Annual Groundwater Monitoring Report

Public Service Company of Oklahoma

Northeastern 3&4 Power Station

Bottom Ash Pond CCR Management Unit

7300 E HWY 88

Oologah, Oklahoma

January 2021

Prepared by:
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PUBLIC SERVICE COMPANY OF OKLAHOMA℠

An AEP Company

BOUNDLESS ENERGY℠

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I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for an existing CCR unit at Public Service Company of Oklahoma's (PSO's), a wholly-owned subsidiary of American Electric Power Company (AEP), Northeastern 3&4 Power Station. The Oklahoma Department of Environmental Quality (ODEQ) CCR rules require that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31, 2021.

In general, the following activities were completed:

- This CCR Unit began and ended 2020 in assessment monitoring.
- Semi-annual groundwater samples were collected and analyzed for Appendix A and Appendix B constituents, as specified in OAC 255:517-9-6 Assessment Monitoring program and AEP's *Groundwater Sampling and Analysis Plan* (2016);
- Semi-annual groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units;
- Groundwater Monitoring Statistical Evaluation Reports to evaluate groundwater data were prepared in accordance with OAC 252:517-9-4 and certified. The statistical process was guided by USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* ("Unified Guidance" USEPA, 2009).
- For the First semi-annual 2020 sampling event:
    - Statistically significant increases (SSIs) for pH in SP 1, boron, chloride, fluoride and TDS in SP-10, and sulfate in SP-11 were determined based on 2 of 2 sampling conducted July 28, 2020 and statistical evaluation completed October 28, 2020;
    - Statistically significant levels (SSLs) were determined for lithium and fluoride in SP-10 and statistical evaluation completed October 28, 2020;
    - An alternate source demonstration (ASD) for the SSLs is underway.
- For the Second semi-annual event:
    - Statistical evaluation of the groundwater data is underway

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

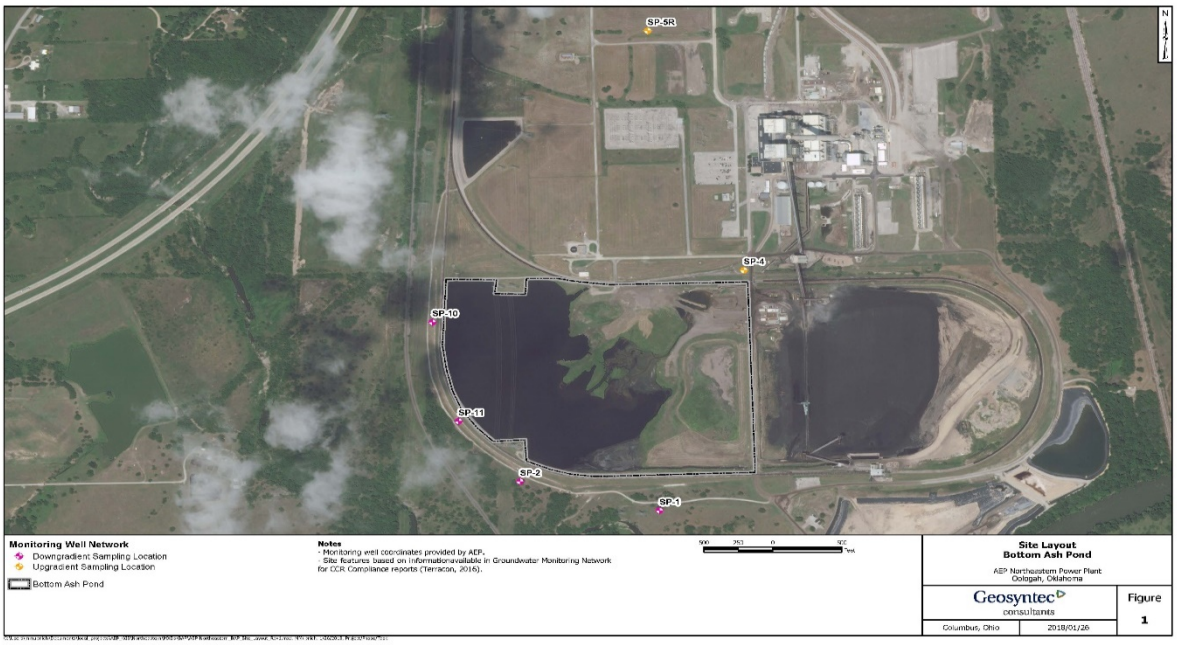
- A map, aerial photograph or a drawing showing the CCR management unit(s), all groundwater monitoring wells and monitoring well identification numbers;
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened;
- 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 detection monitoring or assessment monitoring programs is included in Appendix I;
- Statistically reports are located in Appendix II;
- Alternate Source Demonstrations are located in Appendix III;
- Program required notifications are located in Appendix IV;
- Field Sheets and Laboratory Reports are located in Appendix V;
- ODEQ's related correspondences are located in Appendix VI.

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 figure that follows depicts the PE-certified groundwater monitoring network, the monitoring well locations and their corresponding identification numbers.

Primary Bottom Ash Pond Monitoring Wells	
Up Gradient	Down Gradient
SP-4	SP-1
SP-5R	SP-2
	SP-10
	SP-11



III. Monitoring Wells Installed or Decommissioned

During 2020, no monitoring wells were installed or decommissioned.

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

- Appendix I contains tables showing the applicable groundwater quality data obtained under OAC 252:517-9-4 through 252:517-9-6 relevant to this reporting period. Static water elevation data from each monitoring event also are shown in Appendix I, along with the groundwater velocity, groundwater flow direction and potentiometric maps developed after each sampling event.
- The annual sampling event for Appendix A and Appendix B constituents conducted March 25, 2020 satisfies the requirement of 252:517-9-6(b).
- The semi-annual groundwater sampling events for Appendix A and Appendix B constituents were conducted June 30, 2020 and October 20, 2020 and the resulting data were placed into NPS's Operating Record, satisfying the requirement of 252:517-9-6(d).
    - The groundwater rate and flow direction for the first semi-annual confirmatory sampling event for SSIs on July 28, 2020 reflects that seen during the first semi-annual initial sampling event.

V. Statistical Evaluation Completed in 2020

- First Semi-Annual sampling event was conducted June 30, 2020 and the 2 of 2 confirmatory sampling for potential SSIs was conducted July 28, 2020:
    - SSIs for pH in SP 1, boron, chloride, fluoride and TDS in SP-10, and sulfate in SP-11 were determined based on 2 of 2 sampling conducted July 28, 2020 and statistical evaluation completed October 28, 2020;
    - SSLs were determined for lithium and fluoride in SP-10 and statistical evaluation completed October 28, 2020;
- Second Semi-Annual sampling event was conducted October 20, 2020:
    - Statistical evaluation for SSIs and SSLs determination is underway

VI. Alternate Source Demonstrations Completed in 2020

- An ASD was completed February 11, 2020 for the lithium SSL detected during the Second 2019 semi-annual groundwater sampling event and submitted to ODEQ for approval.
- An ASD is underway for the SSLs of fluoride and lithium determined during the First 2020 semi-annual groundwater monitoring event.

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

This CCR Unit remains in assessment monitoring.

VIII. Other Information Required

Financial Assurance – Corporate Financial Test was accepted by ODEQ in correspondence dated June 30, 2020.

An Alternative Closure Requirements Annual Report was submitted April 30, 2020 and approved by ODEQ in correspondence dated August 11, 2020.

IX. Description of Any Problems Encountered in 2020 and Actions Taken

No significant problems were encountered.

X. A Projection of Key Activities for the Upcoming Year

- As required by OAC 252:517-9-6, conduct assessment monitoring of the groundwater for the CCR unit;
- Evaluation of the assessment monitoring results from a statistical analysis viewpoint, looking for SSLs above GWPS;
- Submit the findings of the ASDs;
- Submit Alternative Closure Requirements Annual Report;
- Submit Financial Assurance documentation;
- Preparation of the next annual groundwater report.

APPENDIX I

Potentiometric maps, 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
- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)
- Bottom Ash Pond
- Impoundment
- Landfill
- Slurry Wall

Notes

- Monitoring well coordinates and water level data (collected on 3/25/2020) provided by AEP.
- Groundwater elevation units are feet above mean sea level (ft. msl).
- Only wells screened in the Altamont Limestone were used for contouring.

600 300 0 600 Feet

Potentiometric Contours - Uppermost Aquifer
March 2020

AEP Northeastern Power Plant - Bottom Ash Pond
Oologah, Oklahoma

Geosyntec consultants

Columbus, Ohio | 2020/06/08

Figure 1

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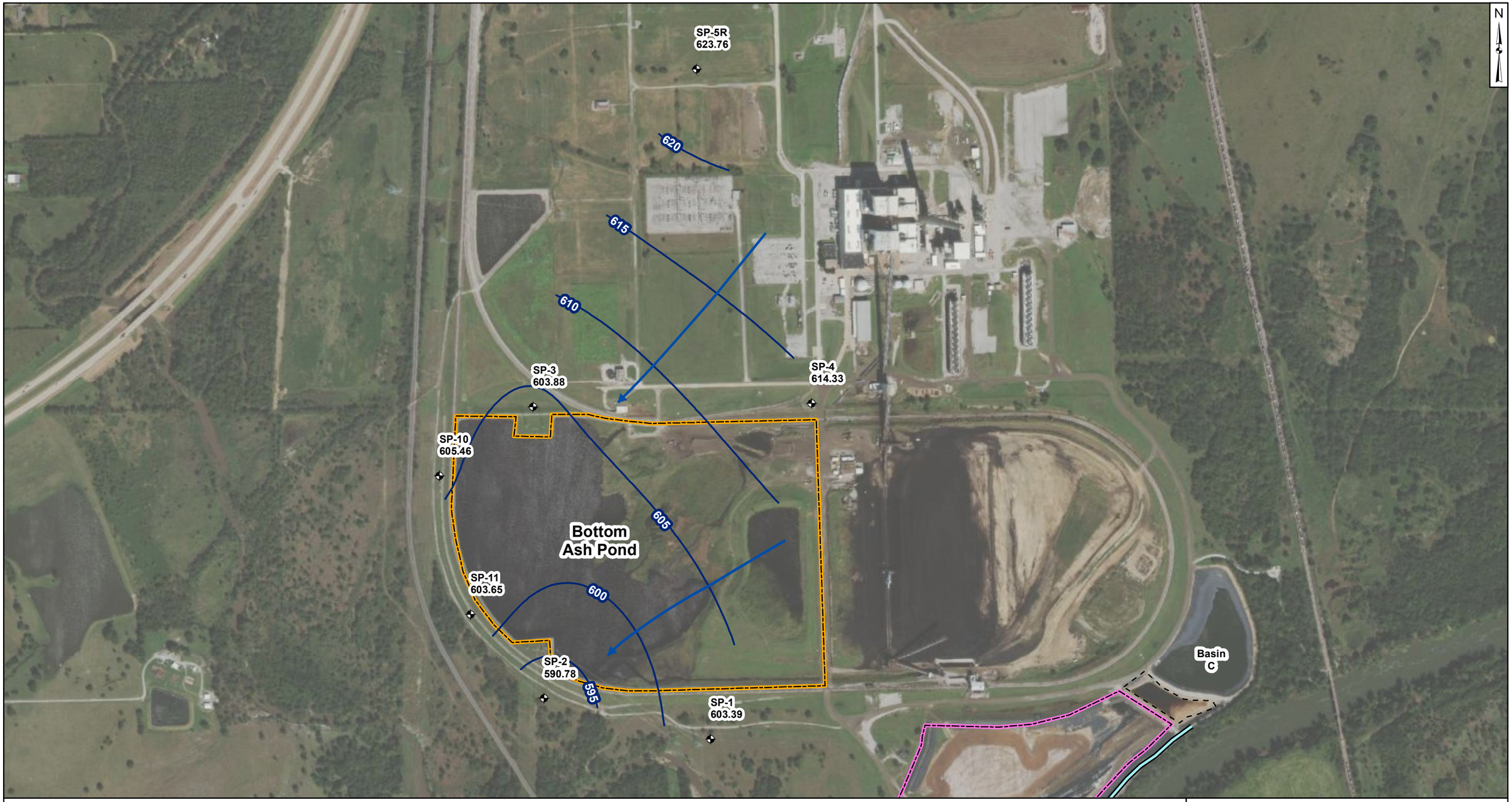


Legend

- Groundwater Monitoring Well
- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)
- Bottom Ash Pond
- Impoundment
- Landfill
- Slurry Wall

Notes

- Monitoring well coordinates and water level data (collected on 6/29-30/2020) provided by AEP.
- Groundwater elevation units are feet above mean sea level (ft. msl).
- Only wells screened in the Altamont Limestone were used for contouring.

600 300 0 600 Feet

Potentiometric Contours - Uppermost Aquifer
June 2020

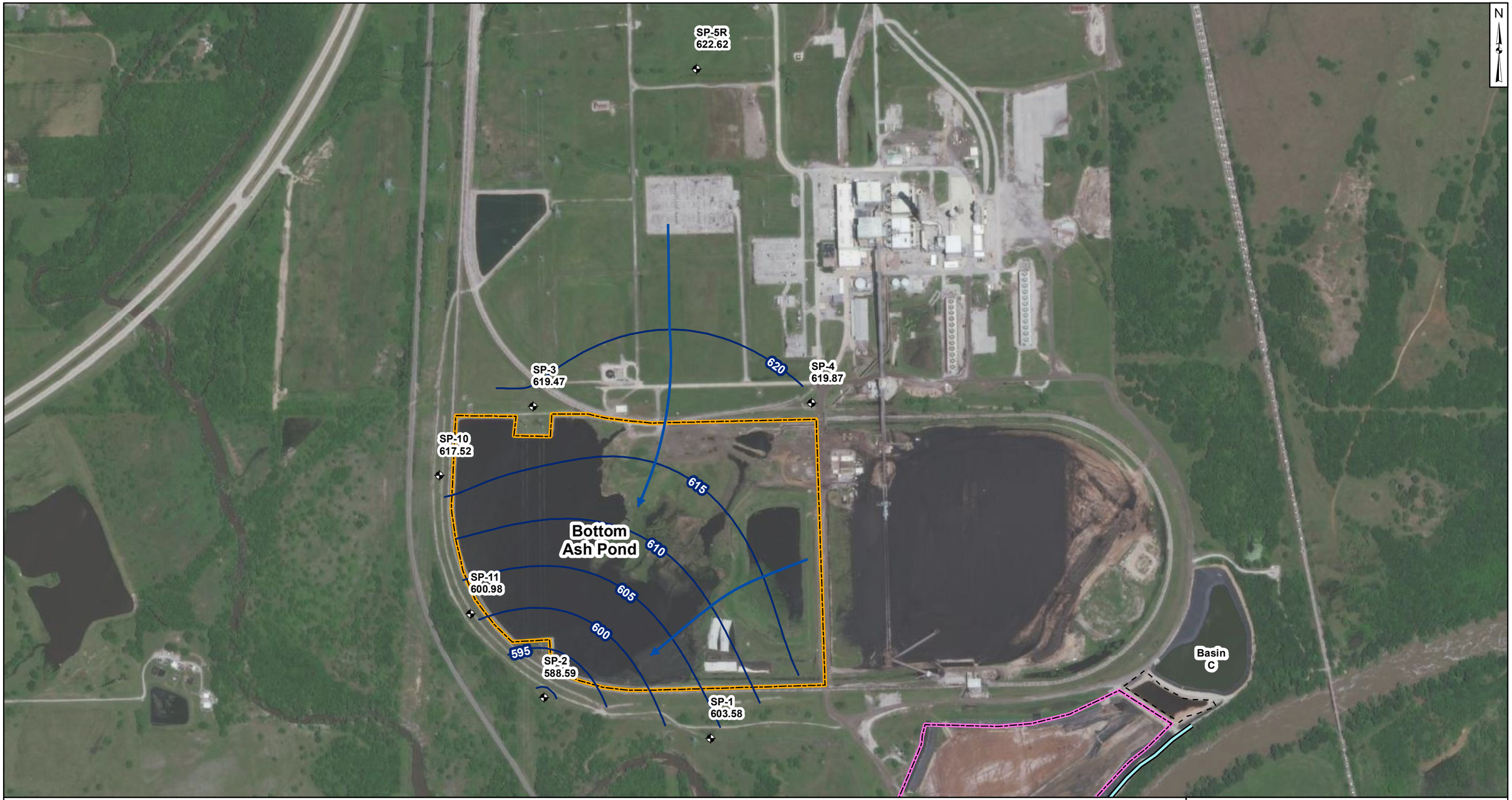
AEP Northeastern Power Plant - Bottom Ash Pond
Oologah, Oklahoma

Geosyntec consultants

Columbus, Ohio | 2020/10/06

Figure **2**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Northeastern\2020\AEP-Northeastern_BAP_2020-06June.mxd. HDuff. 10/6/2020. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour
- Bottom Ash Pond
- Impoundment
- Landfill
- Slurry Wall

Notes

- Monitoring well coordinates and water level data (collected on 10/20/2020) provided by AEP.
- Groundwater elevation units are feet above mean sea level (ft. msl).
- Only wells screened in the Altamont Limestone were used for contouring.

600 300 0 600
Feet

Potentiometric Contours - Uppermost Aquifer
October 2020

AEP Northeastern Power Plant - Bottom Ash Pond
Oologah, Oklahoma

Geosyntec consultants

Columbus, Ohio | 2020/12/23

Figure
3

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NE CCR Units
NE BAP

$$v = 0.00463 \frac{cm}{sec} * \frac{head(ft)}{dist(ft)} * \frac{1}{0.045} * \frac{ft}{30.48cm} * \frac{31536000\ sec}{yr}$$

Distance between wells.

	SP1	SP2	SP3	SP4	SP5R	SP10	SP11
SP1	-	1000.0		2250.0	3750.0	2333.0	1677.0
SP2		-		2444.0	3972	1500.0	666.7
SP3							
SP4				-	2167.0	2333.0	2444.0
SP5R					-	2944.0	3611.0
SP10						-	861.1
SP11							-

NE BAP

Hydraulic gradient. Use row **77** 10/20/2020

	SP1	SP2	SP3	SP4	SP5R	SP10	SP11
SP1	-	0.015		0.0072	0.005	0.006	0.002
SP2		-		0.013	0.009	0.019	0.019
SP3			-				
SP4				-	0.001	0.00101	0.008
SP5R					-	0.002	0.006
SP10						-	0.0192
SP11							-

effective porosity(n) = 0.045
Hydraulic conductivity of aquifer (k) = 4759 ft/yr
Max gradient (dh/dl)
0.019
min gradient
0.001007

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

Groundwater elevations, sea level

Well	**SP-1**	**SP-2**	**SP-3**	**SP-4**	**SP-5R**	**SP-10**	**SP-11**
total depth*	37.99	38.19	37.90	38.30	78.00	54.10	34.51
TOC	621.26	617.49	621.02	639.16	631.17	617.52	615.17

* includes riser

	-----Depth to water-----						
date							
10/4/2017	17.57	36.46	11.60	35.84	7.09	34.79	31.97
10/11/2017	16.53	35.79	9.28	35.04	5.76	34.66	32.21
5/1/2018	16.69	22.15	18.38	15.29	5.8	15.13	12.64
5/29/2018	17.43	21.71	19.12	14.45	6.99	14.89	14.31
7/30/2018	18.04	27.02		20.41	8.53	8.13	16.41
2/27/2019	16.58	20.86		13.09	4.81	20.12	11.15
6/20/2019	16.88	23.31		22.53	4.82	12.32	4.72
8/26/2019	17.51	28.43	16.28	25	6.39	3.85	14.6
3/25/2020	15.34	19.07	14.88	13.28	3.43	13.13	7.16
6/29/2020	17.87	26.71	17.14	24.83	7.41	12.06	11.52
7/28/2020	17.36	32.6	14.29	30.78	7.25	11.76	18.16
10/20/2020	17.68	28.9	1.55	19.29	8.55	0	14.19

	-----Calculated groundwater elevation-----											
Well	**SP-1**	**SP-2**	**SP-3**	**SP-4**	**SP-5R**	**SP-10**	**SP-11**	**Max**	MIN			
TOC	621.26	617.49	621.02	639.16	631.17	617.52	615.17			**(dh/dl)**		
										gradient	**max v(ft/yr)**	**min v(ft/yr)**
Date												
10/4/2017	603.69	581.03	609.42	603.32	624.08	582.73	583.20	624.08	581.03	0.037	**3912.96**	
10/11/2017	604.73	581.7	611.74	604.12	625.41	582.86	582.96	625.41	581.70	0.023	**2432.38**	**12.27**
5/1/2018	604.57	595.34	602.64	623.87	625.37	602.39	602.53	625.37	595.34	0.012	**1269.07**	**17.24**
5/29/2018	603.83	595.78	601.90	624.71	624.18	602.63	600.86	624.71	595.78	0.012	**1269.07**	**25.91**
7/30/2018	603.22	590.47		618.75	622.64	609.39	598.76	622.64	590.47	0.013	**1374.82**	**18.93**
2/27/2019	604.68	596.63		626.07	626.36	597.4	604.02	626.36	596.63	0.012	1269.07	**12.69** 1H2019
6/20/2019	604.38	594.18		616.63	626.35	605.2	610.45	626.35	594.18	0.024	2538.13	**37.12** annual screening
8/26/2019	603.75	589.06	604.74	614.16	624.78	613.67	600.57	624.78	589.06	0.017	1797.84	**22.21** 2H2019
3/25/2020	605.92	598.42	606.14	625.88	627.74	604.39	608.01	627.74	598.42	0.014	1480.58	**69.38** annual screening
6/29/2020	603.39	590.78	603.88	614.33	623.76	605.46	603.65	623.76	590.78	0.019	2009.36	**16.39** 1H2020
7/28/2020	603.90	584.89	606.73	608.38	623.92	605.76	597.01	623.92	584.89	0.019	2009.36	**16.39** 1H2020 SSI confirmatory
10/20/2020	603.58	588.59	619.47	619.87	622.62	617.52	600.98	622.62	588.6	0.019	2009.36	**17.98** 2H2020

Residence Time Calculation Summary
Northeastern Bottom Ash Pond

Geosyntec Consultants, Inc.

			2020-03		2020-06		2020-10	
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)
Bottom Ash Pond	SP-1 [2]	2.0	3.5	17.3	4.6	13.3	5.5	11.1
	SP-2 [2]	2.0	4.8	12.6	6.5	9.3	8.7	7.0
	SP-4 [2]	2.0	4.3	14.1	2.7	22.4	2.0	30.1
	SP-5R [1]	2.0	3.3	18.3	3.2	18.9	1.1	55.4
	SP-10 [1]	2.0	1.3	47.0	1.6	37.1	6.4	9.5
	SP-11 [1]	2.0	5.6	10.9	6.7	9.1	6.6	9.3

Notes:
[1] - Background Well
[2] - Downgradient Well

Residence Time Calculation Summary
Northeastern Bottom Ash Pond

Geosyntec Consultants, Inc.

			2018-05		2018-07	
CCR Management Unit	Monitoring Well	Well Diameter (inches)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Bottom Ash Pond	SP-1 [2]	2.0	2.6	23.4	5.2	11.7
	SP-2 [2]	2.0	3.4	17.7	5.8	10.6
	SP-4 [2]	2.0	5.2	11.6	3.0	20.6
	SP-5R [1]	2.0	3.1	19.6	1.5	40.0
	SP-10 [1]	2.0	1.0	61.4	4.2	14.4
	SP-11 [1]	2.0	3.4	17.9	3.9	15.7

Notes:
[1] - Background Well
[2] - Downgradient Well

Table 1 - Groundwater Data Summary: SP-1
Northeastern - BAP
Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
1/25/2017	Background	0.298	111	60	<1 U	7.5	66	514
3/13/2017	Background	0.186	117	548	4	--	30	480
4/27/2017	Background	0.202	108	83	1.02	7.6	60	496
5/18/2017	Background	0.284	131	104	1.3	--	60	574
6/16/2017	Background	0.242	115	50	0.6437 J	9.3	48	478
6/28/2017	Background	0.232	113	19	0.582 J	11.1	48	424
7/13/2017	Background	0.287	122	70	0.6283 J	9.8	56	504
8/4/2017	Background	0.299	125	20	0.542 J	8.7	52	394
8/17/2017	Background	--	--	--	--	7.9	--	--
8/30/2017	Background	0.25	120	34	0.581 J	7.7	59	456
9/13/2017	Background	0.369	119	62	0.4042 J	8.2	54	536
9/20/2017	Background	0.331	129	22	< 0.083 U	7.3	62	440
10/11/2017	Detection	0.35	152	136	1.4051	7.4	58	676
1/22/2018	Detection	--	119	--	--	6.9	--	--
5/30/2018	Assessment	--	--	--	1.2525	7.3	--	--
7/30/2018	Assessment	0.397	130	46	0.9863 J	7.0	63	1,060
2/4/2019	Assessment	0.354	150	--	--	--	--	--
2/27/2019	Assessment	0.200	122	42.7	0.80	7.3	87.1	532
6/20/2019	Assessment	0.198	126	25.2	0.77	7.1	61.4	452
8/26/2019	Assessment	0.124	120	9	0.525 J	9.0	48	438
3/25/2020	Assessment	0.184	96.7	40.8	0.96	8.5	62.9	500
6/30/2020	Assessment	0.180	99.4	29.6	0.81	9.0	49.3	435
7/28/2020	Assessment	--	--	--	--	8.4	--	--
10/20/2020	Assessment	0.146	103	12.9	0.81	8.5	51.1	427

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-1
Northeastern - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
1/25/2017	Background	<5 U	<5 U	211	<1 U	<1 U	<1 U	<5 U	3.48	<1 U	<5 U	0.006	<0.025 U	11.0	<5 U	<2 U
3/13/2017	Background	<5 U	<5 U	146	<1 U	<1 U	<1 U	<5 U	3.014	4	<5 U	0.007	<0.025 U	16.0	<5 U	<2 U
4/27/2017	Background	2.75 J	1.91 J	195	0.1 J	< 0.07 U	0.84 J	2.42 J	4.71	1.02	0.94 J	0.00789	< 0.005 U	19.92	4.85 J	< 0.86 U
5/18/2017	Background	6.85	5.48	243	0.26 J	0.22 J	2.55	2.55 J	4.12	1.3	1.63 J	0.00853	0.023 J	16.77	6.51	< 0.86 U
6/16/2017	Background	1.14 J	< 1.05 U	183	0.04 J	< 0.07 U	< 0.23 U	0.77 J	2.096	0.6437 J	< 0.68 U	0.00407	0.009 J	7.02	2.54 J	< 0.86 U
6/28/2017	Background	< 0.93 U	< 1.05 U	187	< 0.02 U	< 0.07 U	< 0.23 U	0.77 J	14.29	0.582 J	< 0.68 U	0.00334	< 0.005 U	6.42	2.77 J	< 0.86 U
7/13/2017	Background	1.25 J	< 1.05 U	217	0.09 J	< 0.07 U	0.62 J	1.34 J	4.01	0.6283 J	1.24 J	0.00395	< 0.005 U	8.14	5.21	0.89 J
8/4/2017	Background	< 0.93 U	2.11 J	298	0.1 J	< 0.07 U	0.78 J	1.33 J	3.41	0.542 J	0.94 J	0.00577	0.009 J	19.96	11.96	< 0.86 U
8/30/2017	Background	2.09 J	1.34 J	218	0.14 J	< 0.07 U	0.55 J	1.75 J	4.15	0.581 J	< 0.68 U	0.00468	< 0.005 U	12.08	3.51 J	< 0.86 U
9/13/2017	Background	< 0.93 U	< 1.05 U	210	0.09 J	0.08 J	0.31 J	1.07 J	2.584	0.4042 J	< 0.68 U	0.00548	< 0.005 U	14.65	4.13 J	< 0.86 U
9/20/2017	Background	< 0.93 U	< 1.05 U	168	0.05 J	0.11 J	< 0.23 U	1.15 J	4.53	< 0.083 U	< 0.68 U	0.00318	< 0.005 U	5.32	< 0.99 U	< 0.86 U
5/30/2018	Assessment	< 0.93 U	< 1.05 U	190	< 0.02 U	< 0.07 U	< 0.23 U	0.53 J	3.64	1.2525	< 0.68 U	0.00785	< 0.005 U	16.39	4.23 J	2
7/30/2018	Assessment	0.69	0.93	174	0.06 J	0.08 J	1.83	0.676	3.056	0.9863 J	0.354	0.00615	< 0.005 U	17.1	5.8	0.09 J
2/27/2019	Assessment	0.6 J	0.7 J	168	< 0.2 U	< 0.1 U	2.72	< 0.2 U	3.056	0.80	0.2 J	0.00641	< 0.005 U	10 J	2.8	< 1 U
6/20/2019	Assessment	0.93	1.44	242	0.2 J	0.1 J	0.7 J	5.54	2.745	0.77	0.650	0.03 J	0.01 J	12.1	9.9	< 0.5 U
8/26/2019	Assessment	0.43	0.73	160	0.08 J	0.09	1.49	0.481	2.75	0.525 J	0.835	0.00285	< 0.005 U	5.86	3.4	0.1 J
3/25/2020	Assessment	0.62	0.72	158	0.07 J	0.08	0.499	0.362	6.67	0.96	0.351	0.00600	< 0.002 U	15.8	6.6	< 0.1 U
6/30/2020	Assessment	0.58	0.69	159	0.07 J	0.07	0.969	0.431	2.531	0.81	0.886	0.00534	< 0.002 U	13.6	8.3	< 0.1 U
10/20/2020	Assessment	0.46	0.57	143	0.05 J	0.08	0.215	0.727	2.82	0.81	0.254	0.00336	< 0.002 U	11.5	3.8	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-2
Northeastern - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
1/25/2017	Background	0.274	108	607	3	6.4	21	1,786
3/13/2017	Background	0.251	82.6	37	1	--	70	1,340
4/27/2017	Background	0.152	62	527	2.82	6.5	27	1,242
5/18/2017	Background	0.336	117	1,240	3	--	15	2,214
6/16/2017	Background	0.303	108	888	2.96	8.3	61	1,912
6/28/2017	Background	0.292	98.5	883	2.8408	7.4	58	1,872
7/13/2017	Background	0.339	111	863	3.581	7.9	58	1,846
8/4/2017	Background	0.28	147	1,064	2.788	7.2	57	2,132
8/17/2017	Background	--	--	--	--	7.6	--	--
8/30/2017	Background	0.275	86.8	1,001	4.0998	7.5	47	2,192
9/13/2017	Background	0.311	91.8	930	3.196	7.0	43	1,956
9/20/2017	Background	0.3	129	856	1.726	6.9	37	1,778
10/11/2017	Detection	0.307	91.9	970	3.5881	7.3	41	2,076
1/22/2018	Detection	--	--	975	--	7.0	--	1,910
5/30/2018	Assessment	--	--	--	3.4972	7.5	--	--
7/30/2018	Assessment	0.276	117	268	2.6556	7.5	30	1,006
2/27/2019	Assessment	0.116	94.0	351	2.68	7.6	26.1	932
6/20/2019	Assessment	0.109	58.2	357	2.69	6.8	28.5	1,044
8/26/2019	Assessment	0.173	211	1,072	2.685	8.5	14	2,246
3/25/2020	Assessment	0.114	60.4	418	2.73	8.8	22.0	1,120
6/30/2020	Assessment	0.163	83.9	420	2.64	8.8	26.3	977
7/28/2020	Assessment	--	--	--	--	8.4	--	--
10/20/2020	Assessment	0.151	75.3	850	2.98	8.7	19.1	1,790

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-2
Northeastern - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
1/25/2017	Background	<5 U	11	1460	<1 U	<1 U	3	<5 U	6.89	3	<5 U	0.098	<0.025 U	19	<5 U	<2 U
3/13/2017	Background	<5 U	5	1130	<1 U	<1 U	1	<5 U	9.96	1	<5 U	0.073	<0.025 U	23	<5 U	<2 U
4/27/2017	Background	2.09 J	2.08 J	760	0.04 J	< 0.07 U	0.24 J	0.87 J	8.98	2.82	< 0.68 U	0.05305	< 0.005 U	24.67	2.04 J	< 0.86 U
5/18/2017	Background	8.71	9.02	3,130	0.26 J	0.18 J	2.87	2.77 J	26.48	3	2.02 J	0.111	0.006 J	11.63	6.16	< 0.86 U
6/16/2017	Background	11.34	5.5	1,710	0.18 J	< 0.07 U	2.04	2.51 J	22.16	2.96	< 0.68 U	0.103	0.005 J	29.57	37.83	< 0.86 U
6/28/2017	Background	5.15	1.4 J	1,560	0.06 J	< 0.07 U	1.29	1.82 J	--	2.8408	< 0.68 U	0.09272	< 0.005 U	29.62	22.41	< 0.86 U
7/13/2017	Background	4.74 J	2.51 J	1,540	0.07 J	< 0.07 U	0.59 J	1.23 J	--	3.581	1.41 J	0.0961	< 0.005 U	33.32	23.23	< 0.86 U
8/4/2017	Background	3.51 J	2.54 J	1,010	0.09 J	0.07 J	1.07	1.08 J	16.34	2.788	< 0.68 U	0.09164	0.014 J	39.4	23.36	< 0.86 U
8/30/2017	Background	2.95 J	1.25 J	1,120	0.12 J	< 0.07 U	< 0.23 U	0.8 J	14.48	4.0998	< 0.68 U	0.0931	< 0.005 U	33.86	11.86	< 0.86 U
9/13/2017	Background	2.67 J	1.83 J	992	0.11 J	< 0.07 U	< 0.23 U	0.87 J	14.89	3.196	< 0.68 U	0.09207	0.006 J	37.61	9.87	< 0.86 U
9/20/2017	Background	2.64 J	3.05 J	1,150	0.2 J	0.09 J	3.46	2.55 J	--	1.726	0.91 J	0.09111	< 0.005 U	39.39	9.87	< 0.86 U
5/30/2018	Assessment	1.3 J	< 1.05 U	869	< 0.02 U	< 0.07 U	< 0.23 U	0.55 J	7.85	3.4972	< 0.68 U	0.04039	< 0.005 U	26.46	2.16 J	< 0.86 U
7/30/2018	Assessment	1.21	1.42	656	0.05 J	0.08 J	< 40 U	0.400	9.61	2.6556	0.245	0.0346	< 0.005 U	26.1	2.9	0.06 J
2/27/2019	Assessment	1.39	1.29	841	< 0.2 U	< 0.1 U	4.30	< 0.2 U	5.76	2.68	0.3 J	0.0329	< 0.005 U	25.8	3.7	< 1 U
6/20/2019	Assessment	1.34	1.43	868	0.1 J	0.09 J	0.9 J	0.434	7.94	2.69	0.4 J	0.062	< 0.005 U	25.0	2.9	< 0.5 U
8/26/2019	Assessment	1.22	1.53	1,220	0.07 J	0.05	0.701	0.568	8.72	2.685	0.334	0.0582	< 0.005 U	22.3	3.7	0.1 J
3/25/2020	Assessment	1.14	1.68	1,060	0.07 J	0.13	0.806	0.361	9.73	2.73	0.694	0.0352	< 0.002 U	20.3	2.4	< 0.1 U
6/30/2020	Assessment	1.26	1.28	1,140	0.109	0.05	0.573	0.733	7.84	2.64	0.263	0.0585	< 0.002 U	19.7	6.2	< 0.1 U
10/20/2020	Assessment	1.22	1.08	1,110	0.07 J	0.04 J	0.398	0.433	12.96	2.98	0.1 J	0.0517	< 0.002 U	20.1	4.4	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-4
Northeastern - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
1/25/2017	Background	0.406	57.7	401	3	7.7	37	1,122
3/15/2017	Background	0.399	67	52	4	--	38	1,128
4/27/2017	Background	0.442	58.8	459	3.2	7.0	41	1,128
5/18/2017	Background	0.411	296	232	2.1	--	50	846
6/16/2017	Background	0.395	118	475	3.34	8.3	36	1,164
6/28/2017	Background	0.388	110	471	3.2489	8.1	37	1,388
7/13/2017	Background	0.42	648	489	3.863	8.1	36	1,128
8/4/2017	Background	0.412	1,920	469	3.078	7.7	50	1,150
8/17/2017	Background	0.493	793	460	3.049	7.8	75	1,132
8/31/2017	Background	0.392	612	576	4.086	7.6	74	1,400
9/13/2017	Background	0.387	810	450	3.199	7.7	88	1,236
9/20/2017	Background	0.477	630	440	1.747	7.2	90	1,208
10/11/2017	Detection	0.425	206	431	3.7702	7.4	78	1,200
5/30/2018	Assessment	--	--	--	4.169	7.4	--	--
7/30/2018	Assessment	0.399	164	521	< 0.083 U	7.6	70	1,180
2/27/2019	Assessment	0.370	85.6	470	3.26	7.4	61.5	1,122
6/20/2019	Assessment	0.325	56.4	450	3.24	7.1	58.0	1,128
8/26/2019	Assessment	0.365	182	458	2.99	8.8	61	1,170
3/25/2020	Assessment	0.340	59.6	476	3.29	9.1	68.6	1,130
6/30/2020	Assessment	0.338	80.5	531	3.16	9.0	70.2	1,160
10/21/2020	Assessment	0.333	63.9	441	3.24	8.9	70.4	1,150

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-4
Northeastern - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
1/25/2017	Background	<5 U	<5 U	398	<1 U	<1 U	<1 U	<5 U	4	3	<5 U	0.072	<0.025 U	<5 U	<5 U	<2 U
3/15/2017	Background	<5 U	<5 U	477	<1 U	<1 U	<1 U	<5 U	3.57	4	<5 U	0.073	<0.025 U	<5 U	<5 U	<2 U
4/27/2017	Background	1.36 J	1.72 J	578	0.03 J	0.1 J	0.64 J	1.01 J	2.566	3.2	< 0.68 U	0.06973	< 0.005 U	1.5 J	< 0.99 U	1.21 J
5/18/2017	Background	2.04 J	5.5	762	0.56 J	0.57 J	10.73	5.49	6.37	2.1	3.65 J	0.07998	0.015 J	1.02 J	< 0.99 U	< 0.86 U
6/16/2017	Background	1.74 J	4.59 J	633	0.34 J	< 0.07 U	4.04	4.63 J	4.18	3.34	1.39 J	0.07422	< 0.005 U	0.65 J	1.67 J	< 0.86 U
6/28/2017	Background	< 0.93 U	2.01 J	576	0.24 J	< 0.07 U	2.98	5.29	9.64	3.2489	0.96 J	0.07041	< 0.005 U	0.46 J	< 0.99 U	< 0.86 U
7/13/2017	Background	2.66 J	10.65	1,340	1.28	1.37	22.48	10.64	5.79	3.863	8.47	0.09243	0.01 J	< 0.29 U	< 0.99 U	< 0.86 U
8/4/2017	Background	3.87 J	44.98	4,590	4.97	6.55	84.15	40.69	4.04	3.078	36.63	0.136	0.058	5.03	4.99 J	< 0.86 U
8/17/2017	Background	< 0.93 U	19.31	2,310	2.12	2.05	41.82	17.86	6.71	3.049	10.7	0.111	0.03	4.23 J	1.04 J	< 0.86 U
8/30/2017	Background	2.45 J	9.13	1,490	1.26	1.66	25.81	12.06	8.09	4.086	7.11	0.0962	0.021 J	4.61 J	1.86 J	< 0.86 U
9/13/2017	Background	< 0.93 U	16.34	1,910	1.71	2.47	30.83	17.71	5.92	3.199	8.92	0.104	0.029	6.21	1.65 J	< 0.86 U
9/20/2017	Background	2.3 J	13.95	1,930	1.77	1.9	34.55	16.32	--	1.747	9.6	0.101	0.014 J	7.02	< 0.99 U	< 0.86 U
5/30/2018	Assessment	5.14	< 1.05 U	268	< 0.02 U	< 0.07 U	< 0.23 U	0.49 J	3.186	4.169	< 0.68 U	0.06851	< 0.005 U	3.7 J	< 0.99 U	1.62 J
7/30/2018	Assessment	0.37	1.14	303	0.078	0.07	0.562	0.497	4.85	< 0.083 U	0.356	0.0627	0.006 J	3.63	0.7	0.05 J
2/27/2019	Assessment	0.3 J	1 J	276	< 0.2 U	< 0.1 U	5.71	< 0.2 U	3.144	3.26	< 0.2 U	0.0602	< 0.005 U	< 4 U	0.6 J	< 1 U
6/20/2019	Assessment	0.3 J	0.83	337	< 0.1 U	0.07 J	1.06	0.388	3.751	3.24	1.07	0.068	0.007 J	2 J	0.4 J	< 0.5 U
8/26/2019	Assessment	0.25	1.64	359	0.101	0.05	1.01	1.07	3.24	2.99	0.596	0.0554	< 0.005 U	2 J	0.6	< 0.1 U
3/25/2020	Assessment	0.28	0.83	327	0.04 J	0.04 J	0.332	0.166	4.28	3.29	0.2 J	0.0535	< 0.002 U	4.07	0.7	< 0.1 U
6/30/2020	Assessment	0.32	1.52	334	0.118	0.04 J	1.09	1.28	4.16	3.16	0.527	0.0564	< 0.002 U	3.57	0.7	< 0.1 U
10/21/2020	Assessment	0.29	1.03	322	0.06 J	0.07	0.523	0.508	3.42	3.24	0.359	0.0559	< 0.002 U	3.24	0.7	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-5R
Northeastern - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
1/25/2017	Background	0.233	52.4	500	3	8.0	10	1,354
3/15/2017	Background	0.236	61.7	62	4	--	10	1,420
4/27/2017	Background	0.245	53.8	674	3.06	7.5	9	1,436
5/18/2017	Background	0.319	79.1	1,834	4	--	8	3,008
6/16/2017	Background	0.231	57.1	607	3	8.3	7	1,368
6/28/2017	Background	0.224	53	636	2.835	8.2	8	1,156
7/13/2017	Background	0.261	53.8	640	3.156	8.2	7	1,388
8/4/2017	Background	0.256	61.3	638	2.889	7.9	8	1,372
8/17/2017	Background	0.293	52	661	3.258	8.2	6	1,378
8/30/2017	Background	0.252	57.3	652	3.5698	7.7	7	1,424
9/13/2017	Background	0.232	55.6	644	2.797	8.4	6	1,452
9/20/2017	Background	0.257	53.7	729	1.535	7.4	6	1,312
10/11/2017	Detection	0.61	71	630	3.7844	7.5	5	1,368
5/30/2018	Assessment	--	--	--	4.1115	7.6	--	--
7/30/2018	Assessment	0.246	131	793	4.3905	8.0	4	1,480
2/27/2019	Assessment	0.233	72.8	739	3.08	7.7	1.6	1,530
6/20/2019	Assessment	0.202	48.5	675	3.06	7.3	0.9 J	1,428
8/26/2019	Assessment	0.220	128	697	2.789	8.8	3	1,450
3/25/2020	Assessment	0.214	49.2	790	3.13	8.8	0.8 J	1,580
6/30/2020	Assessment	0.211	64.9	840	2.99	9.0	5.1	1,560
10/21/2020	Assessment	0.188	50.4	584	3.03	8.8	5.0	1,320

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-5R
Northeastern - BAP
Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
1/25/2017	Background	<5 U	12	1650	<1 U	<1 U	<1 U	<5 U	10.09	3	<5 U	0.114	<0.025 U	<5 U	<5 U	<2 U
3/15/2017	Background	<5 U	13	1590	<1 U	<1 U	1.00	<5 U	9.65	4	<5 U	0.112	<0.025 U	<5 U	<5 U	<2 U
4/27/2017	Background	< 0.93 U	17.03	1,610	0.03 J	< 0.07 U	0.33 J	0.88 J	10.27	3.06	< 0.68 U	0.112	0.016 J	1.16 J	< 0.99 U	< 0.86 U
5/18/2017	Background	< 0.93 U	29.42	2,270	0.23 J	< 0.07 U	3.41	2.32 J	15.3	4	2.36 J	0.163	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
6/16/2017	Background	2.02 J	13.7	2,050	0.11 J	< 0.07 U	1.42	1.44 J	10.27	3	< 0.68 U	0.109	0.016 J	< 0.29 U	< 0.99 U	< 0.86 U
6/28/2017	Background	< 0.93 U	12.65	1,790	0.02 J	< 0.07 U	0.3 J	1.01 J	15.84	2.835	0.76 J	0.1	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
7/13/2017	Background	< 0.93 U	17.24	1,880	0.06 J	< 0.07 U	0.5 J	1.1 J	12.21	3.156	0.9 J	0.111	< 0.005 U	< 0.29 U	1.14 J	< 0.86 U
8/4/2017	Background	< 0.93 U	21.6	1,800	0.09 J	< 0.07 U	1.69	1.32 J	11.6	2.889	1.44 J	0.119	0.015 J	1.27 J	< 0.99 U	< 0.86 U
8/17/2017	Background	1.63 J	19.11	1,890	0.04 J	< 0.07 U	< 0.23 U	1 J	10.95	3.258	< 0.68 U	0.106	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
8/30/2017	Background	< 0.93 U	19.47	1,930	0.11 J	< 0.07 U	1.16	1.2 J	12.47	3.5698	< 0.68 U	0.112	0.009 J	< 0.29 U	< 0.99 U	< 0.86 U
9/13/2017	Background	< 0.93 U	20.36	1,930	0.1 J	0.16 J	0.62 J	1 J	10.62	2.797	< 0.68 U	0.11	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
9/20/2017	Background	< 0.93 U	20.77	1,880	0.05 J	< 0.07 U	< 0.23 U	0.97 J	10.5	1.535	1.06 J	0.111	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
5/30/2018	Assessment	1.21 J	28.86	1,760	< 0.02 U	< 0.07 U	< 0.23 U	0.88 J	9.15	4.1115	< 0.68 U	0.102	< 0.005 U	< 0.29 U	< 0.99 U	< 0.86 U
7/30/2018	Assessment	0.05 J	47.3	2,140	0.052	0.02 J	0.082	0.482	11.28	4.3905	0.415	0.0946	< 0.005 U	1.17	0.1	0.02 J
2/27/2019	Assessment	< 0.2 U	25.7	2,130	< 0.2 U	< 0.1 U	2 J	0.3 J	6.702	3.08	0.7 J	0.102	< 0.005 U	< 4 U	< 0.3 U	< 1 U
6/20/2019	Assessment	< 0.1 U	59.9	2,410	< 0.1 U	< 0.05 U	0.8 J	0.598	12.977	3.06	0.701	0.111	0.008 J	< 2 U	< 0.2 U	< 0.5 U
8/26/2019	Assessment	0.06 J	49.3	2,340	0.06 J	0.02 J	0.335	0.485	11.56	2.789	0.545	0.0928	< 0.005 U	1 J	0.1 J	< 0.1 U
3/25/2020	Assessment	0.05 J	26.2	2,600	0.04 J	0.02 J	0.346	0.296	12.09	3.13	0.371	0.0911	< 0.002 U	1 J	0.1 J	< 0.1 U
6/30/2020	Assessment	0.13	27.0	2,520	0.151	0.04 J	1.51	0.774	14.34	2.99	1.65	0.0913	< 0.002 U	1 J	0.5	< 0.1 U
10/21/2020	Assessment	0.10	10.9	2,070	0.05 J	< 0.01 U	0.320	0.378	6.502	3.03	0.373	0.0792	< 0.002 U	0.8 J	0.2 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-10
Northeastern - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
7/13/2017	Background	0.965	53	1,844	6.502	6.7	294	3,416
8/4/2017	Background	1.08	83.1	1,616	< 0.083 U	7.6	761	5,142
8/17/2017	Background	1.09	91.4	1,700	< 0.083 U	7.8	915	5,678
8/30/2017	Background	1.09	81.8	1,932	10.2663	7.6	834	5,264
9/13/2017	Background	1.1	76.9	1,592	7.028	8.3	738	5,168
9/20/2017	Background	1.08	64.6	1,946	< 0.083 U	7.1	544	4,424
9/27/2017	Background	1.07	65.7	1,784	5	7.8	419	4,516
10/4/2017	Background	1.1	52.3	1,553	5.11	7.4	286	3,660
10/11/2017	Detection	1.03	58.4	1,934	7.3938	7.0	188	4,060
1/22/2018	Detection	1.08	--	1,630	5.71	7.0	63.1	3,236
5/30/2018	Assessment	--	--	--	7.333	7.8	--	--
7/30/2018	Assessment	1.17	227	2,283	8.9991	7.6	75	3,632
2/4/2019	Assessment	1.17	144	--	--	--	--	--
2/27/2019	Assessment	1.16	92.6	1,740	5.59	7.8	6.9	3,504
6/20/2019	Assessment	0.916	50.3	1,780	6.40	7.8	30.3	3,512
8/26/2019	Assessment	1.03	216	1,939	4.874	8.9	29	3,446
3/25/2020	Assessment	1.04	44.2	2,000	6.45	8.2	12.6	3,560
6/30/2020	Assessment	0.944	52.1	2,010	6.29	8.9	25.5	3,550
7/28/2020	Assessment	0.914	--	1,960	6.63	8.3	--	3,440
10/20/2020	Assessment	0.955	39.9	1,830	6.55	9.1	9.6	3,540

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-10
Northeastern - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
7/13/2017	Background	4.62 J	<1.05 U	1900	<0.02 U	<0.07 U	110	5.96	17.23	6.502	<0.68 U	0.278	0.006 J	934	5.67	<0.86 U
8/4/2017	Background	2.51 J	2.43 J	330	0.03 J	<0.07 U	2.44	4.74 J	1.153	<0.083 U	<0.68 U	0.284	0.029	129	8.82	<0.86 U
8/17/2017	Background	< 0.93 U	< 1.05 U	282	< 0.02 U	< 0.07 U	< 0.23 U	< 0.14 U	0.995	< 0.083 U	< 0.68 U	0.317	0.027	45.43	< 0.99 U	< 0.86 U
8/30/2017	Background	< 0.93 U	5.66	279	0.06 J	< 0.07 U	1.09	4.27 J	0.763	10.2663	< 0.68 U	0.306	0.019 J	30.35	2.56 J	< 0.86 U
9/13/2017	Background	< 0.93 U	9.42	266	0.07 J	< 0.07 U	0.46 J	2.41 J	0.774	7.028	< 0.68 U	0.315	0.013 J	16.28	3.11 J	< 0.86 U
9/20/2017	Background	1.16 J	13.92	399	0.03 J	< 0.07 U	0.72 J	2.19 J	1.062	< 0.083 U	< 0.68 U	0.292	0.016 J	13.58	2.38 J	< 0.86 U
9/27/2017	Background	1.57 J	15.31	928	0.04 J	< 0.07 U	2.07	3.71 J	1.723	5	< 0.68 U	0.329	0.013 J	35.93	3.84 J	< 0.86 U
10/4/2017	Background	1.27 J	4.3 J	664	0.03 J	< 0.07 U	0.36 J	4.02 J	3.226	5.11	0.87 J	0.279	0.015 J	29.19	< 0.99 U	< 0.86 U
5/30/2018	Assessment	< 0.93 U	8.9	2,550	< 0.02 U	< 0.07 U	< 0.23 U	0.83 J	6.06	7.333	< 0.68 U	0.245	< 0.005 U	2.94 J	2.26 J	< 0.86 U
7/30/2018	Assessment	0.34	7.61	2,330	0.043	0.02 J	0.06 J	2.16	7.89	8.9991	0.102	0.242	0.006 J	18.5	0.09 J	0.04 J
2/27/2019	Assessment	2 J	3.48	5,810	< 0.4 U	< 0.2 U	1 J	< 0.4 U	15.35	5.59	< 0.4 U	0.275	< 0.005 U	< 8 U	< 0.6 U	< 2 U
6/20/2019	Assessment	0.65	3.66	3,880	< 0.1 U	< 0.05 U	8.76	0.743	26.4	6.40	0.3 J	0.290	0.01 J	9 J	< 0.2 U	< 0.5 U
8/26/2019	Assessment	0.61	3.00	3,060	0.08 J	0.03 J	1.61	1.06	8.11	4.874	0.449	0.241	< 0.005 U	8.22	0.4	< 0.1 U
3/25/2020	Assessment	0.17	0.61	6,670	< 0.02 U	0.03 J	0.383	0.522	26.79	6.45	0.08 J	0.214	< 0.002 U	7.39	0.1 J	< 0.1 U
6/30/2020	Assessment	0.21	1.40	3,960	0.03 J	0.01 J	0.204	0.724	8.33	6.29	0.07 J	0.226	< 0.002 U	4.81	0.08 J	< 0.1 U
10/20/2020	Assessment	0.08 J	0.42	6,800	0.03 J	0.01 J	0.2 J	0.103	13.9507	6.55	0.1 J	0.209	< 0.002 U	0.6 J	0.09 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-11
Northeastern - BAP
Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
7/13/2017	Background	0.839	742	568	2.386	7.4	798	2,880
8/4/2017	Background	0.543	272	567	3.355	7.9	870	3,076
8/17/2017	Background	0.453	171	789	4.52	6.9	741	3,308
8/30/2017	Background	0.428	161	683	4.1325	7.6	541	2,732
9/13/2017	Background	0.447	190	628	3.359	7.2	515	2,420
9/20/2017	Background	0.469	1,220	690	2.016	7.2	329	2,336
9/27/2017	Background	0.447	1,170	759	3	7.2	332	2,428
10/4/2017	Background	0.531	1,110	744	2.9	7.5	305	2,288
10/11/2017	Detection	0.446	479	824	4.4661	7.0	223	2,322
1/22/2018	Detection	--	--	470	2.96	6.9	222	1,544
5/30/2018	Assessment	--	--	--	3.574	7.5	--	--
7/30/2018	Assessment	0.280	124	234	3.7832	7.7	79	996
2/27/2019	Assessment	0.375	49.6	241	3.44	7.7	95.1	1,168
6/20/2019	Assessment	0.550	65.6	137	1.67	6.8	203	1,000
8/26/2019	Assessment	0.304	139	129	2.225	8.9	122	970
3/25/2020	Assessment	0.428	40.5	187	2.66	9.0	108	1,060
6/30/2020	Assessment	0.545	57.3	140	1.77	8.9	188	927
7/28/2020	Assessment	0.301	--	--	--	8.6	158	--
10/20/2020	Assessment	0.220	43.8	98.1	3.05	9.2	35.6	764

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
Due to limited groundwater volume, pH values for several sampling events were collected the day prior to collection of analytical samples for other parameters.

Table 1 - Groundwater Data Summary: SP-11
Northeastern - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
7/13/2017	Background	9.43	3.99 J	194	0.22 J	1.40	18.52	9.76	- -	2.386	5.16	0.04698	0.009 J	61.27	5.95	<0.86 U
8/4/2017	Background	4.7 J	1.82 J	98.74	0.07 J	0.44 J	5.25	6.52	25.367	3.355	2.01 J	0.0877	0.023 J	66.41	6.26	<0.86 U
8/17/2017	Background	< 0.93 U	< 1.05 U	83.42	< 0.02 U	< 0.07 U	< 0.23 U	< 0.14 U	0.947	4.52	< 0.68 U	0.08931	0.007 J	51.5	< 0.99 U	< 0.86 U
8/30/2017	Background	4.29 J	1.2 J	93.07	0.07 J	0.34 J	2.76	3.85 J	0.438	4.1325	1.23 J	0.08933	0.008 J	44.33	2.49 J	< 0.86 U
9/13/2017	Background	2.4 J	3.66 J	108	0.08 J	0.09 J	2.57	3.21 J	2.685	3.359	< 0.68 U	0.105	0.009 J	36.16	1.55 J	< 0.86 U
9/20/2017	Background	7.73	12.14	240	0.39 J	2.7	31.3	14.62	4.2	2.016	8.16	0.13	0.027	46.9	5.46	< 0.86 U
9/27/2017	Background	6.89	7.5	269	0.39 J	3.01	32.71	14.37	--	3	8.58	0.129	0.048	48.61	7.47	< 0.86 U
10/4/2017	Background	4.44 J	8.47	347	0.35 J	2.49	29.49	11.99	2.817	2.9	7.05	0.146	0.047	42.14	3.27 J	< 0.86 U
5/30/2018	Assessment	< 0.93 U	5.3	160	< 0.02 U	< 0.07 U	0.34 J	1.61 J	1.334	3.574	< 0.68 U	0.04956	< 0.005 U	3.27 J	1.43 J	< 0.86 U
7/30/2018	Assessment	0.35	4.22	539	0.029	0.04	0.379	5.12	0.95	3.7832	0.404	0.0370	0.005 J	8.85	0.7	0.03 J
2/27/2019	Assessment	< 0.2 U	8.83	529	< 0.2 U	< 0.1 U	0.7 J	0.720	1.81	3.44	0.2 J	0.0580	< 0.005 U	6 J	< 0.3 U	< 1 U
6/20/2019	Assessment	0.3 J	4.18	169	< 0.1 U	0.06 J	6.71	0.948	0.81	1.67	0.719	0.047	0.01 J	< 2 U	0.3 J	< 0.5 U
8/26/2019	Assessment	0.37	6.30	492	0.04 J	0.13	1.47	2.73	1.623	2.225	0.764	0.0337	< 0.005 U	5.70	0.8	< 0.1 U
3/25/2020	Assessment	0.15	2.88	415	0.02 J	0.05 J	0.705	0.702	1.73	2.66	0.409	0.0402	0.003 J	3.01	0.3	< 0.1 U
6/30/2020	Assessment	0.14	2.79	187	< 0.02 U	0.01 J	0.201	0.620	3.845	1.77	0.1 J	0.0278	0.008	2.15	0.2 J	< 0.1 U
10/20/2020	Assessment	0.48	1.49	630	0.03 J	0.15	2.20	1.16	0.661	3.05	0.719	0.0298	0.004 J	2 J	0.5	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.

APPENDIX II

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

STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Northeastern Power Station
Oologah, Oklahoma

Submitted to

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Columbus, Ohio 43215-2372

Submitted by

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October 28, 2020

CHA8500

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LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

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

SECTION 1

EXECUTIVE SUMMARY

In accordance with the Oklahoma Department of Environmental Quality (ODEQ) and Oklahoma administrative code (OAC) regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (OAC 252:517), groundwater monitoring has been conducted at the Bottom Ash Pond (BAP), an existing CCR unit at the Northeastern Power Station located in Oologah, Oklahoma.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, chloride, fluoride, total dissolved solids (TDS), and sulfate at the BAP. Also, pH values below the lower prediction limit (LPL) resulted in SSIs below background as well. Groundwater protection standards (GWPS) were set in accordance with OAC 252:517-9-6(h). While a lithium exceedance at SP-10 was observed above the GWPS, an alternate source demonstration (ASD) submitted to ODEQ on May 1, 2019 attributed the elevated lithium concentrations at SP-10 to natural variation (Geosyntec, 2019). On October 29, 2019, ODEQ provided a letter to AEP documenting acceptance of the ASD (ODEQ, 2019). Thus, the BAP remained in assessment monitoring. Two assessment monitoring events were conducted at the BAP in March and June 2020, in accordance with OAC 252:517-9-6(b) and OAC 252:517-9-6(d), respectively. Results of these events are documented in this report.

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

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

SECTION 2

BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, two sets of samples were collected for analysis from each upgradient and downgradient well to meet the requirements of OAC 252.:517-9-6(b) (March 2020) and 252:517-9-6(d)(1) (June 2020). Samples from both sampling events were analyzed for the Appendix III and Appendix IV parameters. A summary of data collected during these assessment monitoring events may be found in Table 1.

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

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.26 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for the BAP were conducted in accordance with the January 2017 *Statistical Analysis Plan* (AEP, 2017), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in March and June 2020 were screened for potential outliers. No outliers were identified for these events.

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with OAC 252:517-9-6(h) and the *Statistical Analysis Plan* (AEP, 2017). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or risk-based level specified in OAC 252:517-9-6(h) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for arsenic, beryllium, combined radium, fluoride, and lithium. Non-parametric tolerance limits

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

2.2.2 Evaluation of Potential Appendix IV SSLs

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

The following SSLs were identified at the Northeastern BAP:

- The LCL for fluoride exceeded the GWPS of 4.4 mg/L at SP-10 (4.6 mg/L).
- The LCL for lithium exceeded the GWPS of 0.15 mg/L at SP-10 (0.252 mg/L).

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

2.2.3 Evaluation of Potential Appendix III SSIs

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

Data collected during the June 2020 assessment monitoring event from each compliance well were compared to the prediction limits to evaluate results above background values. Where potential exceedances were noted, verification sampling was completed on July 28, 2020. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.61 mg/L at SP-10 (0.944 mg/L and 0.914 mg/L).
- Chloride concentrations exceeded the interwell UPL of 769 mg/L at SP-10 (2,010 mg/L and 1,960 mg/L).
- Fluoride concentrations exceeded the interwell UPL of 4.39 mg/L at SP-10 (6.29 mg/L and 6.63 mg/L).

- pH concentrations exceeded the interwell UPL of 8.5 at SP-1 (9.0 mg/L and 8.4 mg/L) and at SP-11 (8.9 mg/L and 8.6 mg/L).

- Sulfate concentrations exceeded the interwell UPL of 90.0 mg/L at SP-11 (188 mg/L and 158 mg/L).

- TDS concentrations exceeded the interwell UPL of 1,570 mg/L at SP-10 (3,550 mg/L and 3,440 mg/L).

Based on these results, boron, chloride, fluoride, pH, sulfate, and TDS concentrations exceeded background levels at compliance wells at the Northeastern BAP during assessment monitoring.

2.3 Conclusions

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

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

SECTION 3

REFERENCES

American Electric Power (AEP). 2017. Statistical Analysis Plan – Northeastern Power Station. January 2017.

Geosyntec. 2019. Alternative Source Demonstration Report – State CCR Rule. Northeastern Power Station Bottom Ash Pond. April.

Oklahoma Department of Environmental Quality. 2019. Letter Transmittal – Alternate Source Demonstration for Lithium – Bottom Ash Pond. October.

TABLES

Table 1 - Groundwater Data Summary
Northeastern Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Parameter	Unit	SP-1		SP-2		SP-4		SP-5R		SP-10		SP-11	
		3/25/2020	6/30/2020	3/25/2020	6/30/2020	3/25/2020	6/30/2020	3/25/2020	6/30/2020	3/25/2020	6/30/2020	3/25/2020	6/30/2020
Antimony	µg/L	0.62	0.58	1.14	1.26	0.28	0.32	0.05 J	0.13	0.17	0.21	0.15	0.14
Arsenic	µg/L	0.72	0.69	1.68	1.28	0.83	1.52	26.2	27.0	0.61	1.40	2.88	2.79
Barium	µg/L	158	159	1,060	1,140	327	334	2,600	2,520	6,670	3,960	415	187
Beryllium	µg/L	0.07 J	0.07 J	0.07 J	0.109	0.04 J	0.118	0.04 J	0.151	0.1 U	0.03 J	0.02 J	0.1 U
Boron	mg/L	0.184	0.180	0.114	0.163	0.340	0.338	0.214	0.211	1.04	0.944	0.428	0.545
Cadmium	µg/L	0.08	0.07	0.13	0.05	0.04 J	0.04 J	0.02 J	0.04 J	0.03 J	0.01 J	0.05 J	0.01 J
Calcium	mg/L	96.7	99.4	60.4	83.9	59.6	80.5	49.2	64.9	44.2	52.1	40.5	57.3
Chloride	mg/L	40.8	29.6	418	420	476	531	790	840	2,000	2,010	187	140
Chromium	µg/L	0.499	0.969	0.806	0.573	0.332	1.09	0.346	1.51	0.383	0.204	0.705	0.201
Cobalt	µg/L	0.362	0.431	0.361	0.733	0.166	1.28	0.296	0.774	0.522	0.724	0.702	0.620
Combined Radium	pCi/L	6.67	2.531	9.73	7.84	4.28	4.16	12.09	14.34	26.79	8.33	1.73	3.845
Fluoride	mg/L	0.96	0.81	2.73	2.64	3.29	3.16	3.13	2.99	6.45	6.29	2.66	1.77
Lead	µg/L	0.351	0.886	0.694	0.263	0.2 J	0.527	0.371	1.65	0.08 J	0.07 J	0.409	0.1 J
Lithium	mg/L	0.00600	0.00534	0.0352	0.0585	0.0535	0.0564	0.0911	0.0913	0.214	0.226	0.0402	0.0278
Mercury	µg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.003 J	0.008
Molybdenum	µg/L	15.8	13.6	20.3	19.7	4.07	3.57	1 J	1 J	7.39	4.81	3.01	2.15
Selenium	µg/L	6.6	8.3	2.4	6.2	0.7	0.7	0.1 J	0.5	0.1 J	0.08 J	0.3	0.2 J
Sulfate	mg/L	62.9	49.3	22.0	26.3	68.6	70.2	0.8 J	5.1	12.6	25.5	108	188
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	500	435	1,120	977	1,130	1,160	1,580	1,560	3,560	3,550	1,060	927
pH	SU	8.5	9.0	8.8	8.8	9.1	9.0	8.8	9.0	8.2	8.9	9.0	8.9

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
-: Not analyzed

Table 2: Groundwater Protection Standards
Northeastern Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Constituent Name	MCL	CCR Rule-Specified	Background Limit
Antimony, Total (mg/L)	0.006		0.0051
Arsenic, Total (mg/L)	0.01		0.056
Barium, Total (mg/L)	2		2.60
Beryllium, Total (mg/L)	0.004		0.002
Cadmium, Total (mg/L)	0.005		0.0025
Chromium, Total (mg/L)	0.1		0.042
Cobalt, Total (mg/L)	n/a	0.006	0.018
Combined Radium, Total (pCi/L)	5		17.00
Fluoride, Total (mg/L)	4		4.4
Lead, Total (mg/L)	n/a	0.015	0.011
Lithium, Total (mg/L)	n/a	0.04	0.15
Mercury, Total (mg/L)	0.002		0.000030
Molybdenum, Total (mg/L)	n/a	0.1	0.010
Selenium, Total (mg/L)	0.05		0.005
Thallium, Total (mg/L)	0.002		0.0016

Notes:
Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value.
MCL = Maximum Contaminant Level
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.
The higher of the calculated UTL or MCL/Rule-Specified Level is used as the GWPS.

Table 3: Appendix III Data Summary
Northeastern Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Analyte	Unit	Description	SP-1		SP-2		SP-10		SP-11	
			6/30/2020	7/2/2020	6/30/2020	7/28/2020	6/30/2020	7/28/2020	6/30/2020	7/28/2020
Boron	mg/L	Interwell Background Value (UPL)	0.61							
		Analytical Result	0.18	-	0.163	-	**0.944**	**0.914**	0.545	0.301
Calcium	mg/L	Intrawell Background Value (UPL)	136		157		109		1,890	
		Analytical Result	99.4	-	83.9	-	52.1	-	57.3	-
Chloride	mg/L	Interwell Background Value (UPL)	769							
		Analytical Result	29.6	-	420	-	**2,010**	**1,960**	140	-
Fluoride	mg/L	Interwell Background Value (UPL)	4.39							
		Analytical Result	0.81	-	2.64	-	**6.29**	**6.63**	1.77	-
pH	SU	Interwell Background Value (UPL)	8.5							
		Interwell Background Value (LPL)	7.1							
		Analytical Result	**9.0**	**8.4**	**8.8**	8.4	**8.9**	8.3	**8.9**	**8.6**
Sulfate	mg/L	Interwell Background Value (UPL)	90.0							
		Analytical Result	49.3	-	26.3	-	25.5	-	**188**	**158**
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	1,570							
		Analytical Result	435	-	977	-	**3,550**	**3,440**	927	-

Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit
Bold values exceed the background value.
Background values are shaded gray.
- : Not Sampled

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Northeastern Bottom Ash Pond CCR management area and that the requirements of OAC 252:517-9-4(g) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature

26057	OKLAHOMA	10.28.2020
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

August 25, 2020

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

Re: Northeastern BAP
Assessment Monitoring Event – July 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the Assessment Monitoring Event statistical analysis of groundwater data through July 2020 for American Electric Power Inc.'s Northeastern BAP. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at the site for the CCR program in 2017. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** SP-4 and SP-5R
- **Downgradient wells:** SP-1, SP2, SP-10, and SP-11

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

The CCR program consists of the following Assessment Monitoring 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 and box plots for Appendix IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record (Figures A & B, respectively). A summary of the values identified as outliers through previous screenings follows this letter. These values are deselected prior to the statistical analysis. All flagged values may also be seen in a lighter font and disconnected symbol on the time series graphs (Figure C).

Evaluation of Appendix IV Parameters – July 2020

Prior to constructing statistical limits, background data are screened for outliers and extreme trending patterns that would lead to artificially elevated statistical limits. No new values were suspected as outliers and any flagged values may be seen on the Outlier Summary following this letter as mentioned above. Values flagged during previous analyses are described below.

Tukey's outlier test on downgradient wells only returned a high value for combined radium 226 + 228 in well SP-1, which was flagged as an outlier. Additional values were flagged as outliers on behalf of not adequately representing the populations of their respective wells are chromium in well SP-10, combined radium in well SP-11, lithium in well SP-1, molybdenum in well SP-10. Substantially high values were identified across many Appendix IV parameters for upgradient well SP-4 on 8/4/17 through visual screening. Since they appear as laboratory or sampling issues, they have been flagged as outliers but will be re-evaluated after further confirmation.

Parametric tolerance limits were used to calculate background limits from pooled upgradient well data through July 2020 for Appendix IV parameters with a target of 95% confidence and 95% coverage to determine background limits (Figure D). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were compared to the Maximum Contaminant Levels (MCLs), CCR Rule-Specified levels, 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).

Confidence intervals were then constructed on downgradient wells with data through July 2020 for each of the Appendix IV parameters using the highest limit of the MCL, CCR Rule-Specified level, or background limit as discussed above (Figure F). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No confidence intervals exceedances were found except for fluoride and lithium in well SP-10. A summary of the confidence interval results follows this letter.

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

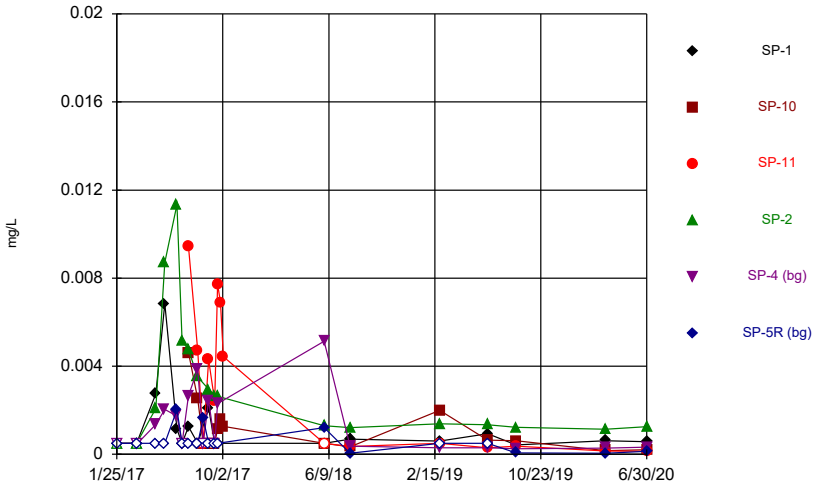
For Groundwater Stats Consulting,

Andrew T. Collins
Project Manager

Kristina L. Rayner
Groundwater Statistician

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

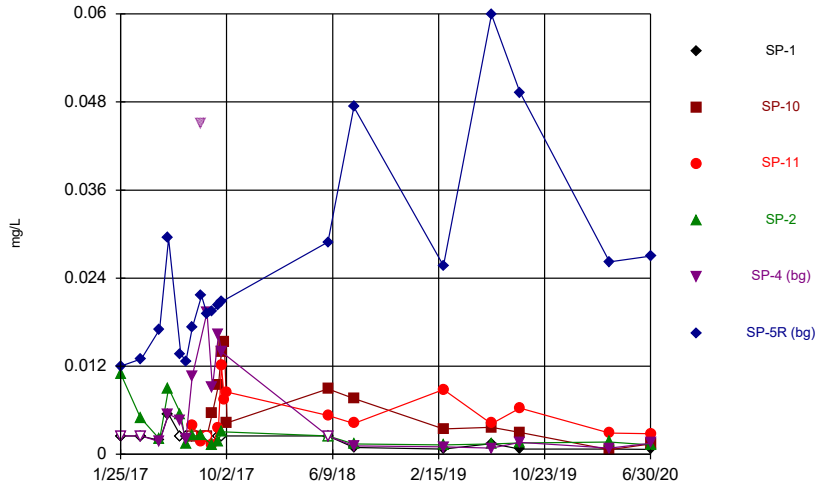
Time Series



Constituent: Antimony Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

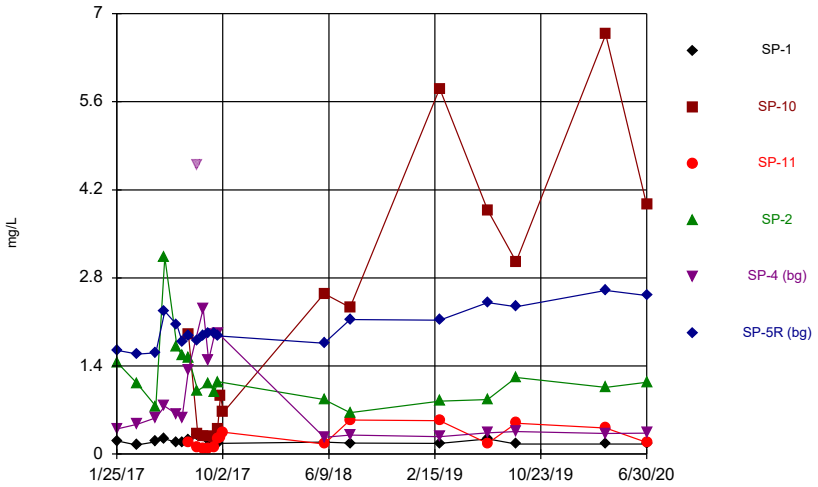
Time Series



Constituent: Arsenic Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

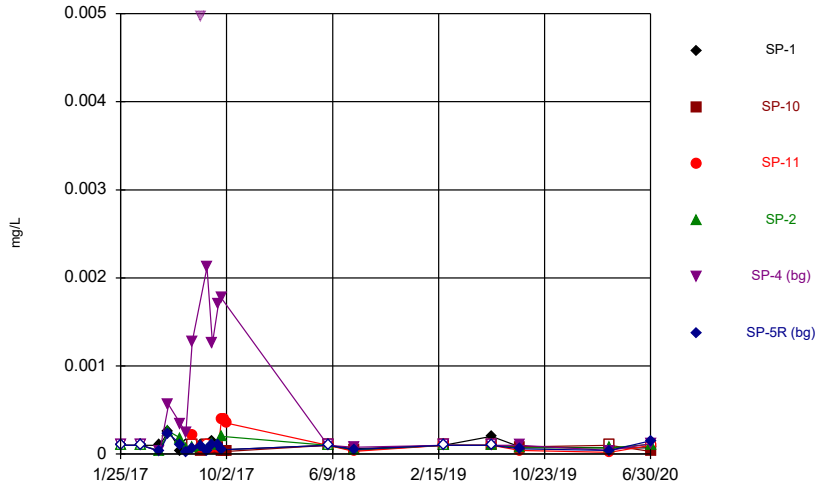
Time Series



Constituent: Barium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

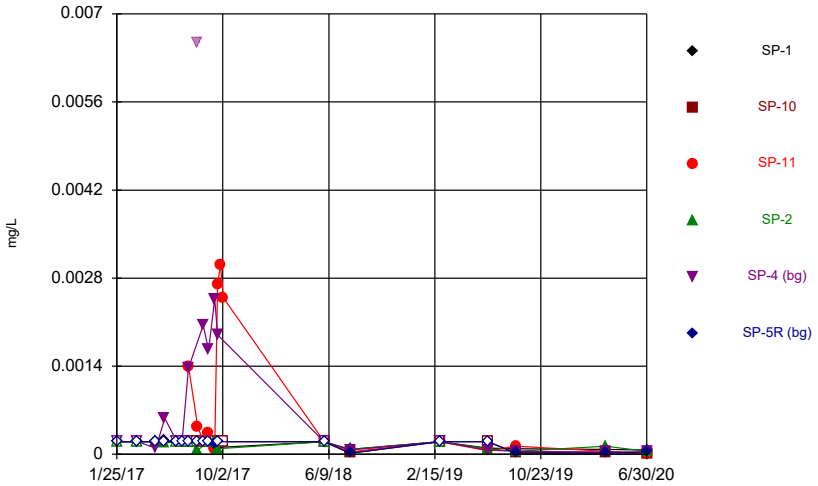
Time Series



Constituent: Beryllium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

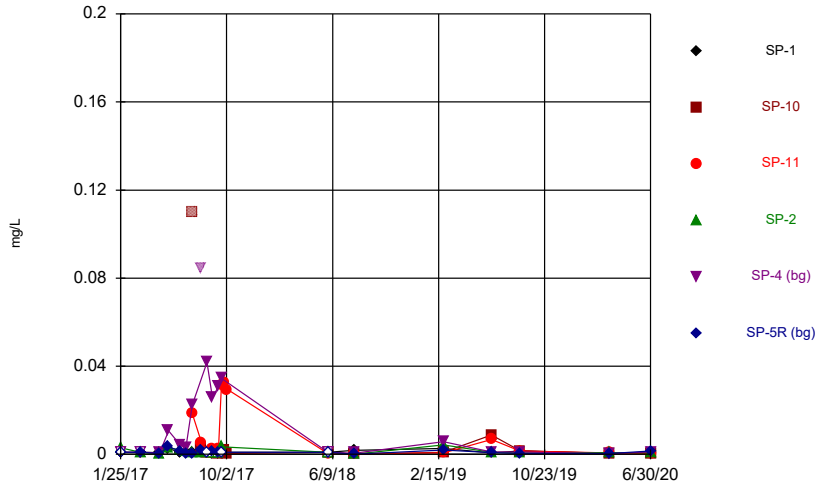
Time Series



Constituent: Cadmium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

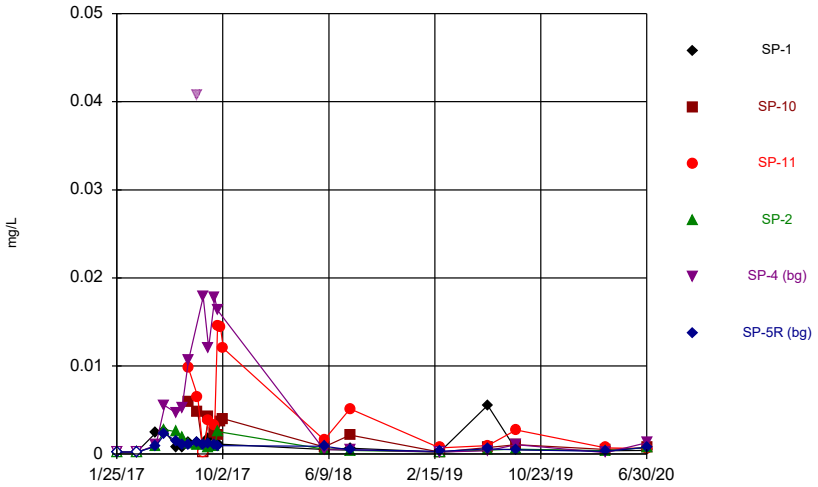
Time Series



Constituent: Chromium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

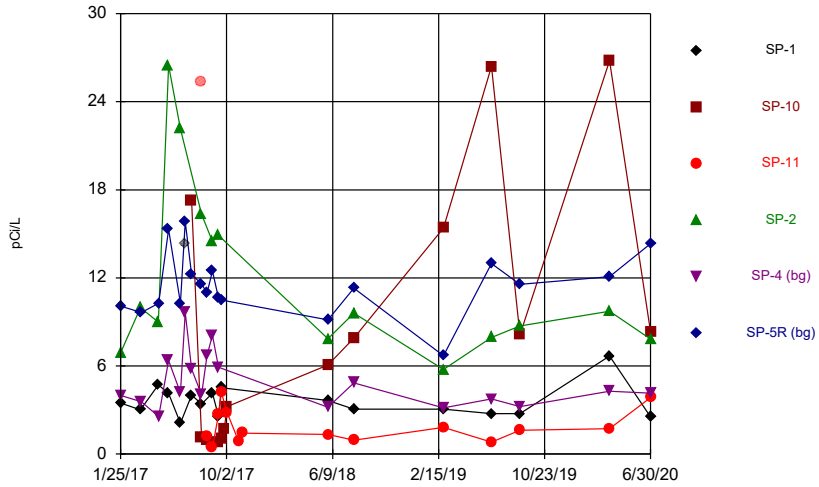
Time Series



Constituent: Cobalt Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

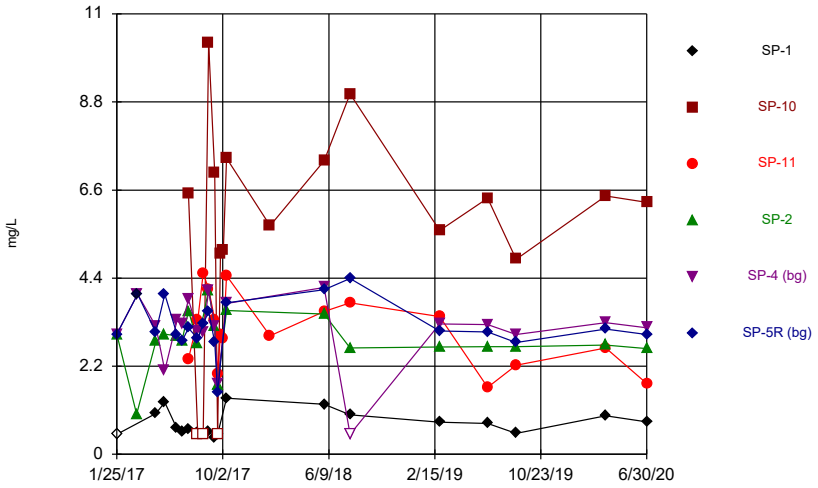
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

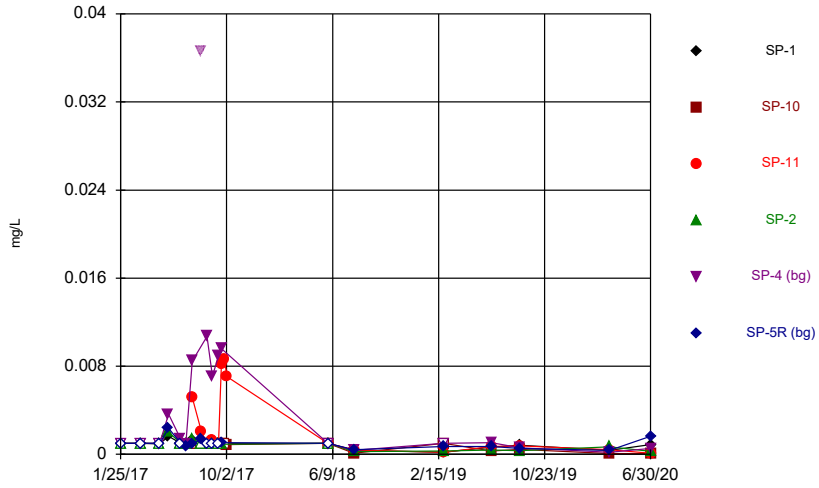
Time Series



Constituent: Fluoride Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

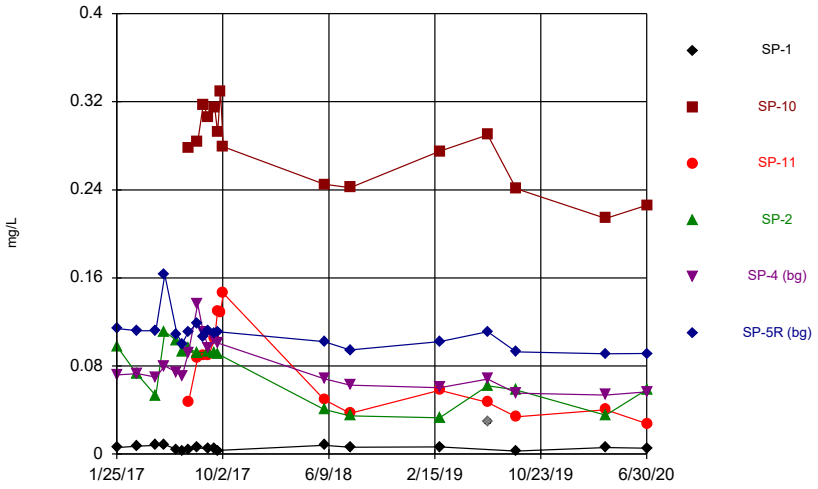
Time Series



Constituent: Lead Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

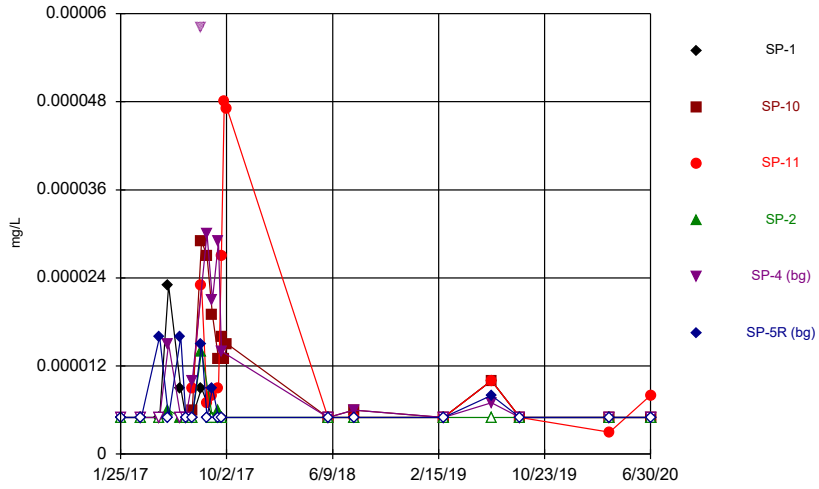
Time Series



Constituent: Lithium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

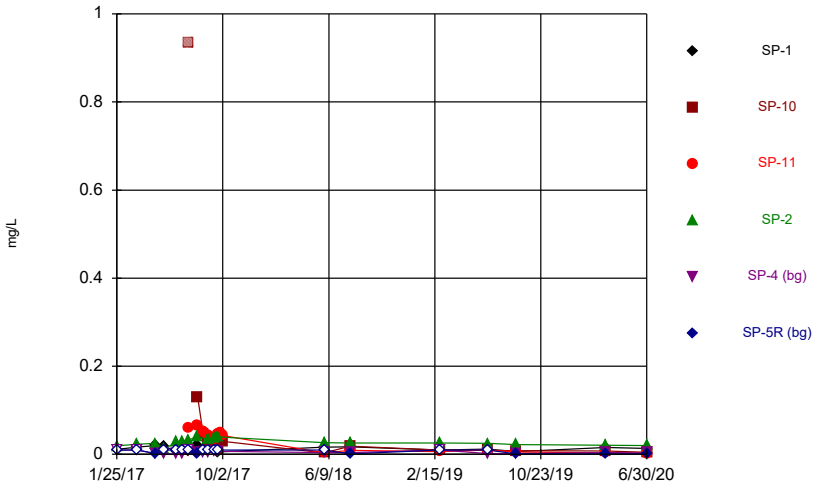
Time Series



Constituent: Mercury Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

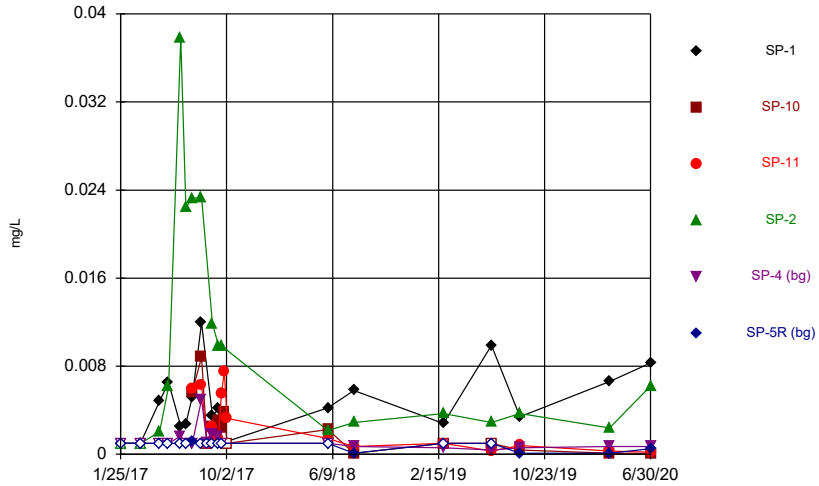
Time Series



Constituent: Molybdenum Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

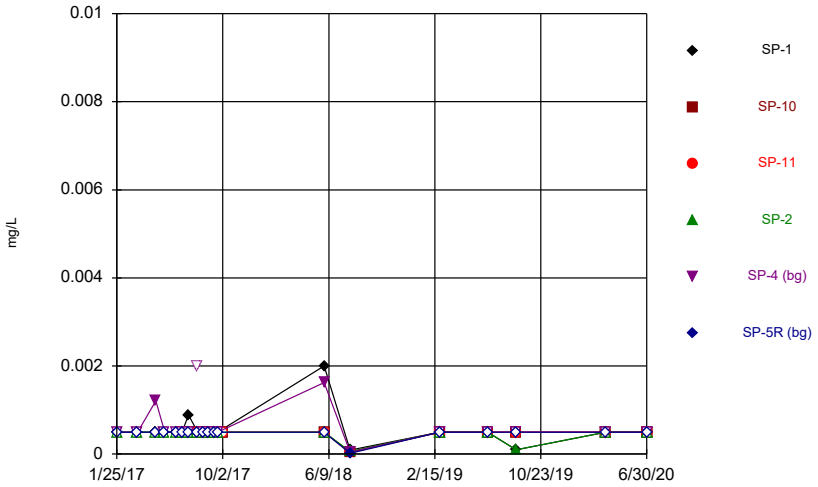
Time Series



Constituent: Selenium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

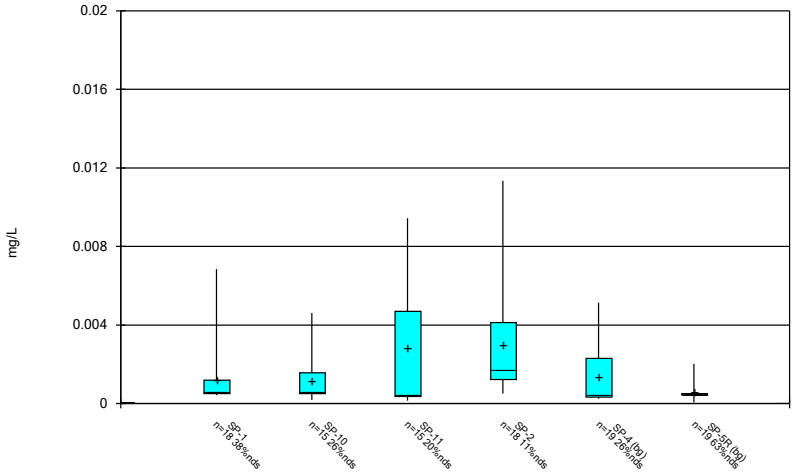
Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



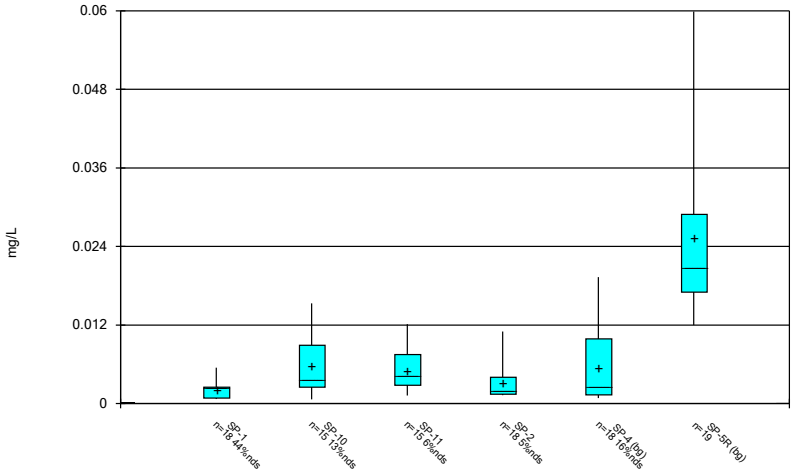
Constituent: Thallium Analysis Run 8/24/2020 12:56 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Box & Whiskers Plot



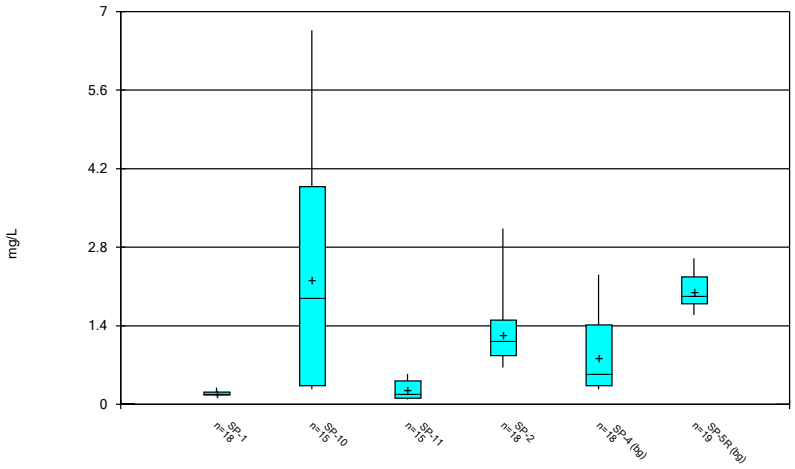
Constituent: Antimony Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Box & Whiskers Plot



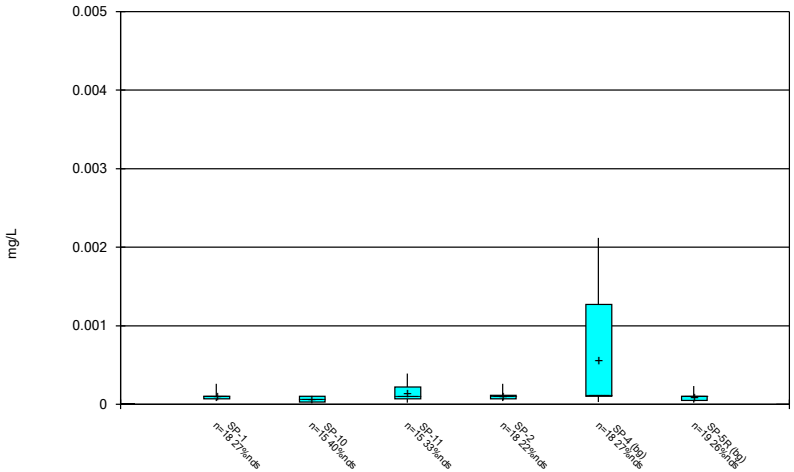
Constituent: Arsenic Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Box & Whiskers Plot



Constituent: Barium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

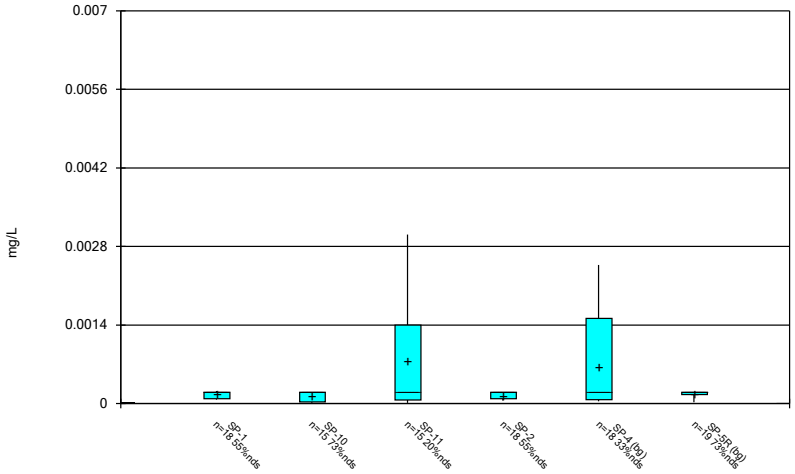
Box & Whiskers Plot



Constituent: Beryllium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

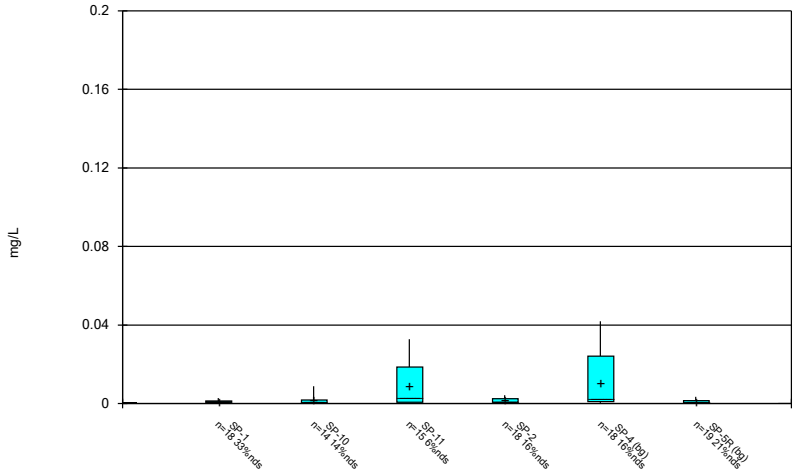
Box & Whiskers Plot



Constituent: Cadmium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

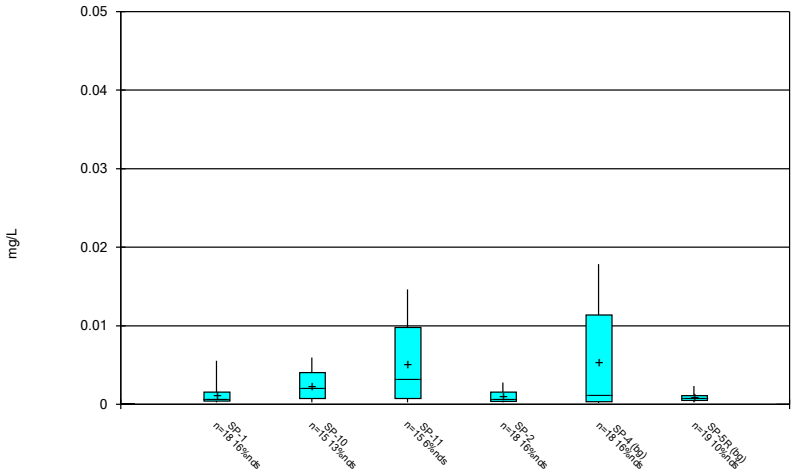
Box & Whiskers Plot



Constituent: Chromium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

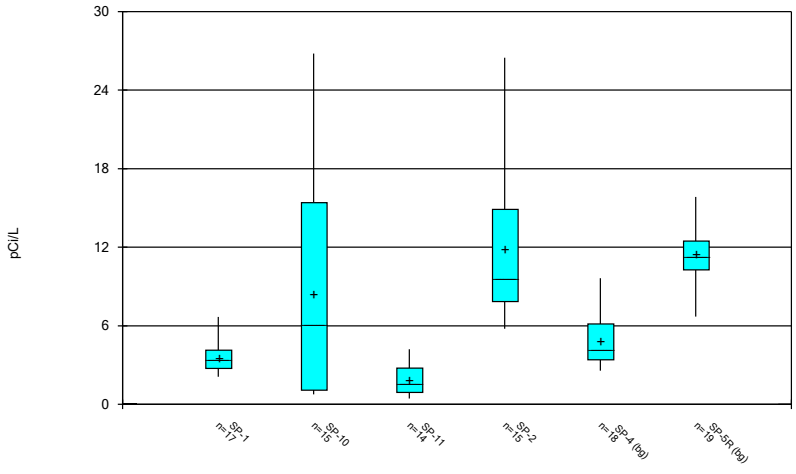
Box & Whiskers Plot



Constituent: Cobalt Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

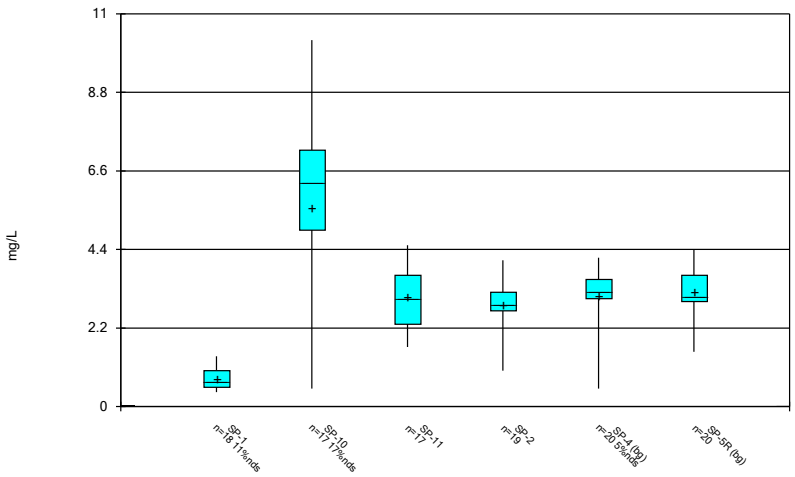
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Box & Whiskers Plot

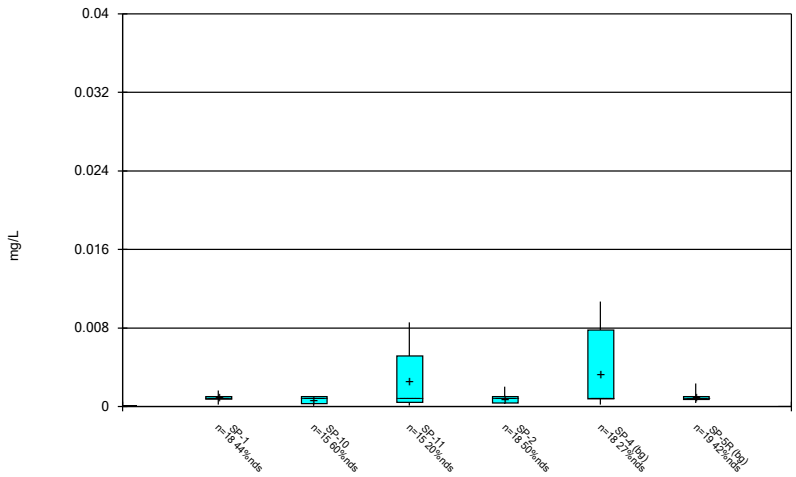


Constituent: Fluoride Analysis Run 8/24/2020 12:58 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Box & Whiskers Plot

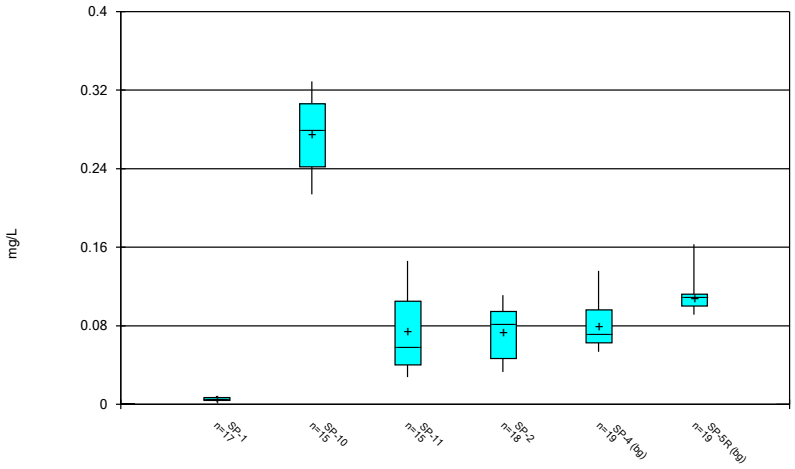


Constituent: Lead Analysis Run 8/24/2020 12:58 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Box & Whiskers Plot

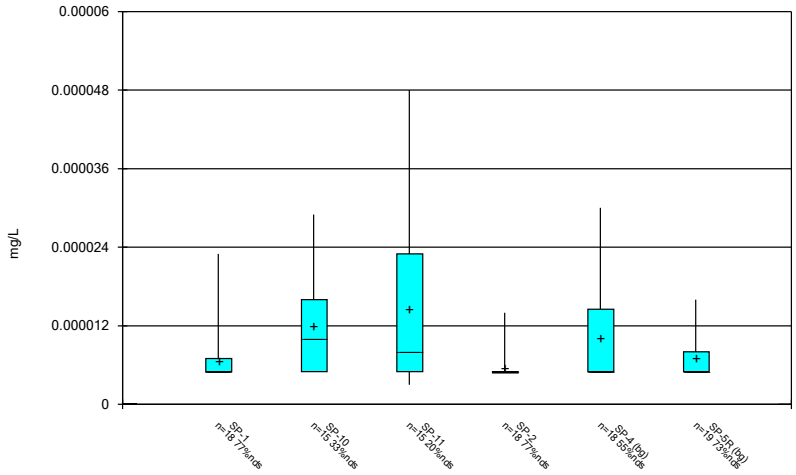


Constituent: Lithium Analysis Run 8/24/2020 12:58 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

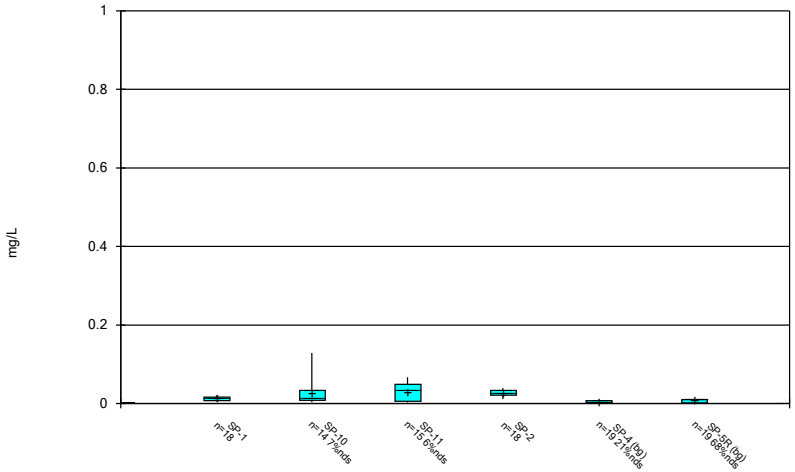
Box & Whiskers Plot



Constituent: Mercury Analysis Run 8/24/2020 12:58 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

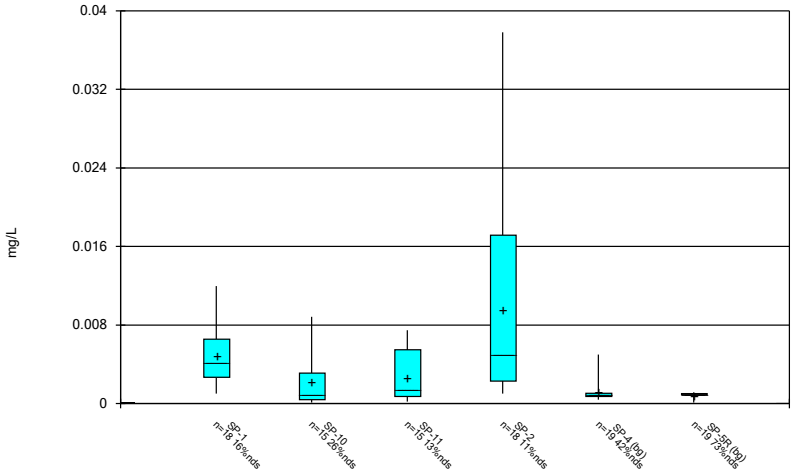
Box & Whiskers Plot



Constituent: Molybdenum Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

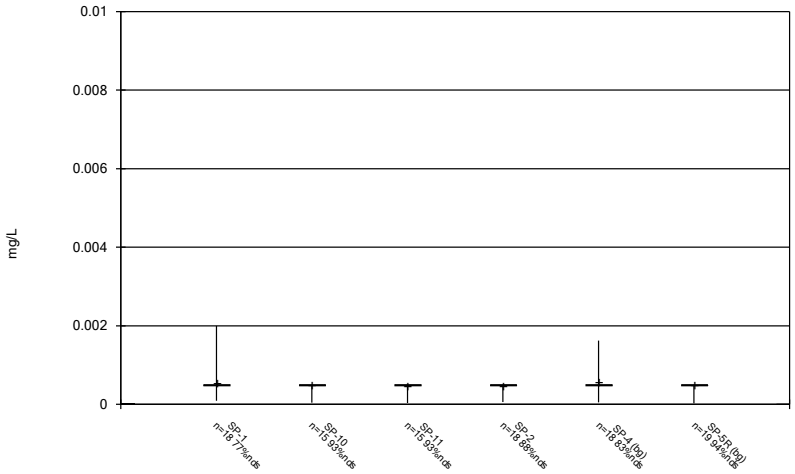
Box & Whiskers Plot



Constituent: Selenium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Thallium Analysis Run 8/24/2020 12:58 PM
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Outlier Summary

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 8/24/2020, 12:59 PM

	SP-4 Arsenic (mg/L)	SP-4 Barium (mg/L)	SP-4 Beryllium (mg/L)	SP-4 Cadmium (mg/L)	SP-10 Chromium (mg/L)	SP-4 Chromium (mg/L)	SP-4 Cobalt (mg/L)	SP-1 Combined Radium 226 + 228 (pCi/L)	SP-11 Combined Radium 226 + 228 (pCi/L)	SP-1 Fluoride (mg/L)
3/13/2017										4 (o)
6/27/2017								14.29 (o)		
7/13/2017					0.11 (o)					
8/4/2017	0.04498 (o)	4.59 (o)	0.00497 (o)	0.00655 (o)		0.08415 (o)	0.04069 (o)		25.367 (o)	
6/20/2019										

	SP-4 Lead (mg/L)	SP-1 Lithium (mg/L)	SP-4 Mercury (mg/L)	SP-10 Molybdenum (mg/L)	SP-4 Thallium (mg/L)
3/13/2017					
6/27/2017					
7/13/2017				0.934 (o)	
8/4/2017	0.03663 (o)		5.8E-05 (o)		<0.0005 (o)
6/20/2019		0.03 (J,o)			

Tolerance Limit Summary Table

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 8/24/2020, 1:08 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0051	n/a	n/a	38	n/a	n/a	44.74	n/a	n/a	0.1424	NP Inter(normality)
Arsenic (mg/L)	0.056	n/a	n/a	37	0.1109	0.05852	8.108	None	sqrt(x)	0.05	Inter
Barium (mg/L)	2.6	n/a	n/a	37	n/a	n/a	0	n/a	n/a	0.1499	NP Inter(normality)
Beryllium (mg/L)	0.0021	n/a	n/a	37	-9.126	1.375	27.03	Kaplan-Meier	ln(x)	0.05	Inter
Cadmium (mg/L)	0.0025	n/a	n/a	37	n/a	n/a	54.05	n/a	n/a	0.1499	NP Inter(NDs)
Chromium (mg/L)	0.042	n/a	n/a	37	n/a	n/a	18.92	n/a	n/a	0.1499	NP Inter(normality)
Cobalt (mg/L)	0.018	n/a	n/a	37	n/a	n/a	13.51	n/a	n/a	0.1499	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	17	n/a	n/a	37	8.253	3.902	0	None	No	0.05	Inter
Fluoride (mg/L)	4.4	n/a	n/a	40	10.57	4.101	2.5	None	x^2	0.05	Inter
Lead (mg/L)	0.011	n/a	n/a	37	n/a	n/a	35.14	n/a	n/a	0.1499	NP Inter(normality)
Lithium (mg/L)	0.15	n/a	n/a	38	0.09391	0.02399	0	None	No	0.05	Inter
Mercury (mg/L)	0.000030	n/a	n/a	37	n/a	n/a	64.86	n/a	n/a	0.1499	NP Inter(NDs)
Molybdenum (mg/L)	0.010	n/a	n/a	38	n/a	n/a	44.74	n/a	n/a	0.1424	NP Inter(normality)
Selenium (mg/L)	0.0050	n/a	n/a	38	n/a	n/a	57.89	n/a	n/a	0.1424	NP Inter(NDs)
Thallium (mg/L)	0.0016	n/a	n/a	37	n/a	n/a	89.19	n/a	n/a	0.1499	NP Inter(NDs)

NORTHEASTERN BAP GWPS				
Constituent Name	**MCL**	**CCR Rule-Specified**	**Background Limit**	**GWPS**
Antimony, Total (mg/L)	0.006		0.0051	0.006
Arsenic, Total (mg/L)	0.01		0.056	0.056
Barium, Total (mg/L)	2		2.6	2.6
Beryllium, Total (mg/L)	0.004		0.0021	0.004
Cadmium, Total (mg/L)	0.005		0.0025	0.005
Chromium, Total (mg/L)	0.1		0.042	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.018	0.018
Combined Radium, Total (pCi/L)	5		17	17
Fluoride, Total (mg/L)	4		4.4	4.4
Lead, Total (mg/L)	0.015		0.011	0.015
Lithium, Total (mg/L)	n/a	0.04	0.15	0.15
Mercury, Total (mg/L)	0.002		0.00003	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.01	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.0016	0.002

**Grey cell indicates Background Limit is higher than MCL or CCR Rule-Specified Level*

**GWPS = Groundwater Protection Standard*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

Confidence Intervals Summary Table - Significant Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 8/24/2020, 1:26 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Fluoride (mg/L)	**SP-10**	**7.399**	**4.664**	**4.4**	**Yes**	**17**	**5.556**	**2.777**	**17.65**	**Kaplan-Meier**	**x^2**	**0.01**	**Param.**
Lithium (mg/L)	**SP-10**	**0.2992**	**0.2518**	**0.15**	**Yes**	**15**	**0.2755**	**0.03497**	**0**	**None**	**No**	**0.01**	**Param.**

Confidence Intervals Summary Table - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 8/24/2020, 1:26 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	SP-1	0.00125	0.00062	0.006	No	18	0.001385	0.001471	38.89	None	No	0.01	NP (normality)
Antimony (mg/L)	SP-10	0.001958	0.0005156	0.006	No	15	0.001274	0.001125	26.67	Kaplan-Meier	sqrt(x)	0.01	Param.
Antimony (mg/L)	SP-11	0.004371	0.0006154	0.006	No	15	0.002946	0.003109	20	Kaplan-Meier	sqrt(x)	0.01	Param.
Antimony (mg/L)	SP-2	0.00474	0.00121	0.006	No	18	0.003037	0.002872	11.11	None	No	0.01	NP (normality)
Arsenic (mg/L)	SP-1	0.005	0.00073	0.056	No	18	0.003114	0.002034	44.44	None	No	0.01	NP (normality)
Arsenic (mg/L)	SP-10	0.008905	0.003055	0.056	No	15	0.00598	0.004317	13.33	None	No	0.01	Param.
Arsenic (mg/L)	SP-11	0.007227	0.00321	0.056	No	15	0.005219	0.002964	6.667	None	No	0.01	Param.
Arsenic (mg/L)	SP-2	0.005	0.0014	0.056	No	18	0.003267	0.002831	5.556	None	No	0.01	NP (normality)
Barium (mg/L)	SP-1	0.2192	0.1727	2.6	No	18	0.1959	0.03837	0	None	No	0.01	Param.
Barium (mg/L)	SP-10	3.261	0.6876	2.6	No	15	2.221	2.1	0	None	sqrt(x)	0.01	Param.
Barium (mg/L)	SP-11	0.354	0.1457	2.6	No	15	0.2616	0.163	0	None	sqrt(x)	0.01	Param.
Barium (mg/L)	SP-2	1.431	0.9272	2.6	No	18	1.234	0.5547	0	None	ln(x)	0.01	Param.
Beryllium (mg/L)	SP-1	0.0001145	0.00005852	0.004	No	18	0.0001028	0.00005267	27.78	Kaplan-Meier	ln(x)	0.01	Param.
Beryllium (mg/L)	SP-10	0.0001	0.00003	0.004	No	15	0.00006753	0.0000311	40	None	No	0.01	NP (normality)
Beryllium (mg/L)	SP-11	0.0001686	0.00003682	0.004	No	15	0.0001439	0.0001291	33.33	Kaplan-Meier	x^(1/3)	0.01	Param.
Beryllium (mg/L)	SP-2	0.0001356	0.00006665	0.004	No	18	0.0001072	0.00005539	22.22	Kaplan-Meier	sqrt(x)	0.01	Param.
Cadmium (mg/L)	SP-1	0.0002	0.00009	0.005	No	18	0.0001572	0.00005829	55.56	None	No	0.01	NP (NDs)
Cadmium (mg/L)	SP-10	0.0002	0.00003	0.005	No	15	0.0001527	0.00008137	73.33	None	No	0.01	NP (NDs)
Cadmium (mg/L)	SP-11	0.0006657	0.00006017	0.005	No	15	0.0007573	0.001081	20	Kaplan-Meier	ln(x)	0.01	Param.
Cadmium (mg/L)	SP-2	0.0002	0.00008	0.005	No	18	0.0001522	0.0000617	55.56	Kaplan-Meier	No	0.01	NP (NDs)
Chromium (mg/L)	SP-1	0.001241	0.0005791	0.1	No	18	0.001103	0.000657	33.33	Kaplan-Meier	x^(1/3)	0.01	Param.
Chromium (mg/L)	SP-10	0.002114	0.0003613	0.1	No	14	0.001511	0.002199	14.29	None	x^(1/3)	0.01	Param.
Chromium (mg/L)	SP-11	0.00876	0.0008192	0.1	No	15	0.00894	0.01241	6.667	None	ln(x)	0.01	Param.
Chromium (mg/L)	SP-2	0.001855	0.000573	0.1	No	18	0.001438	0.001192	16.67	Kaplan-Meier	sqrt(x)	0.01	Param.
Cobalt (mg/L)	SP-1	0.001651	0.0006138	0.018	No	18	0.001218	0.001286	16.67	Kaplan-Meier	x^(1/3)	0.01	Param.
Cobalt (mg/L)	SP-10	0.003515	0.0009964	0.018	No	15	0.002256	0.001859	13.33	None	No	0.01	Param.
Cobalt (mg/L)	SP-11	0.007584	0.001435	0.018	No	15	0.005135	0.005141	6.667	None	sqrt(x)	0.01	Param.
Cobalt (mg/L)	SP-2	0.001398	0.0005817	0.018	No	18	0.001016	0.000835	16.67	Kaplan-Meier	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-1	4.247	2.878	17	No	17	3.562	1.093	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-10	11.73	1.986	17	No	15	8.394	9.04	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-11	2.646	1.029	17	No	14	1.838	1.141	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-2	14.91	7.968	17	No	15	11.84	5.957	0	None	x^(1/3)	0.01	Param.
Fluoride (mg/L)	SP-1	0.9722	0.6063	4.4	No	18	0.7893	0.3024	11.11	None	No	0.01	Param.
Fluoride (mg/L)	**SP-10**	**7.399**	**4.664**	**4.4**	**Yes**	**17**	**5.556**	**2.777**	**17.65**	**Kaplan-Meier**	**x^2**	**0.01**	**Param.**
Fluoride (mg/L)	SP-11	3.623	2.52	4.4	No	17	3.071	0.8801	0	None	No	0.01	Param.
Fluoride (mg/L)	SP-2	3.259	2.55	4.4	No	19	2.852	0.6711	0	None	x^2	0.01	Param.
Lead (mg/L)	SP-1	0.002	0.00065	0.015	No	18	0.001335	0.0006897	44.44	None	No	0.01	NP (normality)
Lead (mg/L)	SP-10	0.002	0.000102	0.015	No	15	0.001325	0.0008761	60	None	No	0.01	NP (NDs)
Lead (mg/L)	SP-11	0.003596	0.0004686	0.015	No	15	0.002719	0.002984	20	Kaplan-Meier	sqrt(x)	0.01	Param.
Lead (mg/L)	SP-2	0.002	0.000334	0.015	No	18	0.001365	0.0007789	50	None	No	0.01	NP (normality)
Lithium (mg/L)	SP-1	0.006628	0.004488	0.15	No	17	0.005558	0.001707	0	None	No	0.01	Param.
Lithium (mg/L)	**SP-10**	**0.2992**	**0.2518**	**0.15**	**Yes**	**15**	**0.2755**	**0.03497**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium (mg/L)	SP-11	0.101	0.04786	0.15	No	15	0.07444	0.03923	0	None	No	0.01	Param.
Lithium (mg/L)	SP-2	0.09083	0.06137	0.15	No	18	0.07314	0.02641	0	None	x^2	0.01	Param.
Mercury (mg/L)	SP-1	0.000009	0.000005	0.002	No	18	0.000006722	0.00000439	77.78	None	No	0.01	NP (NDs)
Mercury (mg/L)	SP-10	0.000019	0.000005	0.002	No	15	0.00001193	0.000008066	33.33	None	No	0.01	NP (normality)
Mercury (mg/L)	SP-11	0.00001788	0.000005529	0.002	No	15	0.0000146	0.00001493	20	Kaplan-Meier	ln(x)	0.01	Param.
Mercury (mg/L)	SP-2	0.000005	0.000005	0.002	No	18	0.000005611	0.0000021	18 77.78	Kaplan-Meier	No	0.01	NP (NDs)
Molybdenum (mg/L)	SP-1	0.01555	0.009798	0.1	No	18	0.01267	0.004754	0	None	No	0.01	Param.
Molybdenum (mg/L)	SP-10	0.03569	0.007195	0.1	No	14	0.0254	0.03257	7.143	None	x^(1/3)	0.01	Param.
Molybdenum (mg/L)	SP-11	0.0515	0.00327	0.1	No	15	0.02875	0.02423	6.667	None	No	0.01	NP (normality)
Molybdenum (mg/L)	SP-2	0.03161	0.02248	0.1	No	18	0.02704	0.007549	0	None	No	0.01	Param.
Selenium (mg/L)	SP-1	0.006725	0.003619	0.05	No	18	0.004751	0.003046	16.67	Kaplan-Meier	No	0.01	Param.
Selenium (mg/L)	SP-10	0.003305	0.0004597	0.05	No	15	0.002221	0.002419	26.67	Kaplan-Meier	sqrt(x)	0.01	Param.
Selenium (mg/L)	SP-11	0.003742	0.0007753	0.05	No	15	0.002545	0.002503	13.33	None	sqrt(x)	0.01	Param.

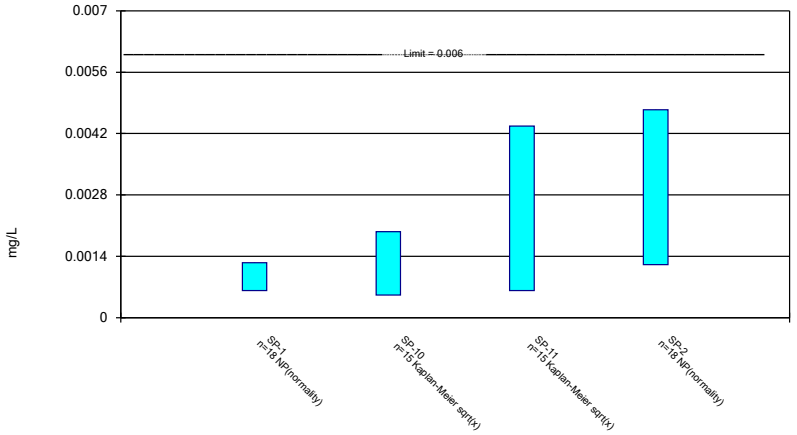
Confidence Intervals Summary Table - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 8/24/2020, 1:26 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Selenium (mg/L)	SP-2	0.0124	0.003115	0.05	No	18	0.009588	0.01039	11.11	None	x^(1/3)	0.01	Param.
Thallium (mg/L)	SP-1	0.00089	0.0001	0.002	No	18	0.00056	0.000396	77.78	None	No	0.01	NP (NDs)
Thallium (mg/L)	SP-10	0.0005	0.00004	0.002	No	15	0.0004693	0.0001188	93.33	None	No	0.01	NP (NDs)
Thallium (mg/L)	SP-11	0.0005	0.00003	0.002	No	15	0.0004687	0.0001214	93.33	None	No	0.01	NP (NDs)
Thallium (mg/L)	SP-2	0.0005	0.0001	0.002	No	18	0.0004533	0.000136	88.89	None	No	0.01	NP (NDs)

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.

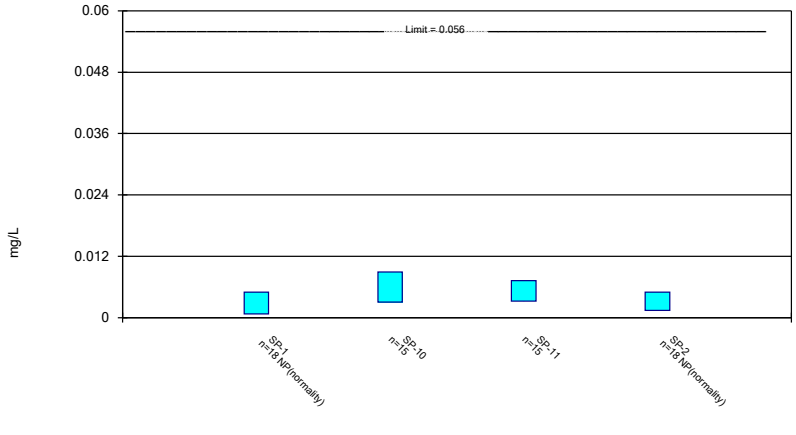


Constituent: Antimony Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

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.

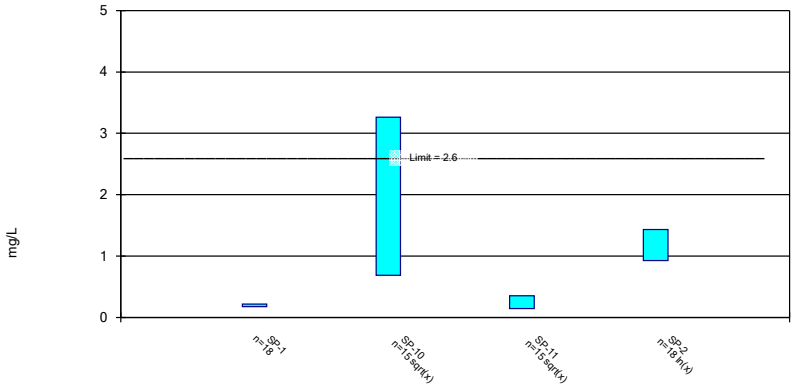


Constituent: Arsenic Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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

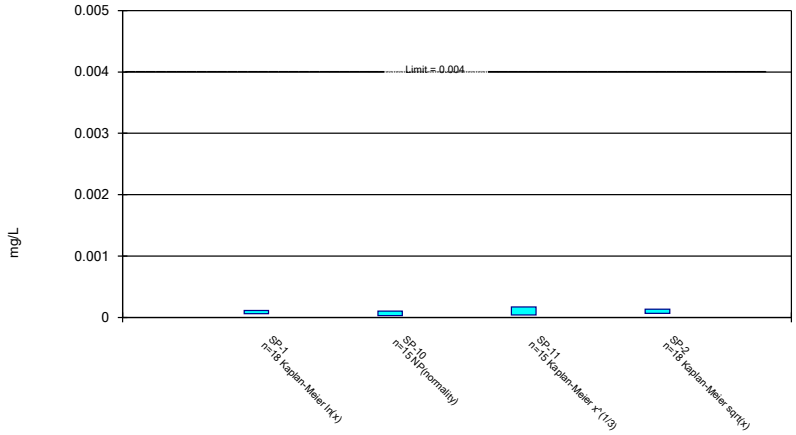


Constituent: Barium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

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

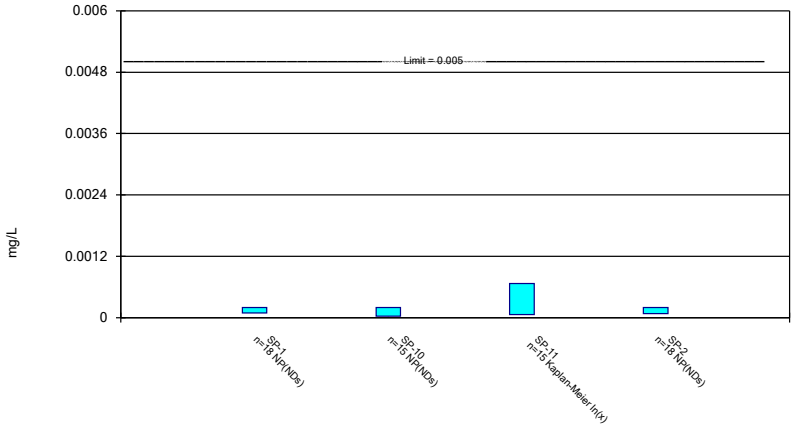


Constituent: Beryllium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

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

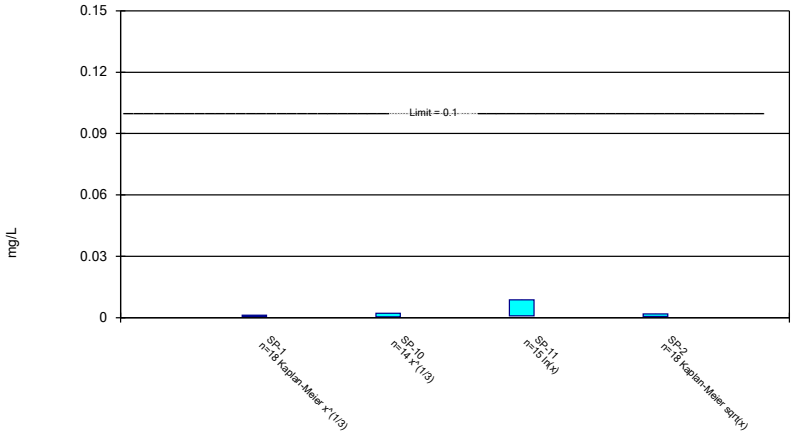


Constituent: Cadmium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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

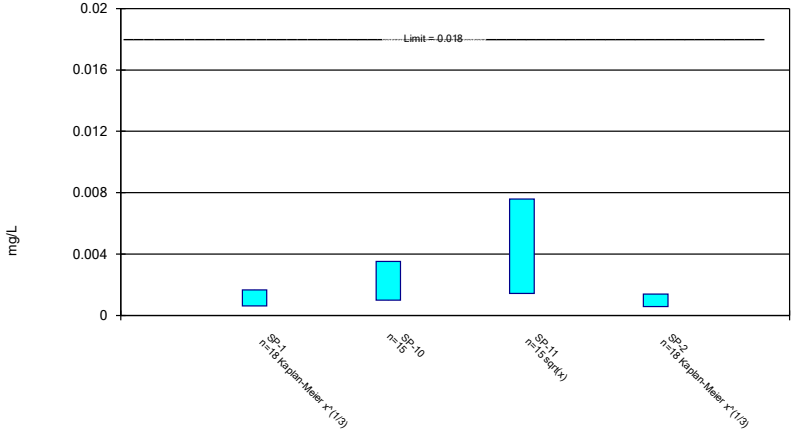


Constituent: Chromium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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

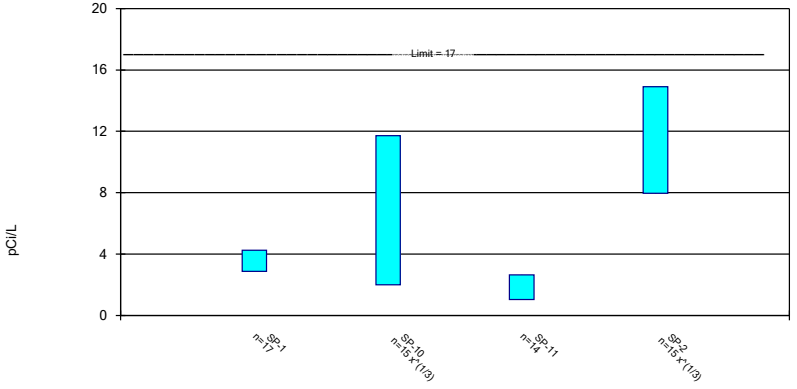


Constituent: Cobalt Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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



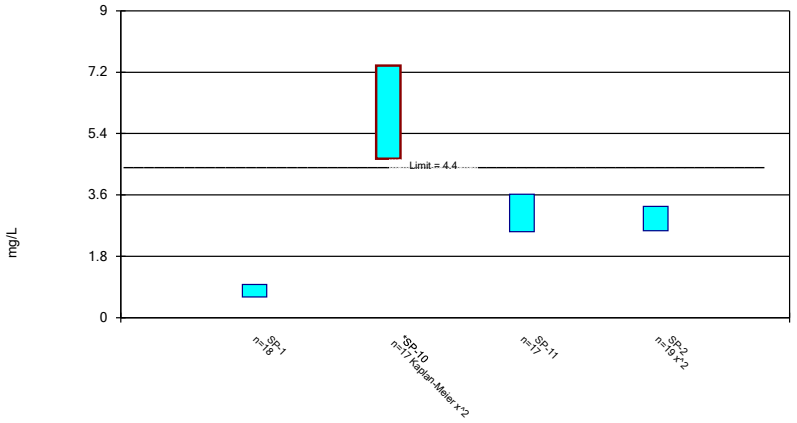
Constituent: Combined Radium 226 + 228 Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



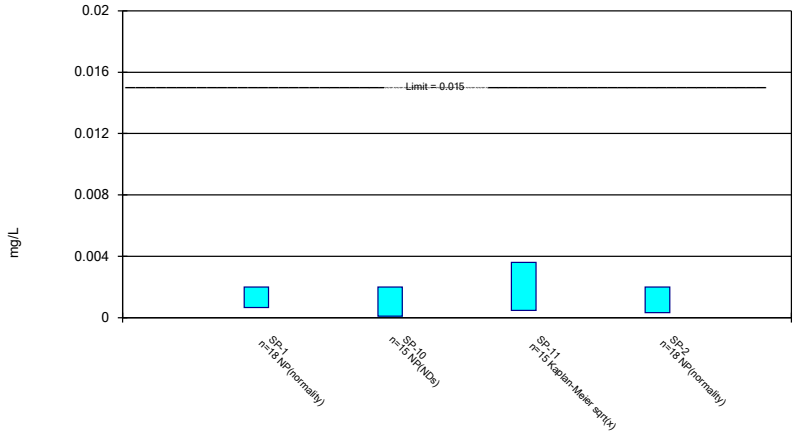
Constituent: Fluoride Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d 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.



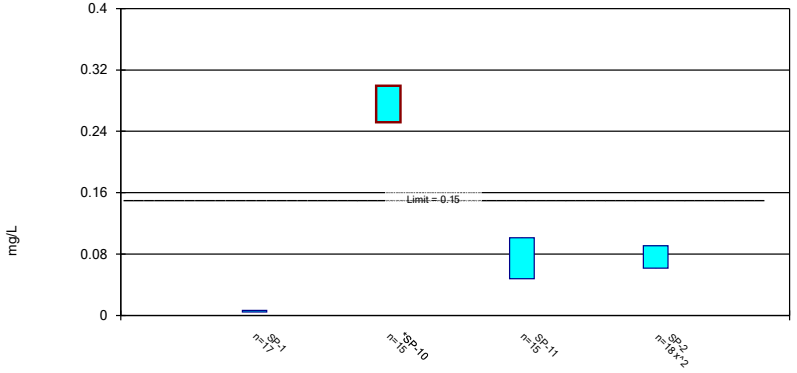
Constituent: Lead Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



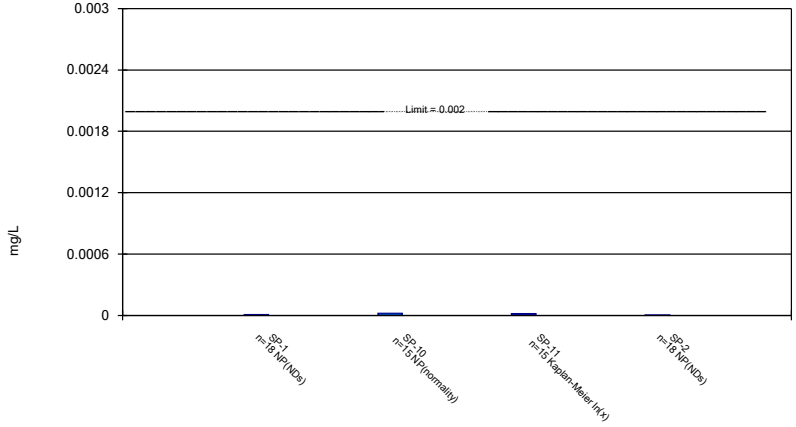
Constituent: Lithium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.26d 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.

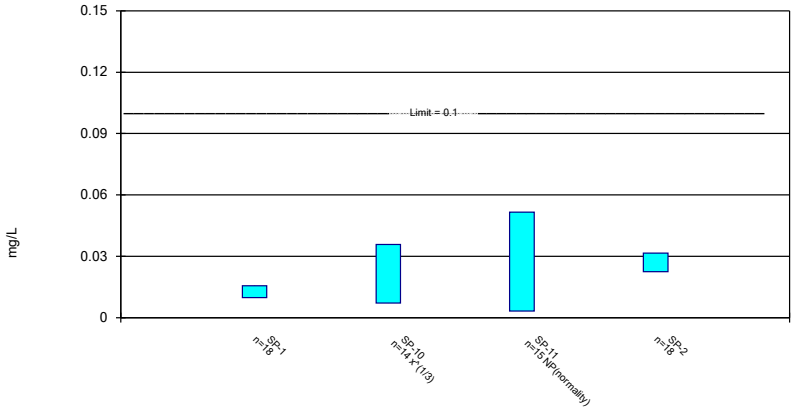


Constituent: Mercury Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

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.

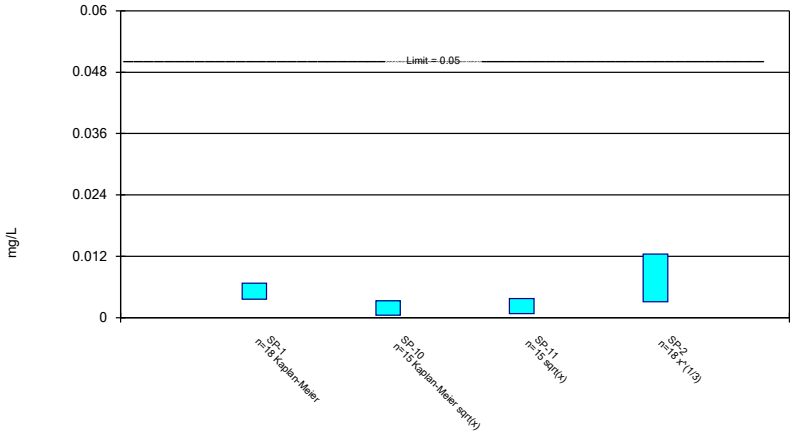


Constituent: Molybdenum Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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

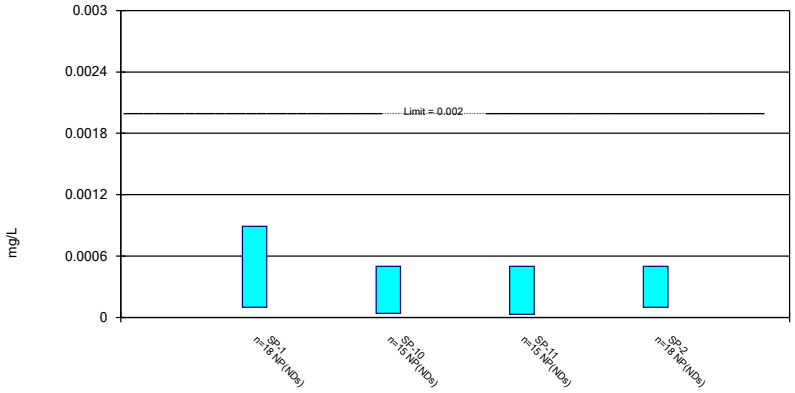


Constituent: Selenium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Non-Parametric Confidence Interval

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



Constituent: Thallium Analysis Run 8/24/2020 1:24 PM

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

APPENDIX III

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

American Electric Power
502 North Allen Avenue
Shreveport, LA 71101
AEP.com

February 11, 2020

Via electronic mail

Ms. Hillary Young
Oklahoma Department of Environmental Quality ("ODEQ")
707 North Robinson, P.O. Box 1677
Oklahoma City, OK 73101-1677

Re: Alternate Source Demonstration ("ASD") for lithium- Bottom Ash Pond(BAP)
Public Service Company of Oklahoma
Northeastern Power Station (NPS)
Roger County
Solid Waste Permit No. Pending

Dear Ms. Young,

PSO received ODEQ's correspondence dated January 24, 2020 in which ODEQ accepted the ASD for the lithium detected in SP-10 during the February 2019 sampling event. ODEQ indicated that if lithium continues to exceed the GWPS in the future and conditions have not changed, NPS may refer to the October 24, 2019 ASD approval and continue assessment monitoring for the BAP in accordance with OAC 252:517-9-6(g)(3)(B).

On December 18, 2019, the statistical evaluation of the August 26, 2019 assessment monitoring event for the BAP was certified. That statistical evaluation was included in the January 2020 Annual Groundwater Monitoring Report and in that statistical evaluation report, it was determined that the Lower Confidence Level (LCL) for lithium (0.263 mg/L) exceeded the GWPS (a calculated Upper Tolerance Limit) of 0.15 mg/L at SP-10. The detected concentration in SP-10 was 0.241 mg/L, which was lower than previously detected. Attached is a graph of the lithium groundwater concentrations over time for SP-10. This is an indication that conditions

have not changed drastically since the approval of the previous lithium ASD, see attached historical analytical data table for SP-10.

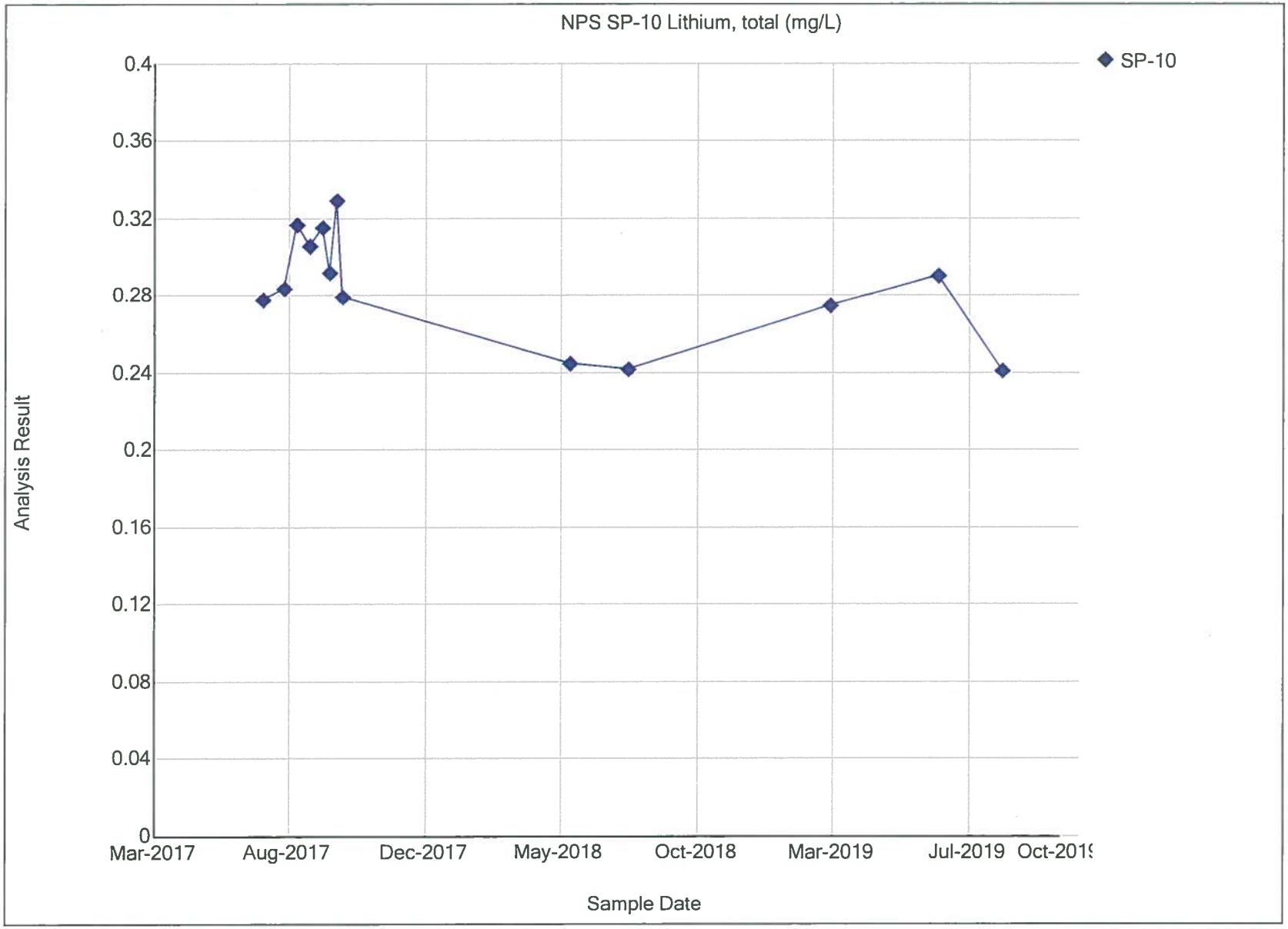
Therefore, PSO is requesting that ODEQ consider the previously submitted and approved lithium ASD for the BAP as providing an adequate ASD for this occurrence. Assessment monitoring for the BAP will continue in accordance with OAC 252:517-9-6(g)(3)(B).

Please do not hesitate to contact me if you have any questions or would like to discuss. I can be reached by email at: jcparker-witt@aep.com or by phone at: (318) 673-3816.

Sincerely,

Jill Parker-Witt, P.E.
AEP, Engineer Principal

Attachments


NPS SP-10 Lithium, total (mg/L)
SP-10
Analysis Result
0.4
0.36
0.32
0.28
0.24
0.2
0.16
0.12
0.08
0.04
0
Mar-2017
Aug-2017
Dec-2017
May-2018
Oct-2018
Mar-2019
Jul-2019
Oct-201
Sample Date

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

KEVIN STITT
Governor

January 24, 2020

Ms. Jill Parker-Witt, P.E.
American Electric Power
502 North Allen Avenue
Shreveport, LA 71101

Re: Alternate Source Demonstration for Lithium –Bottom Ash Pond
Public Service Company of Oklahoma
Northeastern Power Station
Rogers County
Solid Waste Permit No. none

Dear Ms. Parker-Witt:

On October 29, 2019, The Oklahoma Department of Environmental Quality (DEQ) approved the revised alternate source demonstration (ASD) for lithium detected in monitoring well SP-10 for the Bottom Ash Pond (BAP). The ASD proposed that naturally occurring concentrations of lithium in groundwater were the source of the statistically significant level (SSL) of lithium in SP-10 during the 2018 sampling events. DEQ required AEP/Public Service Company of Oklahoma Northeastern Power Station (NPS) to include the revised ASD in the annual groundwater monitoring and corrective action report required by Oklahoma Administrative Code (OAC) 252:517-9-1(e).

On December 12, 2019, by email, DEQ received from NPS the "Alternate Source Demonstration ("ASD") for Lithium –Bottom Ash Pond" (Report) which contains the groundwater sample results with statistical analyses for the February 2019 sampling event. Lithium, in SP-10 (0.275 mg/L), again exceeded the groundwater protection standard (GWPS) of 0.150 mg/L. Since the revised ASD has been approved for lithium in SP-10, and is still valid, NPS may continue assessment monitoring in accordance with the requirements of OAC 252:517-9-6(g)(3)(B). If lithium continues to exceed the GWPS in the future and conditions have not changed, NPS may refer to the October 29, 2019 ASD approval and continue assessment monitoring for the BAP in accordance with OAC 252:517-9-6(g)(3)(B). Please include in future reports if NPS determines, based on an evaluation of the groundwater data, the ASD is still valid for lithium in SP-10.

If you have any questions, please contact Ms. Cindy Hailes at (405) 702-5114.

Sincerely,

Hillary Young, P.E.
Chief Engineer
Land Protection Division

HY/ckh

Table 1 - Groundwater Data Summary: SP-10
Northeastern - BAP
Appendix B Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
7/13/2017	Background	4.62 J	<1.05 U	1900	<0.02 U	<0.07 U	110	5.96	17.23	6.502	<0.68 U	0.278	0.006 J	934	5.67	<0.86 U
8/4/2017	Background	2.51 J	2.43 J	330	0.03 J	<0.07 U	2.44	4.74 J	1.153	<0.083 U	<0.68 U	0.284	0.029	129	8.82	<0.86 U
8/17/2017	Background	<0.93 U	<1.05 U	282	<0.02 U	<0.07 U	<0.23 U	<0.14 U	0.995	<0.083 U	<0.68 U	0.317	0.027	45.43	<0.99 U	<0.86 U
8/30/2017	Background	<0.93 U	5.66	279	0.06 J	<0.07 U	1.09	4.27 J	0.763	10.2663	<0.68 U	0.306	0.019 J	30.35	2.56 J	<0.86 U
9/13/2017	Background	<0.93 U	9.42	266	0.07 J	<0.07 U	0.46 J	2.41 J	0.774	7.028	<0.68 U	0.315	0.013 J	16.28	3.11 J	<0.86 U
9/20/2017	Background	1.16 J	13.92	399	0.03 J	<0.07 U	0.72 J	2.19 J	1.062	<0.083 U	<0.68 U	0.292	0.016 J	13.58	2.38 J	<0.86 U
9/27/2017	Background	1.57 J	15.31	928	0.04 J	<0.07 U	2.07	3.71 J	1.723	5.00	<0.68 U	0.329	0.013 J	35.93	3.84 J	<0.86 U
10/4/2017	Background	1.27 J	4.3 J	664	0.03 J	<0.07 U	0.36 J	4.02 J	3.226	5.11	0.87 J	0.279	0.015 J	29.19	<0.99 U	<0.86 U
5/30/2018*	Assessment	<0.93 U	8.90	2550	<0.02 U	<0.07 U	<0.23 U	0.83 J	6.06	7.333	<0.68 U	0.245	<0.005 U	2.94 J	2.26 J	<0.86 U
7/30/2018	Assessment	0.34	7.61	2330	0.043	0.02 J	0.06 J	2.16	7.89	8.9991	0.102	0.242	0.006 J	18.50	0.09 J	0.04 J
2/27/2019	Assessment	2 J	3.48	5810	<0.4 U	<0.2 U	1 J	<0.4 U	15.35	5.59	<0.4 U	0.275	<0.005 U	<8 U	<0.6 U	<2 U
6/20/2019*	Assessment	0.65	3.66	3880	<0.1 U	<0.05 U	8.76	0.743	26.4	6.40	0.3 J	0.290	0.01 J	9 J	<0.2 U	<0.5 U
8/26/2019	Assessment	0.61	3.00	3060	0.08 J	0.03 J	1.61	1.06	8.11	4.874	0.449	0.241	<0.005 U	8.22	0.4	<0.1 U

Notes
µg/L: micrograms per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the reporting limit for the January and March 2017 events and less than the method detection limit (MDL) for all subsequent events, followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter
Due to limited groundwater volume, radium samples for several sampling events were collected the day prior to collection of analytical samples for other parameters.
*5/30/18 and 6/20/19 were sampling events under 252.517-9-6(b)

SP-10

Sample Number: 192952-005 **Date Collected:** 08/26/2019 16:22 **Date Received:** 9/4/2019

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.61	ug/L		0.1	0.02	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Arsenic, As	3.00	ug/L		0.1	0.03	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Barium, Ba	3060	ug/L		1	0.2	KAN	09/23/2019 16:26	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.08	ug/L	J	0.1	0.02	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	1.61	ug/L		0.2	0.04	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.06	ug/L		0.05	0.02	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.449	ug/L		0.2	0.05	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Molybdenum, Mo	8.22	ug/L		2	0.4	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.2	0.03	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Boron, B	1.03	mg/L		0.05	0.02	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	216	mg/L		0.05	0.02	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4
Lithium, Li	0.241	mg/L		0.0002	0.00005	KAN	09/26/2019 13:38	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.17	pCi/L	0.13	0.38	ttp	9/9/2019	SW-846 9320-2014,Rev. 1.0
Radium-226	6.94	pCi/L	0.39	0.14	sdw	9/10/2019	SW-846 9315-1986,Rev. 0

The RPD between the sample and duplicate result exceed 25%. The carrier recovery is outside the acceptable limit of 30-110%.

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.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Northeastern PP BAP CCR
Contact Name: Jill Parker-Witt
Contact Phone: 318-673-3816
Sampler(s): Kenny McDonald/Matt Hamilton

Analysis Turnaround Time (in Calendar Days)
RESULTS DUE OCTOBER 12

Site Contact: | Date: | For Lab Use Only: COC/Order #: 192952

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO3 (B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li, Mo, Se, TL)	Field-filter 250 mL bottle, then pH<2, HNO3 (Dissolved B, Sb, As, Ba, Be, Ca, Cd, Cr, Co, Fe, K, Li, Mg, Mn, Mo, Na, Pb, Se, Sr, Tl)	250 mL bottle, Cool, 0-6C (Fluoride, Chloride, Sulfate)	Three (six every 10th*) 1 L bottles, pH<2, HNO3 (Ra-226, Ra-228)				Sample Specific Notes:
SP-1	8/26/2019	1650	G	GW	4		X			X				
SP-2	8/26/2019	1640	G	GW	4		X			X				
SP-4	8/26/2019	1705	G	GW	4		X			X				
SP-5R	8/26/2019	1720	G	GW	4		X			X				
SP-10	8/26/2019	1622	G	GW	7		X			X				
SP-11	8/26/2019	1635	G	GW	4		X			X				
DUPLICATE BAP	8/26/2019	1622	G	GW	1		X							
EQUIPMENT BLANK BAP	8/26/2019	1700	G	GW	1		X							
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

****** RESULTS DUE OCTOBER 12**

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Cardno	08/30/19 1400		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
			[signature]	9/4/19 11:50 AM

Form SOP-7102
Sample Receipt Form
Rev 6 11 30 15

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type: (Cooler) Box Bag Envelope

Delivery Type: PONY UPS (FedEX) USPS Other _____

Plant/Customer Northeastern

Number of Plastic Containers: 35

Opened By MSO

Number of Glass Containers: _____

Date/Time 9/4/19 11:50 AM

Number of Mercury Containers: -

Were all temperatures within 0-6°C? Y / N or (N/A) Initial _____ on ice / no ice

#2 (IR Gun Ser# 181354432, Expir 06-12-20) - If No specify each deviation _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: 10/12/19 If RUSH who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? Y / (N) Comments No date time of collection

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A Initial & Date MGK 9/4/19

- 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# 192957 Initial & Date & Time _____

Comments COC said "SP-5R" bottle labels say "SP-5"

Logged by MSO

Reviewed by SM

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

APPENDIX IV

Notices of groundwater monitoring programs are included in this appendix.

PUBLIC SERVICE COMPANY OF OKLAHOMA℠

An AEP Company

BOUNDLESS ENERGY℠

Northeastern Power Station

Notice of Statistically Significant Levels (SSLs) above the Groundwater Protection Standard (GWPS)

CCR Unit – Bottom Ash Pond

As required by OAC 252:517-9-6 (g), this is a notification that on October 28, 2020 lithium and fluoride were detected at an SSL above the GWPS. This notification is being placed in the plant's operating record, as required by OAC 252:517-19-1(h)(8).

APPENDIX V

Field Sheets and Laboratory Report for this reporting period

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonald **DATE:** March 25/2020

Well Identification Number	SP-1	SP-2	SP-4	SP-5	SP-10	SP-11
Activities	Gauge	Gauge	Gauge	Gauge	Gauge	Gauge
Samples	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV
Depth to Water (ft)	15.34	19.07	13.28	3.43	13.13	7.16
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.99	38.19	38.30	78.00	54.10	34.51
Height of Water Column (ft.)	22.65	19.12	25.02	74.57	40.97	27.35
Well Size (I.D.) (inches)	2	2	2	2	2	2
Volume of Water in Well (gallons)	3.69	3.12	4.08	12.15	6.68	4.46
Water Removed From Well (gallons)	12.0	10	13.0	30.0	20.0	14.0
Method of Removal	Pump	Pump	Pump	Pump	Pump	Pump
Was Well Purged Dry?	NO	NO	NO	YES	NO	NO
pH (standard units)	8.52	8.79	9.05	8.80	8.29	8.96
Temperature (°C)	18.11	17.16	17.92	18.27	15.74	14.78
Conductivity (µmhos/cc)	891	2150	2240	3090	6860	1920
Turbidity (NTU)	165	85.8	56.5	53.8	38.6	82.2
Appearance	CLEAR	CLEAR	CLEAR	CLEAR	GRAYISH BLACK TINT	CLEAR
Odor	NONE	NONE	NONE	NONE	SLIGHT SULPHUR	NONE
Containers	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C
Sample Time	1010	0940	1050	1115	0850	0915
Sample Date	03/25/20	03/25/20	03/25/20	03/25/20	03/25/20	03/25/20

DUPLICATE

For 2" well multiply by	0.163
For 4" well multiply by	0.653

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonald. **DATE:** March 25, 2020.

Well Identification Number	SP-3					
Activities	Gauge					
Samples	NA					
Depth to Water (ft)	14.88					
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.90					
Height of Water Column (ft.)						
Well Size (I.D.) (inches)	2					
Volume of Water in Well (gallons)						
Water Removed From Well (gallons)						
Method of Removal						
Was Well Purged Dry?						
pH (standard units)						
Temperature (°C)						
Conductivity (µmhos/cc)						
Turbidity (NTU)						
Appearance						
Odor						
Containers						
Sample Time						
Sample Date						

For 2" well multiply by	0.163
For 4" well multiply by	0.653

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonnell **DATE:** 06/29-30/20

Well Identification Number	SP-1	SP-2	SP-4	SP-5 R	SP-10	SP-11
Activities	Gauge	Gauge	Gauge	Gauge	Gauge	Gauge
Samples	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV
Depth to Water (ft)	17.87	26.71	24.83	7.41	12.06	11.52
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.99	38.19	38.30	78.00	54.10	34.51
Height of Water Column (ft.)	20.12	11.48	13.47	70.59	42.04	22.99
Well Size (I.D.) (inches)	2	2	2	2	2	2
Volume of Water in Well (gallons)	3.28	1.87	2.20	11.51	6.85	3.75
Water Removed From Well (gallons)	11.0	6.5	7.0	30.25	19.0	5.0
Method of Removal	Pump	Pump	Pump	Pump	Pump	Pump
Was Well Purged Dry?	NO	NO	~~YES~~ NO	YES	YES	YES
pH (standard units)	8.97	8.80	8.96	8.97	8.92	8.85
Temperature (°C)	20.82	19.76	20.48	19.07	21.30	20.71
Conductivity (µmhos/cc)	820	3760	2190	3070	6600	1530
Turbidity (NTU)	78.4	123	58.7	26.4	34.1	13.6
Appearance	CLEAR	CLEAR	CLEAR	CLEAR TO SLIGHTLY	SLIGHT BLACK TINT	CLEAR
Odor	NONE	NONE	NONE	NONE	NONE	NONE
Containers	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C
Sample Time	1242	1214	1311	1352	1120	1139
Sample Date	06/30/20	06/30/20	06/30/20	06/30/20	06/30/20	06/30/20

For 2" well multiply by	0.163
For 4" well multiply by	0.653

BAP DUPLICATE

BAP ROCKS

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonald . **DATE:** 07/28/20 .

Well Identification Number	SP-1	SP-2	SP-4	SP-5R	SP-10	SP-11
Activities	Gauge	Gauge	Gauge	Gauge	Gauge	Gauge
Samples	pH	pH	NA	NA	B, Cl, F, pH, TDS	B, pH, Sulfate
Depth to Water (ft)	17.36	32.60	30.78	7.25	11.76	18.16
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.99	38.19	38.30	78.00	54.10	34.51
Height of Water Column (ft.)	20.63	5.59	7.52	70.75	42.34	16.35
Well Size (I.D.) (inches)	2	2	2	2	2	2
Volume of Water in Well (gallons)	3.36	0.91	1.23	11.53	6.90	2.67
Water Removed From Well (gallons)	13.00	4.00			17.75	8.50
Method of Removal	Pump	Pump			Pump	Pump
Was Well Purged Dry?	No	Yes			Yes	Yes
pH (standard units)	8.35	8.41			8.29	8.57
Temperature (°C)	18.34	17.92			18.37	19.09
Conductivity (µmhos/cc)	644	3710			6490	1360
Turbidity (NTU)	17.2	101			1.8	48.5
Appearance	Clear	Clear			Clear	Clear
Odor	None	None			None	Slight Sulphur
Containers	NA	NA			250 mL HNO3 1 L Cool 0-6C	250 mL HNO3 1 L Cool 0-6C
Sample Time	937	922			840	909
Sample Date	7/28/2020	7/28/2020			7/28/2020	7/28/2020

For 2" well multiply by	0.163
For 4" well multiply by	0.653

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonald . **DATE:** 07/28/20 .

Well Identification Number	SP-3	SP-6	SP-7	SP-8	SP-9	
Activities	Gauge	Gauge	Gauge	Gauge	Gauge	
Samples	NA	NA	NA	NA	NA	
Depth to Water (ft)	14.29	22.00	25.29	7.11	69.32	
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.90	73.93	84.02	74.06	78.82	
Height of Water Column (ft.)	23.61	51.93	58.73	66.95	9.50	
Well Size (I.D.) (inches)	2	2	2	2	2	
Volume of Water in Well (gallons)	3.85	8.46	9.57	10.91	1.55	
Water Removed From Well (gallons)						
Method of Removal						
Was Well Purged Dry?						
pH (standard units)						
Temperature (°C)						
Conductivity (µmhos/cc)						
Turbidity (NTU)						
Appearance						
Odor						
Containers						
Sample Time						
Sample Date						

For 2" well multiply by	0.163
For 4" well multiply by	0.653

NORTHEASTERN POWER PLANT
GROUNDWATER SAMPLING DATA FORM

SAMPLED BY: Kenny McDonald/Matt Hamilton . **DATE:** 10/20-21/20 .

Well Identification Number	SP-1	SP-2	SP-4	SP-5R	SP-10	SP-11
Activities	Gauge	Gauge	Gauge	Gauge	Gauge	Gauge
Samples	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV	Appendix III & IV
Depth to Water (ft)	17.68	28.90	19.29	8.55	TOC	14.19
Water Level Elevation (ft. NGVD)						
Measured Depth Total Depth of Well (ft.)	37.99	38.19	38.30	78.00	54.10	34.51
Height of Water Column (ft.)	20.31	9.29	19.01	69.45	54.10	20.32
Well Size (I.D.) (inches)	2	2	2	2	2	2
Volume of Water in Well (gallons)	3.31	1.51	3.10	11.32	8.82	3.31
Water Removed From Well (gallons)	10.00	5.00	9.00	28.75	21.25	6.00
Method of Removal	Pump	Pump	Pump	Pump	Pump	Pump
Was Well Purged Dry?	No	No	Yes	Yes	Yes	Yes
pH (standard units)	8.53	8.69	8.90	8.81	9.08	9.18
Temperature (°C)	18.23	18.32	18.75	17.80	18.05	18.70
Conductivity (µmhos/cc)	800	3420	2140	2780	6960	1610
Turbidity (NTU)	9.7	18.1	70.5	103	24.3	116
Appearance	Clear	Clear	Clear	Slightly Turbid	Clear	Clear
Odor	None	None	None	None	Sulphur	None
Containers	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C	250 mL HNO3 125 mL HCL 3 x 1L HNO3 1 L Cool 0-6C
Sample Time	1432	1511	818	758	1450	1502
Sample Date	10/20/2020	10/20/2020	10/21/2020	10/21/2020	10/20/2020	10/20/2020

BAP Dup

For 2" well multiply by	0.163
For 4" well multiply by	0.653

Form REP-703
Rev. 1, 11/2013

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

Water Analysis

Location: Northeastern Station ***Report Date: 4/10/2020***

SP-1

Sample Number: 200959-001 **Date Collected: 03/25/2020 10:10** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	326	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	0.1	mg/L	J	0.2	0.04	CRJ	03/27/2020 16:00	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	40.8	mg/L		0.2	0.06	CRJ	03/27/2020 15:35	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.96	mg/L		0.06	0.01	CRJ	03/27/2020 16:00	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	500	mg/L		500	200	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	62.9	mg/L		2	0.3	CRJ	03/27/2020 15:35	EPA 300.1-1997, Rev. 1.0

SP-2

Sample Number: 200959-002 **Date Collected: 03/25/2020 09:40** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	361	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	1.37	mg/L		0.5	0.1	CRJ	03/27/2020 21:49	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	418	mg/L		1	0.3	CRJ	03/27/2020 16:50	EPA 300.1-1997, Rev. 1.0
Fluoride, F	2.73	mg/L		0.2	0.04	CRJ	03/27/2020 21:49	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1120	mg/L		1000	400	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	22.0	mg/L		1	0.2	CRJ	03/27/2020 21:49	EPA 300.1-1997, Rev. 1.0

Sp-4

Sample Number: 200959-003 **Date Collected: 03/25/2020 10:50** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	326	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	1.71	mg/L		0.5	0.1	CRJ	03/27/2020 22:14	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	476	mg/L		1	0.3	CRJ	03/27/2020 17:15	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.29	mg/L		0.2	0.04	CRJ	03/27/2020 22:14	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1130	mg/L		100	40	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	68.6	mg/L		1	0.2	CRJ	03/27/2020 22:14	EPA 300.1-1997, Rev. 1.0

SP-5

Sample Number: 200959-004 **Date Collected: 03/25/2020 11:15** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	328	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	2.86	mg/L		0.5	0.1	CRJ	03/27/2020 23:04	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	790	mg/L		1	0.3	CRJ	03/27/2020 17:40	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.13	mg/L		0.2	0.04	CRJ	03/27/2020 23:04	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1580	mg/L		500	200	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	0.8	mg/L	J	1	0.2	CRJ	03/27/2020 23:04	EPA 300.1-1997, Rev. 1.0

SP-10

Sample Number: 200959-005 **Date Collected: 03/25/2020 08:50** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	462	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	7.44	mg/L		1	0.2	CRJ	03/28/2020 00:19	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	2000	mg/L		5	2	CRJ	03/27/2020 18:55	EPA 300.1-1997, Rev. 1.0
Fluoride, F	6.45	mg/L		0.3	0.07	CRJ	03/28/2020 00:19	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	3560	mg/L		200	80	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	12.6	mg/L		2	0.3	CRJ	03/28/2020 00:19	EPA 300.1-1997, Rev. 1.0

SP-11

Sample Number: 200959-006 **Date Collected: 03/25/2020 09:15** **Date Received: 3/27/2020**

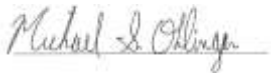
Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	513	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	0.869	mg/L		0.5	0.1	CRJ	03/27/2020 23:29	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	187	mg/L		1	0.3	CRJ	03/27/2020 18:05	EPA 300.1-1997, Rev. 1.0
Fluoride, F	2.66	mg/L		0.2	0.04	CRJ	03/27/2020 23:29	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1060	mg/L		1000	400	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	108	mg/L		1	0.2	CRJ	03/27/2020 23:29	EPA 300.1-1997, Rev. 1.0

Duplicate

Sample Number: 200959-007 **Date Collected: 03/25/2020 10:15** **Date Received: 3/27/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	321	mg/L		20	5	MGK	03/27/2020 14:39	SM 2320B-2011
Bromide, Br	0.1	mg/L	J	0.5	0.1	CRJ	03/28/2020 00:44	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	39.5	mg/L		0.1	0.03	CRJ	03/28/2020 00:44	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.93	mg/L		0.2	0.04	CRJ	03/28/2020 00:44	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	500	mg/L	J	1000	400	SDW	03/30/2020	SM 2540C-2011
Sulfate, SO4	63.6	mg/L		1	0.2	CRJ	03/28/2020 00:44	EPA 300.1-1997, Rev. 1.0

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



Michael Ohlinger, Chemist

Email msohlinger@aep.com *Tel.*

Fax 614-836-4168 *Audinet 8-210-*

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

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

Project Name: Northeastern PP
Contact Name: Jill Parker-Witt
Contact Phone:
Sampler(s): Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 200959

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, Tl and Na, K, Mg, Sr (250 mL bottle, pH<2, HNO_3)	Hg (125 mL bottle, then pH<2, HCL)	TDS, F, Cl, SO_4, and Br, Alkalinity (1 L bottle, Cool, 0-6°C)	Ra-226, Ra-228 (Three (six every 10th*) 1 L bottles, pH<2, HNO_3)				Sample Specific Notes:
SP-1	3/25/2020	1010	G	GW	1				X					
SP-2	3/25/2020	940	G	GW	1				X					
SP-4	3/25/2020	1050	G	GW	1				X					
SP-5	3/25/2020	1115	G	GW	1				X					
SP-10	3/25/2020	850	G	GW	1				X					
SP-11	3/25/2020	915	G	GW	1				X					
DUPLICATE	3/25/2020	1015	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: EAGLE	Date/Time: 03/26/20 1300	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 3-27-20 9:50

Form REP-703
Rev. 2, 05/2016

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http://aepenv/labs

Water Analysis

Location: Northeastern Station ***Report Date: 4/22/2020***

SP-1

Sample Number: 200994-001 **Date Collected: 03/25/2020 10:10** **Date Received: 3/31/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.62	ug/L		0.1	0.02	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.72	ug/L		0.1	0.03	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Barium, Ba	158	ug/L		0.2	0.05	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.07	ug/L	J	0.1	0.02	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.08	ug/L		0.05	0.01	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.499	ug/L		0.2	0.04	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.362	ug/L		0.05	0.02	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.351	ug/L		0.2	0.05	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	15.8	ug/L		2	0.4	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Selenium, Se	6.6	ug/L		0.2	0.03	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Boron, B	0.184	mg/L		0.05	0.02	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	96.7	mg/L		0.3	0.1	SH	04/07/2020 16:10	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00600	mg/L		0.0002	0.00005	JDB	04/01/2020 21:23	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	26.4	mg/L		0.1	0.02	SH	04/07/2020 16:10	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	04/07/2020 16:10	EPA 200.7-1994, Rev. 4.4
Sodium, Na	39.9	mg/L		0.5	0.1	SH	04/07/2020 16:10	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	3.14	mg/L		0.01	0.002	SH	04/07/2020 16:10	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	4.03	pCi/L	0.18	0.43	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	2.64	pCi/L	0.29	0.19	ttp	4/7/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-2

Sample Number: 200994-002 **Date Collected:** 03/25/2020 09:40 **Date Received:** 3/31/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	1.14	ug/L		0.1	0.02	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.68	ug/L		0.1	0.03	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Barium, Ba	1060	ug/L		4	1	JDB	04/07/2020 18:44	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.07	ug/L	J	0.1	0.02	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.13	ug/L		0.05	0.01	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.806	ug/L		0.2	0.04	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.361	ug/L		0.05	0.02	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.694	ug/L		0.2	0.05	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	20.3	ug/L		2	0.4	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.4	ug/L		0.2	0.03	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Boron, B	0.114	mg/L		0.05	0.02	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	60.4	mg/L		0.3	0.1	SH	04/07/2020 16:52	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0352	mg/L		0.0002	0.00005	JDB	04/01/2020 21:28	EPA 200.8-1994, Rev. 5.4
•The MS is outside the acceptable limit of 75-125%.								
Magnesium, Mg	56.2	mg/L		0.1	0.02	SH	04/07/2020 16:52	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.10	mg/L		1	0.2	SH	04/07/2020 16:52	EPA 200.7-1994, Rev. 4.4
Sodium, Na	237	mg/L		0.5	0.1	SH	04/07/2020 16:52	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	9.40	mg/L		0.01	0.002	SH	04/07/2020 16:52	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	4.99	pCi/L	0.18	0.45	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	4.74	pCi/L	0.37	0.13	ttp	4/7/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

Sp-4

Sample Number: 200994-003 **Date Collected:** 03/25/2020 10:50 **Date Received:** 3/31/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.28	ug/L		0.1	0.02	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.83	ug/L		0.1	0.03	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Barium, Ba	327	ug/L		0.2	0.05	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.04	ug/L	J	0.1	0.02	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.04	ug/L	J	0.05	0.01	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.332	ug/L		0.2	0.04	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.166	ug/L		0.05	0.02	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.2	ug/L	J	0.2	0.05	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	4.07	ug/L		2	0.4	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.7	ug/L		0.2	0.03	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Boron, B	0.340	mg/L		0.05	0.02	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	59.6	mg/L		0.3	0.1	SH	04/07/2020 16:56	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0535	mg/L		0.0002	0.00005	JDB	04/01/2020 21:33	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	38.2	mg/L		0.1	0.02	SH	04/07/2020 16:56	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.48	mg/L		1	0.2	SH	04/07/2020 16:56	EPA 200.7-1994, Rev. 4.4
Sodium, Na	301	mg/L		0.5	0.1	SH	04/07/2020 16:56	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	7.00	mg/L		0.01	0.002	SH	04/07/2020 16:56	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.73	pCi/L	0.19	0.56	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	1.55	pCi/L	0.26	0.25	ttp	4/7/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-5

Sample Number: 200994-004 **Date Collected: 03/25/2020 11:15** **Date Received: 3/31/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.05	ug/L	J	0.1	0.02	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Arsenic, As	26.2	ug/L		0.1	0.03	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Barium, Ba	2600	ug/L		4	1	JDB	04/07/2020 18:49	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.04	ug/L	J	0.1	0.02	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.01	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.346	ug/L		0.2	0.04	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.296	ug/L		0.05	0.02	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.371	ug/L		0.2	0.05	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	1	ug/L	J	2	0.4	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.2	0.03	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Boron, B	0.214	mg/L		0.05	0.02	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	49.2	mg/L		0.3	0.1	SH	04/07/2020 17:01	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0911	mg/L		0.0002	0.00005	JDB	04/07/2020 18:54	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	33.0	mg/L		0.1	0.02	SH	04/07/2020 17:01	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.96	mg/L		1	0.2	SH	04/07/2020 17:01	EPA 200.7-1994, Rev. 4.4
Sodium, Na	449	mg/L		0.5	0.1	SH	04/07/2020 17:01	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	6.71	mg/L		0.01	0.002	SH	04/07/2020 17:01	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	5.71	pCi/L	0.18	0.42	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	6.38	pCi/L	0.49	0.22	ttp	4/7/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-10

Sample Number: 200994-005 **Date Collected: 03/25/2020 08:50** **Date Received: 3/31/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.17	ug/L		0.1	0.02	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.61	ug/L		0.1	0.03	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Barium, Ba	6670	ug/L		4	1	JDB	04/07/2020 19:00	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.03	ug/L	J	0.05	0.01	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.383	ug/L		0.2	0.04	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.522	ug/L		0.05	0.02	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	7.39	ug/L		2	0.4	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.2	0.03	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Boron, B	1.04	mg/L		0.05	0.02	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	44.2	mg/L		0.3	0.1	SH	04/07/2020 17:05	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.214	mg/L		0.0002	0.00005	JDB	04/01/2020 21:44	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	44.4	mg/L		0.1	0.02	SH	04/07/2020 17:05	EPA 200.7-1994, Rev. 4.4
Potassium, K	6.70	mg/L		1	0.2	SH	04/07/2020 17:05	EPA 200.7-1994, Rev. 4.4
Sodium, Na	992	mg/L		0.5	0.1	SH	04/07/2020 17:05	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	15.2	mg/L		0.01	0.002	SH	04/07/2020 17:05	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.39	pCi/L	0.12	0.33	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
The carrier recovery is outside the acceptable limit of 30-110%.							
Radium-226	25.4	pCi/L	0.98	0.18	ttp	4/7/2020	SW-846 9315-1986,Rev. 0
The carrier recovery is outside the acceptable limit of 30-110%.							

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.

SP-11

Sample Number: 200994-006 **Date Collected: 03/25/2020 09:15** **Date Received: 3/31/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.15	ug/L		0.1	0.02	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Arsenic, As	2.88	ug/L		0.1	0.03	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Barium, Ba	415	ug/L		0.2	0.05	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.02	ug/L	J	0.1	0.02	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.05	ug/L	J	0.05	0.01	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.705	ug/L		0.2	0.04	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.702	ug/L		0.05	0.02	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.409	ug/L		0.2	0.05	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.003	ug/L	J	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	3.01	ug/L		2	0.4	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.2	0.03	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Boron, B	0.428	mg/L		0.05	0.02	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	40.5	mg/L		0.3	0.1	SH	04/07/2020 17:10	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0402	mg/L		0.0002	0.00005	JDB	04/01/2020 21:49	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	13.2	mg/L		0.1	0.02	SH	04/07/2020 17:10	EPA 200.7-1994, Rev. 4.4
Potassium, K	7.81	mg/L		1	0.2	SH	04/07/2020 17:10	EPA 200.7-1994, Rev. 4.4
Sodium, Na	297	mg/L		0.5	0.1	SH	04/07/2020 17:10	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	3.63	mg/L		0.01	0.002	SH	04/07/2020 17:10	EPA 200.7-1994, Rev. 4.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.14	pCi/L	0.14	0.44	jls	4/15/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.59	pCi/L	0.13	0.15	ttp	4/7/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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

Duplicate

Sample Number: 200994-007 **Date Collected:** 03/25/2020 10:15 **Date Received:** 3/31/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.61	ug/L		0.1	0.02	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.73	ug/L		0.1	0.03	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Barium, Ba	163	ug/L		0.2	0.05	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.06	ug/L	J	0.1	0.02	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.06	ug/L		0.05	0.01	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.349	ug/L		0.2	0.04	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.404	ug/L		0.05	0.02	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.414	ug/L		0.2	0.05	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	16.1	ug/L		2	0.4	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Selenium, Se	6.3	ug/L		0.2	0.03	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Boron, B	0.185	mg/L		0.05	0.02	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	92.6	mg/L		0.3	0.1	SH	04/07/2020 17:13	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00552	mg/L		0.0002	0.00005	JDB	04/01/2020 21:54	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	25.0	mg/L		0.1	0.02	SH	04/07/2020 17:13	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	04/07/2020 17:13	EPA 200.7-1994, Rev. 4.4
Sodium, Na	38.2	mg/L		0.5	0.1	SH	04/07/2020 17:13	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	2.86	mg/L		0.01	0.002	SH	04/07/2020 17:13	EPA 200.7-1994, Rev. 4.4

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

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

Equipment Blank

Sample Number: 200994-008 **Date Collected:** 03/25/2020 11:30 **Date Received:** 3/31/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Arsenic, As	< 0.03	ug/L	U	0.1	0.03	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Barium, Ba	< 0.05	ug/L	U	0.2	0.05	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.355	ug/L		0.2	0.04	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	< 0.02	ug/L	U	0.05	0.02	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	SH	04/02/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.05	ug/L	J	0.2	0.03	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Boron, B	< 0.02	mg/L	U	0.05	0.02	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	04/07/2020 17:17	EPA 200.7-1994, Rev. 4.4
Lithium, Li	< 0.00005	mg/L	U	0.0002	0.00005	JDB	04/01/2020 21:59	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	< 0.02	mg/L	U	0.1	0.02	SH	04/07/2020 17:17	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	SH	04/07/2020 17:17	EPA 200.7-1994, Rev. 4.4
Sodium, Na	< 0.1	mg/L	U	0.5	0.1	SH	04/07/2020 17:17	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	SH	04/07/2020 17:17	EPA 200.7-1994, Rev. 4.4

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

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

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Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
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Contacts: Jonathan Barnhill (318-673-3803)
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Project Name: Northeastern PP
Contact Name: Jill Parker-Witt
Contact Phone:
Sampler(s): Kenny McDonald

Analysis Turnaround Time (In Calendar Days)

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 200994

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL and Na, K, Mg, Sr	125 mL bottle, then pH<2, HCL Hg	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4, and Br, Alkalinity	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228				Sample Specific Notes:
SP-1	3/25/2020	1010	G	GW	8		X	X		X				
SP-2	3/25/2020	940	G	GW	5		X	X		X				
SP-4	3/25/2020	1050	G	GW	5		X	X		X				
SP-5	3/25/2020	1115	G	GW	5		X	X		X				
SP-10	3/25/2020	850	G	GW	5		X	X		X				
SP-11	3/25/2020	915	G	GW	5		X	X		X				
DUPLICATE	3/25/2020	1015	G	GW	2		X	X						
EQUIPMENT BLANK	3/25/2020	1130	G	W	2		X	X						
							4	F4	1	4				

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

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

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: EAGLE	Date/Time: 03/26/20 1300	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 3-31-20 12:15

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
Cooler Box Bag Envelope	PONY UPS FedEX USPS
	Other _____

Plant/Customer Northeastern **Number of Plastic Containers:** 29

Opened By SM/MK **Number of Glass Containers:** _____

Date/Time 3-31-20 12:15 **Number of Mercury Containers:** 8

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: 28 Days If **RUSH**, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** MK 3-31-20

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

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

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

Lab ID# 200994 Initial & Date & Time : _____

Comments: _____

Logged by SM _____

_____

Reviewed by MSD _____

_____

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.

Form REP-703
Rev. 1, 11/2013

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

Water Analysis

Location: Northeastern Station ***Report Date: 7/13/2020***

SP-1 BAP

Sample Number: 202051-001 **Date Collected: 06/30/2020 12:42** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	29.6	mg/L		0.04	0.01	CRJ	07/08/2020 21:50	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.81	mg/L		0.06	0.01	CRJ	07/08/2020 21:50	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	435	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	49.3	mg/L		0.4	0.06	CRJ	07/08/2020 21:50	EPA 300.1-1997, Rev. 1.0

SP-2 BAP

Sample Number: 202051-002 **Date Collected: 06/30/2020 12:14** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	420	mg/L		1	0.3	CRJ	07/08/2020 17:41	EPA 300.1-1997, Rev. 1.0
Fluoride, F	2.64	mg/L		0.2	0.04	CRJ	07/08/2020 20:10	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	977	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	26.3	mg/L		1	0.2	CRJ	07/08/2020 20:10	EPA 300.1-1997, Rev. 1.0

SP-4 BAP

Sample Number: 202051-003 **Date Collected: 06/30/2020 13:11** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	531	mg/L		1	0.3	CRJ	07/08/2020 18:05	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.16	mg/L		0.2	0.04	CRJ	07/08/2020 22:15	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1160	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	70.2	mg/L		1	0.2	CRJ	07/08/2020 22:15	EPA 300.1-1997, Rev. 1.0

SP-5R BAP

Sample Number: 202051-004 **Date Collected: 06/30/2020 13:52** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	840	mg/L		1	0.3	CRJ	07/08/2020 14:46	EPA 300.1-1997, Rev. 1.0
Fluoride, F	2.99	mg/L		0.2	0.04	CRJ	07/08/2020 15:11	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1560	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	5.1	mg/L		1	0.2	CRJ	07/08/2020 15:11	EPA 300.1-1997, Rev. 1.0

SP-10 BAP

Sample Number: 202051-005 **Date Collected: 06/30/2020 11:20** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	2010	mg/L		5	2	CRJ	07/09/2020 00:44	EPA 300.1-1997, Rev. 1.0
Fluoride, F	6.29	mg/L		0.3	0.07	CRJ	07/09/2020 01:09	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	3550	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
Sample was reanalyzed on 7-8-2020 to confirm the results. Reanalysis occurred after the hold time was expired. Sdw70920 The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	25.5	mg/L		2	0.3	CRJ	07/09/2020 01:09	EPA 300.1-1997, Rev. 1.0

SP-11 BAP

Sample Number: 202051-006 **Date Collected: 06/30/2020 11:39** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	140	mg/L		1	0.3	CRJ	07/08/2020 18:30	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.77	mg/L		0.2	0.04	CRJ	07/08/2020 22:40	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	927	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	188	mg/L		10	2	CRJ	07/08/2020 18:30	EPA 300.1-1997, Rev. 1.0

Duplicate BAP

Sample Number: 202051-007 **Date Collected: 06/30/2020 13:58** **Date Received: 7/2/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	846	mg/L		1	0.3	CRJ	07/08/2020 16:01	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.03	mg/L		0.2	0.04	CRJ	07/08/2020 16:26	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1560	mg/L		50	20	HRF	07/02/2020	SM 2540C-2011
The RPD between the LFB and LFBD exceeds 5%. The LFB is outside of the acceptable lmit of 92.24-105.69%. Hrf07102020								
Sulfate, SO4	5.1	mg/L		1	0.2	CRJ	07/08/2020 16:26	EPA 300.1-1997, Rev. 1.0

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

Michael Ohlinger, Chemist
Email msohlinger@aep.com *Tel.*
Fax 614-836-4168 *Audinet 8-210-*

Chain of Custody Record

202051

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL) 4001 Bixby Road Groveport, Ohio 43125 Contacts: Jonathan Barnhill (318-673-3803) Michael Ohlinger (614-836-4184)						Site Contact:			Date:					For Lab Use Only: COC/Order #:
Project Name: NPS BAP Semi-Annual CCR Sampling Contact Name: Jill Parker-Witt Contact Phone: 318-673-3816 Sampler(s): Kenny McDonald	Analysis Turnaround Time (in Calendar Days) Routine (28 days for Monitoring Wells)					Sampler(s) Initials	250 mL bottle, pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL	Field-filter 250 mL bottle, then pH<2, HNO_3 dissolved Fe and Mn	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	125 mL PTFE lined bottle, pH <2, HCl Hg			
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.									Sample Specific Notes:
SP-1	6/30/2020	1242	GRAB	GW	1				X					
SP-2	6/30/2020	1214	GRAB	GW	1				X					
SP-4	6/30/2020	1311	GRAB	GW	1				X					
SP-5R	6/30/2020	1352	GRAB	GW	1				X					
SP-10	6/30/2020	1120	GRAB	GW	1				X					
SP-11	6/30/2020	1139	GRAB	GW	1				X					
BAP DUPLICATE	6/30/2020	1358	GRAB	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	EAGLE	07/01/20 1100	[signature]	7/2/2020 9:45AM
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
Cooler Box Bag Envelope	PONY UPS FedEX USPS
	Other _____

Plant/Customer Northeaster **Number of Plastic Containers:** 7

Opened By SM **Number of Glass Containers:** _____

Date/Time 7-2-20 9:45 **Number of Mercury Containers:** _____

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

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

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** SM 7-2-20

- 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: _____

Initial & Date & Time : _____

Lab ID# 202051

Comments: _____

Logged by JAB

Reviewed by MSO

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

Form REP-703
Rev. 2, 05/2016

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

Water Analysis

Location: Northeastern Station ***Report Date: 7/31/2020***

SP-1

Sample Number: 202076-001 **Date Collected: 06/30/2020 12:42** **Date Received: 7/6/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.58	ug/L		0.1	0.02	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.69	ug/L		0.1	0.03	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Barium, Ba	159	ug/L		0.2	0.05	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
•The MSD is outside the acceptable limit of 75-125%.•The RPD between the MS/MSD exceeds 20%.								
Beryllium, Be	0.07	ug/L	J	0.1	0.02	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.01	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.969	ug/L		0.2	0.04	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.431	ug/L		0.05	0.02	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.886	ug/L		0.2	0.05	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	13.6	ug/L		2	0.4	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Selenium, Se	8.3	ug/L		0.2	0.03	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Boron, B	0.180	mg/L		0.05	0.02	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	99.4	mg/L		0.3	0.1	SH	07/09/2020 09:45	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00534	mg/L		0.0002	0.00005	JDB	07/08/2020 11:39	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.08	pCi/L	0.17	0.49	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.451	pCi/L	0.19	0.48	ttp	7/23/2020	SW-846 9315-1986,Rev. 0

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

SP-2

Sample Number: 202076-002 **Date Collected:** 06/30/2020 12:14 **Date Received:** 7/6/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	1.26	ug/L		0.1	0.02	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.28	ug/L		0.1	0.03	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Barium, Ba	1140	ug/L		0.2	0.05	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.109	ug/L		0.1	0.02	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.05	ug/L		0.05	0.01	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.573	ug/L		0.2	0.04	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.733	ug/L		0.05	0.02	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.263	ug/L		0.2	0.05	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	19.7	ug/L		2	0.4	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Selenium, Se	6.2	ug/L		0.2	0.03	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Boron, B	0.163	mg/L		0.05	0.02	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	83.9	mg/L		0.3	0.1	SH	07/09/2020 09:53	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0585	mg/L		0.0002	0.00005	JDB	07/08/2020 11:45	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	4.55	pCi/L	0.16	0.36	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	3.29	pCi/L	0.38	0.26	ttp	7/23/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-4

Sample Number: 202076-003 **Date Collected: 06/30/2020 13:11** **Date Received: 7/6/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.32	ug/L		0.1	0.02	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.52	ug/L		0.1	0.03	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Barium, Ba	334	ug/L		0.2	0.05	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.118	ug/L		0.1	0.02	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.04	ug/L	J	0.05	0.01	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	1.09	ug/L		0.2	0.04	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.28	ug/L		0.05	0.02	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.527	ug/L		0.2	0.05	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	3.57	ug/L		2	0.4	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.7	ug/L		0.2	0.03	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Boron, B	0.338	mg/L		0.05	0.02	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	80.5	mg/L		0.3	0.1	SH	07/09/2020 10:28	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0564	mg/L		0.0002	0.00005	JDB	07/08/2020 11:50	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	3.22	pCi/L	0.17	0.47	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.94	pCi/L	0.15	0.11	ttp	7/27/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-5R

Sample Number: 202076-004 **Date Collected: 06/30/2020 13:52** **Date Received: 7/6/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.13	ug/L		0.1	0.02	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Arsenic, As	27.0	ug/L		0.1	0.03	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Barium, Ba	2520	ug/L		0.4	0.1	JDB	07/09/2020 22:06	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.151	ug/L		0.1	0.02	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.04	ug/L	J	0.05	0.01	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	1.51	ug/L		0.2	0.04	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.774	ug/L		0.05	0.02	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Lead, Pb	1.65	ug/L		0.2	0.05	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	1	ug/L	J	2	0.4	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.5	ug/L		0.2	0.03	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Boron, B	0.211	mg/L		0.05	0.02	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	64.9	mg/L		0.3	0.1	SH	07/09/2020 10:32	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0913	mg/L		0.0002	0.00005	JDB	07/08/2020 11:55	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	4.52	pCi/L	0.18	0.47	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
The RPD between the MS/MSD exceeds 25%.							
Radium-226	9.82	pCi/L	0.52	0.12	ttp	7/27/2020	SW-846 9315-1986,Rev. 0
The carrier recovery is outside the acceptable limit of 30-110%. The RPD between the sample and duplicate result exceeds 25%.							

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.

SP-10

Sample Number: 202076-005 **Date Collected: 06/30/2020 11:20** **Date Received: 7/6/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.21	ug/L		0.1	0.02	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.40	ug/L		0.1	0.03	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Barium, Ba	3960	ug/L		0.6	0.2	JDB	07/09/2020 22:11	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.03	ug/L	J	0.1	0.02	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.01	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.204	ug/L		0.2	0.04	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.724	ug/L		0.05	0.02	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.07	ug/L	J	0.2	0.05	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	4.81	ug/L		2	0.4	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.08	ug/L	J	0.2	0.03	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Boron, B	0.944	mg/L		0.05	0.02	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	52.1	mg/L		0.3	0.1	SH	07/09/2020 10:37	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.226	mg/L		0.0002	0.00005	JDB	07/08/2020 12:00	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.29	pCi/L	0.10	0.29	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	7.04	pCi/L	0.40	0.12	ttp	7/27/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-11

Sample Number: 202076-006 **Date Collected: 06/30/2020 11:39** **Date Received: 7/6/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.14	ug/L		0.1	0.02	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Arsenic, As	2.79	ug/L		0.1	0.03	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Barium, Ba	187	ug/L		0.2	0.05	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.01	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.201	ug/L		0.2	0.04	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.620	ug/L		0.05	0.02	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.008	ug/L		0.02	0.007	JAB	07/20/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	2.15	ug/L		2	0.4	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.2	ug/L	J	0.2	0.03	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Boron, B	0.545	mg/L		0.05	0.02	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	57.3	mg/L		0.3	0.1	SH	07/09/2020 10:41	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0278	mg/L		0.0002	0.00005	JDB	07/08/2020 12:05	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	3.17	pCi/L	0.14	0.36	ttp	7/27/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.675	pCi/L	0.15	0.20	ttp	7/27/2020	SW-846 9315-1986,Rev. 0

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

BAP Duplicate

Sample Number: 202076-007 **Date Collected:** 06/30/2020 13:58 **Date Received:** 7/6/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.14	ug/L		0.1	0.02	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Arsenic, As	27.2	ug/L		0.1	0.03	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Barium, Ba	2620	ug/L		0.4	0.1	JDB	07/09/2020 22:16	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.152	ug/L		0.1	0.02	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.05	ug/L		0.05	0.01	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	1.55	ug/L		0.2	0.04	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.834	ug/L		0.05	0.02	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Lead, Pb	2.10	ug/L		0.2	0.05	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	1	ug/L	J	2	0.4	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.6	ug/L		0.2	0.03	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Boron, B	0.215	mg/L		0.05	0.02	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	70.3	mg/L		0.3	0.1	SH	07/09/2020 10:45	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0917	mg/L		0.0002	0.00005	JDB	07/08/2020 12:10	EPA 200.8-1994, Rev. 5.4

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

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

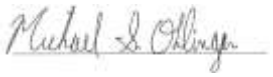
BAP Equipment Blank

Sample Number: 202076-008 **Date Collected:** 06/30/2020 14:06 **Date Received:** 7/6/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Arsenic, As	< 0.03	ug/L	U	0.1	0.03	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Barium, Ba	0.48	ug/L		0.2	0.05	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	< 0.04	ug/L	U	0.2	0.04	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	< 0.02	ug/L	U	0.05	0.02	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	07/08/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.03	ug/L	U	0.2	0.03	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Boron, B	< 0.02	mg/L	U	0.05	0.02	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	07/09/2020 10:50	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00006	mg/L	J	0.0002	0.00005	JDB	07/08/2020 12:15	EPA 200.8-1994, Rev. 5.4

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

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



Michael Ohlinger, Chemist
Email msohlinger@aep.com *Tel.*
Fax 614-836-4168 *Audinet 8-210-*

Chain of Custody Record

202076

Program: Coal Combustion Residuals (CCR)

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

Project Name: NPS BAP Semi-Annual CCR Sampling
Contact Name: Jill Parker-Witt
Contact Phone: 318-673-3816
Sampler(s): Kenny McDonald

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

Analysis Turnaround Time (in Calendar Days)
Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO_3: B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL	Field-filter 250 mL bottle, then pH<2, HNO_3: dissolved Fe and Mn	1 L bottle, Cool, 0-6°C: TDS, F, Cl, SO_4	Three (six every 10th*) 1 L bottles, pH<2, HNO_3: Ra-226, Ra-228	125 mL PTFE lined bottle, pH <2, HCl: Hg			Sample Specific Notes:
SP-1	6/30/2020	1242	GRAB	GW	5		X			X	X			
SP-2	6/30/2020	1214	GRAB	GW	5		X			X	X			
SP-4	6/30/2020	1311	GRAB	GW	5		X			X	X			
SP-5R	6/30/2020	1352	GRAB	GW	8		X			X	X			
SP-10	6/30/2020	1120	GRAB	GW	5		X			X	X			
SP-11	6/30/2020	1139	GRAB	GW	5		X			X	X			
BAP DUPLICATE	6/30/2020	1358	GRAB	GW	2		X				X			
BAP EQUIPMENT BLANK	6/30/2020	1406	GRAB	W	2		X				X			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by: Kenny McDonald	Company: EAGLE	Date/Time: 07/01/20 1100	Received by: JMS 7/6/20 DAE DGA	Date/Time: 7/6/2020 12:00N
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS (FedEX) USPS
	Other _____

Plant/Customer Northeastern **Number of Plastic Containers:** 29

Opened By DGA **Number of Glass Containers:** —

Date/Time 7-6-2020 12:00N **Number of Mercury Containers:** 8

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) N Comments _____

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

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** JWB 7/6/20

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

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

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

Lab ID# 202076 Initial & Date & Time : _____

Comments: _____

Logged by JAB _____

Reviewed by _____

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.

Form REP-703
Rev. 1, 11/2013

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

Water Analysis

Location: Northeastern Station ***Report Date: 8/11/2020***

SP-10

Sample Number: 202307-001 **Date Collected: 07/28/2020 08:40** **Date Received: 7/30/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Boron, B	0.914	mg/L		0.05	0.02	JDB	08/06/2020 10:58	EPA 200.8-1994, Rev. 5.4
Chloride, Cl	1960	mg/L		5	2	CRJ	07/30/2020 20:21	EPA 300.1-1997, Rev. 1.0
Fluoride, F	6.63	mg/L		0.3	0.07	CRJ	07/30/2020 20:46	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	3440	mg/L		200	80	SDW	07/31/2020	SM 2540C-2011

SP-11

Sample Number: 202307-002 **Date Collected: 07/28/2020 09:09** **Date Received: 7/30/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Boron, B	0.301	mg/L		0.05	0.02	JDB	08/06/2020 11:03	EPA 200.8-1994, Rev. 5.4
Sulfate, SO4	158	mg/L		10	2	CRJ	07/30/2020 21:37	EPA 300.1-1997, Rev. 1.0

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

Michael Ohlinger, Chemist
Email msohlinger@aep.com *Tel.*
Fax 614-836-4168 *Audinet 8-210-*

Chain of Custody Record

Program: 2 of 2

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

Project Name: NPS BAP 2 of 2 Sampling

Contact Name: Jill Parker-Witt

Contact Phone: 318-673-3816

Sampler(s): Kenny McDonald

Analysis Turnaround Time (in Calendar Days)
Routine (28 days for Monitoring Wells)

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 202307

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO_3 Boron	Field-filter 250 mL bottle, then pH<2, HNO_3 dissolved Fe and Mn	1 L bottle, Cool, 0-6°C TDS, F, Cl	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	125 mL PTFE lined bottle, pH <2, HCl Hg	1 L bottle, Cool, 0-60C SO4		Sample Specific Notes:
SP-10	7/28/2020	840	GRAB	GW	2		X		X					
SP-11	7/28/2020	909	GRAB	GW	2		X					X		
Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: EAGLE	Date/Time: 07/29/20 1300	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: Michael Ohly	Date/Time: 7/30/2020 10:36Am

WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY (UPS) FedEX USPS
	Other _____

Plant/Customer NE 344 Number of Plastic Containers: 4

Opened By JWB Number of Glass Containers: -

Date/Time 7-30-20 Ø934 Number of Mercury Containers: -

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

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

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** JWB 7-30-20

- 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: _____

Initial & Date & Time : _____

Lab ID# 202307

Comments: _____

Logged by MBD

Reviewed by SM

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

Form REP-703
Rev. 1, 11/2013

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

Water Analysis

Location: Northeastern Station ***Report Date: 11/2/2020***

SP-1

Sample Number: 203055-001 **Date Collected: 10/20/2020 14:32** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	12.9	mg/L		0.04	0.01	CRJ	10/29/2020 23:34	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.81	mg/L		0.06	0.01	CRJ	10/29/2020 23:34	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	427	mg/L		50	20	HRF	10/26/2020	SM 2540C-2011
Sample 203055-001 and its duplicate exceeds 5% RPD. Hrf10292020.								
Sulfate, SO4	51.1	mg/L		0.4	0.06	CRJ	10/29/2020 23:34	EPA 300.1-1997, Rev. 1.0

SP-2

Sample Number: 203055-002 **Date Collected: 10/20/2020 15:11** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	850	mg/L		1	0.3	CRJ	10/29/2020 22:43	EPA 300.1-1997, Rev. 1.0
Fluoride, F	2.98	mg/L		0.2	0.04	CRJ	10/30/2020 03:23	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1790	mg/L		50	20	HRF	10/26/2020	SM 2540C-2011
Sulfate, SO4	19.1	mg/L		1	0.2	CRJ	10/30/2020 03:23	EPA 300.1-1997, Rev. 1.0

SP-4

Sample Number: 203055-003 **Date Collected: 10/21/2020 08:18** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	441	mg/L		1	0.3	CRJ	10/30/2020 00:25	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.24	mg/L		0.2	0.04	CRJ	10/30/2020 05:04	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1150	mg/L		50	20	HRF	10/26/2020	SM 2540C-2011
Sample 203055-003 and its duplicate exceeds 5% RPD. Hrf10292020.								
Sulfate, SO4	70.4	mg/L		1	0.2	CRJ	10/30/2020 05:04	EPA 300.1-1997, Rev. 1.0

SP-5R

Sample Number: 203055-004 **Date Collected: 10/21/2020 07:58** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	584	mg/L		1	0.3	CRJ	10/30/2020 00:50	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.03	mg/L		0.2	0.04	CRJ	10/30/2020 05:30	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1320	mg/L		50	20	HRF	10/26/2020	SM 2540C-2011
Sulfate, SO4	5.0	mg/L		1	0.2	CRJ	10/30/2020 05:30	EPA 300.1-1997, Rev. 1.0

SP-10

Sample Number: 203055-005 **Date Collected: 10/20/2020 14:50** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	1830	mg/L		5	2	CRJ	10/30/2020 06:21	EPA 300.1-1997, Rev. 1.0
Fluoride, F	6.55	mg/L		0.3	0.07	CRJ	10/30/2020 06:46	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	3540	mg/L		200	80	HRF	10/27/2020	SM 2540C-2011
Sulfate, SO4	9.6	mg/L		2	0.3	CRJ	10/30/2020 06:46	EPA 300.1-1997, Rev. 1.0

SP-11

Sample Number: 203055-006 **Date Collected: 10/20/2020 15:02** **Date Received: 10/23/2020**

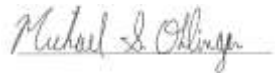
Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	98.1	mg/L		1	0.3	CRJ	10/30/2020 01:15	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.05	mg/L		0.2	0.04	CRJ	10/30/2020 07:41	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	764	mg/L		100	40	HRF	10/26/2020	SM 2540C-2011
Sulfate, SO4	35.6	mg/L		1	0.2	CRJ	10/30/2020 07:41	EPA 300.1-1997, Rev. 1.0

BAP Duplicate

Sample Number: 203055-007 **Date Collected: 10/21/2020 08:00** **Date Received: 10/23/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Chloride, Cl	591	mg/L		1	0.3	CRJ	10/30/2020 01:41	EPA 300.1-1997, Rev. 1.0
Fluoride, F	3.02	mg/L		0.2	0.04	CRJ	10/30/2020 08:06	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1330	mg/L		100	40	HRF	10/26/2020	SM 2540C-2011
Sulfate, SO4	5.1	mg/L		1	0.2	CRJ	10/30/2020 08:06	EPA 300.1-1997, Rev. 1.0

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



Michael Ohlinger, Chemist
Email msohlinger@aep.com *Tel.*
Fax 614-836-4168 *Audinet 8-210-*

Chain of Custody Record

203055

Program: Coal Combustion Residuals (CCR)

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

Project Name: NPS BAP Semi-Annual CCR Sampling

Contact Name: Jill Parker-Witt

Contact Phone: 318-673-3816

Sampler(s): Kenny McDonald

Analysis Turnaround Time (In Calendar Days)
Routine (28 days for Monitoring Wells)

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL	Field-filter 250 mL bottle, then pH<2, HNO_3 dissolved Fe and Mn	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	125 mL PTFE lined bottle, pH <2, HCl Hg			Sample Specific Notes:
SP-1	10/20/2020	1432	GRAB	GW	1				X					
SP-2	10/20/2020	1511	GRAB	GW	1				X					
SP-4	10/21/2020	818	GRAB	GW	1				X					
SP-5R	10/21/2020	758	GRAB	GW	1				X					
SP-10	10/20/2020	1450	GRAB	GW	1				X					
SP-11	10/20/2020	1502	GRAB	GW	1				X					
BAP DUPLICATE	10/21/2020	800	GRAB	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: EAGLE	Date/Time: 10/22/20 1300	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 10-23-20 10:45

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS FedEX USPS
	Other _____

Plant/Customer Mot Eastern **Number of Plastic Containers:** ~~4~~ 7

Opened By Misgina **Number of Glass Containers:** ~~0~~

Date/Time 10-23-20 10:45 **Number of Mercury Containers:** ~~7~~

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

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

pH (15 min) Cr^{+6} (pres) (24 hr) NO_2 or NO_3 (48 hr) *ortho*-PO_4 (48 hr) Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** MGC 10-23-20

- 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# 203055 Initial & Date & Time : _____

Comments: _____

Logged by MGC _____

_____

Reviewed by MGC _____

pH Lot # HC727135

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.

Form REP-703
Rev. 2, 05/2016

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

Water Analysis

Location: Northeastern Station ***Report Date: 11/23/2020***

SP-1

Sample Number: 203063-001 **Date Collected: 10/20/2020 14:32** **Date Received: 10/26/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.46	ug/L		0.1	0.02	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.57	ug/L		0.1	0.03	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Barium, Ba	143	ug/L		0.2	0.05	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.05	ug/L	J	0.1	0.02	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.08	ug/L		0.05	0.01	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.215	ug/L		0.2	0.04	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.727	ug/L		0.05	0.02	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.254	ug/L		0.2	0.05	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	11.5	ug/L		2	0.4	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Selenium, Se	3.8	ug/L		0.2	0.03	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Boron, B	0.146	mg/L		0.05	0.02	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	103	mg/L		0.3	0.1	DAM	10/29/2020 16:20	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00336	mg/L		0.0002	0.00005	JDB	10/28/2020 17:10	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.51	pCi/L	0.18	0.52	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.31	pCi/L	0.076	0.096	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-2

Sample Number: 203063-002 **Date Collected:** 10/20/2020 15:11 **Date Received:** 10/26/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	1.22	ug/L		0.1	0.02	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.08	ug/L		0.1	0.03	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Barium, Ba	1110	ug/L		0.2	0.05	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.07	ug/L	J	0.1	0.02	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.04	ug/L	J	0.05	0.01	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.398	ug/L		0.2	0.04	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.433	ug/L		0.05	0.02	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	20.1	ug/L		2	0.4	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.4	ug/L		0.2	0.03	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Boron, B	0.151	mg/L		0.05	0.02	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	75.3	mg/L		0.3	0.1	DAM	10/29/2020 15:53	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0517	mg/L		0.0002	0.00005	JDB	10/28/2020 17:15	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	10.22	pCi/L	0.26	0.52	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	2.74	pCi/L	0.23	0.099	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-4

Sample Number: 203063-003 **Date Collected: 10/21/2020 08:18** **Date Received: 10/26/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.29	ug/L		0.1	0.02	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.03	ug/L		0.1	0.03	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Barium, Ba	322	ug/L		0.2	0.05	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.06	ug/L	J	0.1	0.02	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.01	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.523	ug/L		0.2	0.04	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.508	ug/L		0.05	0.02	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.359	ug/L		0.2	0.05	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	3.24	ug/L		2	0.4	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.7	ug/L		0.2	0.03	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Boron, B	0.333	mg/L		0.05	0.02	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	63.9	mg/L		0.3	0.1	DAM	10/29/2020 16:24	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0559	mg/L		0.0002	0.00005	JDB	10/28/2020 17:20	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.03	pCi/L	0.12	0.29	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	1.39	pCi/L	0.17	0.10	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-5R

Sample Number: 203063-004 **Date Collected: 10/21/2020 07:58** **Date Received: 10/26/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.10	ug/L		0.1	0.02	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Arsenic, As	10.9	ug/L		0.1	0.03	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Barium, Ba	2070	ug/L		2	0.5	JDB	10/29/2020 08:59	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.05	ug/L	J	0.1	0.02	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.320	ug/L		0.2	0.04	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.378	ug/L		0.05	0.02	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.373	ug/L		0.2	0.05	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	0.8	ug/L	J	2	0.4	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.2	ug/L	J	0.2	0.03	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Boron, B	0.188	mg/L		0.05	0.02	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	50.4	mg/L		0.3	0.1	DAM	10/29/2020 16:28	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0792	mg/L		0.0002	0.00005	JDB	10/28/2020 17:25	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.742	pCi/L	0.12	0.36	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	5.76	pCi/L	0.28	0.077	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-10

Sample Number: 203063-005 **Date Collected: 10/20/2020 14:50** **Date Received: 10/26/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.08	ug/L	J	0.1	0.02	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.42	ug/L		0.1	0.03	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Barium, Ba	6800	ug/L		2	0.5	JDB	10/29/2020 09:05	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.03	ug/L	J	0.1	0.02	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.01	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.103	ug/L		0.05	0.02	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	0.6	ug/L	J	2	0.4	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.09	ug/L	J	0.2	0.03	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Boron, B	0.955	mg/L		0.05	0.02	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	39.9	mg/L		0.3	0.1	DAM	10/29/2020 16:32	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.209	mg/L		0.0002	0.00005	JDB	10/28/2020 17:30	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.0507	pCi/L	0.19	0.65	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	13.9	pCi/L	0.54	0.099	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

SP-11

Sample Number: 203063-006 **Date Collected: 10/20/2020 15:02** **Date Received: 10/26/2020**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.48	ug/L		0.1	0.02	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.49	ug/L		0.1	0.03	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Barium, Ba	630	ug/L		0.2	0.05	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.03	ug/L	J	0.1	0.02	JDB	10/29/2020 07:14	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.15	ug/L		0.05	0.01	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	2.20	ug/L		0.2	0.04	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.16	ug/L		0.05	0.02	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.719	ug/L		0.2	0.05	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.004	ug/L	J	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	2	ug/L	J	2	0.4	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.5	ug/L		0.2	0.03	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Boron, B	0.220	mg/L		0.05	0.02	JDB	10/28/2020 17:35	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	43.8	mg/L		0.3	0.1	DAM	10/29/2020 16:39	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0298	mg/L		0.0002	0.00005	JDB	10/29/2020 07:14	EPA 200.8-1994, Rev. 5.4

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

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	-0.251	pCi/L	0.14	0.50	ttp	11/18/2020	SW-846 9320-2014,Rev. 1.0
Radium-226	0.661	pCi/L	0.11	0.15	ttp	11/17/2020	SW-846 9315-1986,Rev. 0

The carrier recovery is outside the acceptable limit of 30-110%.

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.

BAP Duplicate

Sample Number: 203063-007 **Date Collected:** 10/21/2020 08:00 **Date Received:** 10/26/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.1	ug/L	J	0.1	0.02	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Arsenic, As	10.8	ug/L		0.1	0.03	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Barium, Ba	2010	ug/L		2	0.5	JDB	10/29/2020 09:10	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.05	ug/L	J	0.1	0.02	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.234	ug/L		0.2	0.04	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.349	ug/L		0.05	0.02	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.319	ug/L		0.2	0.05	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	0.7	ug/L	J	2	0.4	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.2	0.03	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Boron, B	0.188	mg/L		0.05	0.02	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	49.5	mg/L		0.3	0.1	DAM	10/29/2020 16:43	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0781	mg/L		0.0002	0.00005	JDB	10/28/2020 17:40	EPA 200.8-1994, Rev. 5.4

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

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

BAP Equipment Blank

Sample Number: 203063-008 **Date Collected:** 10/20/2020 14:40 **Date Received:** 10/26/2020

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.1	ug/L	J	0.1	0.03	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Barium, Ba	0.99	ug/L		0.2	0.05	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.02	ug/L	U	0.1	0.02	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.01	ug/L	U	0.05	0.01	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	< 0.04	ug/L	U	0.2	0.04	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.03	ug/L	J	0.05	0.02	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	10/31/2020	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.4	ug/L	U	2	0.4	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.03	ug/L	U	0.2	0.03	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.1	ug/L	U	0.5	0.1	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.02	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.3	mg/L	J	0.3	0.1	DAM	10/29/2020 16:47	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.000487	mg/L		0.0002	0.00005	JDB	10/28/2020 17:46	EPA 200.8-1994, Rev. 5.4

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

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

Michael Ohlinger, Chemist
Email msohlinger@aep.com Tel.
Fax 614-836-4168 Audinet 8-210-

Chain of Custody Record

203063

Program: Coal Combustion Residuals (CCR)

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

Project Name: NPS BAP Semi-Annual CCR Sampling
Contact Name: Jill Parker-Witt
Contact Phone: 318-673-3816
Sampler(s): Kenny McDonald

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

Analysis Turnaround Time (in Calendar Days)
Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL	Field-filter 250 mL bottle, then pH<2, HNO_3 dissolved Fe and Mn	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	125 mL PTFE lined bottle, pH <2, HCl Hg			Sample Specific Notes:
SP-1	10/20/2020	1432	GRAB	GW	5		X			X	X			
SP-2	10/20/2020	1511	GRAB	GW	5		X			X	X			
SP-4	10/21/2020	818	GRAB	GW	5		X			X	X			
SP-5R	10/21/2020	758	GRAB	GW	8		X			X	X			
SP-10	10/20/2020	1450	GRAB	GW	5		X			X	X			
SP-11	10/20/2020	1502	GRAB	GW	5		X			X	X			
BAP DUPLICATE	10/21/2020	800	GRAB	GW	2		X				X			
BAP EQUIPMENT BLANK	10/20/2020	1440	GRAB	W	2		X				X			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: EAGLE	Date/Time: 10/22/20 1300	Received by: [signature]	Date/Time: 10/26/2020 230pm
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type: Cooler   Box   Bag   Envelope

wrong plant JAB 10/26/2020

Delivery Type: PONY   UPS   FedEX   USPS

Other ______

Plant/Customer ~~Flint Creek~~ Northeastern PS

Number of Plastic Containers: 21

Opened By JAB

Number of Glass Containers: —

Date/Time JABeach 2:30 pm

Number of Mercury Containers: 8

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

(IR Gun Ser# #2 (192635988), *Expir.* 11/12/2021) - If No, specify each deviation: ______

Was container in good condition? (Y) / N   Comments ______

Was Chain of Custody received? (Y) / N   Comments ______

Requested turnaround: 28 days   If **RUSH**, who was notified? ______

pH (15 min) Cr^{+6} (pres) (24 hr) NO_2 or NO_3 (48 hr)   *ortho*-PO_4 (48 hr)   Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) N   Comments ______

Were samples labeled properly? Y (N)   Comments No Dates or Times

Were correct containers used? (Y) N   Comments ______

Was pH checked & Color Coding done? (Y) N or N/A   **Initial & Date**: JAB 10/26/2020

- 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# 203063

Initial & Date & Time : ______

Logged by JAB

Comments: pH paper MColorpHast Lot HC727135 cat# 1.09535.0001 + pH paper LRS-4801 Lot X000RWDG 21

Reviewed by MSS

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

APPENDIX VI

ODEQ Correspondence

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

KEVIN STITT
Governor

January 24, 2020

Ms. Jill Parker-Witt, P.E.
American Electric Power
502 North Allen Avenue
Shreveport, LA 71101

Re: Alternate Source Demonstration for Lithium –Bottom Ash Pond
Public Service Company of Oklahoma
Northeastern Power Station
Rogers County
Solid Waste Permit No. none

Dear Ms. Parker-Witt:

On October 29, 2019, The Oklahoma Department of Environmental Quality (DEQ) approved the revised alternate source demonstration (ASD) for lithium detected in monitoring well SP-10 for the Bottom Ash Pond (BAP). The ASD proposed that naturally occurring concentrations of lithium in groundwater were the source of the statistically significant level (SSL) of lithium in SP-10 during the 2018 sampling events. DEQ required AEP/Public Service Company of Oklahoma Northeastern Power Station (NPS) to include the revised ASD in the annual groundwater monitoring and corrective action report required by Oklahoma Administrative Code (OAC) 252:517-9-1(e).

On December 12, 2019, by email, DEQ received from NPS the "Alternate Source Demonstration ("ASD") for Lithium –Bottom Ash Pond" (Report) which contains the groundwater sample results with statistical analyses for the February 2019 sampling event. Lithium, in SP-10 (0.275 mg/L), again exceeded the groundwater protection standard (GWPS) of 0.150 mg/L. Since the revised ASD has been approved for lithium in SP-10, and is still valid, NPS may continue assessment monitoring in accordance with the requirements of OAC 252:517-9-6(g)(3)(B). If lithium continues to exceed the GWPS in the future and conditions have not changed, NPS may refer to the October 29, 2019 ASD approval and continue assessment monitoring for the BAP in accordance with OAC 252:517-9-6(g)(3)(B). Please include in future reports if NPS determines, based on an evaluation of the groundwater data, the ASD is still valid for lithium in SP-10.

If you have any questions, please contact Ms. Cindy Hailes at (405) 702-5114.

Sincerely,

Hillary Young

Hillary Young, P.E.
Chief Engineer
Land Protection Division

HY/ckh

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

KEVIN STITT
Governor

February 21, 2020

Ms. Jill Parker-Witt, P.E.
American Electric Power
502 North Allen Avenue
Shreveport, LA 71101

Re: Annual Groundwater Monitoring Report – Bottom Ash Pond
Public Service Company of Oklahoma-Northeastern Power Station
Rogers County
Solid Waste Permit No. none

Dear Ms. Parker-Witt:

On January 31, 2020, the Department of Environmental Quality (DEQ) received the Annual Groundwater Monitoring Report for the Bottom Ash Pond (BAP) CCR Management Unit (Report) at Northeastern Power Station (NPS). Oklahoma Administrative Code (OAC) 252:517-9-1(e) requires NPS to prepare the annual groundwater monitoring and corrective action report to document the status of the coal combustion residual (CCR) surface impoundment.

Monitoring wells SP-4 and SP-5R are upgradient wells. Downgradient monitoring wells are SP-1, SP-2, SP-10 and SP-11. Section IV states that groundwater velocity and groundwater flow direction were not determined since the wells are not screened within an interconnected aquifer; however, groundwater velocity was reported as 26 ft/yr in a southwesterly direction between SP-5R and the BAP as presented in Attachment E of the Alternate Source Demonstration (ASD) for Lithium – Bottom Ash Pond letter, dated September 11, 2019. DEQ does not agree with the assertion that the monitoring wells are not screened in an interconnected aquifer; so please, continue to include contours on the potentiometric map and show groundwater flow directions in future submissions.

In a letter dated October 29, 2019, DEQ accepted the ASD for a statistically significant level (SSL) of lithium in monitoring well SP-10 in sampling events in 2018 and 2019. NPS returned to assessment monitoring in accordance with OAC 252:517-9-6(g)(3)(B). The ASD is included in the Report. The statistical analysis included in the Report was for assessment monitoring events conducted on February 27, 2019 and August 28, 2019.

Both monitoring events results were statistically analyzed and the upper prediction limit (UPL) for all Appendix A constituents, and a lower prediction limit (LPL) for pH, were calculated based on a one-of-two retesting procedure. A statistically significant increase (SSI) is determined if both samples in the series of two exceed the UPL. For both sampling events, SSIs were determined for various parameters indicating "exceedances" of background conditions. NPS shall remain in assessment monitoring.

The assessment monitoring events results were statistically analyzed and assessed for SSLs where the entire confidence interval exceeds the groundwater protection standards (GWPS). An SSL for lithium in monitoring well SP-10 was determined for both sampling events. The ASD attributed the lithium as naturally occurring in the shale lenses within the screened interval of SP-10.

The Report is accepted as submitted. The Report was placed on the facility's publicly accessible internet site. If you have any questions, please contact Ms. Cynthia Hailes, P.E. at (405) 702-5114.

Sincerely,

Hillary Young, P.E.
Chief Engineer
Land Protection Division

HY/ckh