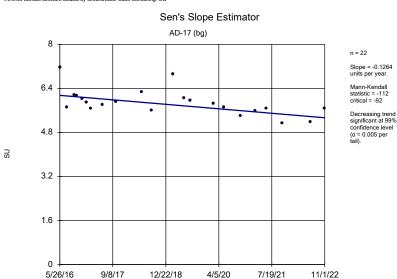


Mann-Kendall

Decreasing trend significant at 99% confidence level  $(\alpha = 0.005 per$ 

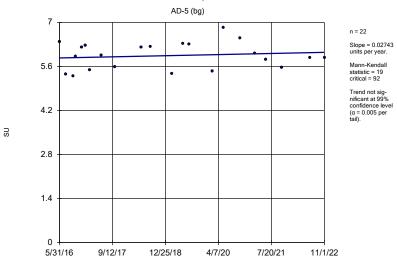


Constituent: Fluoride, total Analysis Run 2/1/2023 11:37 AM View: Trend Test Welsh Landfill Client: Geosyntec Data: Welsh LF



Constituent: pH, field Analysis Run 2/1/2023 11:37 AM View: Trend Test Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sen's Slope Estimator



Constituent: pH, field Analysis Run 2/1/2023 11:37 AM View: Trend Test
Welsh Landfill Client: Geosyntec Data: Welsh LF

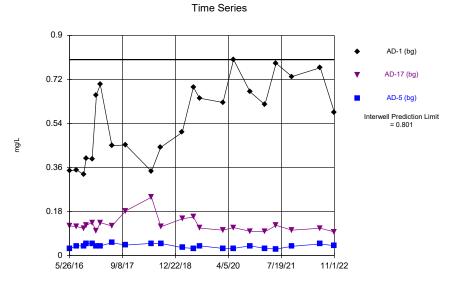
# FIGURE G Interwell PL

### Interwell Prediction Limit - All Results

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

Constituent	Well	Upper Lim.	Lower Lim.	<u>Date</u>	Observ.	Sig.	Bg N	Bg Mea	n Std. De	<u>v.</u> <u>%ND</u>	sND Adj.	Transforr	n <u>Alpha</u>	Method
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	l 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

Sanitas™ v.9.6.36 Groundwater Stats Consulting. UG



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

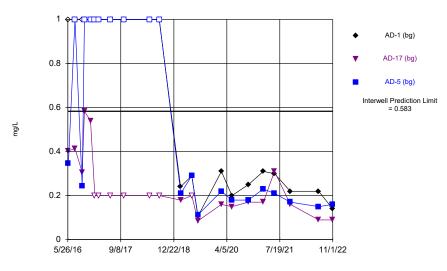
Sanitas™ v.9.6.36 Groundwater Stats Consulting. UG

#### Time Series AD-1 (bg) AD-17 (bg) AD-5 (bg) Upper Interwell Prediction Limit = 6.936 Lower Interwell 4.8 Prediction Limit = 4.77 SC 3.2 1.6 5/26/16 9/8/17 12/22/18 4/5/20 7/19/21 11/1/22

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

Sanitas™ v.9.6.36 Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

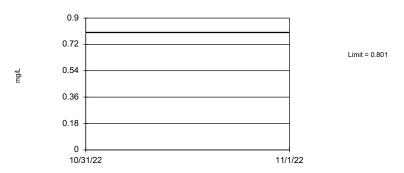




Constituent: Fluoride, total Analysis Run 2/9/2023 10:16 AM View: Interwell
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit
Interwell Non-parametric

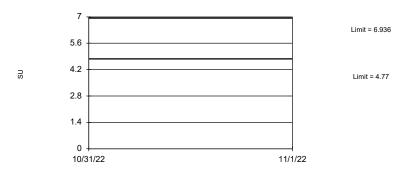


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 66 background values. Annual per-constituent alpha = 0.002659. Individual comparison alpha = 0.0004437 (1 of 2). Assumes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

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

### Prediction Limit Interwell Parametric



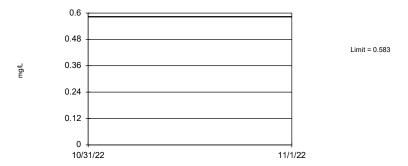
Background Data Summary: Mean=5.853, Std. Dev.=0.637, n=66. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9836, critical = 0.948. Kappa = 1.7 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001253. Assumes 3 future values.

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG



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 perconstituent 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

### FIGURE H UTL

### Upper Tolerance Limits

• • • • • • • • • • • • • • • • • • • •										
		Welsh Land	ffill Client: G	eosyntec D	Data: We	lsh LF	Printed 2	2/1/2023, 12:20 PM		
Constituent	<u>Well</u>	Upper Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	Transform	<u>Alpha</u>	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							
		Background					
Constituent Name	MCL	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				

<sup>\*</sup>MCL = Maximum Contaminant Level

<sup>\*</sup>GWPS = Groundwater Protection Standard

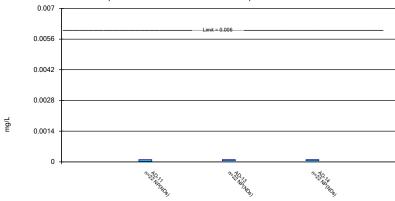
# FIGURE J Confidence Intervals

### Confidence Interval - All Results (No Significant)

	• • • • • • • • • • • • • • • • • • • •								9	,	
		Wels	h Landfill Clie	ent: Geosynte	c D	ata: We	elsh LF	Printed 2/3/2023, 2:3	8 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	In(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.

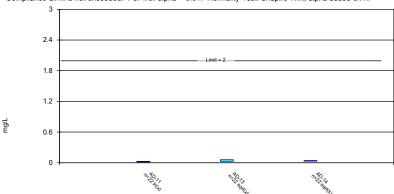


Constituent: Antimony, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

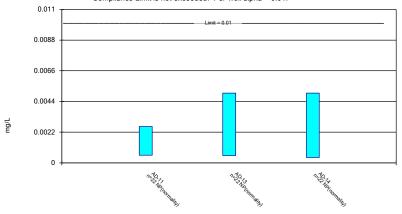
#### Parametric Confidence Interval

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



#### Non-Parametric Confidence Interval

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

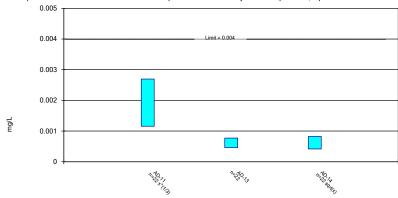


Constituent: Arsenic, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

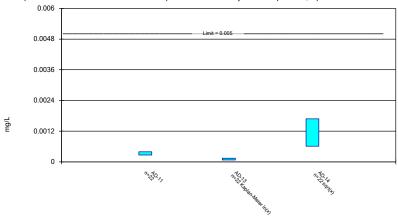
#### Parametric Confidence Interval

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



#### Parametric Confidence Interval

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

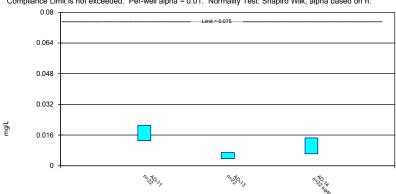


Constituent: Cadmium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

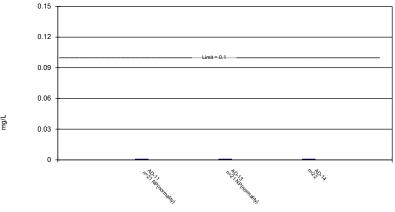
#### Parametric Confidence Interval

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



#### 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.

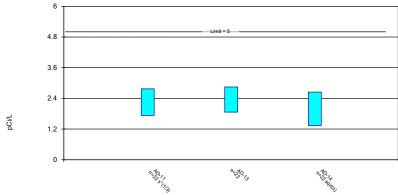


Constituent: Chromium, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

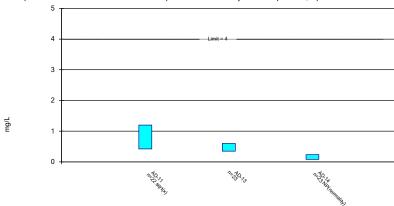
#### Parametric Confidence Interval

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



#### 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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

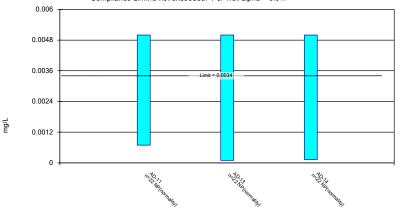
#### Parametric Confidence Interval

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



#### Non-Parametric Confidence Interval

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

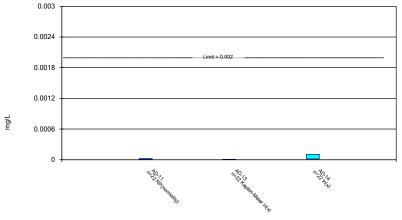


Constituent: Lead, total Analysis Run 2/3/2023 2:37 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

#### 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.



Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

#### Non-Parametric Confidence Interval

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

0.0024

0.0018

0.0012

0.0006

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

#### Non-Parametric Confidence Interval

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

0.003

0.0024

0.0018

0.0012

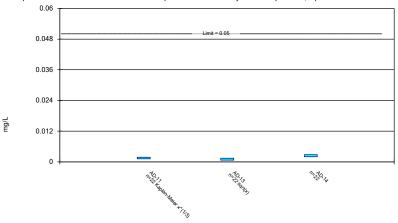
0.0006

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

Sanitas™ v.9.6.36 Sanitas software utilized by Groundwater Stats Consulting. UG

#### 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





engineers | scientists | innovators

## 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

October 3, 2023



#### **TABLE OF CONTENTS**

1.	EXE	ECUTIVE SUMMARY	1
2.		NDFILL EVALUATIONData Validation and QA/QC	
		Statistical Analysis	
		2.2.1 Evaluation of Potential Appendix IV SSLs	2
		2.2.2 Evaluation of Potential Appendix III SSIs	3
	2.3	Conclusions	3
3.	REF	FERENCES	4

#### 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<sup>TM</sup> 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.

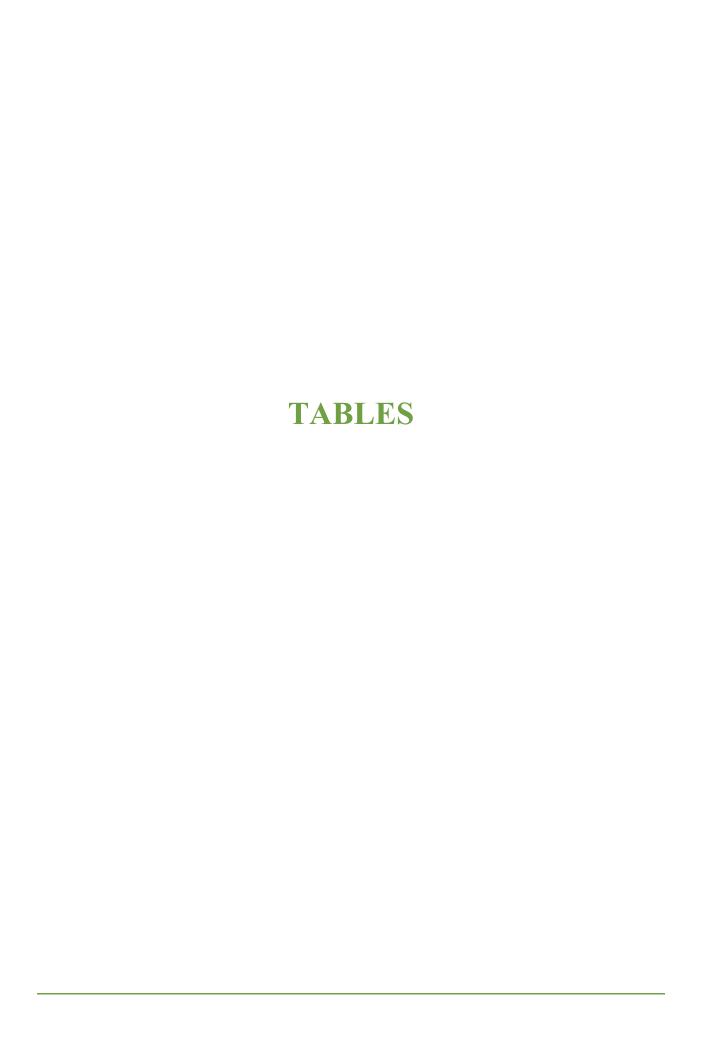
The Appendix III results were evaluated to assess whether concentrations of Appendix III parameters were above background levels. Boron, sulfate, and TDS results were above and, in the case of pH, were below background levels at select downgradient wells.

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.



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

		AD-1	AD-5 AD-11			AΓ	<b>)-13</b>	AD	<b>)-14</b>	AD-17
Parameter	Unit	Background	Background	Comp	liance	Comp	oliance	Comp	oliance	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
рН	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	Unit Description	AD-11	AD-13	AD-14	
Analyte	Omt	Description	6/5/2023	6/5/2023	6/5/2023	
Boron	mg/L	Interwell Background Value (UPL)	0.801			
Doron	mg/L	Analytical Result	0.969	1.22	1.26	
Calcium	mg/L	Intrawell Background Value (UPL)	24.5	40.7	26.9	
Calcium	mg/L	Analytical Result	7.50	4.24	10.8	
Chloride	mg/L	Intrawell Background Value (UPL)	13.7	21.3	11.5	
Cilioride	mg/L	Analytical Result	10.8	8.39	11.5	
Fluoride	mg/L	Interwell Background Value (UPL)		0.583		
Pluoride	mg/L	Analytical Result	0.51	0.11	0.50	
		Interwell Background Value (UPL)		6.9		
рН	SU	Interwell Background Value (LPL)		6/5/2023     6/5/2       0.801     1.22     1.2       40.7     26.     4.24     10.       21.3     11.     8.39     11.       0.583     0.11     0.5       6.9     4.8       4.6     5.3       365     26       184     36       656     52		
		Analytical Result	4.0	4.6	5.3	
Sulfate	mg/L	Intrawell Background Value (UPL)	745	365	269	
Sullate	mg/L	Analytical Result	413	184	367	
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1,150	656	527	
Total Dissolved Solids	mg/L	Analytical Result	670	6/5/2023     6/5/2023       0.801     1.22       40.7     26.9       4.24     10.8       21.3     11.5       8.39     11.5       0.583     0.11       6.9     4.8       4.6     5.3       365     269       184     367       656     527	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 Mill	er	155	ł,
Printed Name of Licens	sed Professional Engineer	DAVID ANTHONY MILLER	
Dourd Anthon	y Miller	CENSE ONAL ENGLIS	
Signature			
112498	Texas	10.04.2023	
License Number	Licensing State	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. 32<sup>1</sup> 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

<sup>&</sup>lt;sup>1</sup> TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

Data Quality Review – Welsh February 2023 Data September 22, 2023 Page 2

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. 32<sup>1</sup> prior to submittal of this data to TCEQ.

<sup>&</sup>lt;sup>1</sup> TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

Data Quality Review – Welsh June 2023 Data October 3, 2023 Page 2

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.

Data Quality Review – Welsh June 2023 Data October 3, 2023 Page 3

- 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.

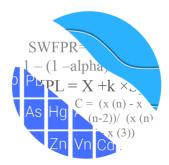
Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered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

o **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% nondetects.

# **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

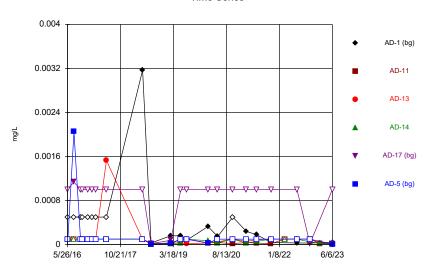
**Groundwater Analyst** 

Tristan Clark

Andrew Collins
Project Manager

# FIGURE A Time Series

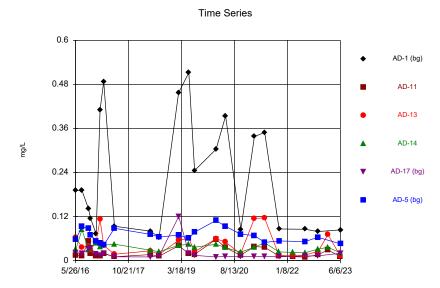
#### Time Series



Constituent: Antimony, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

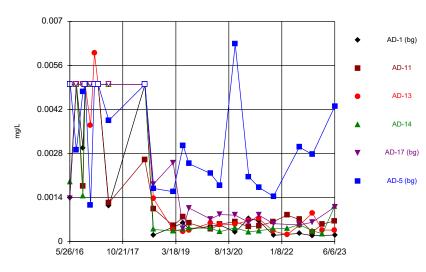
#### Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Barium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

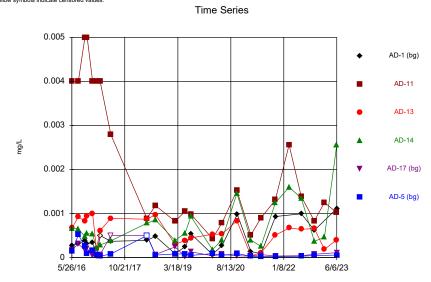




Constituent: Arsenic, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

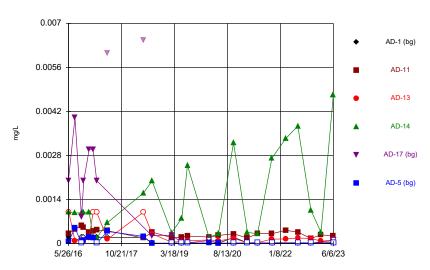
# Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



Constituent: Beryllium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

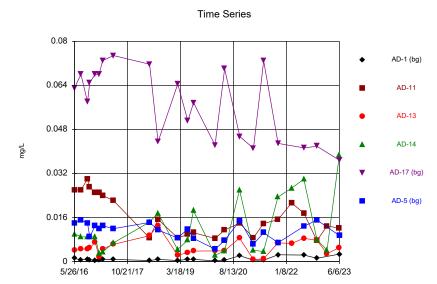
#### Time Series



Constituent: Cadmium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

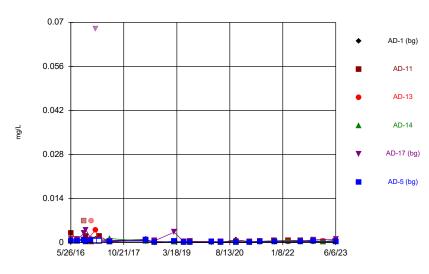
#### Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Cobalt, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Time Series

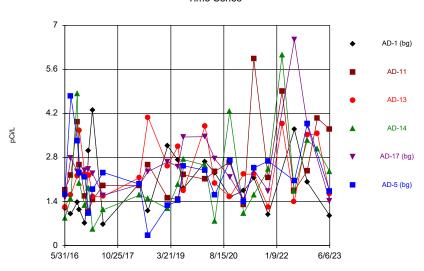


Constituent: Chromium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

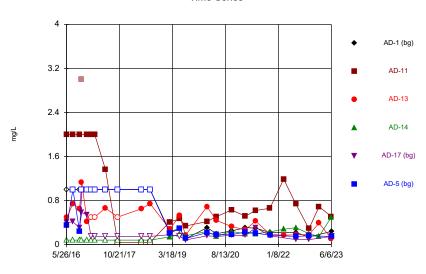
#### Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

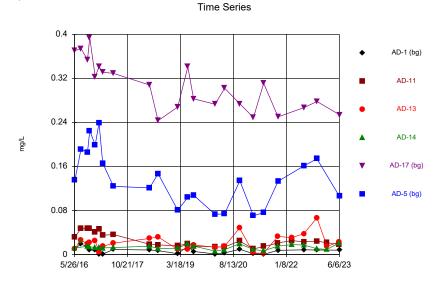
#### Time Series



Constituent: Fluoride, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

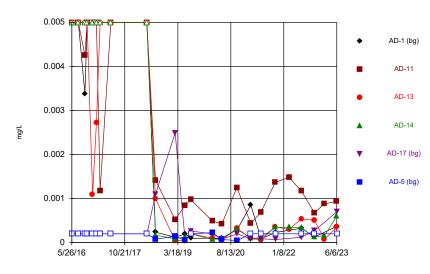
# Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



Constituent: Lithium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Time Series

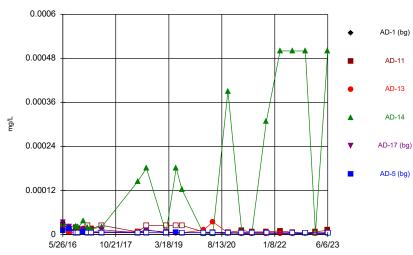


Constituent: Lead, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

# Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

# Time Series

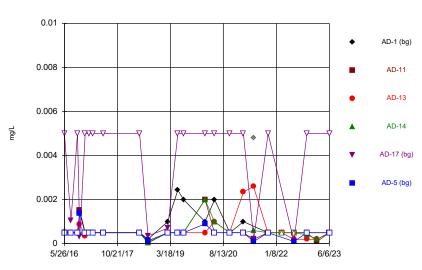


Constituent: Mercury, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values



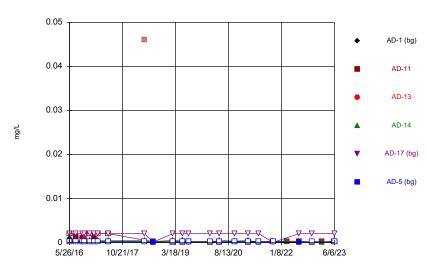


Constituent: Molybdenum, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

#### Time Series

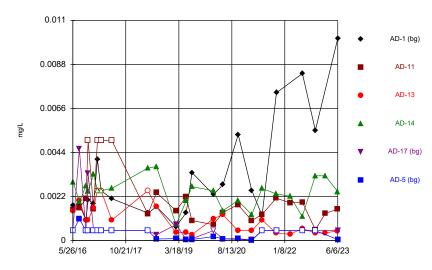


Constituent: Thallium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Time Series

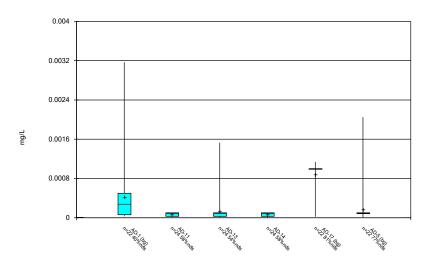


Constituent: Selenium, total Analysis Run 9/1/2023 4:25 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

# FIGURE B Box Plots

#### Box & Whiskers Plot

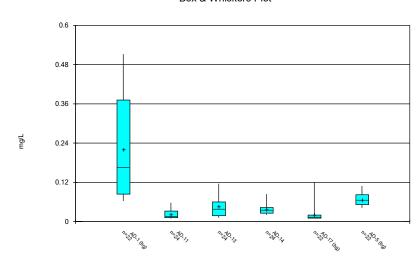


Constituent: Antimony, total Analysis Run 9/1/2023 4:26 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

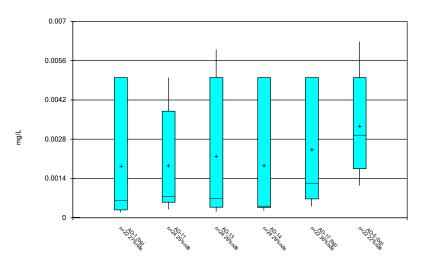
Box & Whiskers Plot



Constituent: Barium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot

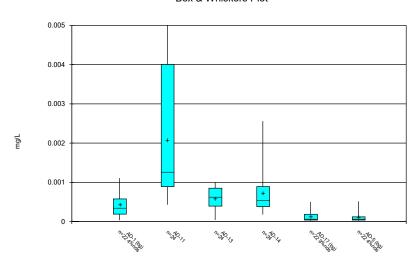


Constituent: Arsenic, total Analysis Run 9/1/2023 4:26 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

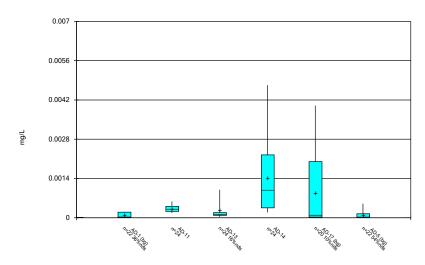
Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Box & Whiskers Plot

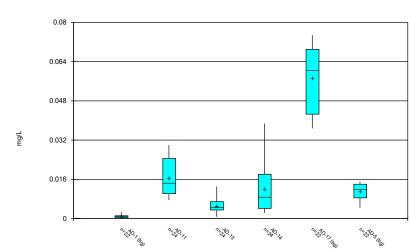


Constituent: Cadmium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

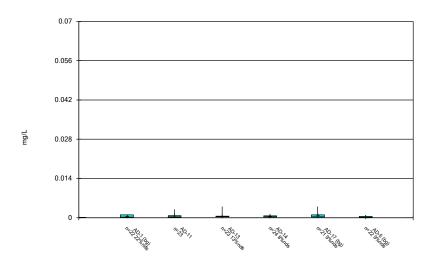
#### Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot

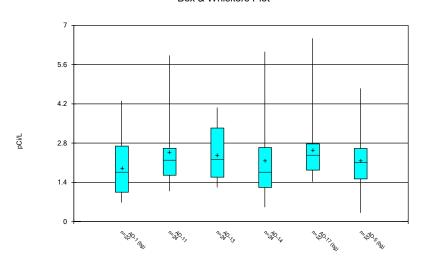


Constituent: Chromium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

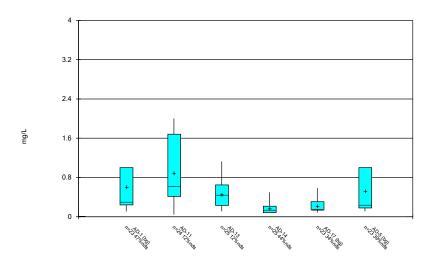
Box & Whiskers Plot



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

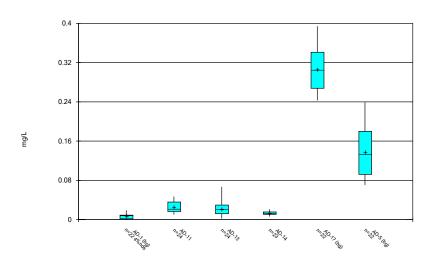


Constituent: Fluoride, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

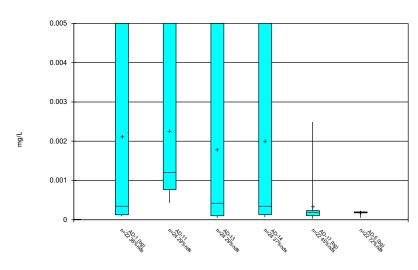
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Box & Whiskers Plot

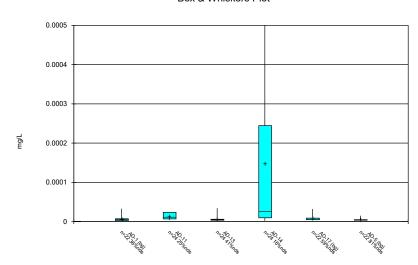


Constituent: Lead, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot

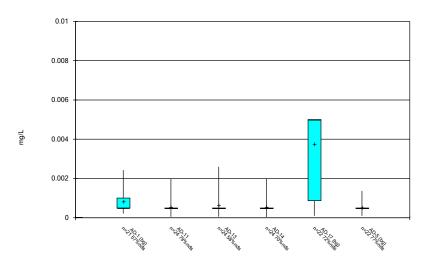


Constituent: Mercury, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Box & Whiskers Plot

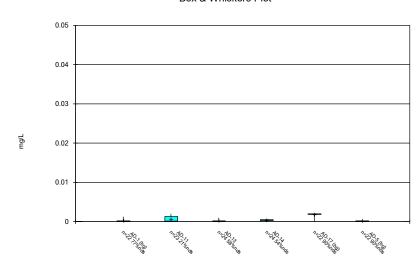


Constituent: Molybdenum, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot

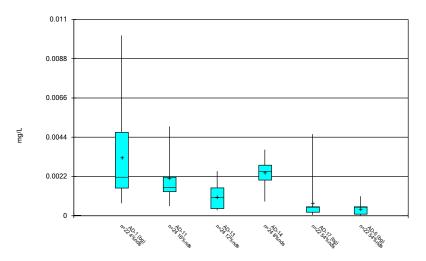


Constituent: Thallium, total Analysis Run 9/1/2023 4:27 PM View: Appendix IV

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Selenium, 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-11 Fluoride, AD-17 Chromium, total (mg/L)	total (mg/L) D-14 Lithium, total (mg/L) AD-1 Molybdenum, total (mg/L) AD-11 Thallium, total (mg/L)
7/29/2016		.024 (o)
9/30/2016	0.007 (o)	
10/21/2016	3 (0)	
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 Land	ffill Client: G	eosyntec D	Data: We	lsh LF	Printed 2	/1/2023, 12:20 PM		
Constituent	<u>Well</u>	Upper Lim.	<u>Date</u>	Observ.	Sig.	Bg N	%NDs	Transform	<u>Alpha</u>	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								
	Background							
Constituent Name	MCL	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					

<sup>\*</sup>MCL = Maximum Contaminant Level

<sup>\*</sup>GWPS = Groundwater Protection Standard

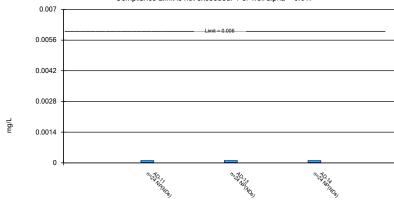
# FIGURE F Confidence Interval

# Confidence Interval - All Results (No Significant)

		Welsh Land	fill Client: Ge	eosyntec Data	a: Welsh	LF	Printed 9/	1/2023, 4:30 PM			
Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	<u>N</u>	%NDs	ND Adj.	Transform	<u>Alpha</u>	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

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

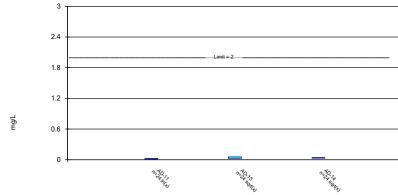


Constituent: Antimony, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

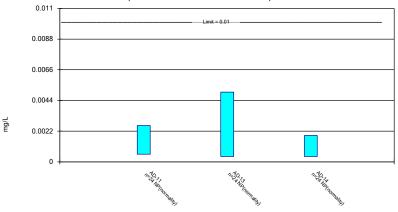
#### Parametric Confidence Interval

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



#### Non-Parametric Confidence Interval

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

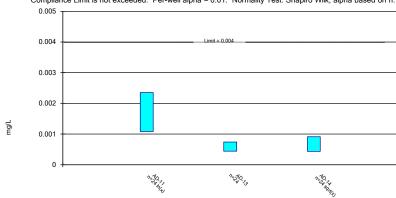


Constituent: Arsenic, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

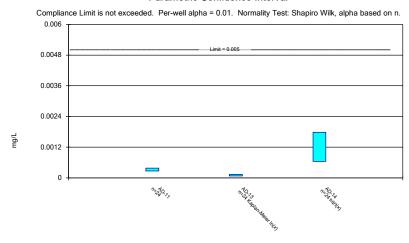
Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Parametric Confidence Interval

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



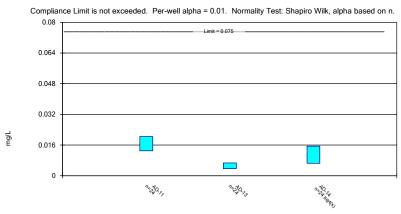
#### Parametric Confidence Interval



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

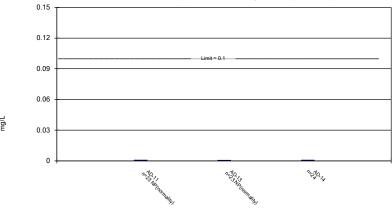
Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Parametric Confidence Interval



#### 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.

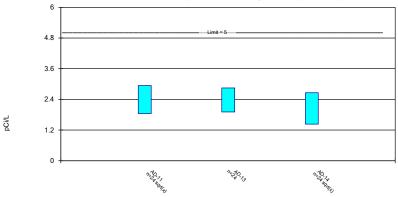


Constituent: Chromium, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

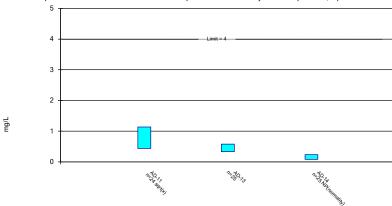
#### Parametric Confidence Interval

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



### 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.

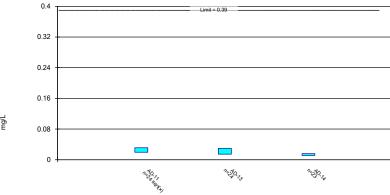


Constituent: Fluoride, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Parametric Confidence Interval

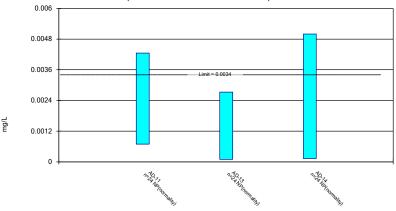
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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

#### Non-Parametric Confidence Interval

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

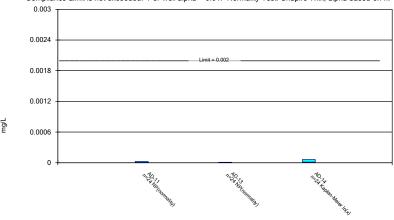


Constituent: Lead, total Analysis Run 9/1/2023 4:30 PM View: Confidence Interval Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### 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.



Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Non-Parametric Confidence Interval

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

0.003

0.0024

0.0018

0.0012

0.0006

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

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### Non-Parametric Confidence Interval

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

0.003

0.0024

0.0018

0.0012

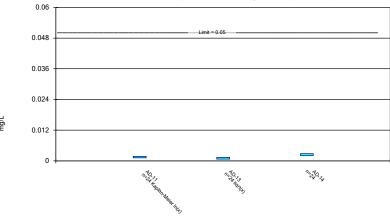
0.0006

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

Sanitas™ v.9.6.37a Sanitas software utilized by Groundwater Stats Consulting. UG

#### 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





engineers | scientists | innovators

# 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

January 23, 2024



## **TABLE OF CONTENTS**

1.	EXE	ECUTIV	VE SUMMARY	1
2.	LAN	NDFILL	L EVALUATION	2
	2.1		Validation and QA/QC	
	2.2	Statist	tical Analysis	2
		2.2.1	Establishment of GWPSs	2
			Evaluation of Potential Appendix IV SSLs	
			Establishment of Appendix III Prediction Limits	
		2.2.4	Evaluation of Potential Appendix III SSIs	4
	2.3		lusions	
3.	REF	EREN	CES	5
			LIST OF TABLES	
Tal	ole 1:		Groundwater Data Summary	
Tal	ole 2:		Appendix IV Groundwater Protection Standards	

# LIST OF ATTACHMENTS

Attachment A: Certification by Qualified Professional Engineer

Appendix III Data Summary

Attachment B: Data Quality Review Memorandum

Attachment C: Statistical Analysis Output

Table 3:



## **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<sup>TM</sup> 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-Francía 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

		AD-1 AD-5		AD-11	AD-13	AD-14	AD-17	
Parameter	Unit	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	
рН	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		
Allalyte	Omi	Description	10/3/2023	10/3/2023	10/3/2023		
Boron	mg/L	Interwell Background Value (UPL)	0.901				
DOIOII	mg/L	Analytical Result	1.41	0.961	1.57		
Calcium	ma/I	Intrawell Background Value (UPL)	24.5	40.7	26.9		
Calcium	mg/L	Analytical Result	10.5	6.73	12.9		
Chloride	ma/I	Intrawell Background Value (UPL)	13.7	21.3	11.5		
Cilioride	mg/L	Analytical Result	10.6	10.9	11.4		
Fluoride	ma/I	Interwell Background Value (UPL)	0.583				
riuoride	mg/L	Analytical Result	0.69	0.15	0.46		
		Interwell Background Value (UPL)	6.9				
рН	SU	Interwell Background Value (LPL)	4.8				
		Analytical Result	4.1	5.3	4.6		
Sulfate	mg/L	Intrawell Background Value (UPL)	745	365	269		
Sullate	mg/L	Analytical Result	490	181	404		
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1,150	656	527		
Total Dissolved Solids	mg/L	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 Mil	1	A STAN	
Printed Name of Licens	sed Professional Engineer	3	AVID ANTHONY MILLER 112498
David Lothony Signature	M:llen		SO/ONAL ENGINE
112498	Texas	01.24.202	24
License Number	Licensing State	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. 32<sup>1</sup> prior to submittal of this data to TCEQ.

<sup>&</sup>lt;sup>1</sup> TCEQ. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action: Technical Guidance No. 32. May 2020.

Data Quality Review – Welsh October 2023 Data January 12, 2024 Page 2

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.

Data Quality Review – Welsh October 2023 Data January 12, 2024 Page 3

- 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.

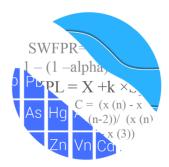


# ATTACHMENT C Statistical Analysis Output

## 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

o 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% nondetects (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-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**

## <u>Appendix III – Determination of Spatial Variation</u>

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.

## <u>Intrawell – Prediction Limits</u>

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.

## <u>Interwell – Trend Test Evaluation</u>

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.

## <u>Trend Test Evaluation – Appendix IV</u>

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.

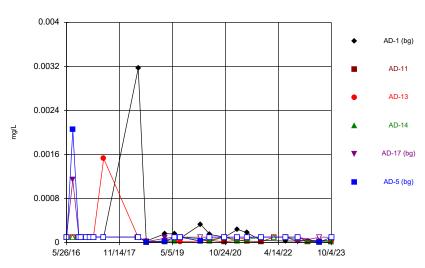
For Groundwater Stats Consulting,

Kristina Rayner

Kristina L. Rayner Senior Statistician Andrew Collins
Project Manager

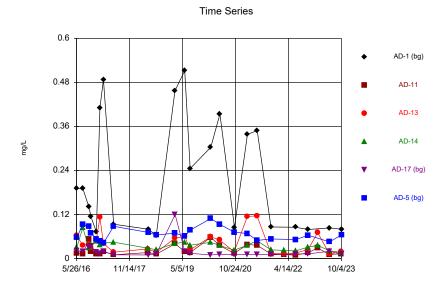
FIGURE A
Time Series





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

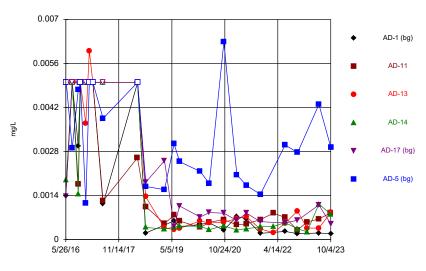
#### $Sanitas^{\text{\tiny{TM}}}\,v.10.0.15$ Software licensed to Groundwater Stats Consulting. UG



Constituent: Barium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive

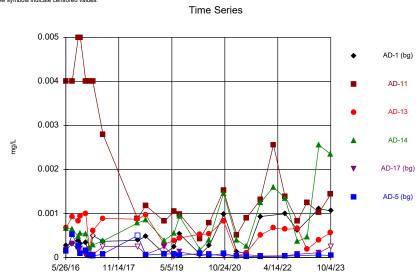
Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Time Series



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

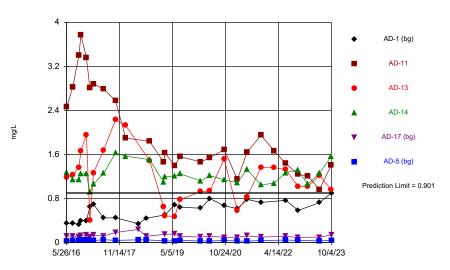
## Sanitas<sup>ru</sup> v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



Constituent: Beryllium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive

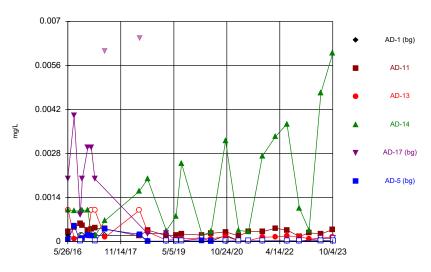
Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Time Series



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

#### Time Series

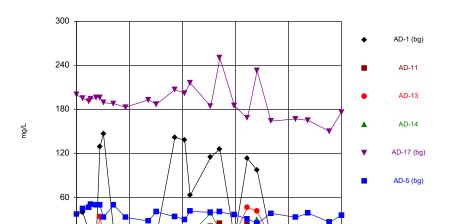


Constituent: Cadmium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas $^{\text{tw}}$ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

5/26/16

11/14/17



Time Series

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

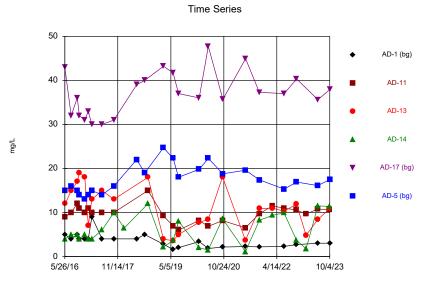
10/24/20

4/14/22

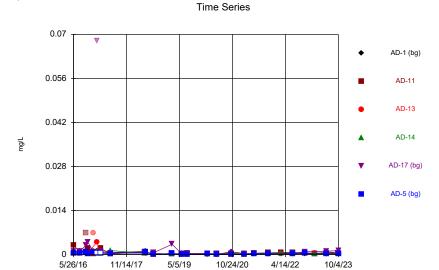
10/4/23

5/5/19

#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

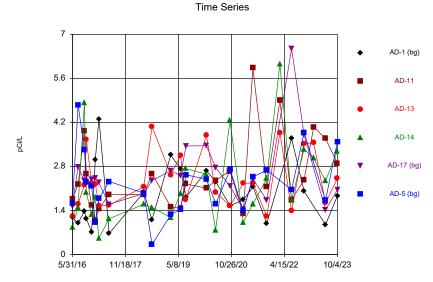


Constituent: Chloride, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF



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

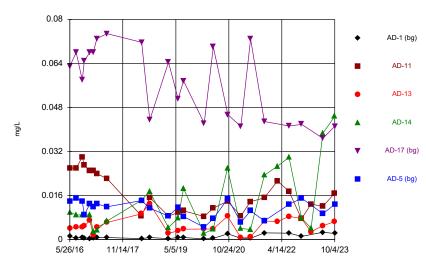
#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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

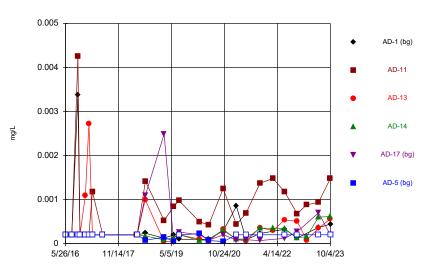
## Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

## Time Series AD-1 (bg) AD-11 3.2 AD-13 2.4 AD-14 AD-17 (bg) 1.6 AD-5 (bg) Prediction Limit = 0.583 8.0 5/26/16 11/14/17 5/5/19 10/24/20 4/14/22 10/4/23

Constituent: Fluoride, total Analysis Run 1/4/2024 2:24 PM View: Descriptive

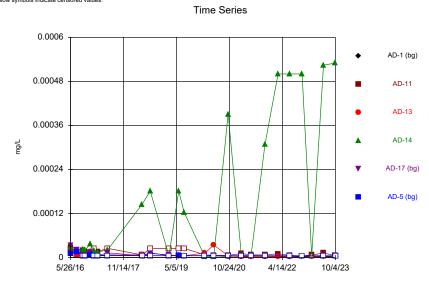
Welsh Landfill Client: Geosyntec Data: Welsh LF





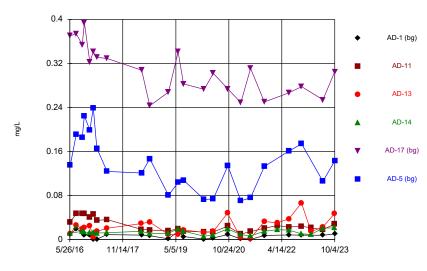
Constituent: Lead, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



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

#### Time Series



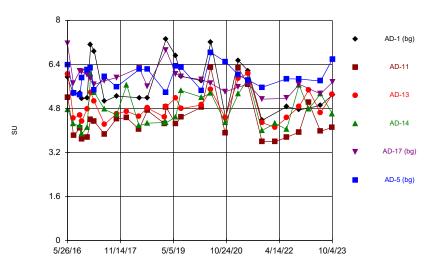
Constituent: Lithium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

### Time Series 0.01 AD-1 (bg) 0.008 AD-11 AD-13 0.006 AD-14 mg/L 0.004 AD-17 (bg) AD-5 (bg) 0.002 5/26/16 11/14/17 5/5/19 10/24/20 4/14/22 10/4/23

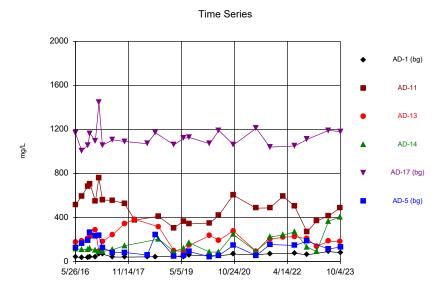
Constituent: Molybdenum, total Analysis Run 1/4/2024 2:24 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF





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

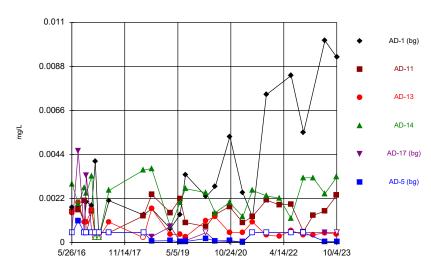
#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



Constituent: Sulfate, total Analysis Run 1/4/2024 2:24 PM View: Descriptive

Welsh Landfill Client: Geosyntec Data: Welsh LF

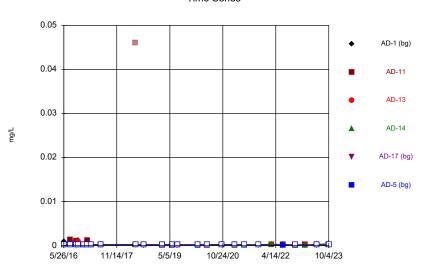
#### Time Series



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

## Sanitas<sup>ru</sup> v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

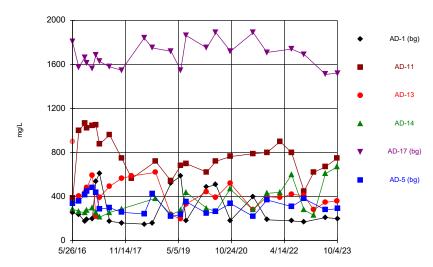
#### Time Series



Constituent: Thallium, total Analysis Run 1/4/2024 2:24 PM View: Descriptive

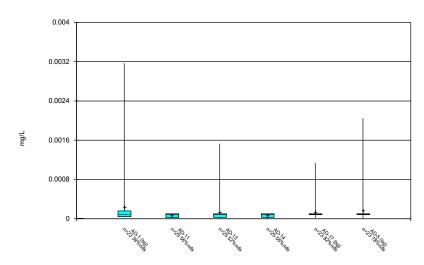
Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Time Series



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

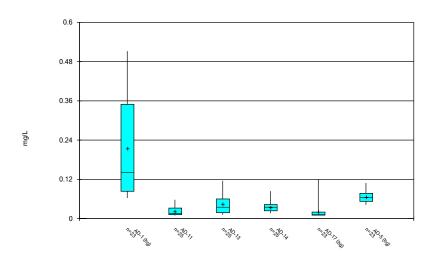
FIGURE B
Box Plots



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

#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

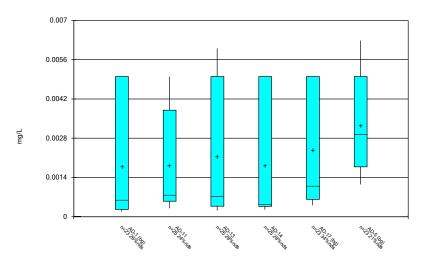
Box & Whiskers Plot



Constituent: Barium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive

Welsh Landfill Client: Geosyntec Data: Welsh LF

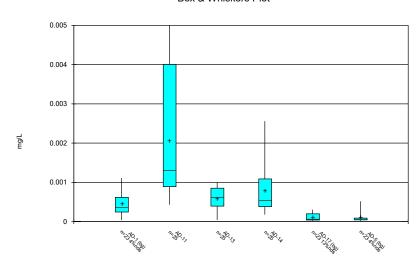
Box & Whiskers Plot



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

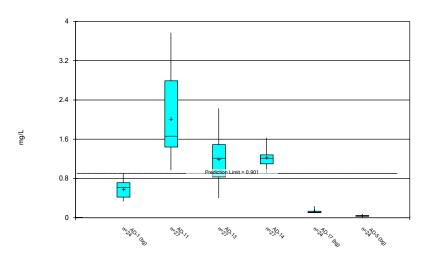
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive

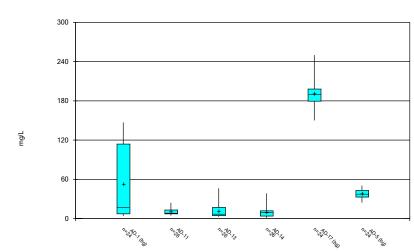
Welsh Landfill Client: Geosyntec Data: Welsh LF



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

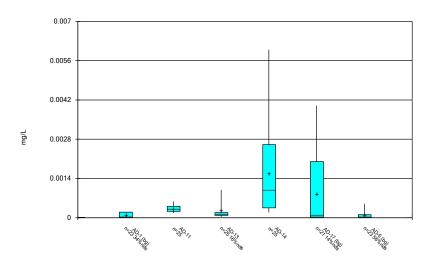
#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

#### Box & Whiskers Plot



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

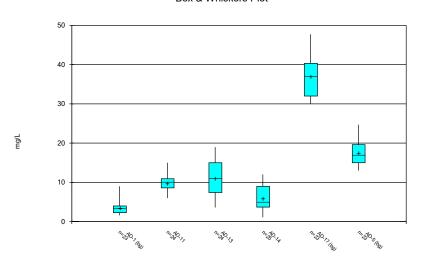
Box & Whiskers Plot



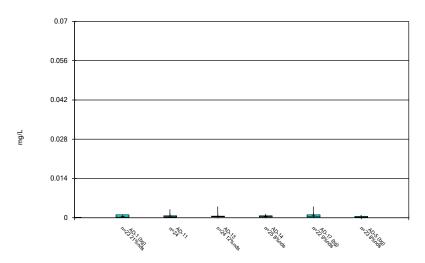
Constituent: Cadmium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



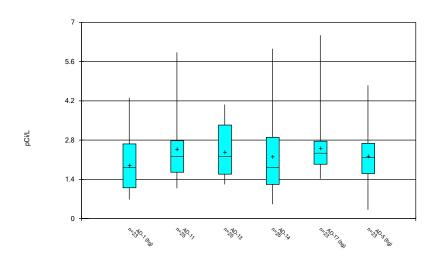
Constituent: Chloride, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF



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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

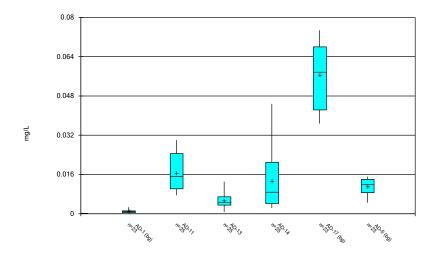
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2024 2:27 PM View: Descriptive

Welsh Landfill Client: Geosyntec Data: Welsh LF

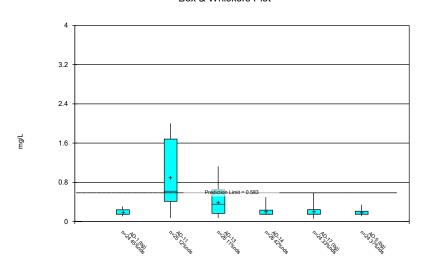
Box & Whiskers Plot



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

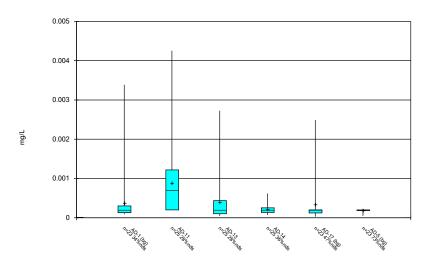
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 1/4/2024 2:27 PM View: Descriptive

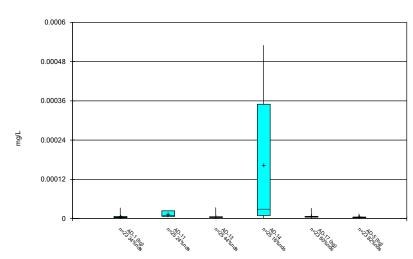
Welsh Landfill Client: Geosyntec Data: Welsh LF



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

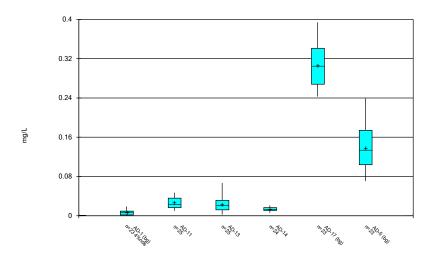
#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

#### Box & Whiskers Plot



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

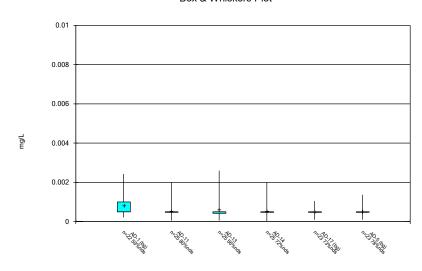
Box & Whiskers Plot



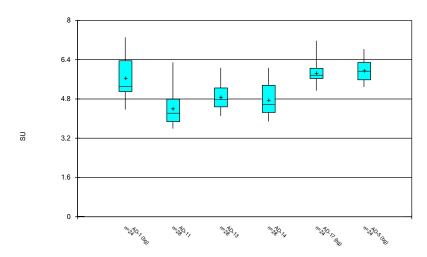
Constituent: Lithium, total Analysis Run 1/4/2024 2:27 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



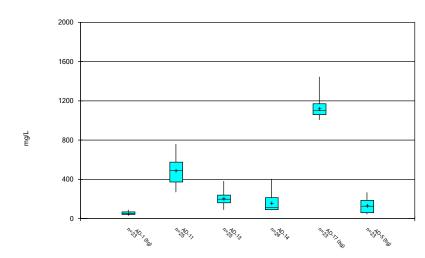
Constituent: Molybdenum, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF



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

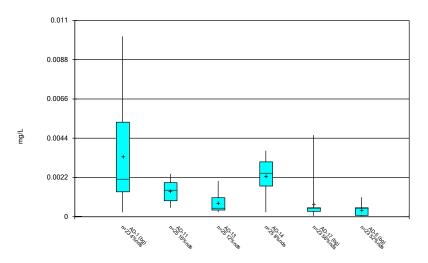
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



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

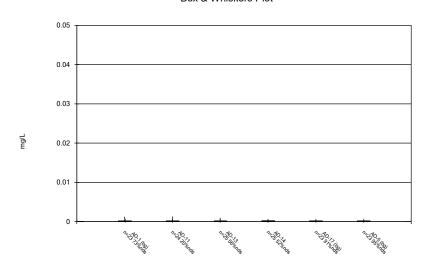
Box & Whiskers Plot



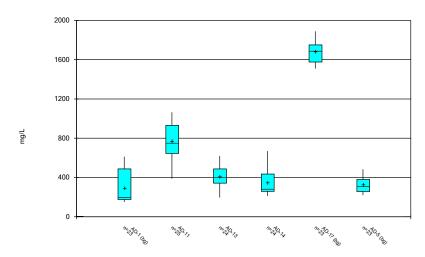
Constituent: Selenium, total Analysis Run 1/4/2024 2:28 PM View: Descriptive
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



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



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

0.0048 (o)

	AD-17 Cadmium	<sub>I, total</sub> (mg/L) AD-11 Chromiur	<sub>n, total</sub> (mg/L) <sub>AD-13</sub> Chromiur	<sub>n, total</sub> (mg/L) <sub>AD-17</sub> Chromiur	<sub>m, total</sub> (mg/L) <sub>AD-11</sub> Fluoride,	<sub>total</sub> (mg/L) <sub>AD-14</sub> Lithium, t	<sub>total</sub> (mg/L) AD-1 Molybden	<sub>um, total</sub> (mg/L) <sub>AD-11</sub> Thallium,	total (mg/L) AD-13 Total Dissolved Solid	<sub>s</sub> (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

## Tukey's Outlier Test - Upgradient Wells - Significant Results

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

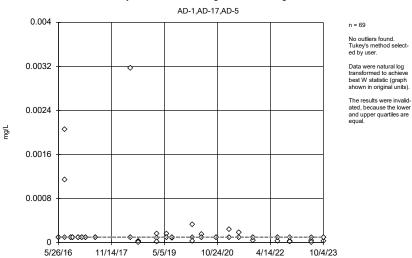
Constituent	<u>Well</u>	Outlie	er <u>Value(s)</u>	Method	<u>Alpha</u>	<u>N</u>	Mean	Std. Dev.	Distribution	Normality Test
Chromium, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.068	NP	NaN	69	0.001542	0.008147	In(x)	ShapiroFrancia
Lead, total (mg/L)	AD-1,AD-17,AD-5	Yes	0.003384, 0.0001, 0.0001, 0.0001, 0.000852, 0.00009, 0.	NP	NaN	69	0.0002942	0.0004942	ln(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	0.000006897	0.000005806	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	Outlie	er Value(s)	Method	<u>Alpha</u>	N	<u>Mean</u>	Std. Dev.	Distribution	n 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	In(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	In(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	0.003384,0.0001,0.0001,0.0001,0.000852,0.00009,0.	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	0.000006897	0.000005806	In(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

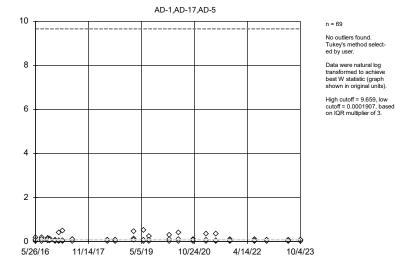
#### Tukey's Outlier Screening, Pooled Background



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

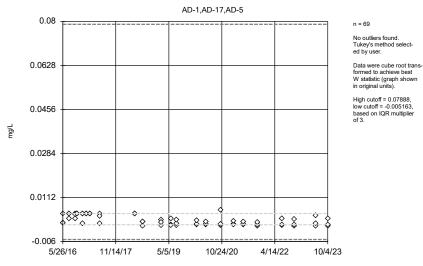
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Tukey's Outlier Screening, Pooled Background



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

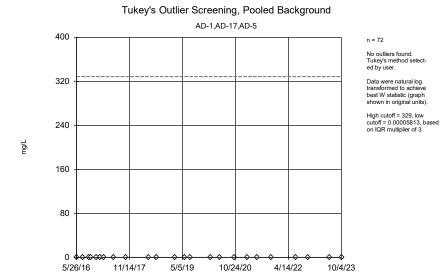


Constituent: Arsenic, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

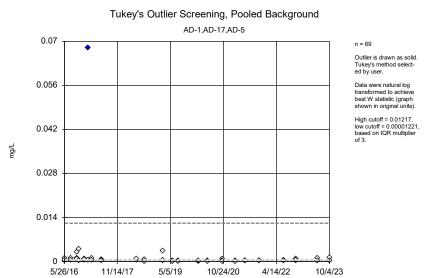
#### Tukey's Outlier Screening, Pooled Background AD-1,AD-17,AD-5 0.05 n = 69 No outliers found. Tukev's method selected by user. 0.04 Data were natural log transformed to achieve best W statistic (graph shown in original units) High cutoff = 0.04297, low cutoff = 3.1e-7, based on IQR multiplier of 3. 0.03 mg/L 0.02 0.01 0 400 5/26/16 11/14/17 5/5/19 10/24/20 4/14/22 10/4/23

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



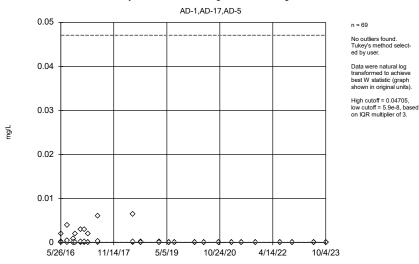
Constituent: Boron, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



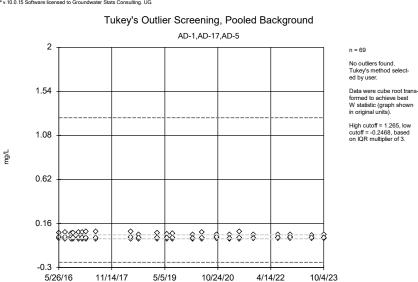
Constituent: Chromium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Tukey's Outlier Screening, Pooled Background



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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



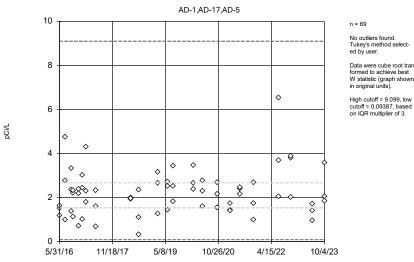
Constituent: Cobalt, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
Welsh Landfill Client: Geosyntec Data: Welsh LF

## Tukey's Outlier Screening, Pooled Background

Data were cube root trans-

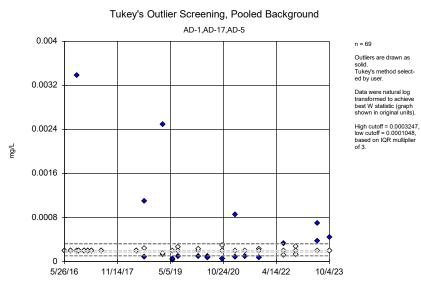
formed to achieve best

on IQR multiplier of 3.



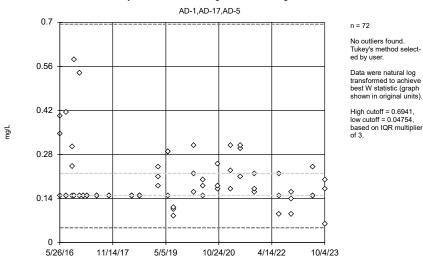
Constituent: Combined Radium 226 + 228 Analysis Run 1/3/2024 10:02 AM View: Outlier Testing Welsh Landfill Client: Geosyntec Data: Welsh LF

#### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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

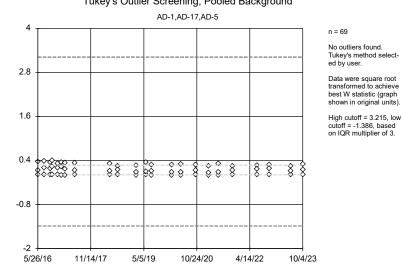


Constituent: Fluoride, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

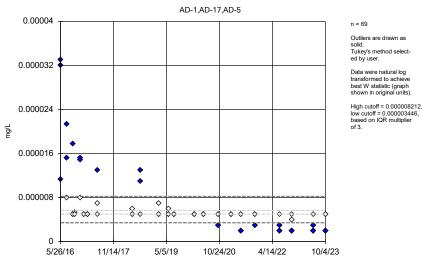
mg/L

## Tukey's Outlier Screening, Pooled Background



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

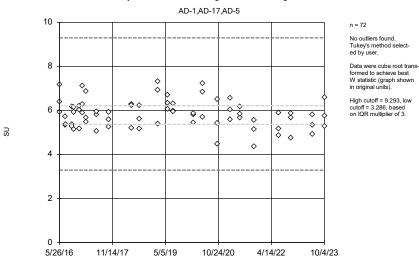
## Tukey's Outlier Screening, Pooled Background



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

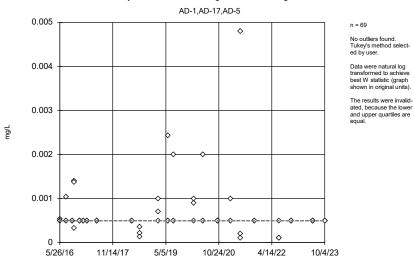
### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Tukey's Outlier Screening, Pooled Background



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

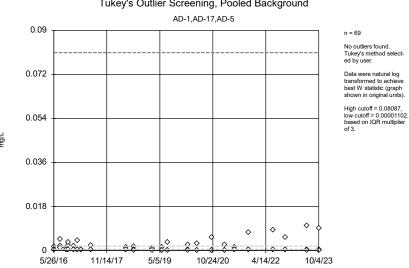
## Tukey's Outlier Screening, Pooled Background



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

### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Tukey's Outlier Screening, Pooled Background



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

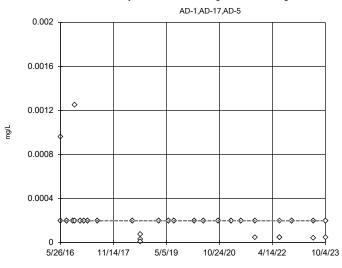


n = 69

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.



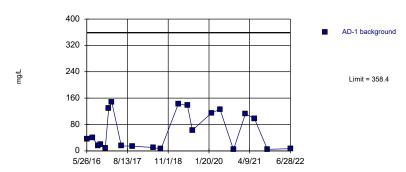
Constituent: Thallium, total Analysis Run 1/3/2024 10:02 AM View: Outlier Testing
Welsh Landfill Client: Geosyntec Data: Welsh LF

# 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 <u>Well</u> Upper Lim. Lower Lim. Date Observ. Sig. Bg N Bg Mean Std. Dev. %NDs ND Adj. TransformAlpha Method AD-1 Calcium, total (mg/L) 358.4 n/a n/a 1 future n/a 21 3.437 1.3 0 None In(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 In(x) 0.002505 Param Intra 1 of 2 Calcium, total (mg/L) AD-13 40.74 1 future 2.15 0.833 0 None In(x) 0.002505 Param Intra 1 of 2 Calcium, total (mg/L) AD-14 1 231 0 0.002505 Param Intra 1 of 2 26.85 n/a n/a 1 future n/a 22 2 88 None sqrt(x) Calcium, total (mg/L) AD-17 232.6 21 20.17 0 0.002505 Param Intra 1 of 2 1 future No Calcium, total (mg/L) AD-5 0 0.002505 53.13 n/a n/a n/a 21 38.6 7.729 No Param Intra 1 of 2 1 future None 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 9.606 2.138 0 0.002505 Param Intra 1 of 2 n/a n/a 1 future n/a 20 None No Chloride, total (mg/L) AD-13 21.31 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 1 future n/a 21 5.71 3.1 0 None No 0.002505 Param Intra 1 of 2 AD-17 36.88 0 0.002505 Param Intra 1 of 2 Chloride, total (mg/L) 46.83 n/a n/a 1 future n/a 20 5 261 None Nο AD-5 0.002505 Param Intra 1 of 2 Chloride, total (mg/L) 23.96 n/a 1 future n/a 20 3.38 None No AD-1 0.002505 Sulfate, total (mg/L) 76.11 n/a n/a 1 future n/a 20 51.68 12.91 0 None Nο Param Intra 1 of 2 Sulfate, total (mg/L) AD-11 744.7 1 future n/a 21 509.3 125.2 0 No 0.002505 Param Intra 1 of 2 AD-13 81.64 0 0.002505 Sulfate, total (mg/L) 364.5 n/a 21 211 Param Intra 1 of 2 n/a n/a 1 future None No Sulfate, total (mg/L) AD-14 269 n/a n/a 1 future n/a 20 n/a 0 n/a n/a 0.004291 NP Intra (normality) 1 of 2 Sulfate, total (mg/L) AD-17 1445 n/a 20 n/a 0 0.004291 NP Intra (normality) 1 of 2 n/a n/a 1 future n/a n/a n/a Sulfate, total (mg/L) AD-5 267.7 n/a 1 future n/a 20 129.5 73.02 0 No 0.002505 Param Intra 1 of 2 Total Dissolved Solids (mg/L) AD-1 612 n/a 20 n/a 0 n/a 0.004291 NP Intra (normality) 1 of 2 n/a n/a 1 future n/a n/a AD-11 798 0 0.002505 Total Dissolved Solids (mg/L) 1147 n/a n/a 1 future n/a 21 185.4 None Nο Param Intra 1 of 2 Param Intra 1 of 2 Total Dissolved Solids (mg/L) AD-13 124.5 No 0.002505 655.6 n/a 1 future n/a 20 None Total Dissolved Solids (mg/L) AD-14 0 0.002505 Param Intra 1 of 2 526.7 n/a n/a 1 future n/a 20 5.744 0.2761 None In(x) Total Dissolved Solids (mg/L) AD-17 1921 20 1704 114.5 0 No 0.002505 Param Intra 1 of 2 1 future Total Dissolved Solids (mg/L) 0 0.002505 AD-5 484 n/a 20 328 82.5 Param Intra 1 of 2 n/a n/a 1 future None No

# Prediction Limit Intrawell Parametric, AD-1 (bg)

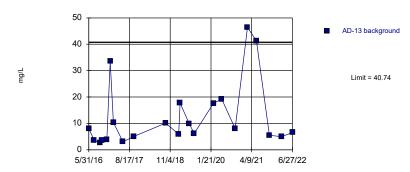


Background Data Summary (based on natural log transformation): Mean=3.437, Std. Dev.=1.3, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8865, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

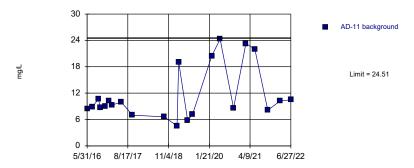
# Prediction Limit Intrawell Parametric, AD-13



Background Data Summary (based on natural log transformation): Mean=2.15, Std. Dev.=0.833, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9311, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

## Prediction Limit

#### Intrawell Parametric, AD-11

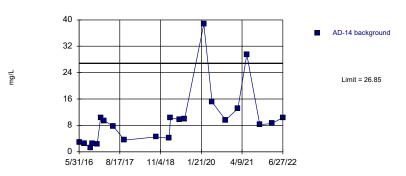


Background Data Summary (based on natural log transformation): Mean=2.332, Std. Dev=0.4638, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8975, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.005205. Assumes 1 future value.

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

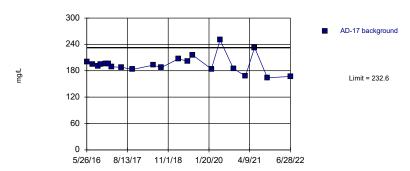
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-14



Background Data Summary (based on square root transformation): Mean=2.88, Std. Dev.=1.231, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.891, critical = 0.878. Kappa = 1.869 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

# Prediction Limit Intrawell Parametric, AD-17 (bg)

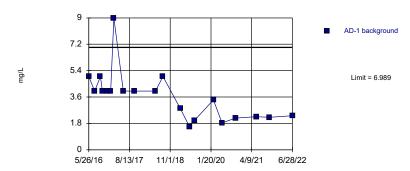


Background Data Summary: Mean=194.7, Std. Dev.=20.17, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9017, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-1 (bg)



Background Data Summary (based on square root transformation): Mean=1.862, Std. Dev.=0.413, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9, 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.

## Prediction Limit

## Intrawell Parametric, AD-5 (bg)

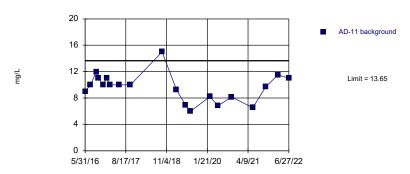


Background Data Summary: Mean=38.6, Std. Dev.=7.729, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9562, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

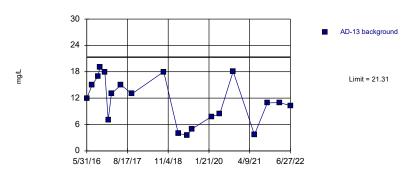
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-11



Background Data Summary: Mean=9.606, Std. Dev.=2.138, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9494, 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.

# Prediction Limit Intrawell Parametric, AD-13

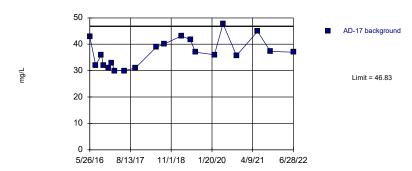


Background Data Summary: Mean=11.49, Std. Dev.=5.192, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9315, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

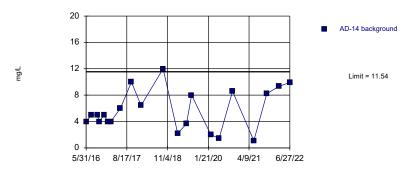
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# 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.

# 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

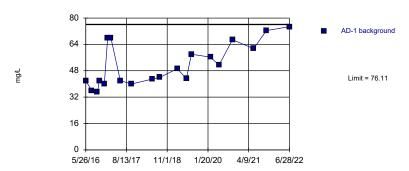
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# 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.

# Prediction Limit Intrawell Parametric, AD-1 (bg)

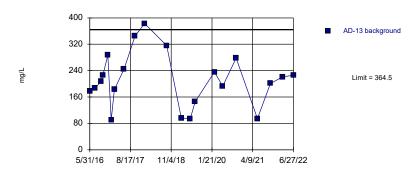


Background Data Summary: Mean=51.68, Std. Dev.=12.91, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8957, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

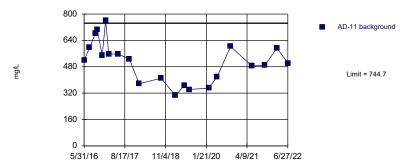
# Prediction Limit Intrawell Parametric, AD-13



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.

nitas\*\* v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-11

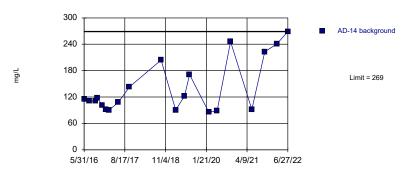


Background Data Summary: Mean=509.3, Std. Dev.=125.2, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9698, critical = 0.873. Kappa = 1.88 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

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

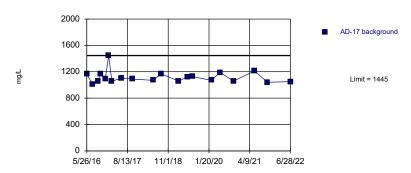
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# 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.

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

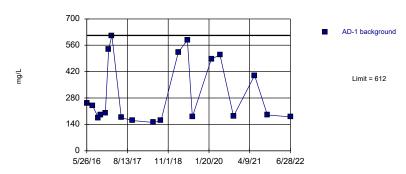


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Well-constituent pair annual alpha = 0.008564. Individual comparison alpha = 0.004291 (1 of 2). Assumes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

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

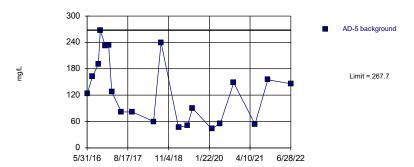
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

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



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

# 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

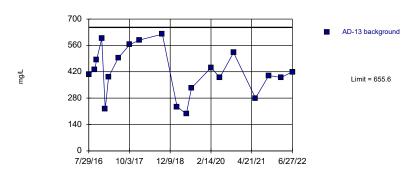
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Intrawell Parametric, AD-11



Background Data Summary: Mean=798, Std. Dev.=185.4, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9594, 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.

# Prediction Limit Intrawell Parametric, AD-13

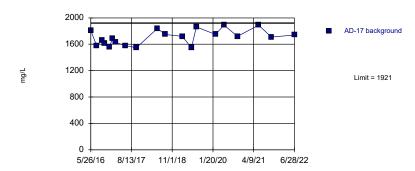


Background Data Summary: Mean=420.1, Std. Dev.=124.5, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9568, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

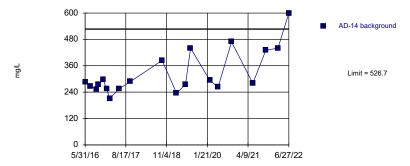
# Prediction Limit Intrawell Parametric, AD-17 (bg)



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.

## Prediction Limit

Intrawell Parametric, AD-14

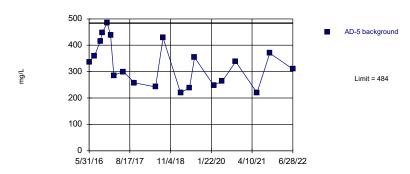


Background Data Summary (based on natural log transformation): Mean=5.744, Std. Dev.=0.2761, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8753, critical = 0.868. Kappa = 1.892 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.005205. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/3/2024 10:17 AM View: PLs Intrawell Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# 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.

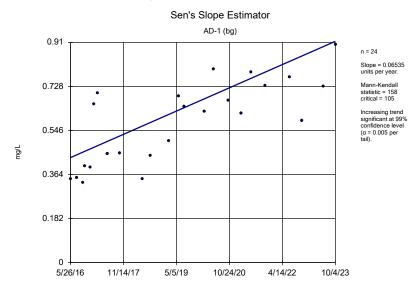
# FIGURE E Upgradient Trend Tests

# Trend Tests - Upgradient Wells - Significant Results

	Welsh La	andfill Client: Geosyntec	Data: W	elsh LF Pri	nted 1/3	3/2024, 1	0:10 AM				
Constituent	<u>Well</u>	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	<u>Alpha</u>	Method
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

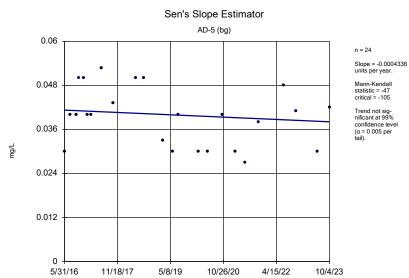
# Trend Tests - Upgradient Wells - All Results

	Welsh Lan	dfill Client: Geosyntec	Data: Wel	sh LF Print	ted 1/3/	2024, 10	:10 AM				
Constituent	Well	Slope	Calc.	Critical	Sig.	<u>N</u>	%NDs	Normality	<u>Xform</u>	<u>Alpha</u>	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



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

### Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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



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

5/5/19

10/24/20

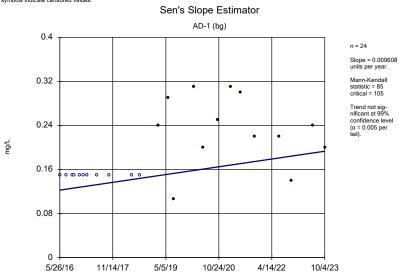
4/14/22

10/4/23

## Sanitas<sup>tw</sup> v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.

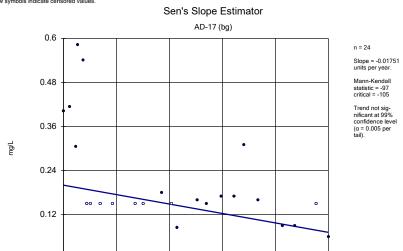
5/26/16

11/14/17



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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



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

10/24/20

4/14/22

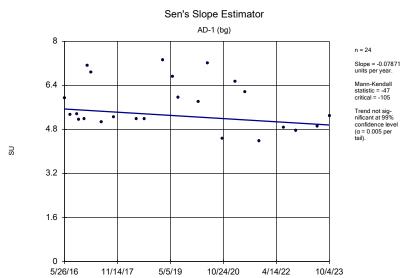
10/4/23

5/5/19

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

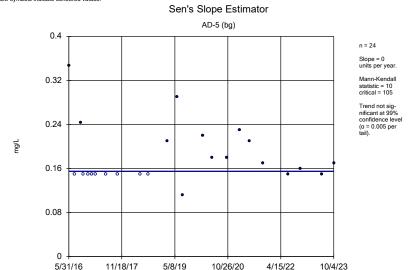
5/26/16

11/14/17



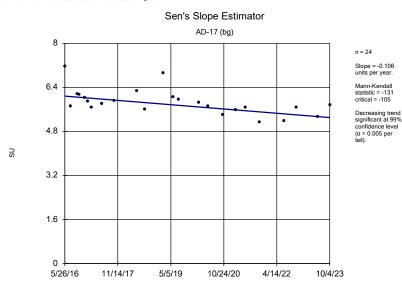
Constituent: pH, field Analysis Run 1/3/2024 10:06 AM View: Trend Tests - Upgradient
Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas<sup>tu</sup> v.10.0.15 Software licensed to Groundwater Stats Consulting. UG Hollow symbols indicate censored values.



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

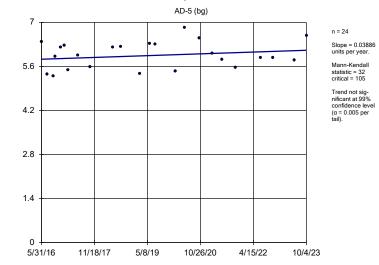
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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

SU

## Sen's Slope Estimator



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

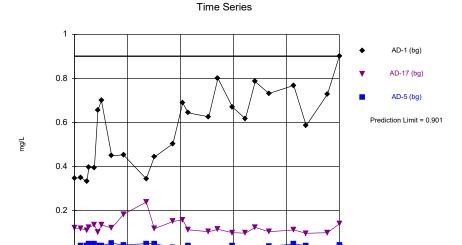
# Appendix III Interwell Prediction Limits - All Results

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

<u>Upper Lim. Lower Lim. Date Observ. Sig. Bg N Bg Mean Std. Dev. %NDs ND Adj. TransformAlpha Method</u>

Constituent Well Boron, total (mg/L) n/a 0.901 n/a n/a 3 future n/a 72 n/a n/a 0 n/a 0.0003715 NP Inter (normality) 1 of 2 0.583 n/a n/a 3 future n/a 72 n/a n/a 38.89 n/a Fluoride, total (mg/L) n/a n/a 0.0003715 NP Inter (normality) 1 of 2 6.905 4.761 n/a 3 future n/a 72 5.833 0.6322 0 None pH, field (SU) 0.001253 Param Inter 1 of 2

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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

10/24/20

10/4/23

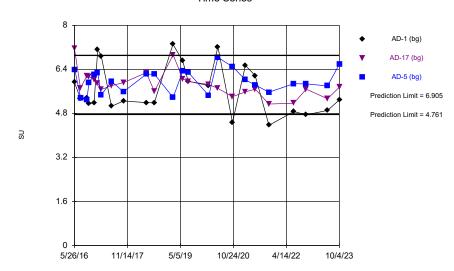
5/5/19

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

5/26/16

11/14/17

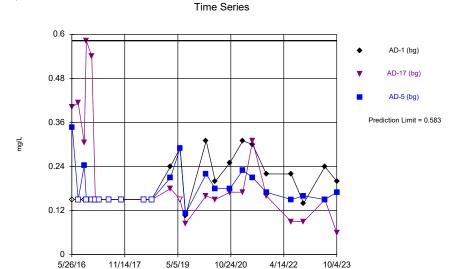
## Time Series



Constituent: pH, field Analysis Run 1/3/2024 10:30 AM View: Time Series - Interwell PLs

Welsh Landfill Client: Geosyntec Data: Welsh LF

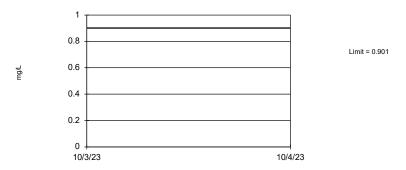
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG



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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Interwell Non-parametric



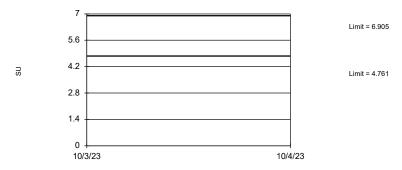
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 72 background values. Annual per-constituent alpha = 0.002227. Individual comparison alpha = 0.0003715 (1 of 2). Assumes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

Constituent: Boron, total Analysis Run 1/3/2024 10:23 AM View: PLs Interwell

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

# Prediction Limit Interwell Parametric

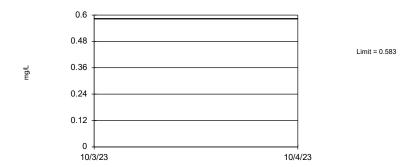


Background Data Summary: Mean=5.833, Std. Dev.=0.6322, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9855, critical = 0.954. Kappa = 1.695 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001253. Assumes 3 future values.

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

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG





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 perconstituent alpha = 0.00227. 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

# FIGURE G UTLs

# Upper Tolerance Limits Summary Table

	•	•					•		
		Welsh	Landfill Clie	nt: Geosynte	c Data: W	elsh LF Printed 1/	4/2024, 2:30 PM		
Constituent	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	<u>Alpha</u>	Method
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	In(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										
		Background								
Constituent Name	MCL	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							

<sup>\*</sup>MCL = Maximum Contaminant Level

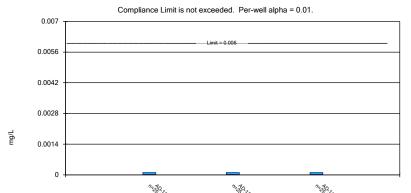
<sup>\*</sup>GWPS = Groundwater Protection Standard

# 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

Comment         Comment         Learning         Learning         Call many         Learning         Learning         Learning         Learning         All         All         Comment         Learning         Learn			Welsh Landfill		Client: Geosyntec		Data: Welsh LF		Printed 1/4/2024, 2:32 PM					
Arthoniny, total (mpl.)         All-14         0.0001         0.0004	Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. I	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	<u>Alpha</u>	Method
Areal controlling (1)         All of the control	Antimony, total (mg/L)	AD-11	0.0001	0.00003	0.006	No 2	25	0.0000674	0.00003795	56	None	No	0.01	NP (NDs)
Americantalingriff of Marian (Anith) (2014)	Antimony, total (mg/L)	AD-13	0.0001	0.00003	0.006	No 2	25	0.0001289	0.000294	52	None	No	0.01	NP (NDs)
Areants fairfurgly (1 Age 1) (1 Ag	Antimony, total (mg/L)	AD-14	0.0001	0.00003	0.006	No 2	25	0.00007096	0.00003554	56	None	No	0.01	NP (NDs)
Areal control (mill)         AB-11 (mill)         OB-10 (mill)         OB-10 (mill)         OB-10 (mill)         OB-10 (mill)         OB-10 (mill)         OB-10 (mill)         AB-11 (mill)         OB-10 (mill)         OB-	Arsenic, total (mg/L)	AD-11	0.0026	0.00056	0.01	No 2	25	0.001826	0.001881	24	None	No	0.01	NP (normality)
Barlunchain (mile) and mile of the mile of	Arsenic, total (mg/L)	AD-13	0.005	0.00038	0.01	No 2	25	0.002152	0.002192	28	None	No	0.01	NP (normality)
Barium, total (ring)	Arsenic, total (mg/L)	AD-14	0.001894	0.00039	0.01	No 2	25	0.001827	0.002055	28	None	No	0.01	NP (normality)
Parameter   Para	Barium, total (mg/L)	AD-11	0.0286	0.0123	2	No 2	25	0.02159	0.01379	0	None	No	0.01	NP (normality)
Parametricular	Barium, total (mg/L)	AD-13	0.05449	0.02636	2	No 2	25	0.04404	0.03189	0	None	sqrt(x)	0.01	Param.
Parametric   Par	Barium, total (mg/L)	AD-14	0.04104	0.02848	2	No 2	25	0.03558	0.0137	0	None	sqrt(x)	0.01	Param.
Beryllim, told (might)         AD-14         0.00887         0.00888 <td>Beryllium, total (mg/L)</td> <td>AD-11</td> <td>0.002301</td> <td>0.001098</td> <td>0.004</td> <td>No 2</td> <td>25</td> <td>0.002067</td> <td>0.001523</td> <td>0</td> <td>None</td> <td>ln(x)</td> <td>0.01</td> <td>Param.</td>	Beryllium, total (mg/L)	AD-11	0.002301	0.001098	0.004	No 2	25	0.002067	0.001523	0	None	ln(x)	0.01	Param.
Communication (might)         AD-11         0.000384         0.000249         0.00049         0.00049         0.00049         0.000494	Beryllium, total (mg/L)	AD-13	0.0007286	0.0004477	0.004	No 2	25	0.0005881	0.0002818	0	None	No	0.01	Param.
Community (all orgin) (in column) (in col	Beryllium, total (mg/L)	AD-14	0.0009873	0.0004589	0.004	No 2	25	0.0007947	0.0006346	0	None	sqrt(x)	0.01	Param.
Communication (might)         AD-14         0.01998         0.006983         0.005         0.0078         0.01886         0.01886         0.01886         0.01886         0.01886         0.001886         0.001886         0.001886         0.000878         0.008078         0.0         No         0.0         1.0         1.0         1.0         1.0         0.008878         0.006883         0.000488         0.000488         0.000488         0.000584         0.000584         0.000588         0.000488         0.000588         0.000588         0.000488         0.000588         0.000	Cadmium, total (mg/L)	AD-11	0.0003804	0.0002699	0.005	No 2	25	0.0003251	0.0001109	0	None	No	0.01	Param.
Chromium, Intell (might)         AD-11         0.00371         0.00324         0.1         v 2 d         0.000893         0.000893         0.00         No.         0.00         10 d         Percentage           Chromium, Intell (might)         AD-14         0.000884         0.000484         0.00048         0.0014         v 2 d         0.000840         0.000281         8 d         No.         0.0         4 D         10 Percentage           Cobalt, Intell (might)         AD-11         0.00280         0.00380         0.075         v 2 d         0.00281         0.0         No.         0.0         No.         0.0         10 Paren           Cobalt, Intell (might)         AD-11         0.01680         0.03830         0.75         v 2 d         0.0180         0.0         No.         0.0         No.         0.0         10 Paren           Cobalt, Intell (might)         AD-11         0.01680         0.0380         0.075         v 2 d         0.00281         0.00280         0.0 <td>Cadmium, total (mg/L)</td> <td>AD-13</td> <td>0.000177</td> <td>0.000085</td> <td>0.005</td> <td>No 2</td> <td>25</td> <td>0.0002618</td> <td>0.0003339</td> <td>16</td> <td>None</td> <td>No</td> <td>0.01</td> <td>NP (normality)</td>	Cadmium, total (mg/L)	AD-13	0.000177	0.000085	0.005	No 2	25	0.0002618	0.0003339	16	None	No	0.01	NP (normality)
Chromium, total (mg/L)         AD-13         O.005816         0.000818         0.000818         0.00828         0.0008089         0.000808         0.000808         0.000808<	Cadmium, total (mg/L)	AD-14	0.001995	0.0006953	0.005	No 2	25	0.001585	0.001566	0	None	sqrt(x)	0.01	Param.
Chromium, foling (ing (ing )         AD-14         O.000e8         0.000e8         0.	Chromium, total (mg/L)	AD-11	0.00071	0.00032	0.1	No 2	24	0.0006931	0.0006758	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)         AD-11         0.02026         0.1146         0.075         No 25         0.1671         0.07119         0         None         No         0.01         Param.           Cobalt, total (mg/L)         AD-13         0.006808         0.008388         0.075         No         25         0.002839         0.008289         0.0         None         sqrtx         0.01         Param.           Cobalt, total (mg/L)         AD-14         0.01680         0.006809         0.075         No         25         0.0188         0.0188         0.0         None         97         0.01         Param.           Combined Radium 226 + 228 (pCill)         AD-14         2.87         1.586         5         No         25         2.937         1.0380         0.0         None         No         0.01         Param.           Fluoride, total (mg/L)         AD-14         1.116         0.4843         4         No         25         2.939         0.0897         12         None         No         0.01         Param.           Fluoride, total (mg/L)         AD-14         0.23         0.251         4.044         No         26         0.03929         0.08969         22         1.049         Param.	Chromium, total (mg/L)	AD-13	0.0005816	0.00032	0.1	No 2	24	0.0006053	0.0007395	12.5	None	No	0.01	NP (normality)
Cobalt total (mg/L)	Chromium, total (mg/L)	AD-14	0.000688	0.0004068	0.1	No 2	25	0.0005474	0.0002821	8	None	No	0.01	Param.
Cobalt, total (mg/L)         AD-14         0.01692         0.06909         0.75         No 25         0.1349         0.1180         0.0         eqr(x)         0.01         param.           Combined Radium 226 + 228 (pCML)         AD-13         2.827         1.881         5         No 25         2.493         1.177         0.0         None         eqr(x)         0.01         Param.           Combined Radium 226 + 228 (pCML)         AD-13         2.827         1.586         5         No 25         2.377         0.9025         0.0         None         801         0.0         Param.           Combined Radium 226 + 228 (pCML)         AD-13         1.186         0.484         1.546         5         802         0.8987         1.5         None         801         9         7         Param.           Fluoride, total (mg/L)         AD-13         0.5246         0.2318         4         No         26         0.00329         0.00840         8         2.0         0.00840         1.5         None         No         0.0         Param.           Fluoride, total (mg/L)         AD-13         0.000292         0.000292         0.00429         0.00429         0.000392         0.000392         2.0         0.000392         0.00039	Cobalt, total (mg/L)	AD-11	0.02026	0.01316	0.075	No 2	25	0.01671	0.007119	0	None	No	0.01	Param.
Combined Radium 226+ 228 (pC/L)I         Ab-11         2.937         1.881         5         4         2.937         2.493         1.777         0.9025         0         None         sqr(x)         0.01         Param.           Combined Radium 226 + 228 (pC/L)         Ab-14         2.88         1.546         5         4         2.213         1.338         0         None         80         0         Param.           Fluoride, total (mg/L)         Ab-11         1.116         0.2484         4         No         2         0.8912         0.8912         1.54         None         80         7         Param.           Fluoride, total (mg/L)         Ab-13         0.2546         0.2818         4         No         2         0.90326         2.31         None         0.0         1.7         Param.           Lead, total (mg/L)         Ab-14         0.002905         0.00415         0.004         No         25         0.000405         2         2         Maplameter         1/10         0.01         Param.           Lead, total (mg/L)         Ab-13         0.000216         0.000405         0.0041         0.0041         0.0041         0.0041         0.0041         0.0041         0.0041         0.0041 <t< td=""><td>Cobalt, total (mg/L)</td><td>AD-13</td><td>0.006668</td><td>0.003838</td><td>0.075</td><td>No 2</td><td>25</td><td>0.005253</td><td>0.002839</td><td>0</td><td>None</td><td>No</td><td>0.01</td><td>Param.</td></t<>	Cobalt, total (mg/L)	AD-13	0.006668	0.003838	0.075	No 2	25	0.005253	0.002839	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)         AD-13         2.827         1.928         5         No         2.5         2.377         0.9025         0.0         None         No         0.00         param.           Combined Radium 226 + 228 (pCi/L)         AD-14         2.88         1.546         5         No         2.5         2.13         1.338         1.0         None         No         0.0         Param.           Fluoride, total (mg/L)         AD-13         0.5246         0.2818         4         No         26         0.9392         0.9826         11.5         None         0.0         0.0         Param.           Fluoride, total (mg/L)         AD-14         0.233         0.00486         0.00481         0.00386         0.008468         0.00486         0.008468         0.008468         2.0008768         0.008869         2.0         No         2.0         0.008769         2.0         No	Cobalt, total (mg/L)	AD-14	0.01692	0.006909	0.075	No 2	25	0.01349	0.0118	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCLL)         AD-14         2.88         1.546         5         No         25         2.133         1.338         0         None         No         0.0         Param.           Fluoride, total (mg/L)         AD-13         0.5246         0.2618         4         No         28         0.3932         0.2696         11.54         None         0.0         0.0         1.0         1.0         0.0         0.00926         1.55         None         0.00936         0.0         0.0         0.00936         1.54         None         0.0         0.0         0.00936         0.00936         0.000407         0.000936         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.000946         0.0000946         0.000946         0.000946         0.000946         0.000946         0.0000946         0.0000946         0.000946         0.0000946         0.000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.0000946         0.00	Combined Radium 226 + 228 (pCi/L)	AD-11	2.937	1.881	5	No 2	25	2.493	1.177	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	Combined Radium 226 + 228 (pCi/L)	AD-13	2.827	1.928	5	No 2	25	2.377	0.9025	0	None	No	0.01	Param.
Fluoride, total (mg/L)         AD-13         6248         0.2618         4         No 26         0.3932         0.2686         11.54         None         No         0.0         Param.           Fluoride, total (mg/L)         AD-14         0.23         0.15         4         No         2.6         0.2039         0.09326         42.31         None         No         0.0         No         No         1.0         No         1.0         No         1.0         No         1.0         No         1.0         No         2.0         0.003408         0.003408         2.0         8.0         Raplan-Meriz "x(1/3)         0.0         Param.           Lead, total (mg/L)         AD-14         0.002216         0.001095         0.0034         No         2.0         0.003496         2.0         Raplan-Meriz "x(1/3)         0.0         Param.           Lithium, total (mg/L)         AD-14         0.002216         0.00349         0.00250         0.001391         0.0         No         No         2.0         0.00391         0.0181         No         2.0         0.00392         0.001391         0.00240         No         0.00240         No         0.00240         No         0.00240         No         0.00240         No	Combined Radium 226 + 228 (pCi/L)	AD-14	2.88	1.546	5	No 2	25	2.213	1.338	0	None	No	0.01	Param.
Fluoride, total (mg/L)	Fluoride, total (mg/L)	AD-11	1.116	0.4643	4	No 2	25	0.8912	0.6987	12	None	sqrt(x)	0.01	Param.
Lead, total (mg/L)	Fluoride, total (mg/L)	AD-13	0.5246	0.2618	4	No 2	26	0.3932	0.2696	11.54	None	No	0.01	Param.
Lead, total (mg/L)         AD-13         0.0002902         0.000886         0.0034         No 25         0.0003949         0.0005557         28         Kaplan-Meir Int,         0.01         Param.           Lead, total (mg/L)         AD-14         0.0002156         0.001095         0.0034         No 25         0.0002355         0.001391         36         Kaplan-Meir Int,         0.01         Param.           Lithium, total (mg/L)         AD-11         0.03221         0.02044         0.39         No 25         0.02302         0.01181         0         None         No         0.01         Param.           Lithium, total (mg/L)         AD-13         0.03072         0.01583         0.39         No         25         0.02302         0.01543         0         None         No         0.01         Param.           Lithium, total (mg/L)         AD-13         0.01586         0.01148         0.39         No         25         0.003025         0.004297         0         None         No         0.01         Param.           Lithium, total (mg/L)         AD-13         0.0008055         0.000200         0.002         No         20         0.0004097         0.0002097         0.000200         0.00000088         4         None <t< td=""><td>Fluoride, total (mg/L)</td><td>AD-14</td><td>0.23</td><td>0.15</td><td>4</td><td>No 2</td><td>26</td><td>0.2039</td><td>0.09326</td><td>42.31</td><td>None</td><td>No</td><td>0.01</td><td>NP (normality)</td></t<>	Fluoride, total (mg/L)	AD-14	0.23	0.15	4	No 2	26	0.2039	0.09326	42.31	None	No	0.01	NP (normality)
Lead, total (mg/L)         AD-14         0.0002156         0.001095         0.0034         No         25         0.0001391         36         Kaplan-Meier         x²(13)         0.01         Param.           Lithium, total (mg/L)         AD-11         0.03221         0.02044         0.39         No         25         0.02302         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         0.0         1         Param.           Lithium, total (mg/L)         AD-14         0.01586         0.01148         0.39         No         26         0.004297         0         None         No         0.0         1         Param.           Mercury, total (mg/L)         AD-13         0.0000225         0.000064         0.002         No         25         0.0000689         4         None         No         0.0         No         25         0.0000699         0.00000887         4         None         No         0.0         No         25         0.0001637         0.000000887         4         No         No <td< td=""><td>Lead, total (mg/L)</td><td>AD-11</td><td>0.0009958</td><td>0.0004215</td><td>0.0034</td><td>No 2</td><td>25</td><td>0.0008763</td><td>0.0008405</td><td>28</td><td>Kaplan-Meier</td><td>x^(1/3)</td><td>0.01</td><td>Param.</td></td<>	Lead, total (mg/L)	AD-11	0.0009958	0.0004215	0.0034	No 2	25	0.0008763	0.0008405	28	Kaplan-Meier	x^(1/3)	0.01	Param.
Lithium, total (mg/L)  AD-11  AD-13  AD-13  AD-13  AD-14  AD-13  AD-14  AD-14  AD-13  AD-14	Lead, total (mg/L)	AD-13	0.0002902	0.00008866	0.0034	No 2	25	0.0003949	0.0005557	28	Kaplan-Meier	ln(x)	0.01	Param.
Lithium, total (mg/L)  AD-13  AD-13  D.03072  D.01586  D.01148  D.01586  D.01148  D.00002258  D.00000624  D.000006258  D.000006258  D.000006258  D.000006258  D.000006258  D.000006269  D.000006269  D.000006287  D.000006887  D.00000006887  D.000006887  D.0000006887  D.000006887  D.000006887  D.000006887  D.000006887  D.0000006887  D.000006887	Lead, total (mg/L)	AD-14	0.0002156	0.0001095	0.0034	No 2	25	0.0002255	0.0001391	36	Kaplan-Meier	x^(1/3)	0.01	Param.
Lithium, total (mg/L)  AD-14  AD-14  D.01586  D.01148  D.0006225  D.0000625  D.0000625  D.0000625  D.0000626  D.0000626  D.0000626  D.0000626  D.0000636  D.0000686  D.0000686 D.0000686  D.0000686  D.0000686 D.0000686 D.0000686 D.0000686 D.000	Lithium, total (mg/L)	AD-11	0.03221	0.02044	0.39	No 2	25	0.02633	0.01181	0	None	No	0.01	Param.
Mercury, total (mg/L)         AD-11         0.00002258         0.0000682         0.002         No         25         0.00001352         0.000007862         No         0.01         NP (normality)           Mercury, total (mg/L)         AD-13         0.0000515         0.00001322         0.002         No         25         0.0000687         4         None         No         0.01         NP (normality)           Mercury, total (mg/L)         AD-14         0.0001219         0.0002         0.0024         No         25         0.0005342         0.000231         16         Kaplan-Meier In(x)         0.01         Param.           Molybdenum, total (mg/L)         AD-11         0.001519         0.0002         0.0024         No         25         0.000548         0.003908         80         None         No         0.01         NP (NDs)           Molybdenum, total (mg/L)         AD-13         0.0008705         0.000497         0.0024         No         25         0.0005491         0.0005913         56         None         No         0.01         NP (NDs)           Selenium, total (mg/L)         AD-14         0.001707         0.001899         0.0024         No         25         0.0001415         0.0005616         16         Kaplan-Meier	Lithium, total (mg/L)	AD-13	0.03072	0.01533	0.39	No 2	25	0.02302	0.01543	0	None	No	0.01	Param.
Mercury, total (mg/L)         AD-13         0.0000515         0.0000132         0.002         No 25         0.0000698         2-4         None         No 0.01         NP (normality)           Mercury, total (mg/L)         AD-14         0.0008121         0.0001322         0.002         No 25         0.0001637         0.0002031         16         Kaplan-Meier In(x)         0.01         Param.           Molybdenum, total (mg/L)         AD-11         0.001519         0.0002         0.0024         No 25         0.000514         0.0005913         56         None         No         0.01         NP (NDs)           Molybdenum, total (mg/L)         AD-13         0.0008705         0.00059         0.0024         No         25         0.0005913         56         None         No         0.01         NP (NDs)           Molybdenum, total (mg/L)         AD-14         0.0006         0.00497         0.0024         No         25         0.0005913         56         None         No         0.00         NP (NDs)           Selenium, total (mg/L)         AD-14         0.001707         0.001899         0.05         No         25         0.001415         0.000136         16         Kaplan-Meier         No         0.01         Param. <td< td=""><td>Lithium, total (mg/L)</td><td>AD-14</td><td>0.01586</td><td>0.01148</td><td>0.39</td><td>No 2</td><td>24</td><td>0.01367</td><td>0.004297</td><td>0</td><td>None</td><td>No</td><td>0.01</td><td>Param.</td></td<>	Lithium, total (mg/L)	AD-14	0.01586	0.01148	0.39	No 2	24	0.01367	0.004297	0	None	No	0.01	Param.
Mercury, total (mg/L) AD-14 O.0008121 O.00008122 O.00024 No 25 O.0001637 O.0002031 O.00002031 O.0002031 O.	Mercury, total (mg/L)	AD-11	0.00002258	0.00000624	0.002	No 2	25	0.00001352	0.000007964	24	None	No	0.01	NP (normality)
Molybdenum, total (mg/L) AD-11 0.001519 0.0002 0.00024 No 25 0.000548 0.0005913 56 None No 0.01 NP (NDs) NP (ND	Mercury, total (mg/L)	AD-13	0.00000515	0.000004	0.002	No 2	25	0.0000069	0.000006887	44	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)         AD-13         0.0008705         0.00054         0.0024         No         25         0.000621         0.0005913         56         None         No         0.01         NP (NDs)           Molybdenum, total (mg/L)         AD-14         0.00064         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         0.001809         0.05         No         25         0.001415         0.000616         16         Kaplan-Meier         No         0.01         Param.           Selenium, total (mg/L)         AD-13         0.0009184         0.001807         0.05         No         25         0.0007679         0.0005271         12         None         x²(1/3)         0.01         Param.           Selenium, total (mg/L)         AD-14         0.002768         0.001807         0.05         No         25         0.002288         0.0009536         8         None         No         0.01         Param.           Thallium, total (mg/L)         AD-13         0.0002         0.00191         0.002         No         24         0.0002937         0.00154 <td>Mercury, total (mg/L)</td> <td>AD-14</td> <td>0.00008121</td> <td>0.00001322</td> <td>0.002</td> <td>No 2</td> <td>25</td> <td>0.0001637</td> <td>0.0002031</td> <td>16</td> <td>Kaplan-Meier</td> <td>In(x)</td> <td>0.01</td> <td>Param.</td>	Mercury, total (mg/L)	AD-14	0.00008121	0.00001322	0.002	No 2	25	0.0001637	0.0002031	16	Kaplan-Meier	In(x)	0.01	Param.
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)	Molybdenum, total (mg/L)	AD-11	0.001519	0.0002	0.0024	No 2	25	0.0005548	0.0003908	80	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^0(1/3)         0.01         Param.           Selenium, total (mg/L)         AD-14         0.002768         0.001807         0.05         No 25         0.002288         0.0009366         8         None         No         0.01         Param.           Thallium, total (mg/L)         AD-11         0.0002         0.0013         0.002         No         24         0.0002937         0.0003564         8         None         No         0.01         Param.           Thallium, total (mg/L)         AD-13         0.0002         0.0013         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 (n	Molybdenum, total (mg/L)	AD-13	0.0008705	0.0005	0.0024	No 2	25	0.000621	0.0005913	56	None	No	0.01	NP (NDs)
Selenium, total (mg/L)         AD-13         0.0009184         0.0004611         0.05         No         25         0.0007679         0.0005271         12         None         x^01/3         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         0.0013         0.002         No         24         0.0002184         0.000364         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)	Molybdenum, total (mg/L)	AD-14	0.0006	0.000497	0.0024	No 2	25	0.0005491	0.0003398	72	None	No	0.01	NP (NDs)
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)	Selenium, total (mg/L)	AD-11	0.001707	0.001089	0.05	No 2	25	0.001415	0.0006136	16	Kaplan-Meier	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)	Selenium, total (mg/L)	AD-13	0.0009184	0.0004611	0.05	No 2	25	0.0007679	0.0005271	12	None	x^(1/3)	0.01	Param.
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)	Selenium, total (mg/L)	AD-14	0.002768	0.001807	0.05	No 2	25	0.002288	0.0009636	8	None	No	0.01	Param.
	Thallium, total (mg/L)	AD-11	0.0002	0.00013	0.002	No 2	24	0.0002937	0.0003564	20.83	None	No	0.01	NP (normality)
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)	Thallium, total (mg/L)	AD-13	0.0002	0.00019	0.002	No 2	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 2	25	0.0002129	0.00008221	52	None	No	0.01	NP (NDs)

## Non-Parametric Confidence Interval

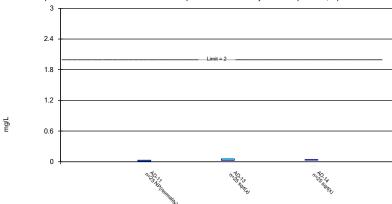


Constituent: Antimony, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Parametric and Non-Parametric (NP) Confidence Interval

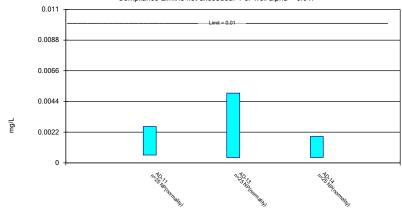
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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

## Non-Parametric Confidence Interval

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

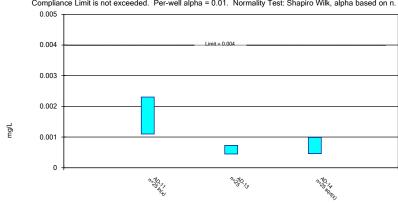


Constituent: Arsenic, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals Welsh Landfill Client: Geosyntec Data: Welsh LF

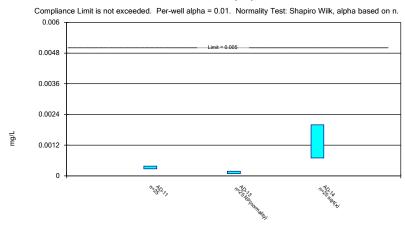
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Parametric Confidence Interval

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



## Parametric and Non-Parametric (NP) Confidence Interval

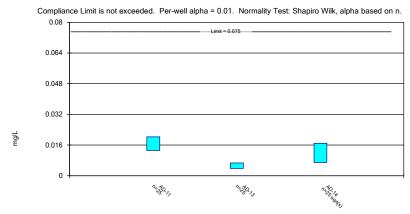


Constituent: Cadmium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

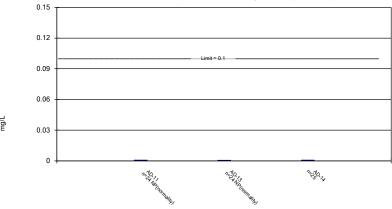
Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Parametric Confidence Interval



## 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.



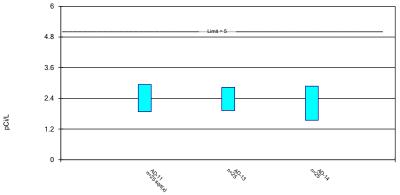
Constituent: Chromium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

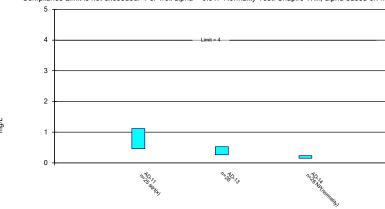
## Parametric Confidence Interval

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



## 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.



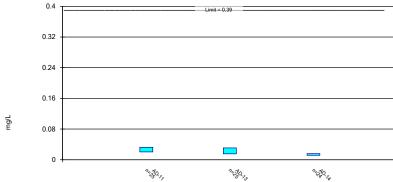
Constituent: Fluoride, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

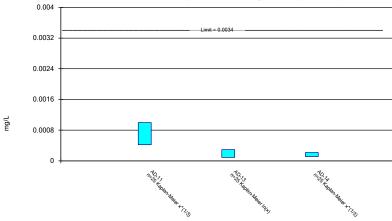
## Parametric Confidence Interval

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



## Parametric Confidence Interval

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



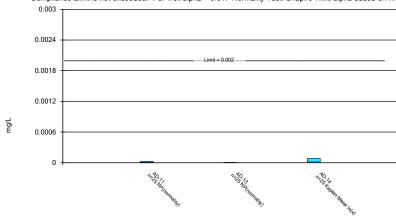
Constituent: Lead, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas  $^{\text{\tiny{TM}}}$  v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## 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.



Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Non-Parametric Confidence Interval

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

0.003

0.0024

0.0018

0.0012

0.0006

Constituent: Molybdenum, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## Non-Parametric Confidence Interval

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

0.003

0.0024

0.0018

0.0012

0.0006

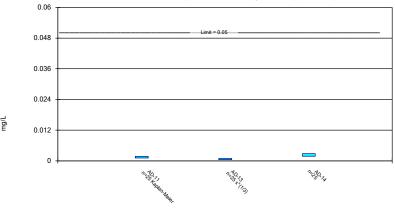
Constituent: Thallium, total Analysis Run 1/4/2024 2:31 PM View: Confidence Intervals

Welsh Landfill Client: Geosyntec Data: Welsh LF

Sanitas™ v.10.0.15 Software licensed to Groundwater Stats Consulting. UG

## 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

## **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.

Facility:		AEP WASH	Of HS		s well illspection Form	rispection	Form		*
Samplin	Sampling Contractor:		CACIF		Sampling Period:	-	FEBRUARY 2023	23	
Well No.	Well	100	:		olgilature:	7	IM		
	Locked	Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good	Well Properly Labeled	Well cap present	Comments	
AD-13	>	7	>	-	Suape				
A0-09	>	>		,	7	>	7		
AD-08	>	>	, >	)	>	>	7		
A0-05	>	3	1/4	2	>	>	7		
A0-0A	>	, >	3	> !	3	>	\		13.48
AD-12	>	>	2	> -	>	7	7		12.75
10-0H	>	>	, ,	3	3	7	7		19.95
AD-02	>	7			>	>	7	T	17.83
AD-03	\	7	, >	> >		>	.>	PAD BROKEN	13,17
AD-07	>	7	7		,	>	)		
A P-16R	>	>	7	3	> _	>	)		17,31
10-04c	5	>	7	.   _	5	> .	\		
1structions: (	Complete fc	<u>istructions:</u> Complete form and submit to AEP		tal Services with	7000	>	>		
nsdustactory	items shou	insatisiactory items should be left blank with a		omments section	note in the comments section on what needs to be a section or what	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.

FEBRUANY 2023	Liter
Sampling Period:	Signature:
1615H M	CACIF
acility: $\beta \in \mathcal{P} $	ampling Contractor: _

An-nyh		and the second s		ì		L	COLLINGING	
>	Functioning	After Sampling	Well Maintained	Housing, and Pad in Good Shape	Properly Labeled	present		
	>	>	>	>	>	>		1919
>	>	>		>	>	>		15,90
>	>	>	>	>	<i>\</i>	>		15.94
>	>	1	>	>	>	>		2333
>	>	>	V	>	7	>		5.71
			>	>		>	NO LOCK	4.66
>	>	>	>	>	>	>		9.34
								_

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

		Comments			DTW 19.26	•						re satisfactory.
2-6-23	Jamille	Well cap		\	7	\	\					for items that a
d:	The state of the s	Well	Labeled	\	\	\	1					sce check mark
Sampling Period:	Signature:	Well Casing,	Pad in Good Shape	>	>	\	\					th Field Data. Pla
S	iS	Access to Well	Maintained	\	>	\	>					ental Services wi
	Tago	Well Locked After Sampling	0	\	\	(	\					Instructions: Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory.
Welsh	tor:	Lock	0	>	>	)	\					e form and subn
	Contraci	Well		>	1	1	\					: Complet
Facility: _	Sampling Contractor:	Well No.		40.15	91.10	Poll	4514					nstructions

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

Facility Name	AFF WIGHPR		
Sample by	Kfrny M. Danged	Sample Location ID	F

05	3 (4)
Depth to water, feet (TOC)	

A0-03	
Sample Location ID	

1 - 1	0000	110110
	John to water date	

Dirgo C+3	Purae Stabilization Data								
20.00	יייייייייייייייייייייייייייייייייייייי			192	Sixed all lives over 100 months				
Time	Water Depth	Flow Rate	Н	Spec Cond	Turbidity	D.O.	ORP	Temperature	
	(from TOC)	(mL/min)	(S.U.)	(mS/cm)	(N.T.U)	(mg/L)	(mV)	(°C)	
0918	7.91	220	19.61	75	2.82	12.5	718	16.84	
0923	2,98	022	8916	72	115	7.07	420	17,21	
0928	2018	022	12.4	77	7.6	2,93	427	17,63	
0933	90'8	022	4.73	6.5	3.9	2,88	431	17,72	
			Control of the last of the las						

A STATE OF THE PARTY OF THE PAR	
Total volume purged	
Sample appearance	CLPAR
Sample time	0 935
Sample date	02/02/23

	Location ID AD-04 C
do H 572M d ) F	KFMNY MIDENMID
Facility Name	Sample by

Depth to water, feet (TOC)

Measured Total Depth, feet (TOC)

Depth to water date 02/07/23

Purge Sta	Purge Stabilization Data									
Ë	Water Depth	Flow Rate	Hd	Spec Cond	Turbidity	D.O.	ORP	Temperature		
ם	(from TOC)	(mL/min)	(S.U.)	(mS/cm)	(N.T.U)	(mg/L)	(mV)	(°C)		
1042	8,13	210	4.82	343	1.8	8,23	427	18:59		
1647	0218	210	18.5	350.	4.7	2,48	226	18.61		
7501	978	210	7.5	350	3,8	14.2	232	18,63		
1057	8.33	210	4.91	352	4,5	2,36	724	18,66		
								THE REAL PROPERTY AND PERSONS ASSESSED.	The second law and the second la	The same of the sa

Total volume purged	
Sample appearance	7/6477
Sample time	0501
Sample date	2/40/20

Facility Name	A ED WEISH PD		
Sample by	KFMMY Mr Denald	Sample Location ID	V

Depth to water, feet (TOC)	18.81
	3.0
Measured Total Depth, feet (TOC)	75 20
(0) (1) (1) (1) (1) (1) (1) (1) (1) (1)	2

A0-08	02/06/23
Sample Location ID	Depth to water date

	D.O. ORP	(mg/L) (mV)	8,21 345	1.94 344	1,73 342									
	Flow Rate pH Spec Cond	(mL/min) (S.U.) (µS/cm)	6.30	9Lh 559 022	220 6.35 481	220 6.33 486								
Purge Stabilization Data		(from TOC)	1011 14,23	1016 14,27	1021 14,29	1026 14.36	•		 10000					

Total volume purged	
Sample appearance	C1441
Sample time	1028
Sample date	12/99/20

0 0	10-07
	Sample Location ID
AEP WELSHPP.	KERNY M. Den Ald
Facility Name	Sample by

Depth to water, feet (TOC) | 3, 14

Measured Total Depth, feet (TOC) | 3 6 1 4 5

Depth to water date 02/00/2

											41							
	lemperature (°C)	17.91		8:36	14:06	9.13	1971											
0	ORP (mV)	212	2/2	2000	386	292	296											
	D.O. (mg/L)	3(0)	2,6	3,15	3.09	3,06	692	100										
	Turbidity (N T II)	10.1.10	10:1	7 -	[2,]	7.11	2 61	6 17 1										
	Spec Cond	( 12/c 11)	503	3 5 4	386	102	0011	700										
	Hd	(3.0.)	2,47	5,38	20,2	7 90	200	1.81										
	Flow Rate	(mL/min)	218	812	2.18	200	010	8 7										
Purge Stabilization Data	Water Depth	(trom 10C)	15,48	12.51	13, 64	12/2	) i @ /	14,73										
Purge Stabi	Time		000	0913	0100	0100	0760	0428										

Total volume purged	Sample appearance	Carripic appearance	Sample time	0+010 010000

Temperature (°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C)	
Sample Location ID  Depth to water date  (mg/L) (mV)  Coc   36  Coc   57  Coc   55	
Turbidity (N.T.U)	
Spec Cond (µS/cm) 45-6 58-6 68-6 68-6 68-6 68-6 68-6 68-6 6	
14.21 14.21 S.42 S.62 S.62 S.62 (1037)	52.9.5
TOC) feet (TOC)  and the Flow Rate  C) (mL/min)  22,  22,  22,  22,  22,  22,  22,  2	
Facility Name Sample by  Depth to water, feet (TOC)  Measured Total Depth, feet (TOC)  Purge Stabilization Data  (from TOC) (C25) (4/3)  14/37	

Duplicate 915

Facility Name	H fo WELSHAP
Sample by	Kinny mi Dengia

14,00	0 6'61
Depth to water, feet (TOC)	Measured Total Depth, feet (TOC)

140-13	02/06/23
Sample Location ID	Depth to water date

Purge Stabilization Data								
	Flow Rate	Hd	Spec Cond	Turbidity	D.0.	ORP	Temperature	
	(mL/min)	(S.U.)	(µS/cm)	(N.T.U)	(mg/L)	(mV)	(°C)	
	110	5.43	456	2.8	4,64	372	20,12	
	110	85'5	524	9.7	3,91	373	20,23	
_								
_			1.5					
_		WORLT	HOLD WATTER LEVEL	n Were				
_								
_								
-							32	
_								
<del></del>								
-								
-								
-								
_								
_								
$\vdash$								

Total volume purged	
Sample appearance	Clara
Sample time	1103
Sample date	02/00/23

2-623	Temperature (°C)	
Sample Location ID Depth to water date	ORP (mV) 227 243 245	*
Sample 1 Depth to	Turbidity D.O. (mg/l.) 21.3 ao/ 0 0.15 0 0.15	
	Spec Cond Tu (transfer) (transfer	
12.64 12.64 24.2	(S.U.) 4.84 4.77 4.77 4.77 (L.) (Slo) (Slo) (Slo) (Slo)	
(TOC)	(mL/min) 226 122 122 122 122 122 122 122 122 122	
	Time (from TOC) (126 12.87 12.47 12.	
Facility Name Sample by Depth to war Measured Tot	Time  (126  1025  1134  Total volume Sample appe Sample time Sample date	

•

2-6-23	Temperature (°C) (7°-7) (°C) (7°-18) (2.18)	
Sample Location ID Depth to water date	7. ORP (mV) (mV) 4.5 4.6 5.7 1.4 1.4 5.7 1.4 1.4 5.1 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1	
Sample	Turbidity D.O. (mg/L) 33 0 85 24 0.13   18 0.13   18 0.05   18 0.0	
12-miles.	Spec Cond (µS/cm) 2.5 8 147 137 147	
Molsh	PH (S.U.) 4(37) 4(37) 4(33) 4(33) 4(33)	16.1. 957 2-6-23
OC) Ceet (TOC	C) (mL/min) 250 250 250 250 250 250 250 250 250 250	
Facility Name Sample by Depth to water, feet (TOC) Measured Total Depth, feet (TOC) Purge Stabilization Data	11me (from TOC) 425 435 435 445 546 547 547 547 547 547 547 547 547 547 547	Sample appearance Sample time Sample date

Facility Name	A CO WAS IT PO
Sample by	Kray M. Dangeld

Depth to water, feet (TOC)  $2 \dot{b}$ ,  $0 \ 3$  Measured Total Depth, feet (TOC)  $3 \ i$ ,  $3 \ i$ 

Sample Location ID  $\beta 0 - 16 R$ Depth to water date  $\delta 2 / \delta 7 / 2 3$ 

Purge Sta	Purge Stabilization Data								
Ä	Water Depth	Flow Rate	Hd	Spec Cond	Turbidity	D.0.	ORP	Temperature	
ב	(from TOC)	(mL/min)	(S.U.)	(µS/cm)	(N.T.U)	(mg/L)	(mV)	(°C)	
1000	26,32	120	3.75	212	11.8	5.31	885	18.37	
1005	26.37	120	3,71	209	3,6	12.21	75h	18.44	
0101	26,40	021	3,67	202	2.0	2,18	427	14,81	
1015	26,44	120	3,65	197	217	2,14	61h	18,49	

Total volume purged	
Sample appearance	W1)
Sample time	1017
Sample date	02/07/23

June 2023		Comments	DIW = Depth to	W ster	2	Vegitatin afound Well	.Vestating alound well	DTW-11.61 OVERGIOWN		No Bolleids	DTW - (5.0) No Dellings		NTW 7.03	DTW 10,94	DTW 12.01		
	WAT KANNING	Well Cap	Present and Vented*	Υ	\	\	)			7	1	)		\	\		
Sampling Period:	nre:	Well	Properly Labeled		\	\	J	7	1	)	)	)		\	\		
Sampli	Signature:	Well Casing,	Protective Cover, Barriers and	Pad in Good Shape	\	\	)	)	\	)		\	1	\	\	P	
		Access to	Well Maintained		1	÷			\	)	\	\	J				
ļ	7	Well	Locked After Sampling		)	\	)	)	\	)	\	\	\	<b>)</b>	)		
ا کام	or:	Fastener	and Lock Functioning		\		)	1		)	1	,	/	)			
	Contracto	Well	Locked		7	1	7	7	\	)	\	7	)	>			
Facility: _	Sampling Contractor:	Well No.			AFIR	An	A - 1-4	AD-10	An. 16A	AD . V	AD:2	ANIJ	X	40-22	A-23		

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

2023

Sampling Period:	Signature:
11	CACIF ENVIOUN
acility: レドン 日	Sampling Contractor:

Comments				175.	12.61	9'8	17,23		13.13			not moute
Well cap present	>	7	>	>	4	>	>	>	>	>	>	V NOT
Well Properly Labeled	>	1	1	/	>	>	>	>	>	>	>	>
Well Casing, Housing, and Pad in Good Shape	>	>	1	>	1	>	>	>	>	>	>	
Access to Well Maintained	>	>	>	>	>		7		1	>	>	
Well Locked After Sampling	>	>	>	>	>	^	>	/	1	1	>	>
Lock	>	>	>	)	>	5	>	>	>	>	1	>
Well	>	>	>	>	>	>	>	>	>	>	>	,,
Well No.	AD-13	AD-08	A0-04C	40-04	A10-04A	AD-076	40-07	A0-12	90-0A	A0-05	A0-09	0.00

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.

12	ナイアションコーナ		
7	Kinny Mipongy	Sample Location ID	10-dH
	18,38	Depth to water date	06/06/23
	78:71		

	Temperature	(2)	23,12	23,08	23.04	22,97							
	ORP	(mV)	198	197	191	186							
	D.O.	(mg/L)	1.78	1,50	1:36	1.31							
	Turbidity	(N.T.U)	13,6	1,3	. 8	610							
	Spec Cond	(m2/cm)	364	3.04	767	162							
	Hd	(S.U.)	4.99	4.93	263	1615							
	Flow Rate	(mL/min)	214	412	412	717							
Purge Stabilization Data	Water Depth	(from TOC)	18.42	18,46	18,51	4.56							
Purge Stabi	Time		1037	7401	1047	1052							

BACKERONNO DUPLICATE 120 0

chan

Total volume purged Sample appearance

Sample time Sample date

Facility Name		11/21 01						
Sample by		1000						
		アナナイル	100		Sample Location ID	Ol ID	40.2	
Depth to water feet (TOC)								
Moseurod Total Parata	(C)	70,6	9.6		Depth to water date	er date	1172	
ivieasuled lotal Depth, teet (10C)	100)	70.	13			7155	6.6-6.7	
Purge Stabilization Data			***************************************				~	
14.24.27	- 1				٠			
Time Water Deptil	Flow Kate	Ha	Spec Cond	Turbidity	D.O.	aao	1	
	(mL/min)	(S.U.)	(µS/cm)		(1/2001)		emperature 7	
37,9 7,60	200	7007	(=)	27 1	ATT.	ď	(2,2)	
16471 9.54	300	なっつ	) (	-	2000 P. C.	ľ	25.68	
1057 6 6	702	1			3.46	~	ング、ダグ	
-	2,2	1, 50	64	4,5	3.49	327	7417	
	200	~,	63	-0	ンドイ	37.4	207 170	
						/	27,08	
4-4-7								
							-	
		-						
						,		
Total volume purged								
Sample appearance		Clest						
Sample time		1059						
Sample date		1-1-72						
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						

Facility Name	ACP WASH PP		
Sample by	12 from m Deraid	Sample Location ID	A0-04C
	1		
Depth to water, feet (TOC)	h8'8	Depth to water date	06/05/23
Measured Total Depth, feet (TOC)	oc)   8.8 2		

	Temperature (°C)	72,54	22:22	22,13	22,06	22.01							
	ORP (mV)	256	198	16	170	163							
	D.O. (mg/l.)	3.28	141	2,33	2,29	2,27							
	Turbidity (N T II)	781	17.5	17.3	17,3	17,0							
	Spec Cond	339	338	337	335	734							
	Hd	\$ 2.5	51.5	2115	5.10	80.5							
	Flow Rate	200	200	200	200	002							
Purge Stabilization Data	Water Depth	8 9 4	8,99	9.03	9,09	7							
Purge Stak	Time	200	1019	1024	1029	1034							

Total volume purged	
Sample appearance	C1(44)
Sample time	1036.
Sample date	06/05/23

Facility Name	TO WAGH PO		
Sample by	Kiny Millerail	Sample Location ID	AD-05
	14 N 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
Depth to water, feet (TOC)	14.42	Depth to water date	06/00/23
Aeasured Total Depth, feet (TOC)	38'28		

	Temperature	(°C)	21,52	21.40									
	ORP	(mV)	121	561									
	.O.d	(mg/L)	4157	3.52			H						
	Turbidity	(N.T.U)	166	158			with the						
	Spec Cond	(µS/cm)	464	463			wit the water to the						
	Н	(S.U.)	525	0815									
	Flow Rate	(mL/min)	601	F 01									
Purge Stabilization Data	Water Depth	(from TOC)	15.37	16,52									
Purge Stab	Time	)	9280	0831									

Total volume purged	
Sample appearance	TURRIO
Sample time	00 00
Sample date	06/06/23

Facility Name       H CP ~ ELSH P F         Sample by         C   M C   D   P C   P F         Depth to water, feet (TOC)         H CP ~ ELSH P F         Measured Total Depth, feet (TOC)         H CP ~ ELSH P F         Measured Total Depth, feet (TOC)         P C		000		
Sam Nater, feet (TOC) 1/4、S () Dep Total Depth, feet (TOC) 2 % () V	Facility Name	4CP > F15H PF		
14.50 2 9.09	Sample by	16 promy M. C. Der M. C.	Sample Location ID	AD-08
14.50 Pop 2				
Measured Total Depth, feet (TOC) 2 9,04	Depth to water, feet (TOC)	14.50	Depth to water date	82/50/90
	Measured Total Depth, feet (TOC)	5006 2		

	Temperature	(၁ )	22.45	27.79	77.87	58.27								
	ORP	(mV)	318	339	345	357								
	D:0	(mg/L)	2.81	2.78	54.2	2,73								
	Turbidity	(N.T.U)	13,6	8.3	9,0	8.6	•							
	Spec Cond	(µS/cm)	1/Lh	666	473	26h		2						
	Н	(S.U.)	56.3	1119	(11)	6.13								
	Flow Rate	(mL/min)	012	210	210	012								
Purge Stabilization Data	Water Depth	(from TOC)	14,72	14,74	14.74	14,77								
Purge Stabi	Time	)	9580	1000	9060	100				3				

#### PBAP DUPLICATT. 1200

1441

Total volume purged

Sample appearance Sample time

Sample date

Facility Name	AFP WHSH PP.		· c	- 1
Sample by	KINDY MIDOUALD	Sample Location ID	FO-09	
				1
Depth to water, feet (TOC)	E2/h/	Depth to water date	06/06/73	
Measured Total Depth, feet (TOC)	56.95			

Turbidity D.O. ORP  (N.T.U) (mg/L) (mV)  2, 8	rge Sta	Purge Stabilization Data								T
14,31 218 5.08 568 2.8 2.62 217 14,39 218 5.05 566 1.1 2,37 219 14,39 218 5.10 567 0.7 2.37 213 14,39 218 5.10 567 2.37 213	e	Water Depth (from TOC)	Flow Rate (mL/min)	рН (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)	
14,39 2.18 5.05 5.66 1.1 2,37 2.19 14,39 2.18 5.00 5.61 0.7 2.34 2.13 14,42 2.18 5.10 5.61 0.9 2.31 2.11	38	14.3)	812	80.5	895	2.8	2912	217	25,77	
14,39 218 5,10 561 0,9 2,34 213 14,42 218 5,10 561 0,9 2,34 211 112 152 0,9 2,34 211	I.	14,33	812	50.5	266	1.1	2,37	612	18122	
117 12 218 5:10 561 0.9 2:31 211	48	14,39	218	2015	557	0,7	2,34	512	48.52	
	53	_	218	5.10	561	6.0	2,3	112	18'22	
									e.	
				24						

Total volume purged	
Sample appearance	Clear
Sample time	0955
Sample date	06/06/23

Temperature 22.0x 2 h 12 ÓRP (m) Depth to water date Sample Location ID (mg/L) Turbidity (N.T.U) 7.75 Spec Cond (µS/cm) 585 3.3 ₹ 2 (S.U.) Welsh ᇊ Flow Rate (mL/min) 204 200 200 Measured Total Depth, feet (TOC) Depth to water, feet (TOC) Water Depth (from TOC) Purge Stabilization Data 8= 21 5 Š Facility Name Sample by グナー = 38 1043 57.0 Time

Land fill Duplicet

1-5-23

clear

Total volume purged Sample appearance

Sample time Sample date

Facility Name	the wash pp		
	KINNY MI PONALO	Sample Location ID	A0-13
Depth to water, feet (TOC)	20191	Depth to water date	62/50/90
Measured Total Depth, feet (TOC)	05'61		

200												
	Temperature (°C)	77,54	19:22									
	ORP (mV)	277	236									
	D.O. (mg/L)	3,82	2,97									
	Turbidity (N.T.U)	20.7	19,4			17 / m						
	Spec Cond (µS/cm)	790	493			1400 Jahr						
	PH (S.U.)	29%	69'6			12 (IN 17						
	Flow Rate (mL/min)	401	401									
Purge Stabilization Data	Water Depth (from TOC)	16,94	70.81									
Purge Stab	Time	8838	560									The state of the s

Total volume purged	
Sample appearance	( Way
Sample time	6/11
Sample date	62/50/00

Facility Name	Š	W. I. I.						
Sample by		Total Total	7-6		Comme	1		
		1			Sample Location (U	Ulon ID	ADVIE	
Depth to water, feet (TOC)		75 75						
Measured Total Depth, feet (TOC)	TOC)	1/1	7.2		Depth to water date	ter date	82-5-9	
			)					
Purge Stabilization Data								
Time Water Depth	Flow Rate	Hd	Spec Cond	Turbidity	D.O.	ORP	Temperature	
	(mL/min)	(S.U.)	(µS/cm)	(N.T.U)	(mg/L)	(mV)	(0,)	 
	200	27:1	588	25.4	7.50	33	124	
4	260	4,43	476	6.5	27.0	2.2	77.50	
32.38	200	5,33	863	\ \ \	0.18	284	いい	
1156 15.79	220	5.34	7%	8	11.0	もって	14.4	
					99.5	<b>*</b>	7.1.	
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					******
								d dec
								İ
Taka in the same of the same o								
Total volume purged								
Sample appearance		cleur						
Sample time		158						
Sample date		6-5-23						

Facility Name		Molt L		<b></b>				
Sample by	1	1	-+		Cample Lores			
	-			_	Sample Location ID	cron (C)	AD-15	
Depth to water, feet (TOC)		5167		,	Destablish			
Measured Total Depth, feet (TOC)	(TOC)	1,44.		· •	Depth to water date	er date	6-5-53	
							u.	
Purge Stabilization Data								
Time Water Depth	Flow Rate	Hď	Spec Cond	Turbidity	0	490		
(fro	(mL/min)	(S.U.)	(µS/cm)	(N.T.III)	(2,2)		emperature	<b>⇔</b>
928 21.81	2 K	4.03	27.5	17.3	(11/E/L)	(my)		
533 22.02	280	たった	2	100		260	~	
938 22.11	280	5/7	145	75.5	000	283	23.33	144
643 22.15	286	11 7	3	1/[4		258	23.42	
4.18 22 17	28,	7	1012	5	0,51	286	1	
453 22.18	2%	1~	2/0	2	0.87	780	23,54	
グー・ハー・メント	Ž		27	92.	0,79	2.75	23.65	
	30,	4	2 \$	35	C. 74	275	23,71	
4 4	207	7.50	5	30	0.70	> 71	23.72	
7-57	286	4.32	187	~	L, 0	> 16	12 21	
1013 22.11	\$ ~	4.33	183	13.2	11 7	0,7	12.10	
					20.,,	000	<>> /	
Total volume purged			_					
Sample appearance		4.1bid						
Sample time		1015		·				
Sample date		1-4-23						
				_				

Sample Location ID	Depth to water date $6-6-23$		/ D.O.	(N.T.U) (mg/L) (mv) (°C)	5.55						Ē		CONCINCTOR AND				
Wesh Hemilton	c) 25:48 31.30	Commence of the state of the st	Flow Rate pH Spec Cond		235	<b>-</b>									(1086	を行う	(-9-53
Facility Name Sample by	Depth to water, feet (TOC) Measured Total Depth, feet (TOC)	Purge Stabilization Data	Time Water Depth (from TOC)	56.15	7 26									Total volume purged	Sample appearance	Sample time	Sample date

Sample Location ID  Depth to water date  \[ \langle \l	W         D.O.         ORP         Temperature           (mg/L)         (mV)         (°C)           (/Z \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$		
1) 1/2 Hen Hen Hen 19-6	Flow Rate   pH   Spec Cond   Turbidity   (mL/min)   (5.U.)   (µS/cm)   (N.T.U)   ( 2.3	Will Max	Cles 6
Facility Name Sample by Depth to water, feet (TOC) Measured Total Depth, feet (TOC)	Time Water Depth (from 70C)  8\$\inf{\alpha} \geq \frac{\alpha}{\alpha} \frac{\alpha}{\al		Total volume purged Sample appearance Sample time

		vtd s					16.99			9.90	18.62	18.71	7	21.40
~		Comments											DVACALWA	DUFACHEN
cTB/M 6023		Well cap	present	>	>	>	7	>	\ \	\	>	>	>	>
	A.	Well	Properly Labeled	>	>	1	1	/	1					>
Sampling Period:	Signature:	Well Casing,	Housing, and Pad in Good Shape	)	1	0		1		>		>	>	>
		Access to	Well Maintained	>		)	>				>			
1.1	FAOIC	Well Locked	After Sampling	>	1	>	1	1	1		>			<i>&gt;</i>
THE WEIST IT		Lock	Functioning	>	1	~	>	>	1	>		>	/	
7	g Contrac	Well	Locked	>	>	>	>	>	>	>	>	`.	\ \	>
Facility:	Sampling Contractor:	Well No.		H0-13	A10-09	A10-08	A D-07	A10-05	AD-04c	AD-046	AD-07	A.D-04a	10-0H	21-04

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.

O Vin Grown

Comments no bulliers Dallie15 0 Well Cap Present Vented\* and Sampling Period: Properly Labeled Well Signature: Well Casing, **Barriers and** Pad in Good Protective Cover, Shape Maintained Access to Well Sampling Locked After Well Functioning and Lock Fastener Sampling Contractor: Locked Well Facility: Well No. AD-22 MD-16R Ab-18 AD .23 AD-114 AD-17 AD-15 AD-10 AD-11 AD-3 **₹-**-

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

Facility Name	AS WELCH PP		
Sample by	Kerry M. Dowald	Sample Location ID	10-01
Depth to water, feet (TOC)	90'0	Depth to water date	10/04/23
Measured Total Depth, feet (TOC)	28.71		

	Temperature	54.42	24,43	24,43	24,40							
	ORP (2017)	383	287	389	391							
	D:0.	(IIIB/L) 2, (1)	2,10	80'2	2,05							
	Turbidity	2,8	1.3	1.1	8.0							
	Spec Cond	7.70	822	692	267							
	Hd	5.30	5.30	525	5.29							
	Flow Rate	022	072	220	220							
Purge Stabilization Data	Water Depth	19.26	19,27	19,27	19.20							
Purge Sta	Time	4560	6560	1001	6001							

BACKGALLIND DUP 1200

WW377

Sample appearance Sample time

Sample date

Total volume purged

	5			
	20 J	Temperature (°C)		
	ation ID	ORP (mv) 33 7 35 7 346 343		
• 4	Sample Location ID Depth to water date	0.0. (mg/l)   1,35 0.65 0.45		
·		Turbidity (N.T.U)  5,  26.57 23.3		
	24,13	Spec Cond (uS/cm) (s d		
15/07	0.1	Hd (S.U.) 4.4.4.4.4.4.4.4.8.4.4.4.8.4.4.4.8.4.4.8.4.4.8.4.4.8.4.4.8.4.4.8.4.4.8.4.4.8.4.4.4.8.4.4.8.4.4.8.4.4.4.8.4.4.8.4.4.4.8.4.4.4.8.4	clese   050   0-4-23	
		Flow Rate (mL/min)		•
me	Depth-to water, feet (TOC) Measured Total Depth, feet (TOC) Purge Stabilization Data	Water Depth (from TOC)   0.45   11.06   11.11	e purged earance	
Facility Name Sample by	Depth-to	Time (25/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/	Total volume purged Sample time Sample time	

Sample by King of Mary Man 1	Facility Name	FF >615+		
	Sample by	KINNY M. News. 1	Sample Location ID	カン・しな

Depth to water, feet (TOC)	(0,0)
Measured Total Depth, feet (TOC)	18.87

82/h
10/0
epth to water date

		J. De la Contraction de la Con												
	Temperature	(a,C)	211/2	24,65	24,67	24.68								
	ORP	(mV)	782	262	396	った								
	D.O.	(mg/L)	11/5	3.07	5,93	2,88								
	Turbidity	(N.T.U)	9.21	1.8	10,7	211	1.111							
	Spec Cond	(mS/cm)	345	341	340	740								
	Hd	(S.U.)	18/6	28.7	4.94	4.97								
	Flow Rate	(mL/min)	210	012	210	210								
Purge Stabilization Data	Water Depth	(from TOC)	10.11	10,16	10,20	10.23								
Purge Stak	Time	)	4060	0000	61160	6 6 6 0								

Total volume purged	
Sample appearance	Cherry
Sample time	0921
Sample date	10/04/23

Facility Name	TT WEIST 1			
Sample by	KINNY OF OCH	Samule Location ID	20-05	

Depth to water, feet (TOC)  $|\mathcal{A}.38$ Measured Total Depth, feet (TOC) 32.88

Depth to water date  $|0/64/z_3|$ 

Spec Cond Turbidity D.O. ORP Temperature (μS/cm) (M.T.U) (mg/L) (mV) (°C) (°C) (γγ β β β β β β β β β β β β β β β β β β
(N.T.U) (mg/L) (mV)    16
116 2,79 329 42,3 1,43 87 44.0
45.3 1.43 87
WOR17 HEU

Total volume purged  Sample appearance  Sample time  Sample date  Total volume $\frac{5 \iota_1 \iota_2 \mu_1 \iota_3 \nu_2}{1 \mu_3}$		
Sample appearance $\frac{\int L(c_H T L^4) + L M \delta I O}{1   1   8}$ Sample date $\frac{10}{1000000000000000000000000000000000$	Total volume purged	
Sample time	Sample appearance	SLICHTLY TLABID
Sample date 10/04/23	Sample time	8111
	Sample date	10/04/23

Facility Name	AFO WELSH PP			
Sample by	Kinry McDorAnd	Sample Location ID	HO-08	
				į į
Depth to water, feet (TOC)	14.57	Depth to water date	10/03/23	
Measured Total Depth, feet (TOC)	29.64			

	*												
	Temperature (°C)	26.42	26,69	66.32	26.76								
	ORP (mV)	47	43	40	39								
	D.O. (mg/L)	2,03	1.69	1.68	5911								
	Turbidity (N.T.U)	4.8	5/2	1.6	1.3								
	Spec Cond (µS/cm)	SSH	2htz	438	433								
	рН (S.U.)	6519	6667	19:9	6.68								
	Flow Rate (mL/min)	216	216	912	912		2						
Purge Stabilization Data	Water Depth (from TOC)	127	14,6	19,41	14,63								
Purge Stab	Time	1003	1008	1017	1018								

PBAP DUPLICATE 1200

( Com

Total volume purged Sample appearance

Sample time Sample date

Facility Name	AFF WELSH PP			
Sample by	Kenty My Dona U	Sample Location ID	P-0-9	
Depth to water, feet (TOC)	= 5	Depth to water date	10/03/23	
Measured Total Depth, feet (TOC)	36,45		-	

	Temperature	10.50	1200	23,09	22,87	23.01	22,96							
	ORP (m)/	100	200	28	10	id	52							
	D.O.	(IIIB/L) S (, f	100	2,34	2,33	2,27	7,24							
	Turbidity	(N.1.0)	5 - 1	0.0	0.0	0,6	0 0							
	Spec Cond	(haycill)	05 12	1300	1310	1480	0951							
	Hd	(3.0.)	0,56	5,88	185	5.83	683							
	Flow Rate	770	177	072	220	022	220							
Purge Stabilization Data	Water Depth	14 10	0 11	14.21	17,22	14,27	14,29							
Purge Stab	Time	100	000	200	900	9	126							

Total volume purged	
Sample appearance	Clear
Sample time	6923
Sample date	10/03/23

10-3.23 Temperature ングとなる ORP CAST Depth to water date Sample Location ID (mg/L) 0.00 0.0 1300 Turbidity (N.T.U) 19.2 22.5 Spec Cand (µS/cm) 980 N=41. 4=17 22,10 (S.U.) 1,17 4.15 0 7 717 드 C Car Flow Rate (mL/min) 200 Measured Total Depth, feet (TOC) Depth-to water, feet (TOC) Water Depth (from TOC) Purge Stabilization Data 5.32 537 13.38 Total volume purged Sample appearance Sample time Sample date Sample by 1000 Time

Facility Name

Lendfill Dup 1036

ו מכווונא ואמוווב	THE WEIST JO		
Sample by	KINCY MICDENAND	Sample Location ID	A0-13
			7
Depth to water, feet (TOC)	1/5,51	Depth to water date	10/03/23
Measured Total Depth, feet (TOC)	19,40		

Total volume purged	
Sample appearance	CLEAN
Sample time	8111
Sample date	22/20/01

Ap. 14	Temperature (°C) 3-713 6-25	
Sample Location ID Depth to water date	D.O. ORP Tempera (mg/L) (mV) ("C"C) 265 3 3.,44 C. 55 5 26.73 0.95 25.7 26.25	
	Spec Cond Turbidity (µS/cm) (N.T.U) {\$!	
16-54 Harilling 16-31	nin) (5.U.)  4,55  4,61	[ca/   04   05.23
by  to water, feet (TOC)  ed Total Depth, feet (TOC)  tabilization Data	(from TOC) (mL/min)   (from TOC) (mL/min)	Total volume purged Sample time Sample time

:

•

Temperature 25.34 ORP (mV) Depth to water date Sample Location ID 0.4% (mg/L) 2000 0.0 Turbidity (N.T.U) 50.7 Spec Cond (µS/cm) (S.U.) んろ Flow Rate (mL/min) 28° 28% Measured Total Depth, feet (TOC) Depth-to water, feet (TOC) Water Depth (from TOC) Purge Stabilization Data Total volume purged Sample appearance Facility Name Sample time Sample date Sample by 3258 438 Time

AD-10-19,24 AD-22 11,85 AD-2-15,56 AD-23 13.33 AD-18-9,34

Sample Location ID  Depth to water date    0-4-23	Turbidity D.O. ORP Temperature (N.T.U) (mg/L) (mv) (°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C			
Welsh Hamilton 2672 2672	Flow Rate   pH   Spec Cond   Tur			
Facility Name Sample by Depth to water, feet (TOC) Measured Total Depth, feet (TOC) Purge Stabilization Data	Time Water-Depth Fic (from 70C) (m (4e7 27.3)			Total volume purged Sample appearance Sample time Sample date

BASP Dup 113

10-17 10-4-73	Temperature (°C) 23-4 i 22 55		
Sample Location ID Depth to water date	D.O. ORP Temper (mg/L) (mV) (°C / 23.4 / 23.4 / 22.5)		
S 2 0 0	Spec Cond Turbidity (us/cm) (N.T.U) (76e &3 . & (76e & 75 . &	Will hat hald	
Weldy Nort How; 14.	Flow Rate   pH   Sp.		slightly twibid
Facility Name Sample by Depth to water, feet (TOC) Measured Total Depth, feet (TOC)	Purge Stabilization Data Time Water Depth Flov (from TOC) (ml \$34		Total volume purged Sample appearance Sample time



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-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. <b>1</b> 0 μg/L	1	0.20	0.04 J1	GES	02/15/2023 09:27	EPA 200.8-1994, Rev. 5.4

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 %					

<sup>\*</sup> 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.



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-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

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 %					

<sup>\*</sup> 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.



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. <b>1</b> 6 μg/L	1	0.20	0.04 J1	GES	02/15/2023 09:47	EPA 200.8-1994, Rev. 5.4

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 %					

<sup>\*</sup> 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.



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

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
<b>Carrier Recovery</b>	87.5 %					
Radium-228	1.22 pCi/L	0.19	0.59	ΠTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	68.7 %					

<sup>\*</sup> 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.



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 Uni	s Dilution	RL	MDL Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.03 μg/	. 1	0.10	0.02 J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25 μg/	. 1	0.10	0.03	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Barium	35.8 μg/	. 1	0.20	0.05	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.460 µg/	. 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/	. 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/	. 1	0.20	0.04	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Cobalt	4.17 μg/	. 1	0.020	0.003	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4
Lead	0.16 µg/	. 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/	. 1	5	2 U1	JAB	03/01/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2 μg/	. 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/	. 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/	. 1	0.20	0.04 J1	GES	02/15/2023 10:59	EPA 200.8-1994, Rev. 5.4

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 %					

<sup>\*</sup> 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.



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 Qualifier	s 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. <b>1</b> 62 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. <b>1</b> 5 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

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
<b>Carrier Recovery</b>	96.3 %					
Radium-228	1.16 pCi/L	0.28	0.89	ΠTP	02/22/2023 16:47	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	59.6 %					

<sup>\*</sup> 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.



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

Metais							
Parameter	Result Unit	s 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	<b>16.1</b> 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	<b>131</b> 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



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



Job ID: 230470

### **Water Analysis Report**

### Reissued

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

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

Muhael S. Ollinger

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 Qualifer 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.

Dolan Chemical Laboratory (DCL.) 4001 Bixby Road				0	Chair	ı of C	Susto.	ર્ક્ટ્ર lain of Custody Record	ord	tol-	hasey	2304701 Meh. S
Groveport, Ohio 43125 Jonathan Barnhill (318-673-3803) Contacts: Michael Ohlinger (614-876-4784)				Prog	Program: 6	Coal Com	mbustio	Coal Compustion Residuals (CCR) Site Contact	is (CCR	) Date:	-	For Lab Use Only: COV
Project Name Welsh Annual Screening						14		Field-filter 500 mL	12	Three (six every		
Contact Name: Jill Parker-Witt	Analysis	Turnaround	Analysis Tumaround Time (in Calendar Days)	lendar Da	375)			bottle, then pH<2,	bottle, Coot,	10th*)	0 mL ( Н ,6115) (<2	087087
Contact Phone: (318) 673-3816							HNO3	HNO3	<b>3,9-0</b>	pH<2, HNO3	po	
Sampler(s): Matt Hamilton Kenny McDonald						(S) (S)	o, Pb,	nM bas (	SO,,	-228		
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Init	B, Ca, Li, Sb, Be, Cd, Cr, C Mo, Se, TL and Na, K, M	dissolved Fe	TDS, F, CI, and Br, All	Ra-226, Ra	βн	Sample Specific Notes.
AD-8 (PBAP)	2/6/2023	1028	g	GW	9		×		×	×	×	
AD-9 (PBAP)	2/6/2023	930	ပ	GW	g		×		×	×	×	
AD-11 (LF)	2/6/2023	1037	g	ß	o)		×		×	×	×	
AD-13 (LF)	2/6/2023	1103	O	GW	ø	1	×		×	×	×	
AD-14 (LF)	2/6/2023	1132	ŋ	GW	φ		×		×	×	×	
AD-15 (PBAP)	2/6/2023	957	ŋ	GW	ø		×		×	×	×	
DUPLICATE	2/6/2023	915	Ø	GW	m		×		×		×	
EQUIPMENT BLANK	2/6/2023	1114	ŋ	AS S	2		×				×	
					1	+						
					+	1						
					+	+						
Preservation Used: 1* Ice, 2* HCI; 3* H2SO4; 4*HNO3; 5*NaOH; 6* Other Six 1L Bottles must be collected for Radium for every 10th sample.	HNO3; S=Na	Sample.	her	; F= filter in field	ilter in f	pla	4	7		4	2	
Special Instructions/QC Requirements & Comments:	nts:											
,												
Relinquished by That Samillan	Company:	77,8,7		Date/Time: 2/8/23	l	12co Re	Received by					Date/Time
	Company:	,		Date/Time:	iei (	ď	Received by		*			Date/Time
Relinquished by:	Company:			Date/Time:	je je	ď	Received in Labo	Laboratory by:	× ×	Jag To		DaterTime; 2/9/2 10,30Am
Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1	ord for Coal	Combust	on Residu	I (CCR)	Samplir	ig - Shre	veport, Re	2		9	1	Maffy - /2/24 10:30AM
							•	3	3	335	١ / ١	17110117



# WATER & WASTE SAMPLE RECEIPT FORM (Temp Gun 1)

Package Type	Delivery Type
Cooler Box Bag Envelope	PONY UPS AedEX USPS
	Other
Plant/Customer Welsh	Number of Plastic Containers: 29
Opened By MAK/TTP/MSD	Number of Glass Containers:
Date/Time <u>8/13/23</u> (0'.30A~	
g .	of N/A Initial:on ice / no
ice (IR Gun Ser# 221368900, Expir. 3/22/26	
Was container in good condition?   N	Comments
	Comments
	If RUSH, who was notified?
pH (15 min) Cr <sup>+6</sup> (pres ) NO₂ or N (24 hr)	NO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)
Was COC filled out properly?	Comments
Were samples labeled properly? (Y) N	Comments
Were correct containers used? YN	Comments
Was pH checked & Color Coding done?	N or N/A Initial & Date: Mbk 2/13/23
pH paper (circle one). MQuant.PN1.09535.0001.L	OT# HC904495 [OR] ab Rat,PN4801,LOT# X000RWDG21
Was Add'l Preservative needed?	es: By whom & when: Hg Lab (See Prep Book)
Is sample filtration requested? Y / (W)	Comments (See Prep Book)
Was the customer contacted? If Yes:	Person Contacted:
Lab ID# 230470 Initial &	Date & Time :
Logged by	ents:
Reviewed by MIC	

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



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 Description: TG-32** 

Customer Sample ID: AD-9 (PBAP)

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



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	<b>11</b> 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



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 Description: TG-32** 

Customer Sample ID: AD-15 (PBAP)

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 I	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



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.



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 Qualifer Legend**

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

		COC/Order #	230430		Sample Specific Notes:															Date/Time:	Date/Time:	Date/Time; 2/9/2 10,30Am	
to	72		250 mL Glass bottle, HCL**, pH<2		вн	×	×	×	×	×	×	×	×				2						
40V)		Date:	Three (six every 10th") 1 L bottles, pH<2, HNO <sub>3</sub>	82Z-F	Ra-226, Ra	×	×	×	×	×	×		100				4					The state of the s	
ord	als (CCF		1 L bottle, Cool, 0-6°C	SO <sub>4</sub> ,	TDS, F, CI, and Br, All	/.×	ж	×	×	×	×	×					- 1					¥ 4	
Chain of Custody Record	Coal Compustion Residuals (CCR)		Field-filter 500 mL bottle, then pH<2, HNO <sub>3</sub>		Feriossip												F4			.A.	. <del>y</del> .	Received in Laboratory by:	Sampling - Shreveport, Rev. 1, 1/10/17
Custo	ombusti	tact	250 mL bottle, pH<2, HNO3	,o, Pb,	B, Ca, Li, Sb, Mo, Se, TL and Na, K, M	×	×	×	×	×	×	×	×			8	4			Received by:	Received by:	Received in	eveport, R
in of	Coal C	Site Con			Sampler(s) ini								20				field			550			ling - Shr
Cha	ram:		r Days)	, (85 <u>- 52 </u> 1744)	# of Conf.		9	ø	ø	ဖ	9	E	2				= filter in field			Date/Time:	Date/Time:	Date/Time:	
	Prog		Calenda		p, Matrix		Β	ΝS	₩ B	δ	Ğ	GW	GW				) F= (			Date/	Date/	Date/	dual (CC
			Analysis Turnaround Time (in Calendar Days)		Sample Type (C=Comp,	g	σ	Ø	O	O	g	ပ	თ				Other						tion Resid
			Turnaroui		Sample Time	1028	930	1037	1103	1132	957	915	1114			7700.0	3OH; 6= (	sample.		77	7		Combus
_			Analysis		Sample Date	2/6/2023	2/6/2023	2/6/2023	2/6/2023	2/6/2023	2/6/2023	2/6/2023	2/6/2023				HN03; 5=N	r every 10th	ints:	Company:	Company:	Company:	ord for Coa
Dolan Chemical Laboratory (DCL)	4001 Bixby Road Groveport, Ohio 43125	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	Sample Identification	AD-8 (PBAP)	AD-9 (PBAP)	AD-11 (LF)	AD-13 (LF)	AD-14 (LF)	AD-15 (PBAP)	DUPLICATE	EQUIPMENT BLANK		100		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:	Relinquished by:	Relinquished by:	Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR)

# WATER & WASTE SAMPLE RECEIPT FORM (Temp Gun 1)

Package Type Delivery Type
Cooler Box: Bag Envelope PONY UPS FedEX USPS
Other
Plant/Customer Wolfen Number of Plastic Containers:
Opened By WEKTTP Number of Glass Containers:
Date/Time 2923 Number of Mercury Containers:
Were all temperatures within 0-6°C? (Y) N or N/A Initial: M(-15 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?    / N Comments
Requested turnaround: March 9, 23 If RUSH, who was notified?
pH (15 min) Cr <sup>-6</sup> (pres ) NO₂ or NO₃ (48 hr) ortho-PO₄ (48 hr) Hg-diss (pres ) (24 hr) (48 hr)
Was COC filled out properly? / YID Comments Metals and Radium were oncac but we
Were samples labeled properly? (V) N Comments
Were correct containers used? (Y)/ N Comments
Was pH checked & Color Coding done? (Y) N or N/A Initial & Date: TTY 2/9/23
pH paper (circle one): MQuant.PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4861_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# 230435 Initial & Date & Time :
Logged by Ms Comments: Metal Wete on Coc, but we did  Not Received Them Yet, more
- Also Rollelm
Reviewed by 11 Talmoz
COC does not indicate TG-32 Requirement GIP

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

AEP- Dalan Chemical Laborator,

Sample Receipt Form SOP-7102

Page 1 cf.1



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 Uni	s Dilution	RL	MDL Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.020 µg/	. 1	0.100	0.008 J1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.66 µg/	. 1	0.10	0.03	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Barium	11.2 µg/	. 1	0.20	0.05	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Beryllium	1.02 µg/	. 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/	. 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/	. 1	0.30	0.07	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Cobalt	12.1 µg/	. 1	0.020	0.005	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Lead	0.94 µg/	. 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	<b>12</b> ng/l	. 1	5	2	JAB	06/20/2023 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1 µg/	. 1	0.5	0.1 U1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Selenium	1.58 µg/	. 1	0.50	0.04	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4
Thallium	0. <b>14</b> μg/	. 1	0.20	0.02 J1	GES	06/20/2023 14:57	EPA 200.8-1994, Rev. 5.4

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
<b>Carrier Recovery</b>	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 %					

<sup>\*</sup> 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.



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. <b>11</b> 5 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

Parameter	Result Units	UNC*(+/-)	MDA* Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.94 pCi/L	0.20	0.24	ΠP	06/30/2023 08:57	SW-846 9315-1986, Rev. 0
<b>Carrier Recovery</b>	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	928 %					

<sup>\*</sup> 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.



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 Uni	ts 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/	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	<b>2.44</b> 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

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
<b>Carrier Recovery</b>	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 %					

<sup>\*</sup> 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.



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

Motais							
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



Reissued

**Report**4001 Bixby Road

Groveport, OH 43125

Phone: 614-836-4221

Audinet: 210-4221

**Dolan Chemical Laboratory** 

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

Motals							
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



**Dolan Chemical Laboratory** 4001 Bixby Road Groveport, OH 43125

Phone: 614-836-4221 Audinet: 210-4221

### Reissued

**Customer: Welsh Power Station** Date Reported: 10/29/2023 Job ID: 231720

**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 l	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 µ	µg/L	1	0.10	0.03 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Barium	<0.05 µ	µg/L	1	0.20	0.05 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007 µ	µg/L	1	0.050	0.007 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Boron	<0.007 r	mg/L	1	0.050	0.007 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004 µ	µg/L	1	0.020	0.004 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Calcium	0.01 r	mg/L	1	0.05	0.01 J1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Chromium	0.30 μ	µg/L	1	0.30	0.07	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Cobalt	0.031 μ	µg/L	1	0.020	0.005	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05 µ	µg/L	1	0.20	0.05 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00007 r	mg/L	1	0.00030	0.00007 U1	GES	06/20/2023 15:22	EPA 200.8-1994, Rev. 5.4
Mercury	<2 r	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 µ	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
<b>Carrier Recovery</b>	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 %					

<sup>\*</sup> 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.



### Reissued

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

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

Muhuel S. Ollinger

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 Qualifer 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**

Dolan Chemical Laboratory (DCL)

4001 Bixby Road				Ć			-						
Groveport, Unio 43123					Tam:	Oal Com	onsno	Program: Coal Compusuon Residuals (CCK)	8 (CC)			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Г
Contacts: Michael Ohlinger (614-836-4184)					v)	Site Contact:	.			Date:		COC/Order #:	
Project Name: Welsh Landfill						25		Field-filter 500 mL	11	Three (six every			
Contact Name: Rebecca Jones	Analysis	Turnaround Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	lendar D	(F)	<u> </u>	bottle, nH<2.	then office.	Cool	10th*)	uur i	0,110,0	
Contact Phone. (737) 330-3725						LI	$\neg$	HNO	D-8-0	pH<2, HNO,	auji	C2/140	_
Sampler(s): Matt Hamilton Kenny McDonald						-	~,dq`,o;	uM bns e	'os	822-8			
Sample Identification	Sample Date	Sample	Sample Type (C=Comp,	Matrix	Cont.	Sampler(s) In	B, Ca, Li, Sb Mo, Se, TL	∃ beviossib	TDS, F, CI	Ra-226, Ra	<b>р</b> ВН	Sample Specific Notes:	
AD-11	6/5/2023	1055	9	GW	80		×			×	×	TG-32 needed	
AD-13	6/5/2023	1114	ŋ	GW	ည		×			×	×		
AD-14	6/5/2023	1158	ŋ	GW	υ		×			×	×		$\neg$
DUPLICATE - LANDFILL	6/5/2023	1122	9	Q.W	2		×				×		Т
EQUIPMENT BLANK - LANDFILL	6/5/2023	1130	O	ΒW	2	+	×				×		
FIELD BLANK - LANDFILL	6/5/2023	1132	g	δW	c)	~	×			×	×		Т
					7	1							_
						+	1						Т
						-							_
		379	1		-								Т
					Н								Т
													1
Preservation Used: 1ª Ice, 2ª HCl; 3ª H2SO4; 4#HNO3; 5ªNaOH; 6ª Other	HNO3; 6=Na	OH; 6≈ Ot	her	; F= filter	liter in field	eld	4	F4	-	4	2		
Six 1L Bottles must be collected for Radium for every 10th sample.	v every 10th	sample.											_

Special Instructions/QC Requirements & Comments:

Relinquished bg.	Company	Date/Time /6~	// Received by	Date/Time;
Relinquished by	Company:		Received by:	Date/Time;
Relinquished by:	Company:	Date/Time:	Received in Laboratory by	Date/Time: 1:30 PM
Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17	ord for Coal Combustion Residua	il (CCR) Sampling - Shr	eveport, Rev. 1, 1/10/17	

# AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type					
Cooler Box Bag Envelope	PONY UPS FEDEX USPS					
	Other					
Plant/Customer Welsh	Number of Plastic Containers:					
Opened By MGW	Number of Glass Containers:					
Date/Time 6/9/23 1'.30Pm	Number of Mercury Containers:					
	or N/A Initial:on ice no ice					
	4) -If No, specify each deviation:					
	Comments					
Was Chain of Custody received? Y/N	If RUSH, who was notified?					
	IO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)					
Was COC filled out properly?	Comments					
Were samples labeled properly? (Y)/ N	Comments					
Were correct containers used? ( ) / N Comments						
Was pH checked & Color Coding done? YN or N/A Initial & Date: Mb (19173						
pH paper (circle one): MQuant,PN1.09535.0001,LO	OT#[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# 231770 Initial & D	Date & Time :					
	sangles, Did not receive					
Reviewed by /////	number 5077376474221					

**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.

### **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of: х 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. X R1 Field chain-of-custody documentation X R2 Sample identification cross-reference х Test reports (analytical data sheets) for each environmental sample that includes: RЗ (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) NA R4 Surrogate recovery data including: (a) Calculated recovery (%R) (b) The laboratory's surrogate QC limits X Test reports/summary forms for blank samples **R**5 X **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 OC limits X Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: **R7** (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 х **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  $\square$ List of method quantitation limits (MQLs) for each analyte for each method and matrix R9 × R10 Other problems or anomalies X 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. **Senior Chemist** 06-21-23 Susann Sulzmann

Official Title

Name (printed)

Date

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	0, 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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
<b>S</b> 7	0	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	
<b>S</b> 9	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	

## Table 3. Exception Reports.

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

Exception Report No.	Description							
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>							
*								

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ata pack	tage 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 2 NELAC Standard  (b) Dilution factors  (c) Preparation methods  (d) Cleanup methods  (e) If required for the project, tentatively identified compounds (TICs)									
	R4	(a) Calculate	overy data including d recovery (%R) atory's surrogate Q							
П	R5		ummary forms for							
	R6	Test reports/s (a) LCS spiki (b) Calculated	ummary forms for	laboratory control samples (LC	CSs) including:					
	R7	<ul><li>(a) Samples a</li><li>(b) MS/MSD</li><li>(c) Concentra</li><li>(d) Calculate</li></ul>	associated with the spiking amounts ation of each MS/M	ike/matrix spike duplicates (M MS/MSD clearly identified ISD analyte measured in the pa percent differences (RPDs) C limits	-					
	R8	(a) The amou	unt of analyte meas lated RPD	f applicable) recovery and predured in the duplicate ranalytical duplicates	cision:					
	R9	List of method	l quantitation limits	s (MQLs) for each analyte for e	each method and matrix					
	R10	Other problem	ns or anomalies							
	The Ex	ception Report	t for every item for	which the result is "No" or "NF	R" (Not Reviewed)					
packag require reports by the laborat that we Check respon used is	ge as be ements s. By m laborat tory in t ould aff a, <b>if app</b> dding to	en reviewed by of the methods y signature beltory as having the Laboratory ect the quality of rule. The officiasible for release	the laboratory and used, except where low, I affirm to the he potential to affect Review Checklist, a of the data.  This laboratory is an al signing the cover	release of this laboratory data is complete and technically conted by the laboratory in the best of my knowledge, all probet the quality of the data, have and no information or data have in-house laboratory controlled page of the rule-required repose and is by signature affirming	ompliant with the e attached exception clems/anomalies, observed been identified by the re been knowingly withheld ed by the person ort in which these data are					
Name	 (printed	d)	Signature	Official Title	Date					

## **Table 1. Reportable Data.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Laboratory Job Number:	
Prep Batch Number(s):	

I tem <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	Surrogate recovery data			
		Were surrogates added prior to extraction?			
		Were surrogate percent recoveries in all samples within the laboratory QC limits?			
R5	Ο, Ι	Test reports/summary forms for blank samples			
		Were appropriate type(s) of blanks analyzed?			
		Were blanks analyzed at the appropriate frequency?			

I tem <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
		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?		

## **Table 2. Supporting Data.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Laboratory Job Number: _	
Prep Batch Number(s):	

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
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	0	Mass spectral tuning:		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	0	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?		

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
		Did dual column confirmation results meet the method-required QC?		
S7	0	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?		

## **Table 3. Exception Reports.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Prep Batch Number(s):	

Exception Report No.	Description

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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	KL	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
Wat Ob analatm							
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



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 D	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** 

<20 mg/L

**Customer Description: TG-32** 

ELT

06/08/2023 13:41 SM 2540C-2015

Lab Number: 231696-005

Preparation:

Date Collected: 06/05/2023 12:32 EDT

Date Received: 06/08/2023 11:00 EDT

## **Ion Chromatography**

TDS, Filterable Residue

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

20 U1

50



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

Muhael S. Ollinger

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 Qualifer Legend**

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

# **Chain of Custody Record**

Dolan Chemical Laboratory (DCL.)

4001 Blxby Road

Groveport, Ohio 43125				Prog	Program:	Coal Co	ombustio	Coal Combustion Residuals (CCR)	ils (CCR	9		
Contacts: Michael Ohlinger (614-836-4184)					41	Site Contact:	act:			Date:		For Lab Use Only: COC/Order #:
Project Name: Welsh Landfill Contact Name: Rebecca Jones	Analysis T	umaround Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	ilendar D	878)		250 mL bottle, pH<2,	Field-filter 500 mL bottle, then pH<2,	1 L bottle, Cool.	Three (six every 10th*)	mL Glass visi 125 mL PTFE 3d bottle, L**, pH<2	707720
Contact Phone: (737) 330-3725								HNO	ე,9−0	pH<2, HNO,	or '	25 le 16
Sampler(s): Matt Hamilton Kenny McDonald	·	=					,88 ,84 , ,d9 ,o;	nM bas e	'os	975-6		
Sample Identification	Sample Date	Sample	Sample Type (C=Comp, G=Grab)	Matrix	# Cont	Sampler(s) in	8, Ca, Li, Sb Be, Cd, Cr, C Mo, Se, TL	∃ bevlossib	1DS, F, CI	당 '927-8권	6 <sub>H</sub>	Sample Specific Notes:
AD-11	6/5/2023	1055	၅	οw	-				×			TG-32 needed
AD-13	6/5/2023	1114	ŋ	οw	-				×			
AD-14	6/5/2023	1158	ŋ	GW	<b>.</b>				×			
DUPLICATE - LANDFILL	6/5/2023	1122	ပ	ΝĎ	7-				×			
FIELD BLANK - LANDFILL	6/5/2023	1132	ပ	δ	-				×			
					-							
								_				
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	HNO3; 5=Na	OH; 6= Of	ther	; Fo filter	filter in	in field	4	F4	1	4		
* Six 1L Bottles must be collected for Radium for every 10th sample.	r every 10th	sample.										

Special Instructions/QC Requirements & Comments:

•				
Relinquished by R	Company:	Date/Time: 1600	Received by:	Date/Time.
Relinquished by:	Company:		Received by:	Date/Time;
Relinquished by:	Company:	Date/Time;	Received in Labitation by: (PCL)	Date/Time /8/23 11,20 Am
Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR)	ord for Coal Combustion Residu	al (CCR) Sampling - Shr	Sampling - Shreveport, Rev. 1, 1/10/17	

# AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type							
Cooler Box Bag Envelope	PONY UPS FEEEX USPS							
	Other							
Plant/Customer Welsh Power	Number of Plastic Containers:							
Opened By Misgina Micha	Number of Glass Containers:							
	Number of Mercury Containers:							
	or N/A Initial: /// on ice / no ice							
	If No, specify each deviation:  Comments							
_	Comments							
Requested turnaround: Revision								
	O <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)							
Was COC filled out property?	Comments							
Were samples labeled properly? (Y)/ N	Comments							
Were correct containers used?    V N	Comments							
Was pH checked & Color Coding done? (9) N or N/A Initial & Date: 18 06/08/23								
7	OT# [OR] Lab Rat, PN4801, LOT# X000(WDG21 Exp 11/18/202							
	Yes: By whom & when: (See Prep Book)							
Is sample filtration requested? Y / (V)	Comments (See Prep Book)							
Was the customer contacted? If Yes:	Person Contacted:							
Lab ID# 23/696 Initial & I	Date & Time :							
Logged by 50	nts:							
Reviewed by 11/1								

**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.

## **Municipal Solid Waste Laboratory Review Checklist**

This da	ata pack	age consists of:					
х	(which		portable data identified on	ecklist consisting of Table 1, l this page), Table 2, Supportin			
×	R1	Field chain-of-	custody documentation				
x	R <sub>2</sub>	Sample identifi	cation cross-reference				
X	R3	<ul><li>(a) Items spec NELAC Sta</li><li>(b) Dilution fa</li><li>(c) Preparatio</li><li>(d) Cleanup m</li></ul>	ified in NELAC Chapter 5 f andard ctors n methods ethods	ch environmental sample that for reporting results, e.g., Sec dentified compounds (TICs)	tion 5.5.10 in 2003		
х	R4	(a) Calculated	very data including: recovery (%R) tory's surrogate QC limits				
x	R <sub>5</sub>		mmary forms for blank sai	mples			
x	R6	<ul><li>(a) LCS spikin</li><li>(b) Calculated</li></ul>		ry control samples (LCSs) inc	luding:		
×	R7	<ul><li>(a) Samples as</li><li>(b) MS/MSD s</li><li>(c) Concentra</li><li>(d) Calculated</li></ul>	ssociated with the MS/MSI spiking amounts	yte measured in the parent ar			
x	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						
x	R9			) for each analyte for each me	thod and matrix		
x	R10	Other problems	s or anomalies				
x	The Ex	ception Report	for every item for which th	e result is "No" or "NR" (Not	Reviewed)		
packag require reports by the laborat	e as be ements s. By m laborat tory in t	en reviewed by to of the methods to y signature belo tory as having th	the laboratory and is compused, except where noted bow, I affirm to the best of me potential to affect the quartery Checklist, and no in	of this laboratory data package lete and technically complian by the laboratory in the attach by knowledge, all problems/a ality of the data, have been id formation or data have been	t with the ed exception nomalies, observed entified by the		
respon used is	ding to	rule. The officia sible for releasin	l signing the cover page of	se laboratory controlled by the tule-required report in we by signature affirming the ab	hich these data are		
	Arnold		millered	Chemist Principle	6/30/23		
Name	(printed	i) :	Signature	Official Title	Date		

## 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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
R1	0, 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	0	Surrogate recovery data		
	1/1. <b>I</b>	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	

<i>j.</i>			Result	Exception
Item <sup>1</sup>	Analytes <sup>2</sup>	Description	(Yes, No, NA, NR) <sup>3</sup>	Report No. <sup>4</sup>
	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	
	<sub>γγ</sub> . <b>Ι</b>	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
<b>S</b> 3	0	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	0	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		

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>	
<b>S6</b>	0	Dual column confirmation			
	I	Did dual column confirmation results meet the method-required QC?	NA	_	
<b>S</b> 7	0	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:			
	e: 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)	15		
	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		

## Table 3. Exception Reports.

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

Exception Report No.	Description							
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>							

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.

<sup>&</sup>lt;sup>2</sup>O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

## **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of: X 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. X Field chain-of-custody documentation R<sub>1</sub> × R<sub>2</sub> Sample identification cross-reference  $\mathbf{x}$ Test reports (analytical data sheets) for each environmental sample that includes: R3 (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) M **R**4 Surrogate recovery data including: (a) Calculated recovery (%R) (b) The laboratory's surrogate QC limits X Test reports/summary forms for blank samples  $R_5$  $\square$ **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 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: X R7 (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 X Laboratory analytical duplicate (if applicable) recovery and precision: R8 (a) The amount of analyte measured in the duplicate (b) The calculated RPD (c) The laboratory's QC limits for analytical duplicates X R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix X 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)

7/5/2023

Date

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
R1	0, 1	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		
	1	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	0	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		

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	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 .		
54	0	Internal standards (IS):			
	I	Were IS area counts and retention times within the method-required QC limits?	NA	2	
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		

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
S6	0	Dual column confirmation			
	I	Did dual column confirmation results meet the method-required QC?	NA		
S7	0	Tentatively identified compounds (TICs):			
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA		
<b>S8</b>	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	0, 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	5.81	
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		

## Table 3. Exception Reports.

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

Exception Report No.	Description
••••	
<del></del>	
·	

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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 %					

<sup>\*</sup> 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.



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 Unit	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 %					

<sup>\*</sup> 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.



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	<b>1</b> 9.6 μg/L	10	2.0	0.5	GES	06/20/2023 09:53	EPA 200.8-1994, Rev. 5.4
Beryllium	0. <b>11</b> 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	<b>Analysis Date</b>	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 %					

<sup>\*</sup> 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.



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**

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	<b>10.1</b> 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



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

Motals							
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



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

Audinet: 210-4221

#### Reissued

**Customer: Welsh Power Station** Date Reported: 10/29/2023 Job ID: 231716

**Customer Sample ID: FIELD BLANK - BACKGROUND Customer Description: TG-32** 

Lab Number: 231716-006 Preparation:

Date Received: 06/09/2023 13:30 EDT Date Collected: 06/06/2023 12:22 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
<b>Carrier Recovery</b>	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 %					

<sup>\*</sup> 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.



#### Reissued

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

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

Muhael S. Ollinger

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 Qualifer 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				Prog	ıram:	Coal Co	smbustio	Program: Coal Combustion Residuals (CCR)	ils (CCR	_				
Confects: annual Obligace (A44 098 4404)						Site Contact:	act:			Date:		Ö	For Lab Use Only:	M
Project Name: Welsh Background Contact Name: Rebecca Jones Contact Phone: (737) 330-3725	Analysis	Tumarounc Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	elendar D	ays.		250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 500 mL bottle, then pH<2, HNO <sub>3</sub>	t L bottle, Cool, 0-6°C	Three (six every 10th*) 1 L bottles, pH<2, HNO,	125 mL PTFE lined bottle, HCL**, pH<2		231716	
Sampler(s): Matt Hamilton Kenny McDonald		="	2			11	,48,84, ,d9,00	uM bas s	'os	822-8				
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Inl	B, 6a, Li, 5b, Be, Cd, Cr, 7 Mo, Se, Tt	4 beviossib	, F, CI,	Ka-226, Ra	6н <b>/</b>		Sample Specific Notes:	
AD-1	6/6/2023	1054	တ	ВW	8		×			×	×	Rot	Routine (28 days)	
AD-5	6/6/2023	900	တ	ВW	25		×			×	×	ρ̈́	TG-32 needed	
AD-17	6/8/2023	1134	ဟ	ВW	2		×			×	×			T
DUPLICATE - BACKGROUND	6/6/2023	1200	တ	S.	2		×				×	1		T
EQUIPMENT BLANK - BACKGROUND	6/6/2023	1125	Ø	QW	2	1	×				×	+		
FIELD BLANK - BACKGROUND	6/6/2023	1122	Ø	8 B	ιΩ		×			×	×	1		T
												1		Т
														Т
												$\dashv$		
		1000												
														П
												$\exists$		٦
Preservation Used: 1a Ice. 2= HCl: 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	HNO3: 5=Ng	10H: 6= 0	ther	; F= filter	filter in	In field	4	7	-	4	2			

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

Special Instructions/QC Requirements & Comments:

Relinquished by	Company Fack	Date/Time: 1/c. Received by.	Received by:	Daterrime
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time
Relinquished by:	Company:	Date/Time:	Reoffice In Laboration by	6/4/23 1:30PM
Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17	ord for Coal Combustion Residu	ıal (CCR) Sampling - Shi	reveport, Rev. 1, 1/10/17	

# MATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type							
Coole Box Bag Envelope	PONY UPS FEDEX USPS							
	Other							
Plant/Customer Welsh	Number of Plastic Containers:							
Opened By M50/MCW	Number of Glass Containers:							
Date/Time 6/9/23 1/309 M	Number of Mercury Containers:							
Were all temperatures within 0-6°C? Y / N	or(N/) Initial:on ice / no ice							
	4) - If No, specify each deviation:							
Was container in good condition?	Comments							
	Comments							
Requested turnaround:kouhiku	If RUSH, who was notified?							
pH (15 min) Cr⁴6 (pres ) NO₂ or N (24 hr)	IO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)							
Was COC filled out properly?	Comments							
Were samples labeled property? (Y)/ N	Comments							
Were correct containers used?    One of the containers used?								
Was pH checked & Color Coding done? Y N or N/A Initial & Date: Mark 6/9/73								
pH paper (circle one): MQuant,PN1.09535.0001,LOT# [OR] Lab Rat,PN4801,LOT#								
- Was Add'l Preservative needed? Y (1) 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#	Date & Time :							
Logged by MGC Commer Life Reviewed by	ots: Missing HD-17 Raylum Cly from Missing cooler Ted Ex 72376474227							
Reviewed by	Missing sumple arrived 6/12/23 Msungle							

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.

## **Municipal Solid Waste Laboratory Review Checklist**

This da	ata pack	tage consists of:					
X	(which	gnature page, and the laboratory review checklist consisting of Table 1, Reportable Data includes the reportable data identified on this page), Table 2, Supporting Data, and Exception Reports.					
х	R1	Field chain-of-custody documentation					
x	R2	Sample identification cross-reference					
x	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)					
, NA	R4	Surrogate recovery data including:  (a) Calculated recovery (%R)  (b) The laboratory's surrogate QC limits					
x	R <sub>5</sub>	Test reports/summary forms for blank samples					
X	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					
X	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					
X	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					
x	R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix						
x	R10 Other problems or anomalies						
х		sception Report for every item for which the result is "No" or "NR" (Not Reviewed)					
packag require reports by the	se Stat ge as be ements s. By m laborat	ement: I am responsible for the release of this laboratory data package. This data en reviewed by the laboratory and is complete and technically compliant with the of the methods used, except where noted by the laboratory in the attached exception y signature below, I affirm to the best of my knowledge, all problems/anomalies, observed tory as having the potential to affect the quality of the data, have been identified by the the Laboratory Review Checklist, and no information or data have been knowingly withheld					
		ect the quality of the data.					
respon used is	ding to	rule. This laboratory is an in-house laboratory controlled by the person rule. The official signing the cover page of the rule-required report in which these data are sible for releasing this data package and is by signature affirming the above release rue.					
Susai	ny Ju	damann Signature Shirt 6.20-23  Official Title Date					
Name	(printed	d) Signature Official Title Date					

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
= 1	I	Were calculations checked by a peer or supervisor?	Yes	
	1	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	0	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	Ο, Ι	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
	Ī	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	О, І	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	Ī	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	0	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
<b>S</b> 7	0	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	0, 1	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)		N
	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	

### Table 3. Exception Reports.

Laboratory Name:	American Electric Power Dolan Chemical Laboratory
Project Name: We	lsh
Reviewer Name: B	ecky Podlasiak
LRC Date: 6/19/20	
Laboratory Job Nu	mber: 231716
Prep Batch Number	

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ata pack	tage 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	R1 Field chain-of-custody documentation			
	R2	Sample identif	fication cross-refere	ence	
	R3	<ul><li>(a) Items spe</li><li>NELAC St</li><li>(b) Dilution f</li><li>(c) Preparation</li><li>(d) Cleanup r</li></ul>	cified in NELAC Ch tandard actors on methods nethods	ts) for each environmental san apter 5 for reporting results, e ntatively identified compound	e.g., Section 5.5.10 in 2003
	R4	(a) Calculate	overy data including d recovery (%R) atory's surrogate Q		
П	R5		ummary forms for		
	R6	Test reports/s (a) LCS spiki (b) Calculated	ummary forms for	laboratory control samples (LC	CSs) including:
	R7	<ul><li>(a) Samples a</li><li>(b) MS/MSD</li><li>(c) Concentra</li><li>(d) Calculate</li></ul>	associated with the spiking amounts ation of each MS/M	ike/matrix spike duplicates (M MS/MSD clearly identified ISD analyte measured in the pa percent differences (RPDs) C limits	-
	R8	(a) The amou	unt of analyte meas lated RPD	f applicable) recovery and predured in the duplicate ranalytical duplicates	cision:
	R9	List of method	l quantitation limits	s (MQLs) for each analyte for e	each method and matrix
	R10	Other problem	ns or anomalies		
	The Ex	ception Report	t for every item for	which the result is "No" or "NF	R" (Not Reviewed)
packag require reports by the laborat that we Check respon used is	ge as be ements s. By m laborat tory in t ould aff a, <b>if app</b> dding to	en reviewed by of the methods y signature beltory as having the Laboratory ect the quality of rule. The officiasible for release	the laboratory and used, except where low, I affirm to the he potential to affect Review Checklist, a of the data.  This laboratory is an al signing the cover	release of this laboratory data is complete and technically conted by the laboratory in the best of my knowledge, all probet the quality of the data, have and no information or data have in-house laboratory controlled page of the rule-required repose and is by signature affirming	ompliant with the e attached exception clems/anomalies, observed been identified by the re been knowingly withheld ed by the person ort in which these data are
Name	 (printed	d)	Signature	Official Title	Date

### **Table 1. Reportable Data.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Laboratory Job Number:	
Prep Batch Number(s):	

I tem <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	Surrogate recovery data		
		Were surrogates added prior to extraction?		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?		
R5	Ο, Ι	Test reports/summary forms for blank samples		
		Were appropriate type(s) of blanks analyzed?		
		Were blanks analyzed at the appropriate frequency?		

I tem <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
		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?		

### **Table 2. Supporting Data.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Laboratory Job Number: _	
Prep Batch Number(s):	

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	Mass spectral tuning:		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	0	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?		

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
		Did dual column confirmation results meet the method-required QC?		
S7	0	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?		

### **Table 3. Exception Reports.**

Laboratory Name:	
Project Name:	
Reviewer Name:	
LRC Date:	
Prep Batch Number(s):	

Exception Report No.	Description

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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	
<b>M</b> - 1 <b>O</b> b 1 - 1								
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**

trot onomiou,							
Parameter	Result Units [	Dilution	RL	MDL Data Qualifiers	Analyst	Analysis Date	Method
TDS. Filterable Residue	1510 mg/L	2	100	40	FLT	06/12/2023 08:27	SM 2540C-2015



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

**Customer: Welsh Power Station Date Reported: 07/05/2023** Job ID: 231698

**Customer Sample ID: DUPLICATE - BACKGROUND** 

Preparation:

**Customer Description: TG-32** 

Lab Number: 231698-004

Date Received: 06/08/2023 11:00 EDT Date Collected: 06/06/2023 13:00 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 Dile	ution	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** 

Lab Number: 231698-005

<20 mg/L

Date Collected: 06/06/2023 12:22 EDT

**Customer Description: TG-32** 

ELT

06/12/2023 08:34 SM 2540C-2015

Preparation:

Date Received: 06/08/2023 11:00 EDT

### **Ion Chromatography**

TDS, Filterable Residue

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

20 U1

50



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

Muhael S. Ollinger

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 Qualifer Legend**

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

# **Chain of Custody Record**

Dolan Chemical Laboratory (DCL) 4001 Bixby Road

Groveport, Ohio 43125				Prog	ram:	Coal Co	ombustic	Program: Coal Combustion Residuals (CCR)	Is (CCR				f)
Contacts: Michael Ohlinger (614-836-4184)						Site Contact:	act:			Date:		O	For Lab Use Only: COC/Order #:
Project Name: Welsh Background Contact Name: Rebecca Jones Contact Phone: (737) 330-3725	Analysis 7	umaround Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	endar D	878)		250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 500 mL bottle, then pH<2, HNO <sub>3</sub>	1 L bottle, Cool, 0-6°C	Three (six every 10th*) 1 L bottles, pH<2, HNO <sub>3</sub>	40 mL Glass visi or 125 mL PTFE Ilned bottle, HCL**, PH<2	sy somethy assistantil	231698
Sampler(s): Matt Hamilton Kenny McDonald						elei?i	, 88, 88, ,dq ,o;	nM bns e	'os	822-8			
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	Cont.	Sampler(s) In	B, Ca, Li, Sb Be, Cd, Cr, C Mo, Se, TL	i beviossib	т <b>р</b> \$, <b>ғ</b> , сі	Ra-226, Ra	вн		Sample Specific Notes:
AD-1	6/6/2023	1054	ŋ	S.W	-				×				TG-32 needed
AD-5	6/6/2023	900	Ø	GW	-				×				
AD-17	6/6/2023	1134	ŋ	βW	-				×				
DUPLICATE - BACKGROUND	6/6/2023	1200	၁	ΝS	-	$\dashv$			×			$\dashv$	
FIELD BLANK - BACKGROUND	6v6/2023	1122	Ø	Š	-				×			$\dashv$	
												$\dashv$	and the second
Preservation Used: 1ª Ice, 2ª HCl; 3ª H2SO4; 4=HNO3; 5=NaOH; 6= Other	HNO3; 5=Na	OH; 6= Ot	her	; F= filter		in field	4	F4	F	4			
	100	ŀ											

<sup>\*</sup> Six 1L Bottles must be collected for Radium for every 10th sample.

Special instructions/QC Requirements & Comments:

Relinquished by	Hal	Company	Date/Time: 160c Received by:		Date/Time:
Refinquished by:		Company:	Date/Time:	Received by:	Date/Time
Relinquished by:		Company:	Date/Time:	Received in Laboration by:	Date: 11,00,AM
Form COC-04, AEP Chain of	Custody (COC) Re	Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17	tal (CCR) Sampling - Sh	Ireveport, Rev. 1, 1/10/17 🗸	<b>L</b>

# AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
(Cooler Box Bag Envelope	PONY UPS FEDEX USPS
	Other
Plant/Customer Welsh Power	Number of Plastic Containers:
Opened By Misgina/Micha	Number of Glass Containers:
_	Number of Mercury Containers:
	or N/A Initial: /// on ice / no ice
	4) - If No, specify each deviation:  Comments
Requested turnaround: Requested turnaround:	If RUSH, who was notified?
	O <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)
Was COC filled out properly?	Comments
Were samples labeled properly? (Y)/ N	Comments
Were correct containers used?	Comments
Was pH checked & Color Coding done?	N or N/A Initial & Date: 123
pH paper (circle one): MQuant,PN1.09535.0001,LC	OT# [OR] Lab Rat,PN4801,LOT# X000FWDG21 Exp 11/15/200
- Was Add'l Preservative needed? Y / Ŋ If	Yes: By whom & when: (See Prep Book)
Is sample filtration requested? Y / 🕅	Comments (See Prep Book)
Was the customer contacted? If Yes:	Person Contacted:
Lab ID# <u>93/698</u> Initial & C	Date & Time :
Logged by \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	nts:
1 (1 8 2 1/ 2	

**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.

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ıta pack	age consists	of:		
x	(which		reportable data identified	w checklist consisting of Table 1, l on this page), Table 2, Supporti	
x	R1	Field chain-	of-custody documentation	1	
x	R2	Sample iden	ntification cross-reference		
X	R3	(a) Items s NELAC (b) Dilution (c) Prepara (d) Cleanup	pecified in NELAC Chapte Standard In factors In methods In methods	or each environmental sample ther 5 for reporting results, e.g., Sec every service to the service of the servic	ction 5.5.10 in 2003
x	R4	(a) Calcula	ecovery data including: ted recovery (%R) oratory's surrogate QC lin	nits	
x	R <sub>5</sub>		s/summary forms for blan		
×	R6	(a) LCS spi (b) Calcula	/summary forms for labo iking amounts ted %R for each analyte oratory's LCS QC limits	ratory control samples (LCSs) in	cluding:
×	R7	<ul><li>(a) Sample</li><li>(b) MS/MS</li><li>(c) Concent</li><li>(d) Calcula</li></ul>	es associated with the MS/ SD spiking amounts	analyte measured in the parent a ent differences (RPDs)	
X	R8	(a) The am (b) The cal	analytical duplicate (if app tount of analyte measured culated RPD oratory's QC limits for an		
x	R9	List of meth	od quantitation limits (M	QLs) for each analyte for each m	ethod and matrix
x	R10	Other probl	ems or anomalies		
х	The Ex	ception Rep	ort for every item for whic	h the result is "No" or "NR" (Not	Reviewed)
packag require reports by the laborat	e as be ements s. By m laborat tory in t	en reviewed of the metho y signature l ory as having he Laborator	by the laboratory and is or ds used, except where not below, I affirm to the best g the potential to affect th	use of this laboratory data package omplete and technically compliated by the laboratory in the attact of my knowledge, all problems/are quality of the data, have been in information or data have been	nt with the hed exception anomalies, observed dentified by the
respon used is statem	ding to respon ent is tr	rule. The off sible for rele	icial signing the cover pag	house laboratory controlled by the of the rule-required report in vold is by signature affirming the a	vhich these data are bove release
	Arnold		Um / Jely	Chemist Principle	6/30/23
Name	(printed	d)	Signature	Official Title	Date

### 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 <sup>1</sup> Analytes		Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
R1	0, 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	0	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	0, 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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
,	1	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	0, 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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
<b>S</b> 2	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
53	0	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	0	Dual column confirmation		
·	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	0	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
<b>S8</b>	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):		4
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

### Table 3. Exception Reports.

Laboratory Nai	me: American Electric Power Dolan Chemical Laboratory
	Welsh Background
Reviewer Name	
LRC Date: 6/30	0/23
	Number: 231698
	mber(s): QC2306254

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>
-	

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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of:

×	(which	nis 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 able 3, Exception Reports.						
x	R <sub>1</sub>	Field	chain-of-cus	stody documen	itation			
X	R2	Samp	ple identifica	tion cross-refe	rence			
x	R3	(a) 1 (b) 1 (c) 1 (d) 0	Items specific NELAC Stand Dilution factor Preparation 1 Cleanup met	ed in NELAC C dard ors nethods hods	Chapter 5 for		sample that includes: s, e.g., Section 5.5.10 in 2003 ands (TICs)	
NA	R4	(a)	Calculated re	ry data includir covery (%R) ry's surrogate (				
x	R <sub>5</sub>	Test	reports/sum	mary forms for	r blank samı	oles		
X	R6	(a) 1 (b) (	LCS spiking a Calculated %		lyte	control samples	(LCSs) including:	
×	R7	(a) { (b) { (c) { (d) {	Samples asso MS/MSD spi Concentratio Calculated %	ciated with the king amounts on of each MS/	e MŚ/MSD o MSD analyto e percent dif	learly identified	e parent and spiked samples	
X	R8	(a) (b) (c)	The amount The calculate	of analyte mea	sured in the	-	precision:	
x	R9	List	of method qu	antitation limi	ts (MQLs) f	or each analyte f	or each method and matrix	
x	R10	Othe	r problems o	r anomalies				
x	The Ex	ceptio	on Report for	every item for	r which the 1	esult is "No" or '	'NR" (Not Reviewed)	
packag require reports by the laborat	e as be ements s. By m laborat tory in t	en revof the y sign as tory as the La	viewed by the methods use nature below s having the p	e laboratory an ed, except whe , I affirm to the potential to aff riew Checklist,	d is complete re noted by the best of my ect the quali	e and technically he laboratory in knowledge, all p ty of the data, ha	ata package. This data y compliant with the the attached exception roblems/anomalies, observed ave been identified by the have been knowingly withheld	
respon used is statem Micha	ding to respon ent is tr ael Oh	rule. sible rue. llinge	The official s for releasing	igning the cove this data pack	er page of th	e rule-required i signature affirm Chemist	report in which these data are ning the above release  7/5/2023	
name	(printed	l)	Sig	gnature	( )	Official Title	Date	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
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	*6
	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	

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

Item¹			Result (Yes, No, NA, NR) <sup>3</sup>	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	
_ \$3	0	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	0	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.)		1993. (6)
	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation	ï	
-	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	0	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	

### Table 3. Exception Reports.

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

Exception Report No.	Description

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup>O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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	s 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	ТΤР	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 %					

<sup>\*</sup> 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.



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	<b>1</b> 9.7 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	<b>101</b> %					
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 %					

<sup>\*</sup> 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.



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 %					

<sup>\*</sup> 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.



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

Motais							
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



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

Motais							
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



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	s 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



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

Muhael S. Ollinger

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 Qualifer 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.

# **Chain of Custody Record**

Dofan Chemical Laboratory (DCL) 4001 Bixby Road

Groveport, Ohio 43125				Prog	ram:	Coal Co	ombustio.	Program: Coal Combustion Residuals (CCR)	Is (CCR.					-
Contacts: Michael Ohlinger (614-836-4184)				1	9,	Site Contact:	act:			Date:		8	For Lab Use Only: COC/Order#	100
Project Name: Welsh Landfill	V-						-	Field-filter 500 mL	=	Three faix every	,ett			
Contact Name: Rebecca Jones	Analysis T	umaround Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	lendar Di	(g)		bottle,	bottle,	bottle,	10th*)	mL F d bot f, f,		727,	
Contact Phone: (737) 330-3725								HNO,	0-e°C	pH<2, HNO <sub>3</sub>	enil		673/10	
Sampler(s): Matt Hamilton Kenny McDonald							,88 ,8A ,d9 ,o	nM bns (	'os	822-				
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Inii	8, Ca, Li, Sb, 8e, Cd, Cr, C Mo, Se, TL	edissolved Fe	,ID ,F ,CI,	Ra-226, Ra	6H		Sample Specific Notes:	
AD-11	10/3/2023	1015	G	GW	80		×			×	×	15	TG-32 needed	
AD-13	10/3/2023	1118	G	GW	5		×			×	×			
AD-14	10/3/2023	1109	G	GW	S		×			×	×			
DUPLICATE - LANDFILL	10/3/2023	1036	ß	GW	2		×				×			,
EQUIPMENT BLANK - LANDFILL	10/3/2023	1131	၅	GW	2		×				×			
FIELD BLANK - LANDFILL	10/3/2023	1017	G	GW	-		×				S	_		-
														-
										,				
														_
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	1NO3; 5=Na(	3H; 6= Oti		: F= filter in field	ilter in 1	ield	4	F4	1	4	2			
* Six 1L Bottles must be collected for Radium for every 10th sample.	every 10th	sample.												

Special Instructions/QC Requirements & Comments:

Received in Laboration by BRI Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17 Date/Time: Company: Relinquished by: Relinquished by:

Company

Relinquished 159

Сотрапу:

52/01/01

Date/Time 10/1

Date/Time:

Date/Time

# WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Dolivery Type
	Delivery Type
Cooled Box Bag Envelo	PONY UPS FedEX USPS
Towns.	Other
Plant/Customer INEUSh	Power Number of Plastic Containers:
Opened By Misting.	Number of Glass Containers:
Date/Time 10/09/22 //	1:30 ftm Number of Mercury Containers: 5
Were all temperatures within 0-6%	C? Y/N or NA Initial: Mb/c on ice / to ice
(IR Gun Ser# 2213689000 , Expir.	03/24/2024) - If No, specify each deviation.
Was container in good condition?	N Comments
Was Chain of Custody received?	N Comments
Requested turnaround: 18d	o-VS If RUSH, who was notified?
	NO <sub>2</sub> or NO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)
Was COC filled out property?	
Were samples labeled properly?	N Comments
were correct containers used?	N Comments
	done? N or N/A Initial & Date: MUC 10/09/25
pH paper (circle one): MQuant.PN1.09	9535.0001,LOT#[OR] Lab Rat,PN4801.LOT#
√Vas Add'l Preservative needed?	Y (N) If Yes: By whom & when: (See Prep Book)
Is sample filtration requested?	Y / O Comments (See Prep Book)
Was the customer contacted?	If Yes: Person Contacted
ab ID# 23.3 119	nitial & Date & Time :
Logged by MSO	Comments
Reviewed by MGC	

**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.

# **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of:

	-	•					
x	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.						
х	R1	Field chain-of	-custody documentation				
x	R2	Sample identification cross-reference					
x	R3	<ul> <li>(a) Items spe NELAC S</li> <li>(b) Dilution f</li> <li>(c) Preparation</li> <li>(d) Cleanup r</li> </ul>	reports (analytical data sheets) for each environmental sample that includes: Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard Dilution factors Preparation methods Cleanup methods If required for the project, tentatively identified compounds (TICs)				
NA	R4	Surrogate recovery data including: (a) Calculated recovery (%R) (b) The laboratory's surrogate QC limits					
х	R <sub>5</sub>	Test reports/summary forms for blank samples					
x	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					
х	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					
x	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					
x	R9						
x	R10 Other problems or anomalies						
х	The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)						
packag require reports by the laborat	ge as be ements s. By m laborat tory in t	en reviewed by of the methods y signature be ory as having t	responsible for the release of the laboratory and is compused, except where noted blow, I affirm to the best of nhe potential to affect the quarter Checklist, and no inof the data.	plete and technically comp by the laboratory in the att my knowledge, all problem ality of the data, have bee	pliant with the tached exception as/anomalies, observed in identified by the		
respon used is	ding to	rule. The offici sible for releas rue.	This laboratory is an in-hou al signing the cover page of ing this data package and is	the rule-required report i	in which these data are		
Susa	nn Su	Izmann	S. Sultmany	Senior Chemist	11-02-2023		
Name	(printed	d)	Signature	Official Title	Date		

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
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	
-m.27=	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	0	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	

Item¹	Analytes <sup>2</sup>	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
	I	Yes		
	I	Were blank concentrations < MQL?	ves	
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?	ves	
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?	ves	
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	Ο, Ι	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
S1	0, 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	0	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		
54	0	Internal standards (IS):			
	I	Were IS area counts and retention times within the method-required QC limits?	NA	5534	
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		

Item¹	em¹ Analytes²	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
	I	NA		
S7	0	Tentatively identified compounds (TICs):		
	I	NA		
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
<b>S</b> 9	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)		3 - 0120 - 200
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
<b>S16</b>	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	Z 3.3 Z5.800

#### Table 3. Exception Reports.

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

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>
-	

<sup>&</sup>lt;sup>1</sup> 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.

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>2</sup>O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ata pack	age consists of	•				
х	(which		nd the laboratory review coportable data identified or ports.				
×	R1	Field chain-of	-custody documentation				
х	R2	Sample identif	fication cross-reference				
х	R3	<ul><li>(a) Items spe NELAC St</li><li>(b) Dilution f</li><li>(c) Preparation</li><li>(d) Cleanup r</li></ul>	actors on methods	for reporting results, e.g.,	Section 5.5.10 in 2003		
NA	R4	(a) Calculate	overy data including: d recovery (%R) atory's surrogate QC limits	- -			
х	R5	Test reports/s	ummary forms for blank sa	amples			
X	R6	(a) LCS spiki (b) Calculated	ummary forms for laborate ng amounts 1 %R for each analyte atory's LCS QC limits	ory control samples (LCSs)	including:		
×	R7	<ul><li>(a) Samples a</li><li>(b) MS/MSD</li><li>(c) Concentra</li><li>(d) Calculate</li></ul>	or project matrix spike/mat associated with the MS/MS spiking amounts ation of each MS/MSD ana d %Rs and relative percent atory's MS/MSD QC limits	SD clearly identified lyte measured in the parendifferences (RPDs)			
×	R8	(a) The amou	alytical duplicate (if applic int of analyte measured in lated RPD atory's QC limits for analyt	the duplicate	on:		
х	R9		l quantitation limits (MQL	<del>-</del>	n method and matrix		
×	R10		ns or anomalies				
×	The Ex	ception Report	t for every item for which t	he 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.							
respon used is	iding to	rule. The offici sible for releas	This laboratory is an in-hou al signing the cover page o ing this data package and i	f the rule-required report i	in which these data are		
Jona	than E	Barnhill	Property of the security begins in the control of	Lab Supervisor	11/8/2023		
Name (printed)			Signature	Official Title	Date		

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

Item¹	Analytes <sup>2</sup>	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
R1	0, 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	0, 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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
	I	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	0, 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	

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

Item¹	Analytes <sup>2</sup>	nalytes <sup>2</sup> Description				
S1	0, 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	0	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	0	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			

Item¹	Analytes <sup>2</sup>	Analytes <sup>2</sup> Description		
S6	0	Dual column confirmation		
	I	NA		
S7	O Tentatively identified compounds (TICs):  If TICs were requested, were the mass spectra and			
	I	NA		
58	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	

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 Berylium and Lithium
-	

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.

<sup>&</sup>lt;sup>2</sup>O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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 I	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	KL	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
Wat Ob analatm							
Wet Chemistry							

Parameter	Result Units Dilut	tion	KL	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



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** 

ELT

10/06/2023 13:31 SM 2540C-2015

Lab Number: 233092-004

Preparation:

Date Collected: 10/03/2023 11:36 EDT

Date Received: 10/06/2023 09:50 EDT

#### Ion Chromatography

TDS, Filterable Residue

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							
wet Chemistry							
Parameter	Result Units	Dilution	RL	MDL Data Qualifiers	Analyst	Analysis Date	Method

20

50

#### **Report Verification**

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

760 mg/L

Michael Ohlinger, Chemist

Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

Muhuel & Ollinger

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.

# **Chain of Custody Record**

Dolan Chemical Laboratory (DCL)

4001 Bixby Road	No. 24 Continues						n sin	and of cashings project of					
CYCC+ OHO THOGSANIA					S S	Site Contact:	Hipusuo H:	Site Contact:	12 (CC)	Date:		For Lab Use Only:	
Contacts: Michael Ohlinger (614-836-4184)	n.18.752									-		COC/Order #:	
Project Name. Welsh Landfill					/	- 23	-	Field-filter 500 mL	7	Three (six every			
Contact Name: Rebecca Jones	Analysis	Furnaround Routine	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	elendar D	ek ek	Δ 0	bottle, pH<2.	bottle,		10th*)		723033	
Contact Phone: (737) 330-3725						-		_	0-6°C,	pH<2, HNO <sub>3</sub>	r no Ilne	72027	
Sampler(s): Matt Hamilton Kenny McDonald							'qa 'o	nM bas e	'os	97 <b>7</b> -558			
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Conf.	Sampler(s) Ini	Be, Cd, Cr, C Mo, Se, TL	dissolved F	TDS, F, CI	Ra-226, Ra	бн	Sample Specific Notes:	
AD-11	10/3/2023	1015	9	δ		Н			×			TG-32 needed	
AD-13	10/3/2023	1118	9	οw	-				×				
AD-14	10/3/2023	1109	ຶ	GW	-				×				
DUPLICATE - LANDFILL	10/3/2023	1036	၅	ßW	-			2000	×				
													Т
		- 200			7 15								$\neg$
	D Tree												
		200				2007							
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	4NO3; 5=Na	OH; 6= Ot	her	; Fa	; F= filter in field	feld	4	F4	-	4			
* Six 1L Bottles must be collected for Radium for every 10th sample.	r every 10th	sample.											

Special Instructions/QC Requirements & Comments:

7				
Relinquished by Relinquished b	Company: Each	Date/Time:     600	(cr. Received by:	Date/Time
Relinquished by:	Company	Date/Time:	Received by:	Date/Time
Relinquished by:	Company.	Date/Time:	Received in Laboratory In.	Date Time. 10/6/23 9:50AM

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

# WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
Gooler Box Bag Envelope	PONY UPS FedEX USPS
	Other
Plant/Customer Welch	Number of Plastic Containers:
Opened By MS 3	Number of Glass Containers:
Date/Time 10/6/23 9,50/2m	Number of Mercury Containers:
	or N/A Initial:
Was container in good condition? (Y)/ N	Comments
1 .	Comments
Requested turnaround: Kouhim	If RUSH, who was notified?
pH (15 min) Cr <sup>+6</sup> (pres ) NO₂ or N (24 hr)	NO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (48 hr)
Was COC filled out properly? (Y)/ N	Comments
Were samples labeled properly? ( N	Comments
Were correct containers used?	
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,L0	OT# {ORT Lab Rat, PN4801, LOT#
- Was Add'l Preservative needed? Y N	Yes: By whom & when: (See Prep Book)
Is sample filtration requested? Y KN	Comments (See Prep Book)
Was the customer contacted? If Yes:	Person Contacted:
Lab ID# 233092 Initial &	Date & Time :
· · · · · · · · · · · · · · · · · · ·	nts:
TVII VC	

**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.

# **Municipal Solid Waste Laboratory Review Checklist**

This d	lata pac	kage consists of:
x	(which	ignature page, and the laboratory review checklist consisting of Table 1, Reportable Data h includes the reportable data identified on this page), Table 2, Supporting Data, and 3, Exception Reports.
x	R1	Field chain-of-custody documentation
×	R2	Sample identification cross-reference
x	R3	<ul> <li>Test reports (analytical data sheets) for each environmental sample that includes:</li> <li>(a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard</li> <li>(b) Dilution factors</li> <li>(c) Preparation methods</li> <li>(d) Cleanup methods</li> <li>(e) If required for the project, tentatively identified compounds (TICs)</li> </ul>
х	R4	Surrogate recovery data including:  (a) Calculated recovery (%R)  (b) The laboratory's surrogate QC limits
х	R5	Test reports/summary forms for blank samples
х	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
X	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
X	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
X	R9	List of method quantitation limits (MQLs) for each analyte for each method and matrix
x	R10	Other problems or anomalies
x	The E	Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)
packa requit report by the labora	ge as brements ts. By relations ts labora atory in	Attement: I am responsible for the release of this laboratory data package. This data been reviewed by the laboratory and is complete and technically compliant with the sof the methods used, except where noted by the laboratory in the attached exception my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed atory as having the potential to affect the quality of the data, have been identified by the the Laboratory Review Checklist, and no information or data have been knowingly withheld fect the quality of the data.
respo used i	nding to	pplicable: This laboratory is an in-house laboratory controlled by the person or rule. The official signing the cover page of the rule-required report in which these data are ensible for releasing this data package and is by signature affirming the above release true.
	Arnolo	

Official Title

Signature

Name (printed)

Date

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0, 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	±:

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
<b>S</b> 1	O, I	Initial calibration (ICAL)			
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	98.7	
	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	0	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	0	Internal standards (IS):			
	I	Were IS area counts and retention times within the method-required QC limits?	NA		
<b>S</b> 5	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		

Item¹	Analytes <sup>2</sup>	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>	
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	0	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
<b>S</b> 8	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	

#### Table 3. Exception Reports.

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

Description								
CCB acceptance criteria is CCB <mql.< th=""></mql.<>								

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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable: NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

### **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of: х 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.  $\left[ \mathbf{x} \right]$  $R_1$ Field chain-of-custody documentation  $\mathbf{x}$ R<sub>2</sub> Sample identification cross-reference X Test reports (analytical data sheets) for each environmental sample that includes: R3 (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) NA **R4** Surrogate recovery data including: (a) Calculated recovery (%R) (b) The laboratory's surrogate QC limits X Test reports/summary forms for blank samples R5 X **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 OC limits x Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: **R**7 (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 х 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 X List of method quantitation limits (MQLs) for each analyte for each method and matrix R9 Х R10 Other problems or anomalies х 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 daya package and is by signature affirming the above release statement is true. Michael Ohlinger

Official Title

Name (printed)

#### 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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	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		

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	

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

Item¹	Analytes <sup>2</sup>	Analytes <sup>2</sup> Description				
S1	O, I	Initial calibration (ICAL)				
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	2 -1831		
	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	0	Mass spectral tuning:				
	I	Was the appropriate compound for the method used for tuning?	NA	E		
	I	Were ion abundance data within the method-required QC limits?	NA			
54	0	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			

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4	
S6	0	Dual column confirmation			
	I	Did dual column confirmation results meet the method-required QC?	NA		
<b>S</b> 7	0	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			
	1	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)		30 30 20 6	
	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		

#### Table 3. Exception Reports.

Laboratory Name	American Electric Power Dolan Chemical Laboratory
Project Name: W	elsh Landfill
Reviewer Name:	Michael Ohlinger
LRC Date: 11/1/2	
Laboratory Job N	umber: 233092
	er(s): QC2310085

Exception Report No.	Description
_	
-	
<u> </u>	

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.

<sup>3</sup>NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



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 Qua	alifiers 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 %					

<sup>\*</sup> 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.



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 %					

<sup>\*</sup> 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.



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 Unit	s 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/	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/	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/	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
<b>Carrier Recovery</b>	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 %					

<sup>\*</sup> 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.



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

Motals							
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	<b>10.0</b> 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



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

Motais							
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



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 Qualifier	s 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



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

Muhuel S. Ollinger

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 Qualifer 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.

# **Chain of Custody Record**

Dolan Chemical Laboratory (DCL)

4001 Bixby Road

Groveport, Ohio 43125				Prog	ram: (	oal Co	mbustion	Program: Coal Combustion Residuals (CCR)	s (CCR)			
Contacts: Michael Ohlinger (614-836-4184)					Ś	Site Contact:	act:			Date:		For Lab Use Only: COC/Order #:
Project Name: Welsh Background	Analysis T	urmaround	Analyais Turnaround Time (in Calendar Days)	lendar Da	( <u>%</u>	.,,			1 L bottle,	Three (six every 10th*)	), PHFE bottle, ', pH<2	
		Routin	Routine (28 days)				pH<2, HNO,	then pH<2, HNO <sub>3</sub>	Coot, 0-6°C	1 L bottles, pH<2, HNO <sub>3</sub>	banii	<del>654</del> 633117
Sampler(s): Matt Hamilton Kenny McDonald							,64 ,69,		'os	1-228		
Sample Identification	Sample Date	Sample	Sample Type (C=Comp, G=Grab)	Matrix	# of Conf.	ini (a)nelqms2	B, Ca, Ll, Sb, Be, Cd, Cr, C Mo, Se, TL	dissolved Fe	, TDS, F, CI,	Ra-226, Ra	рн	Sample Specific Notes:
AD-1	10/4/2023	1011	ტ	GW	80		×			×	×	Routine (28 days)
AD-5	10/4/2023	1118	თ	GW	-S		×			×	×	TG-32 needed
AD-17	10/4/2023	1107	g	GW	2		×			×	×	
DUPLICATE - BACKGROUND	10/4/2023	1200	ဖ	οW	2		×				×	
EQUIPMENT BLANK - BACKGROUND	10/4/2023	949		GW	2		×				×	
FIELD BLANK - BACKGROUND	10/4/2023	1110	ტ	GW	-		×			22		
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	HNO3; 5=Na	DH; 6= Oth	ner	FE f	; F= filter in field	eld	4	F4	-	4		
* Six 1L Bottles must be collected for Radium for every 10th sample.	r every 10th	sample.										

Special instructions/QC Requirements & Comments:

		١		
Relinquished by The Hand	Company	Date/Time: 60	6 or Received by.	Date/ Lime:
Relinquished by	Company	Date/Time:		Date/Time:
Relinquished by	Company:	Date/Time	Received In Laboratory by D. C.	Date/Time 7 9/0/23
Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR)	rd for Coal Combustion Residua	al (CCR) Sampling - Sh	Sampling - Shreveport, Rev. 1, 1/10/17	

# AFF WATER & WASTE SAMPLE RECEIPT FORM

Package Type Delivery Type
Coole Box Bag Envelope   PONY UPS FedEX USPS
Other
Plant/Customer Welsh Power Number of Plastic Containers: 18
Opened By Misgha Number of Glass Containers:
Date/Time 10/09/23 11:30 ftm Number of Mercury Containers: 5
Were all temperatures within 0-6°C? Y / N or (N/A) Initial:
(IR Gun Ser# 2213689000 , Expir. 03/24/2024) - If No, specify each deviation:
Was Chain of Custody received 2 42 / N Comments
Was Chain of Custody received? (2) N Comments
pH (15 min) Cr <sup>+6</sup> (pres ) NO <sub>2</sub> or NO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres ) (24 hr) (48 hr)
Was COC filled out properly? (Ŷ/ N Comments
Were samples labeled properly? (Y) N Comments
were correct containers used? (Y// N Comments
Was pH checked & Color Coding done? (V) N or N/A Initial & Date: MGC 10/09/23
pH paper (circle one): MQuant,PN1.09535.0001,LOT# [OR] Lab Rat,PN4801.LOT# X000RW0G21 Exp 11/15/292
- 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#
Logged by M50
Reviewed by MGC

**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.

# **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of:

I III3 ua	ta pack	age consists or.					
х	(which		portable data iden		dist consisting of Ta s page), Table 2, Sup		
×	R1	Field chain-of-	custody document	ation			
×	R2	Sample identifi	cation cross-refer	ence			
×	R3	<ul><li>(a) Items spec NELAC State</li><li>(b) Dilution fa</li><li>(c) Preparation</li><li>(d) Cleanup m</li></ul>	cified in NELAC Ch andard actors in methods aethods	napter 5 for	environmental sam reporting results, e., entified compounds	g., Section	
M	R4	(a) Calculated	very data including recovery (%R) tory's surrogate Q	_			
x	R <sub>5</sub>	Test reports/su	ımmary forms for	blank samp	les		
x	R6	<ul><li>(a) LCS spikir</li><li>(b) Calculated</li></ul>		⁄te	control samples (LC	Ss) includ	ding:
X	R7	<ul><li>(a) Samples a</li><li>(b) MS/MSD</li><li>(c) Concentra</li><li>(d) Calculated</li></ul>	ssociated with the spiking amounts	MS/MSD c ISD analyte percent diff	measured in the pa		-
х	R8	<ul><li>(a) The amou</li><li>(b) The calcul</li></ul>	nt of analyte meas	ured in the	_	ision:	
X	R9	List of method	quantitation limit	s (MQLs) fo	or each analyte for ea	ach meth	od and matrix
х	R10	Other problem	s or anomalies				
х	The Ex	ception Report	for every item for	which the r	esult is "No" or "NR	" (Not Re	viewed)
packag require reports by the laborat	e as be ements s. By m laborat tory in t	en reviewed by of the methods y signature bel ory as having tl	the laboratory and used, except wher ow, I affirm to the ne potential to affe Review Checklist, a	l is complet e noted by t best of my l ct the quali	nis laboratory data pe e and technically con he laboratory in the knowledge, all proble ty of the data, have b rmation or data have	mpliant w attached ems/ano been iden	vith the exception malies, observed tified by the
respon used is	ding to	rule. The official sible for releasi	al signing the cove ng this data packa	r page of the ge and is by	aboratory controlled e rule-required repo signature affirming	rt in whic the abov	ch these data are
Susa	nn Su	Izmann	Jusann In	7 Many	Senior Chemist		11-02-2023
Name	(printed	d)	Signature		Official Title		Date

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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?	ves	
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?	ves	
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?	ves	
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	0, 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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	2
	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
<b>S</b> 3	0	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	0	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		
<u> </u>	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	
<b>S11</b>	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	0, 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	

#### Table 3. Exception Reports.

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

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>
· · · · · · · · · · · · · · · · · · ·	
<del></del> -	
<u> </u>	

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.

<sup>&</sup>lt;sup>2</sup>O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ıta pack	age	consists of:			
×	(which	incl	ure page, and the labor udes the reportable dat ception Reports.			
x	R1	Fiel	d chain-of-custody doc	umentation		
×	R2	San	ple identification cross	-reference		
x	R3	(a) (b) (c) (d)	t reports (analytical dat Items specified in NEI NELAC Standard Dilution factors Preparation methods Cleanup methods If required for the pro	AC Chapter 5 for	reporting results, e.g	., Section 5.5.10 in 2003
NA	R4	(a)	rogate recovery data in Calculated recovery (9 The laboratory's surro	6R)		
х	R5		t reports/summary for	_	ples	
x	R6	(a) (b)	t reports/summary for LCS spiking amounts Calculated %R for eac The laboratory's LCS (	h analyte	control samples (LCS	s) including:
×	R7	(a) (b) (c) (d)	t reports for project ma Samples associated wi MS/MSD spiking amo Concentration of each Calculated %Rs and re The laboratory's MS/I	ith the MS/MSD bunts MS/MSD analyt clative percent di	clearly identified e measured in the par	/MSDs) including: ent and spiked samples
x	R8	(a) (b)	oratory analytical dupl The amount of analyte The calculated RPD The laboratory's QC li	e measured in the	duplicate	sion:
x	R9		of method quantitation	· ·	_	ch method and matrix
X.	R10	Oth	er problems or anomal	ies		
х	The Ex	cept	ion Report for every ite	em for which the	result is "No" or "NR"	(Not Reviewed)
packag require reports by the laborat that we	e as be ements s. By m laborat tory in t	en re of th y sig tory : the L ect t	as having the potential aboratory Review Cheche quality of the data.	ory and is comple t where noted by to the best of my to affect the qual eklist, and no info	te and technically con the laboratory in the a knowledge, all proble ity of the data, have be rmation or data have	npliant with the attached exception ms/anomalies, observed een identified by the been knowingly withheld
respon used is	ding to	rule sible	This laborato The official signing the for releasing this data	e cover page of the package and is b	ie rule-required repor	t in which these data are
Jona	than E	Barn	hill	Bellevier of the common terries of properties and properties of the common of the common of data makes when the first bellevier than common of which settled the common of the common of the common of the common of the common of the common of the common of the common of the com	Lab Supervisor	11/8/2023
Name	(printed	d)	Signature		Official Title	Date

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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		
	1	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	3
	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
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	0	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	
54	0	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
<b>S</b> 5	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	10000

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	81208
<b>S</b> 7	0	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
58	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	Ο, Ι	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	- 41 01-32-4
	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	

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

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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> 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

20

**ELT** 

10/09/2023 12:54 SM 2540C-2015

Customer Sample ID: AD-17 Customer Description:

Lab Number: 233093-003 Preparation:

290 mg/L

Date Collected: 10/04/2023 12:07 EDT Date Received: 10/06/2023 09:50 EDT

50

#### Ion Chromatography

TDS, Filterable Residue

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**

Wot offormstry								
Parameter	Result Units I	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** 

170 mg/L

**Customer Description:** 

Lab Number: 233093-004

Preparation:

Date Collected: 10/04/2023 13:00 EDT

Date Received: 10/06/2023 09:50 EDT

**ELT** 

10/09/2023 12:59 SM 2540C-2015

#### **Ion Chromatography**

TDS, Filterable Residue

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

40

100

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

Muhael S. Ollinger

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 Qualifer Legend**

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

# **Chain of Custody Record**

Dolan Chemical Laboratory (DCL)

4001 Birby Road						5	)   1   1	pioceta in construction in the construction in	5				
Groveport, Onio 43125				20	E L	Soal	mbusto	Program: Coal Combustion Residuals (CCR)	S (CK			Paral all Para	Е
Contacts: Michael Ohlinger (614-836-4184)					v3	Site Contact:	<del>;</del>			Date		COC/Order #:	
Project Name: Welsh Background						~		Field-filter 500 mL	=	Three (six every			No. of Control
Contact Name: Rebecca Jones	Analysis	Furmaround Routin	Analysis Turnaround Time (in Calendar Days) Routine (28 days)	dendar Da	î Î	700	bottle, nH<2	bottle,	bottle,	10th*)		7,300	UM
Contact Phone: (737) 330-3725								HNO.	0-6°C	pH<2, HNO <sub>3</sub>	f 10	6>5043	0.5
Sampler(s): Matt Hamilton Kenny McDonald							, da, pa, dq ,00,	nM bns e	'os	822-			-
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	Conf.	ini (s)reiqmaS	B, Ca, Li, Sb, Mo, Se, TL	dissolved Fe	, F, CI,	Ra-226, Ra	6H	Sample Specific Notes:	
AD-1	10/4/2023		9		-				×			TG-32 needed	
AD-5	10/4/2023	1118	G	GW	-				×				
AD-17	10/4/2023	1107	9	GW	-			9-09	×				
DUPLICATE - BACKGROUND	10/4/2023	1200	9	GW	-				×				
					1								
					$\dagger$	$\dagger$							
						$\dagger$							-
					1								_
													_
								0.00					
Preservation Used: 1= ice, 2= HCl; 3= H2SO4, 4=HN03; 5=NaOH; 6= Other	HNO3; 5=Na	OH; 6= Ot	her	Fe f	Fe filter in field	Reld	4	F4	,	4			
* Six 1L Bottles must be collected for Radium for every 10th sample.	r every 10th	sample.											

Special Instructions/QC Requirements & Comments:

		FOAM
Date/Time:	Date/Time:	Date/Time: 9:50/Am
Received by:	Received by:	Received in Liborator by:
Date/Time: 6a Received by:	Date/Time;	Date/Time:
Company	Company	Company:
relinquished by May be relinquished	(elinquished by:	elinquished by:

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

# WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
Gooler Box Bag Envelope	PONY UPS FedEX USPS
	Other
Plant/Customer Nelch	Number of Plastic Containers:
Opened By MS5	Number of Glass Containers:
	Number of Mercury Containers:
	I or N/A Initial:
	O24) - If No, specify each deviation:  Comments
	15
1 1 1	Comments  If RUSH, who was notified?
	NO <sub>3</sub> (48 hr) ortho-PO <sub>4</sub> (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	N or N/A Initial & Date: MSO 10/6/23
pH paper (circle one): MQuant,PN1.09535,0001,	LOT#ORTLab Rat,PN4801,LOT# X000RWDG21 Exp 11/15/2024
- Was Add'l Preservative needed? Y	yf 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 8	& Date & Time :
Lambert MAST	ents:
Reviewed by MGIC	

**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.

# **Municipal Solid Waste Laboratory Review Checklist**

This da	ita pack	age consists of	f <b>:</b>		
×	(which		eportable data identified	checklist consisting of Table 1 on this page), Table 2, Suppor	
х	R1	Field chain-of	-custody documentation		
x	R2	Sample identi	fication cross-reference		
X	R3	<ul><li>(a) Items specified NELAC S</li><li>(b) Dilution S</li><li>(c) Preparation (d) Cleanup S</li></ul>	ecified in NELAC Chapter tandard factors on methods methods	r each environmental sample to 5 for reporting results, e.g., So rely identified compounds (TIC	ection 5.5.10 in 2003
×	R4	(a) Calculate	overy data including: ed recovery (%R) eatory's surrogate QC lim	its	
x	R5	Test reports/s	summary forms for blank	samples	
x	R6	(a) LCS spik (b) Calculate		atory control samples (LCSs) is	ncluding:
x	R7	<ul><li>(a) Samples</li><li>(b) MS/MSI</li><li>(c) Concentr</li><li>(d) Calculate</li></ul>	associated with the MS/I spiking amounts	nalyte measured in the parent nt differences (RPDs)	
X	R8	(a) The amo (b) The calcu	unt of analyte measured i	-	:
x	R9	List of metho	d quantitation limits (MC	Ls) for each analyte for each r	nethod and matrix
x	R10	Other problem	ns or anomalies		
х	The Ex	ception Repor	t for every item for which	the result is "No" or "NR" (No	ot Reviewed)
packag require reports by the laborat	e as be ements s. By m laborat tory in t	en reviewed by of the methods y signature be tory as having	y the laboratory and is co s used, except where note clow, I affirm to the best of the potential to affect the Review Checklist, and no	se of this laboratory data packamplete and technically complied by the laboratory in the attack of my knowledge, all problems, quality of the data, have been o information or data have bee	ant with the ched exception /anomalies, observed identified by the
respon used is	ding to	rule. The offic sible for releas	ial signing the cover page	ouse laboratory controlled by of the rule-required report in d is by signature affirming the	which these data are
Tim /	Arnold		Jun Undef	Principle Chemist	10/18/2023
Name	(printe	d)	Signature	Official Title	Date

#### 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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
R1	O, I	Chain-of-custody (COC)		2
	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	0	Surrogate recovery data		
	I	Were surrogates added prior to extraction?	Yes	-25
	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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
<b>S</b> 3	0	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	0	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
<b>S</b> 5	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
<b>S</b> 7	0	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	
<b>S</b> 15	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	

#### Table 3. Exception Reports.

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

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB <mql.< th=""></mql.<>
<u></u>	

<sup>&</sup>lt;sup>1</sup> 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.

O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

## **Municipal Solid Waste Laboratory Review Checklist**

This data package consists of: х 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. x Field chain-of-custody documentation R1 X R<sub>2</sub> Sample identification cross-reference х Test reports (analytical data sheets) for each environmental sample that includes: R3 (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) NA Surrogate recovery data including: **R**4 (a) Calculated recovery (%R) (b) The laboratory's surrogate QC limits х Test reports/summary forms for blank samples **R**5 x 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 x Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: **R**7 (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 X **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 X List of method quantitation limits (MQLs) for each analyte for each method and matrix R9 х R10 Other problems or anomalies X 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)

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	162
	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	0	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	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	
	ī	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	0, 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	

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

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S1	0, 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	E-10-10
	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	0	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	0	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
\$5	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	

Item¹	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No.4
S6	0	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
<b>S7</b>	0	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)	K 19	
	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	

#### Table 3. Exception Reports.

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

Exception Report No.	Description
	V.Sta
-	

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>&</sup>lt;sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>&</sup>lt;sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."