Scott A. Thompson
Executive Director

OKLAHOMA Environmental Quality

Kevin Stitt
Governor

September 20, 2022

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

Re: Alternate Source Demonstration for Barium, Fluoride and Lithium Exceedance – 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 lithium was the source of the statistically significant level (SSL) above the groundwater protection standard (GWPS) in SP-10 during the 2018 sampling events. On June 3, 2021, DEQ approved an ASD for fluoride exceedances detected in SP-10 for the BAP.

In a July 15, 2022 email, American Electric Power Public Service Company of Oklahoma – Northeastern Power Station (AEP) submitted a notification of barium, lithium and fluoride exceedances in SP-10 during the second 2021 semi-annual sampling event conducted on December 27, 2021. Additionally, an ASD for barium in SP-10 for the BAP was submitted.

In an email to AEP dated November 9, 2021, DEQ addressed the ASDs for lithium and fluoride in SP-10 with respect to all sampling events performed by AEP. The ASDs are applicable for lithium and fluoride exceedances of their relative GWPS in SP-10 if conditions have not changed. AEP provided sampling evidence that conditions in the BAP have not changed.

DEQ reviewed the ASD for barium. Sediment was collected from the BAP on July 10, 2019. Barium in pore water was measured at 0.083 mg/L, and extractable barium from the BAP solids was measured at 0.352 mg/L. A surface water sample collected from the BAP on February 5, 2019 had a reported barium concentration of 0.315 mg/L. These barium concentrations are roughly an order of magnitude below the barium concentration collected on April 12, 2021 from SP-10 (6.36 mg/L) and the GWPS (2.60 mg/L). A comparison of the BAP pore water and extractable barium samples with SP-10 groundwater samples using Piper diagrams also showed dissimilar fingerprinting signatures.

The shale lenses observed within the screened interval of SP-10 are predominantly composed of clay minerals such as kaolinite (2 wt.%), chlorite (3 wt. %), illite (38 wt.%), and mixed layer illite-smectite (24 wt.%). Laboratory studies indicate that elevated barium concentrations may be associated with

these clay minerals due to their cation exchange capacity. AEP proposes that the clay minerals are the source of the barium exceedances and not the BAP. DEQ concurs with AEP's demonstration and accepts the ASD for barium in SP-10.

The ASD is applicable for Ba exceedances in SP-10 of the GWPS if conditions do not change. AEP may refer to the ASD approval for Ba and continue assessment monitoring for the BAP in accordance with OAC 252:517-9-6(g)(3)(B). If exceedances of GWPSs are determined in other monitoring wells, AEP is required to submit a separate ASD for constituents in those monitoring wells if applicable.

If you have any questions, please contact Ms. Cindy Hailes at (405) 702-5114 or at cindy.hailes@deq.ok.gov.

Sincerely,

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

HY/ckh

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

July 15, 2022

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)
Bottom Ash Pond (BAP)
Public Service Company of Oklahoma (PSO) - Northeastern Power Station (NPS)
Roger County
Solid Waste Permit No. Pending

Dear Ms. Young,

AEP/PSO received ODEQ's correspondence dated June 4, 2021, in which ODEQ accepted the ASD for the lithium and fluoride detected in SP-10 during the October 28, 2020, sampling event. ODEQ indicated that if lithium and fluoride continue to exceed the groundwater protection standards (GWPS) in the future and conditions have not changed, NPS may refer to the October 24, 2019, ASD approval for lithium and June 4, 2021, ASD approval for fluoride and continue assessment monitoring for the BAP in accordance with OAC 252:517-9-6(g)(3)(B).

On April 18, 2022, the statistical evaluation of the second semi-annual 2021 assessment monitoring event (December 27, 2021) for the BAP was certified and in that statistical evaluation report, potential SSLs were identified for lithium, fluoride, and barium at SP-10.

The statistical findings are summarized as follows:

The Lower Confidence Level (LCL) for lithium (0.238 mg/L) exceeded the GWPS (a calculated Upper Tolerance Limit (UTL)) of 0.14 mg/L at SP-10. The actual detected lithium concentration in SP-10 was 0.198 mg/l.

The LCL for fluoride (5.1 mg/L) exceeded the GWPS (UTL of 4.39 mg/L) was exceeded as at SP-10. The actual detected fluoride concentration in SP-10 was 6.7 mg/L.

The LCL for barium (3.42 mg/L) exceeded the GWPS (UTL of 2.60 mg/L) was exceeded as at SP-10. The actual detected barium concentration in SP-10 was 6.98 mg/L.

Attached is an alternative source demonstration for your review outlining the lines of evidence that these exceedances are the result of natural variations occurring in the groundwater at SP-10 and that the conditions at the BAP have not changed.

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

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

Attachments

ALTERNATIVE SOURCE DEMONSTRATION REPORT STATE CCR RULE

Northeastern Power Station
Bottom Ash Pond
Oologah, Oklahoma

Submitted to

AMERICAN ELECTRIC POWER

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, OH 43221

July 2022

CHA8495

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LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
EPRI	Electric Power Research Institute
ft bgs	Feet Below Ground Surface
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
OAC	Oklahoma Administrative Code
ODEQ	Oklahoma Department of Environmental Quality
OGS	Oklahoma Geological Survey
SPLP	Synthetic Precipitation Leaching Procedure
SSL	Statistically Significant Level
SU	Standard Units
USEPA	United States Environmental Protection Agency
XRD	X-Ray Diffraction

SECTION 1

INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) above the site-specific groundwater protection standard (GWPS) of barium, fluoride, and lithium in groundwater from a compliance monitoring well at the Northeastern Power Station Bottom Ash Pond (BAP; the Site), in Oologah, Oklahoma. The BAP is a regulated coal combustion residuals (CCR) management unit at the Northeastern Power Station. A semi-annual assessment monitoring event was conducted at the BAP in December 2021 in accordance with Oklahoma Administrative Code (OAC) 252:517-9-6(d)(1).

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were re-established for each Appendix B parameter in accordance with United States Environmental Protection Agency's (USEPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance; USEPA, 2009). Confidence intervals were calculated for Appendix B parameters at the BAP compliance wells to assess whether Appendix B parameters were present at an SSL above the GWPS. An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS).

The following SSLs were identified at the Northeastern BAP for the second semi-annual assessment monitoring event of 2021 (Geosyntec, 2022):

- The LCL for barium exceeded the GWPS of 2.60 mg/L at SP-10 (3.42 mg/L).
- The LCL for fluoride exceeded the GWPS of 4.39 mg/L at SP-10 (5.11 mg/L).
- The LCL for lithium exceeded the GWPS of 0.140 mg/L at SP-10 (0.238 mg/L).

1.1 CCR Rule Requirements

Oklahoma Department of Environmental Quality (ODEQ) regulations regarding assessment monitoring of CCR landfills and surface impoundments provide owners and operators with the option to make an ASD when an SSL is identified (OAC 252:517-9-6(g)(3)(B)). An owner or operator may:

> *Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer and submitted to DEQ for approval. If a successful demonstration is made, the owner or operator must continue*

> *monitoring in accordance with the assessment monitoring program pursuant to this Section…*

Pursuant to OAC 252:517-9-6(g)(3)(B), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the SSLs identified for barium, fluoride, and lithium should not be attributed to the BAP.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which the identified SSL could be attributed. Alternative sources were identified amongst five types, based on methodology provided by the Electric Power Research Institute (EPRI; 2017):

- ASD Type I: Sampling Causes;
- ASD Type II: Laboratory Causes;
- ASD Type III: Statistical Evaluation Causes;
- ASD Type IV: Natural Variation; and
- ASD Type V: Alternative Sources.

A demonstration was conducted to show that the SSLs identified for barium, fluoride, and lithium at SP-10 were based on Type IV causes and not by a release from the BAP.

SECTION 2

SITE SETTING

A description of the regional and Site geology is provided below. Field efforts to characterize the Site geology are also described below.

2.1 Regional Geology

The generalized stratigraphic column of the regional geology in the Site vicinity is summarized below:

Series	Group	Formation
Desmoinesian	Marmaton	Oologah
		Labette
		Fort Scott Limestone
	Cherokee	Senora
		Boggy
		Savanna

The Site is underlain by the Oologah Formation. The Oologah Formation is characterized as a dark gray argillaceous limestone with a small amount of fissile shale (Oakes et al., 1952). The limestone is typically dense to moderately crystalline, unjointed, and thinly to massively bedded. The Oologah Formation is approximately 80 to 100 feet thick and is subdivided into three members, the Altamont Limestone, the Bandera Shale, and the Pawnee Limestone (in descending order) as described below:

- *Altamont Limestone*. Grayish orange pink to medium gray limestone, mudstone, wackestones and locally packstones. The texture varies from thin and somewhat wavy to medium planar and is influenced by the presence of fossil algal material. The bedding of the upper portion of the member is typically thinner than the lower portion (Oklahoma Geological Survey [OGS], 2005). The thickness of the Altamont Limestone typically ranges from approximately 65 to 100 feet.
- *Bandera Shale*. Medium dark gray to dark gray, well-laminated to fissile shale. The nearest published thickness of this member is approximately 2 feet about 13 miles south of the Site (OGS, 2005; Woodruff and Cooper, 1928).
- *Pawnee Limestone*. Medium gray, slightly wavy, thin to medium bedded limestone. The bedding is typically 2 to 4-inches thick but can reach 12 inches in thickness. The Pawnee Limestone contains abundant fossil debris and varies in thickness from approximately 19 to 22 feet (OGS, 2005).

The Oologah Formation is underlain by the Labette Formation, a grayish-brown to dark gray, laminated clayshale. The clayshale contains some zones of weakly calcareous shale, and multiple

horizons of sandy shale to sandstone. The thickness of the Labette Formation typically ranges from approximately 120 to 180 feet. A zone of alternating shale and sandstone (Peru Sandstone) or shale and limestone (Sageeyah Limestone) may be present near the top of the Labette Formation. This member (if present) does not typically contain fossils and varies in thickness up to 20 feet south of the Site (OGS, 2005).

The Labette Formation is underlain by the Fort Scott Formation which consists of three members, in descending order: the Higginsville Limestone; the Little Osage Shale; and the Blackjack Creek Limestone. The Fort Scott Formation limestone consists primarily of a light gray, thin to medium, wavy-bedded fossiliferous wackestone and mudstone (OGS, 2004).

2.2 Site Geology

Two soil borings (BAP-B1 and BAP-B2) were advanced in the vicinity of the BAP by Geosyntec staff in early 2019 to clarify the Site geology. The locations of these borings are shown on **Figure 1**. The deeper of those boring (BAP-B1) was advanced to 186 feet below ground surface (ft bgs). Detailed discussion of these borings, supplemented by boring logs and photologs, was provided in the 2019 ASD completed for lithium at SP-10 (Geosyntec, 2019). The borings and associated mineralogical analyses of rock samples indicated that limestone is present at depths to at least 72 ft bgs. This limestone unit is underlain by a shale unit. The following is a general summary of the geologic units encountered at BAP-B1:

Geologic Unit	Depth (ft bgs)	Elevation (ft amsl)[1]
Unconsolidated Soil	0 to 3	625.8 to 622.8
Limestone (Oologah Formation)	3 to 100	622.8 to 525.8
Shale (Labette Formation)	100 to 181	525.8 to 444.8
Limestone (Fort Scott Formation)	181 to 186	444.8 to 439.8

Note: 1. ft amsl = feet above mean sea level

The wells within the CCR compliance network (SP-1, SP-2, SP-4, SP-5R, SP-10, and SP-11) monitor the upper limestone unit (Oologah Limestone), which was determined to contain the shallow aquifer at the site. Monitoring well SP-10 is screened from 40.25-50.75 ft bgs. Based on the BAP-B1 boring log and logs for other borings near the BAP, the screened interval may be inclusive of the Altamont limestone member (upper portion of the Oologah Formation) and the Pawnee member (lower portion of the Oologah Formation). At several boring locations, thin horizons of shale (1-2 inches thick) were identified from elevations of approximately 25 to 75 ft bgs. A 2-inch thick shale horizon was found to occur around 46 ft bgs in multiple boring logs. This shale horizon may be the Bandera Shale.

Boring BAP-B2 was advanced in the vicinity of SP-10, the monitoring well containing SSLs for lithium, fluoride, and barium, and SP-9, its paired deeper well. A thin (approximately 2-inch thick) shale horizon was observed at 46 ft bgs, which is within the screened interval of SP-10. This horizon is underlain by interbedded shale and limestone. As described in the 2019 ASD (Geosyntec, 2019), samples were collected from four intervals at boring BAP-B2 for laboratory analysis, as summarized below:

Sample Depth (ft bgs)	Sample ID	Description
32.0-32.4	SP-10-LOG-1	Upper limestone
46.0-47.0	SP-10-LOG-2	Shale lens within the screened interval of SP-10
46.0-47.0	SP-10-LOG-3	Limestone within screened interval of SP-10
72.0-72.4	SP-10-LOG-4	Limestone within the screened interval of SP-9

X-ray diffraction (XRD) analysis of samples confirmed that limestone is present at depths to at least 72 ft bgs. The analyses also confirmed the horizon observed at 46 ft bgs is a shale lens comprised of primarily 2:1 high activity clay minerals illite and smectite. The mineralogy results of these samples are provided in **Table 1**.

SECTION 3

ALTERNATIVE SOURCE DEMONSTRATION

In accordance with OAC 252:517-9-6(g)(3)(B), the owner of operator of a CCR unit has 90 days from finding that any of the constituents listed in Appendix B have been detected at an SSL exceeding the GWPS to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for barium, lithium, and fluoride at the BAP and the proposed alternative sources are described below.

3.1 Lithium

As described in previous ASDs (Geosyntec, 2019; Geosyntec, 2021a, Geosyntec, 2021b; Geosyntec, 2021c), lower concentrations of lithium in the BAP solid and liquid phases, including pore water, than those observed at SP-10 suggest that the BAP is not the source of this exceedance. Instead, the release of lithium from the clay minerals in the shale lens located at 46 ft bgs in the screened interval of SP-10 is the likely source of lithium in groundwater at that location.

Data from the December 2021 monitoring event indicate a lithium concentration of 0.198 mg/L at SP-10. This lithium concentration is consistent with previous results collected during the assessment monitoring period and continues to show no statistically significant positive trends (**Figure 2**). This is an indication that conditions have not changed substantially since the previous ASD was submitted (Geosyntec, 2021c).

3.2 Fluoride

As described in previous ASDs (Geosyntec, 2021a, Geosyntec, 2021b; Geosyntec, 2021c), lower concentrations of fluoride in the BAP solid and liquid phases, including pore water, than those observed at SP-10 suggest that the BAP is not the source of this exceedance. Instead, the release of fluoride from the clay minerals in the shale lens located at 46 ft below ground surface in the screened interval of SP-10 is the likely source of fluoride in groundwater at that location.

Data from the December 2021 monitoring event indicate a fluoride concentration of 6.7 mg/L at SP-10. This fluoride concentration is consistent with previous results collected during the assessment monitoring period and continues to show no statistically significant positive trends (**Figure 3**). This is an indication that conditions have not changed substantially since the previous ASD was submitted (Geosyntec, 2021c).

3.3 Barium

Solid and liquid phase samples collected from the BAP in July 2019 (AEP, 2019) indicate that barium concentrations within the BAP are less than groundwater concentration at SP-10 as well as below the barium GWPS. Barium in pore water was measured at 0.083 mg/L, and extractable barium from the BAP solids was measured at 0.352 mg/L via synthetic precipitation leaching

procedure (SPLP extraction). A surface water sample collected from the BAP in February 2019 had a reported barium concentration of 0.315 mg/L. These concentrations of barium are roughly an order of magnitude below the barium LCL at SP-10 (3.42 mg/L) and the GWPS (2.60 mg/L). The analytical laboratory reports for the BAP samples are provided in **Attachment A**. Since February 2019 (the date of the BAP liquid and solid phase sampling) there have been no notable changes in coal handling or sourcing at the plant that would have affected the composition of the ash or pond water in the BAP. Therefore, the BAP is not the source of barium at SP-10.

Furthermore, a review of the major ion chemistry of the BAP in contrast to SP-10 groundwater chemistry illustrates very different chemical compositions for these two sample types (**Figure 4**). SP-10 groundwater samples plot in a tight cluster on a Piper diagram, displaying a predominantly sodium/potassium-chloride composition which is clearly distinct from the BAP samples. The BAP samples have a greater contribution of calcium and very little chloride compared to the SP-10 samples. If a release from the BAP had occurred, the major ion chemistry of SP-10 groundwater would be expected to deviate from a sodium/potassium-chloride type and approach the more calcium-bicarbonate/sulfate dominant BAP samples on the Piper diagram. As recent SP-10 groundwater results have not shown a change in geochemical composition, these results do not support a mixing scenario between the BAP and SP-10 to account for changes in SP-10 groundwater composition.

As discussed in Section 2.2, shale lenses were identified within the screened interval of SP-10. These shale lenses are predominantly composed of clay minerals such as kaolinite (2 wt.%), chlorite (3 wt. %), illite (38 wt.%), and mixed layer illite-smectite (24 wt.%) (**Table 1**). Laboratory studies have confirmed that elevated barium concentrations may be associated with these clay minerals due to their cation exchange capacity (Eylem et. al, 1990; Atun and Bascetin, 2003). The presence of these minerals within the screened interval of SP-10 suggests a potential geogenic source of barium instead of the BAP.

3.4 Proposed Alternative Sources

Low concentrations of lithium, fluoride, and barium in the BAP liquid and solid phases, including pore water, suggest that the BAP is not the source of these exceedances. As described in previous ASDs (Geosyntec, 2019; Geosyntec, 2021a), the release of lithium and fluoride from the clay minerals in the shale lens located at 46 ft bgs within the screened interval of SP-10 is the likely source of lithium and fluoride in groundwater at that location. Similarly, the observed barium concentrations in the groundwater at SP-10 are likely associated with the clay minerals in the shale lenses.

3.5 Sampling Requirements

As the ASD described above supports the position that the identified SSLs are not due to a release from the BAP, the unit will remain in the assessment monitoring program. Groundwater sampling at the unit will continue in accordance with OAC 252:517-9-6 on a semi-annual basis.

SECTION 4

CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with OAC 252:517-9-6(g)(3)(B) and supports the position that the SSLs of lithium, fluoride, and barium at SP-10 identified during the second semi-annual assessment monitoring event of 2021 were not due to a release from the BAP. The identified SSLs were, instead, attributed to natural variation in the underlying lithology, including the presence of shale lenses within the screened interval at SP-10. Therefore, no further action is warranted, and the BAP will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment B**.

SECTION 5

REFERENCES

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TABLES

Table 1: X-Ray Diffraction Laboratory Analysis Results
Northeastern Plant Bottom Ash Pond

Geosyntec Consultants

Sample ID	SP-10-LOG 1	SP-10-LOG 2	SP-10-LOG 4	SP-10-LOG 4
Depth (ft bgs)	32-32.4	46	46	72-72.4
Description	Upper Limestone	Shale within screened interval of SP-10	Limestone within screened interval of SP-10	Limestone within screened interval of SP-9
Quartz	1	20	3	6
Albite	ND	4	ND	ND
Microcline	ND	1	ND	ND
Calcite	95	2	93	91
Ferroan Dolomite	4	ND	ND	2
Siderite	ND	1	ND	ND
Pyrite	ND	5	1	ND
Kaolinite	ND	2	1	<0.5
Chlorite	ND	3	<0.5	ND
Illite/Mica	ND	38	1	1
Mixed-Layered Illite/Smectite	ND	24	1	<0.5
% Illite Layers in ML I/S	*N/A*	*75*	*75*	*BDL*

Notes:
Results are shown as percentage of the bulk material.
ND - not detected
N/A: not applicable
BDL: below detection limit

FIGURES

Legend

- Out of Network Wells
- In Network Wells
- Soil Borings
- Bottom Ash Pond
- Impoundment

Notes
- Aerial imagery obtained from ESRI

500 250 0 500 Feet

Soil Boring and Monitoring Well Locations Map

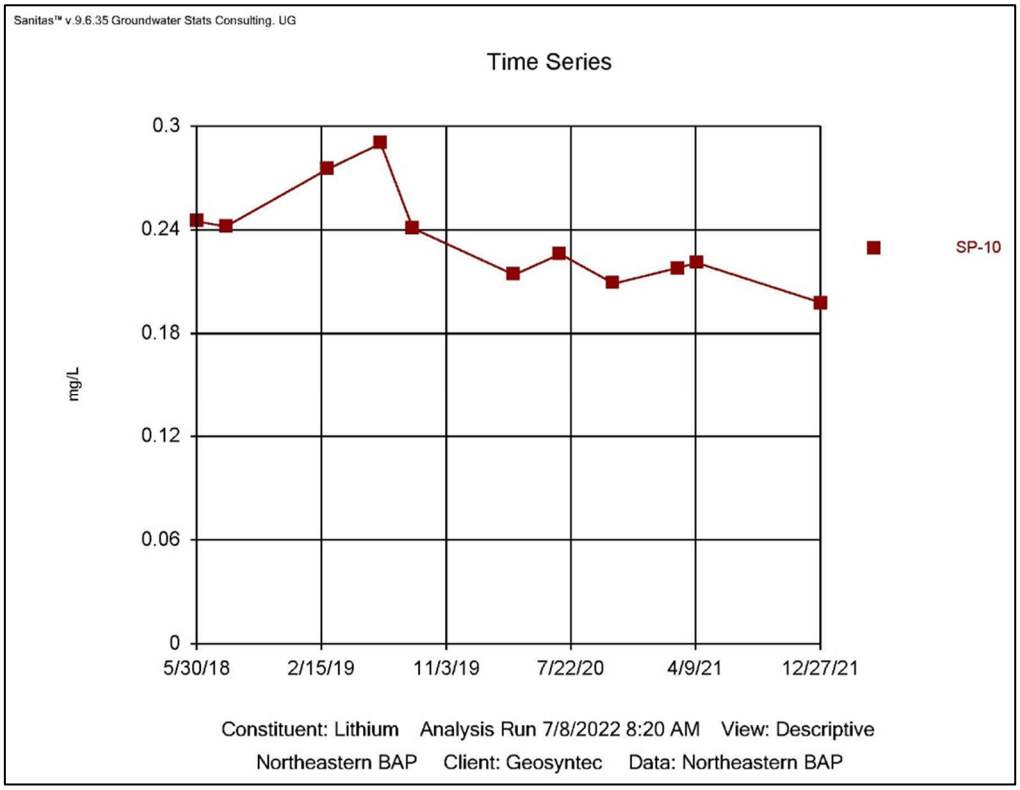
AEP Northeastern Power Plant - Bottom Ash Pond
Oologah, Oklahoma

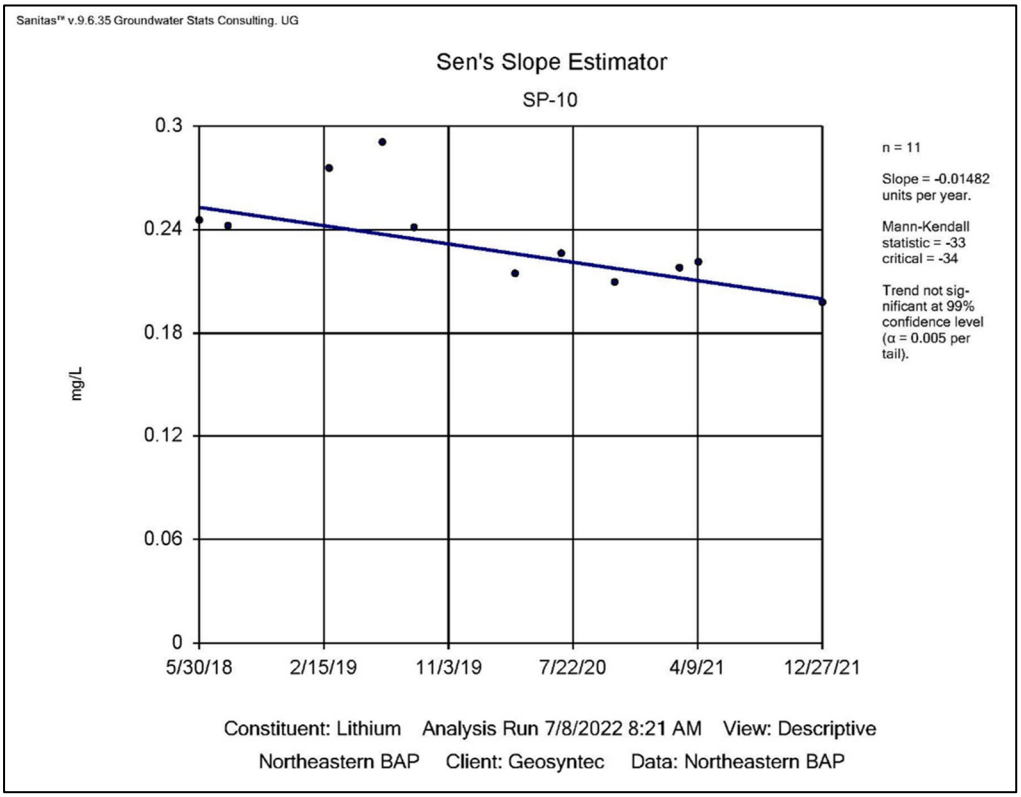
Geosyntec consultants

Columbus, Ohio | July 2022

Figure 1

P:\Projects\AEP\Legal Department - ASD Review\Northeastern\BAP\2020-11 F ASD Investigation\Figures_Tables\AEP-Northeastern_BAP_Soil Boring Locations.mxd. HDuff. 1/25/2021. Project/Phase/Task.

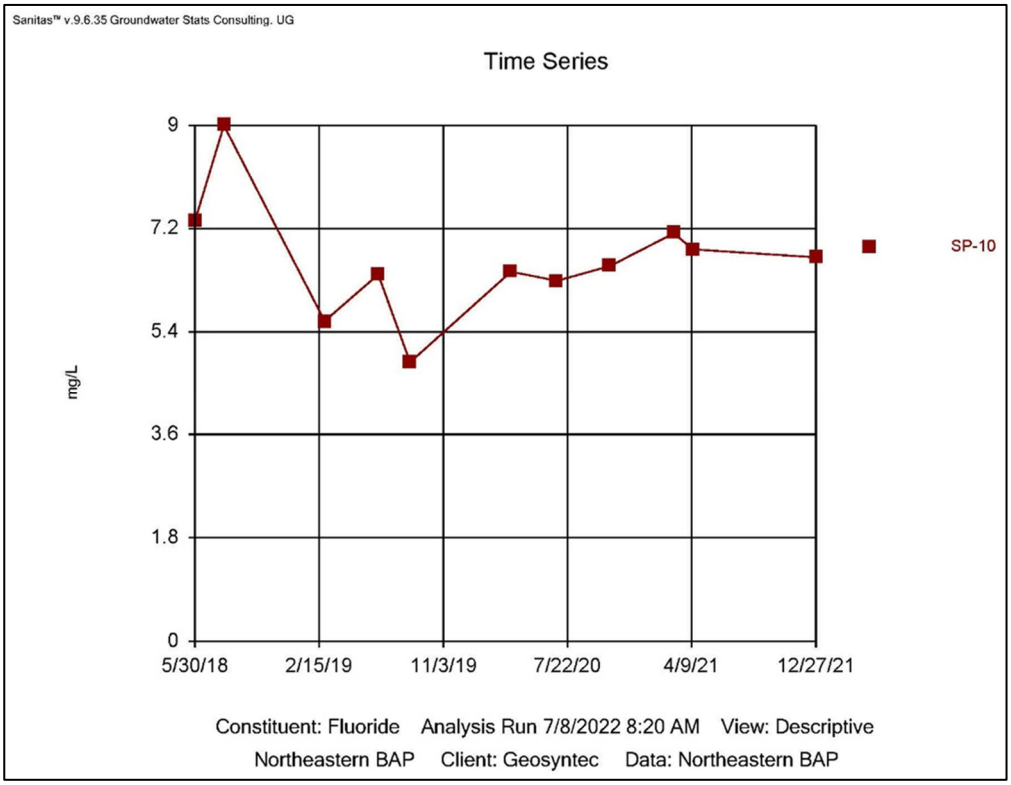


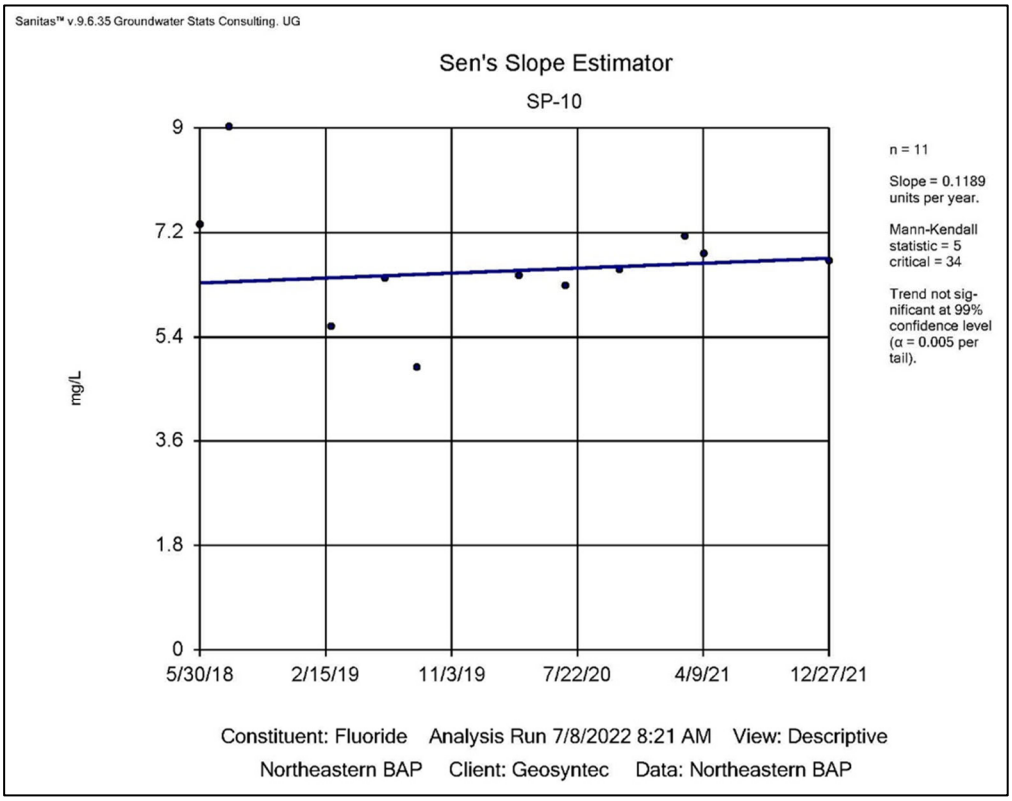


Lithium Time Series and Trend Test – SP-10
Northeastern Bottom Ash Pond

Geosyntec consultants	AMERICAN ELECTRIC POWER	Figure **2**
Columbus, Ohio	July 8, 2022	

internal info: path, date revised, author



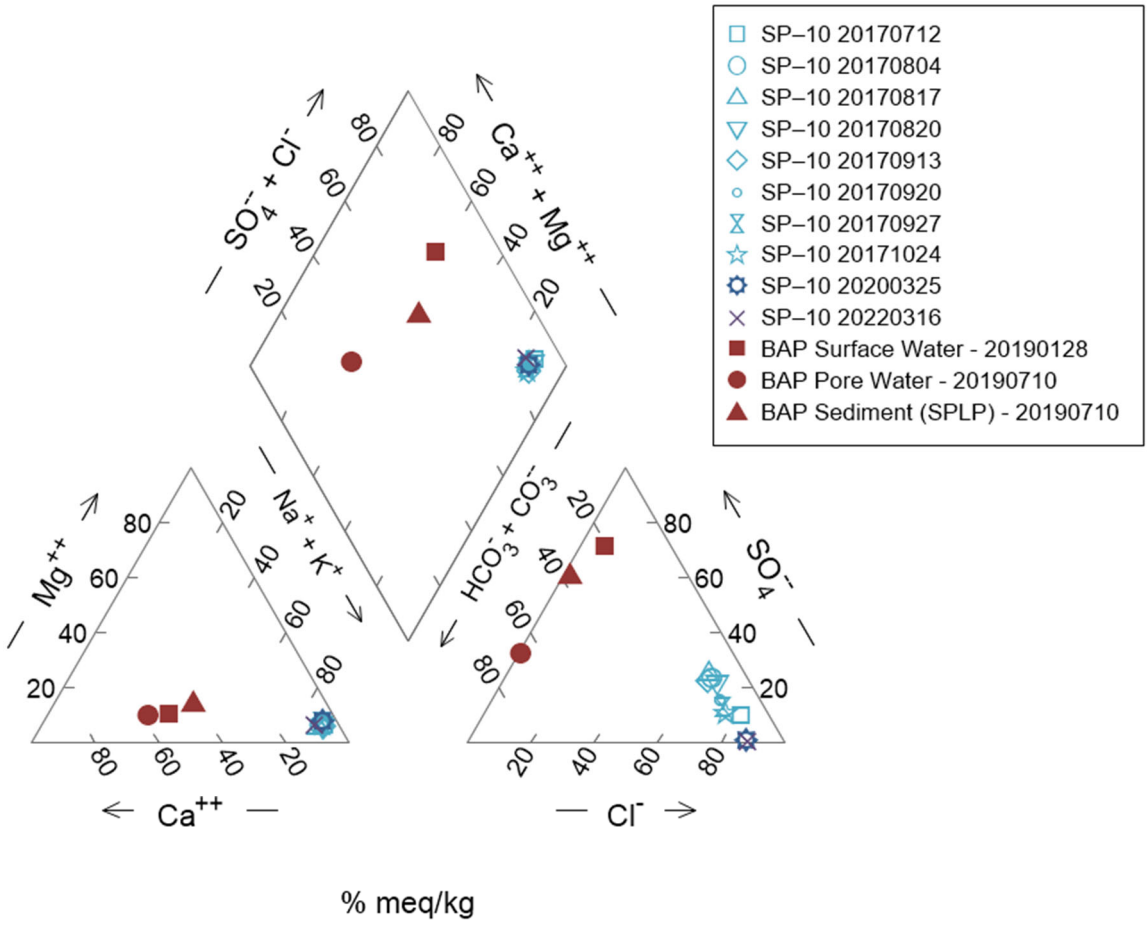


Fluoride Time Series and Trend Test – SP-10

Northeastern Bottom Ash Pond

Geosyntec consultants	AMERICAN ELECTRIC POWER	Figure 3
Columbus, Ohio	July 8, 2022	

internal info: path, date revised, author



Notes:
SPLP – Synthetic Precipitation Leaching Procedure.

Piper Diagram – SP-10 and BAP Samples
Northeastern Bottom Ash Pond

Geosyntec consultants | AMERICAN ELECTRIC POWER | Figure 4

Columbus, Ohio | July 8, 2022

internal info: path, date revised, author

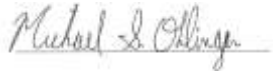
ATTACHMENT A
Analytical Laboratory Reports

BAP Surface Water

Sample Number: 190407-003 **Date Collected:** 02/05/2019 12:30 **Date Received:** 2/6/2019

Parameter	Result Units	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.57 ug/L	0.10	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.18 ug/L	0.10	0.030	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Barium, Ba	315 ug/L	0.10	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.245 ug/L	0.10	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.19 ug/L	0.050	0.010	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	647 ug/L	0.20	0.040	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	9.04 ug/L	0.050	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Lead, Pb	3.33 ug/L	0.10	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Molybdenum, Mo	26.7 ug/L	2.0	0.40	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.5 ug/L	0.20	0.030	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.500 ug/L	0.50	0.10	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Boron, B	0.617 mg/L	0.0050	0.0009	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	128 mg/L	0.020	0.0030	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Iron, Fe	5.77 mg/L	0.010	0.0020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Lithium, Li	0.00874 mg/L	0.0002	0.00001	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	14.8 mg/L	0.010	0.0020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Sodium, Na	105 mg/L	0.050	0.010	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Manganese, Mn	292 ug/L	0.10	0.020	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Potassium, K	5.85 mg/L	0.050	0.010	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Strontium, Sr	1.25 mg/L	0.0002	0.00003	GES	02/06/2019 13:59	EPA 200.8-1994, Rev. 5.4
Alkalinity, as CaCO3	127 mg/L	10	3.0	GES	02/06/2019 16:44	SM 2320B-2011
Bromide, Br	< 0.500 mg/L	0.50	0.10	CRJ	02/06/2019 17:11	EPA 300.1-1997, Rev. 1.0
Surrogate is recovering above acceptance limits due to Chlorate being in the as-rec'd sample.						
Chloride, Cl	28.3 mg/L	0.10	0.030	CRJ	02/06/2019 17:11	EPA 300.1-1997, Rev. 1.0
Surrogate is recovering above acceptance limits due to Chlorate being in the as-rec'd sample.						
Fluoride, F	0.37 mg/L	0.15	0.035	CRJ	02/06/2019 17:11	EPA 300.1-1997, Rev. 1.0
Surrogate is recovering above acceptance limits due to Chlorate being in the as-rec'd sample.						
Residue, Filterable, TDS	694 mg/L	40	10	KAL	02/07/2019	SM 2540C-2011
Due to the reduced time allowed for analysis per the plant's request, the samples were dried at 180*C. KAL020719						
Sulfate, SO4	345 mg/L	10	1.5	CRJ	02/06/2019 14:22	EPA 300.1-1997, Rev. 1.0

Report was reissued on 2/12/19 due to a reanalysis that occurred on alkalinity.



Michael Ohlinger, Chemist

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AEP ANALYTICAL CHEMISTRY SERVICES
Analysis Report

Report ID : 40115
Date Received: 07/12/2019

Company: SEP - Environmental (JP-W)
Contact: Jill Parker-Witt
Phone: (318) 673-3816

Address: 502 N. Allen Avenue
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AEP Sample ID : 226939
Cust Sample ID: Sediment
Sample Desc.: BAP Sediment SPLP

Collected Date: 07/10/2019
Location: NE BAP Sediment Sample

By: BW
Matrix: Liquid

SPLP (226939)

Parameter	Value	Unit	Det. Limit	Dil./Conc.	Method	Analysis Date/Time	Codes	Tech
Aluminum	0.777	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Antimony	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Arsenic	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Barium	0.352	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Beryllium	< 0.001	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Boron	0.389	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Cadmium	< 0.001	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Calcium	24.3	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Chromium	< 0.001	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Cobalt	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Copper	0.004	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Iron	0.1	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Lead	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Lithium	0.001	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Magnesium	2.44	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Manganese	0.01	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Molybdenum	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Nickel	< 0.025	mg/L	0.025	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Potassium	0.703	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Selenium	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Silver	< 0.001	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Sodium	14.9	mg/L	0.01	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Strontium	0.327	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Thallium	< 0.005	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Tin	0.011	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Titanium	0.012	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB

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Vanadium	0.023	mg/L	0.001	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB
Zinc	0.067	mg/L	0.005	1	EPA 1312/6010B 1996	07/25/2019 21:45		JDB

Water (226939)

Parameter	Value	Unit	Det. Limit	Dil./Conc.	Method	Analysis Date/Time	Codes	Tech
Alkalinity, Bicarbonate	101.24	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Alkalinity, Carbonate	< 5	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Alkalinity, Total	101.24	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Chloride	0.839	mg/L	0.219	1	EPA 300.0	08/04/2019 5:20		GB
Fluoride	0.458	mg/L	0.083	1	EPA 300.0	08/04/2019 5:20		GB
Sulfate	38	mg/L	0.140	1	EPA 300.0	08/04/2019 5:20		GB

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Phone: (318) 673-3816

Address: 502 N. Allen Avenue
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AEP Sample ID : 226940
Cust Sample ID: Liquid portion
Sample Desc.: BAP Sediment

Collected Date: 07/10/2019
Location: NE BAP Sediment Sample

By: BW
Matrix: Liquid

Metals (226940)

Parameter	Value	Unit	Det. Limit	Dil./Conc.	Method	Analysis Date/Time	Codes	Tech
Aluminum	0.076	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Antimony	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Arsenic	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Barium	0.083	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Beryllium	< 0.001	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Boron	0.754	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Cadmium	< 0.001	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Calcium	85.7	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Chromium	< 0.001	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Cobalt	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Copper	0.004	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Iron	< 0.01	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Lead	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Lithium	0.003	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Magnesium	17.4	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Manganese	0.032	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Molybdenum	0.027	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Nickel	< 0.025	mg/L	0.025	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Potassium	6.94	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Selenium	0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Silver	< 0.001	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Sodium	99.9	mg/L	0.01	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Strontium	1.22	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Thallium	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Tin	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Titanium	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB

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Vanadium	0.006	mg/L	0.001	1	EPA 6010B 1996	07/25/2019 21:37		JDB
Zinc	< 0.005	mg/L	0.005	1	EPA 6010B 1996	07/25/2019 21:37		JDB

Water (226940)

Parameter	Value	Unit	Det. Limit	Dil./Conc.	Method	Analysis Date/Time	Codes	Tech
Alkalinity, Bicarbonate	399.2	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Alkalinity, Carbonate	< 5	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Alkalinity, Total	399.2	mg/L	5	1	SM 2320 B-2011	08/06/2019 15:30	H1	JTD
Chloride	14	mg/L	0.219	1	EPA 300.0	08/04/2019 5:58		GB
Fluoride	< 0.083	mg/L	0.083	1	EPA 300.0	08/04/2019 5:58		GB
Sulfate	514	mg/L	0.140	1:10	EPA 300.0	08/04/2019 6:16		GB

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Quality Control Data

* Quality control units are the same as reported analytical results

Date	Parameter	Sample ID	Blank Value *	Standard			Spike			Surrogate % Recovery	Duplicate % Difference	Tech
				Value *	Recovery*	%	Value *	Recovery*	%			
8/6/2019	Alkalinity, Total			50	50.84	101.7						JTD
8/6/2019	Alkalinity, Total	227498	<5	50	52.62	105.2	50	47.14	94.3		2.5	JTD
7/25/2019	Aluminum	227041.1	<0.005	2	2.0229733	101.1	2	2.2242	111.2		0.0	JDB
7/25/2019	Aluminum	226939.1	<0.005	2	2.0229733	101.1	2	2.071639	103.6		0.4	JDB
7/25/2019	Antimony	227041.1	<0.005	0.8	0.8092462	101.2	0.8	0.7671843	95.9		0.5	JDB
7/25/2019	Antimony	226939.1	<0.005	0.8	0.8092462	101.2	0.8	0.8159776	102.0		0.2	JDB
7/25/2019	Arsenic	227041.1	<0.005	0.8	0.8086795	101.1	0.8	0.7758421	97.0		0.0	JDB
7/25/2019	Arsenic	226939.1	<0.005	0.8	0.8086795	101.1	0.8	0.8086275	101.1		0.1	JDB
7/25/2019	Barium	226939.1	<0.001	0.2	0.2080557	104.0	0.2	0.209543	104.8		0.1	JDB
7/25/2019	Barium	227041.1	<0.05	0.2	0.2080557	104.0	0.2	0.1829767	91.5		0.4	JDB
7/25/2019	Beryllium	226939.1	<0.001	0.2	0.2122779	106.1	0.2	0.2142832	107.1		0.3	JDB
7/25/2019	Beryllium	227041.1	<0.001	0.2	0.2122779	106.1	0.2	0.1992329	99.6		0.4	JDB
7/25/2019	Boron	226939.1	<0.01	0.3	0.2995651	99.9	0.3	0.2984183	99.5		0.7	JDB
7/25/2019	Boron	227041.1	<0.5	0.3	0.2995651	99.9	0.3	0.2855333	95.2		0.5	JDB
7/25/2019	Cadmium	227041.1	<0.001	0.2	0.2069934	103.5	0.2	0.1836838	91.8		0.6	JDB
7/25/2019	Cadmium	226939.1	<0.001	0.2	0.2069934	103.5	0.2	0.2061243	103.1		0.5	JDB
7/25/2019	Calcium	226939.1	<0.01	1	1.0087505	100.9	1	1.0243667	102.4		0.9	JDB
7/25/2019	Chromium	226939.1	<0.001	0.4	0.4116387	102.9	0.4	0.4125529	103.1		0.4	JDB
7/25/2019	Chromium	227041.1	<0.001	0.4	0.4116387	102.9	0.4	0.3867339	96.7		0.3	JDB
7/25/2019	Cobalt	226939.1	<0.005	0.2	0.2043482	102.2	0.2	0.2054714	102.7		0.4	JDB
7/25/2019	Cobalt	227041.1	<0.005	0.2	0.2043482	102.2	0.2	0.1839347	92.0		0.4	JDB
7/25/2019	Copper	227041.1	<0.001	0.3	0.3066399	102.2	0.3	0.2963301	98.8		0.1	JDB
7/25/2019	Copper	226939.1	<0.001	0.3	0.3066399	102.2	0.3	0.3109092	103.6		0.1	JDB
7/25/2019	Iron	227041.1	<0.5	3	3.1158893	103.9	150	159.28837	106.2		0.8	JDB
7/25/2019	Iron	226939.1	<0.01	3	3.1158893	103.9	3	3.1231158	104.1		1.0	JDB
7/25/2019	Lead	226939.1	<0.005	1	1.0430644	104.3	1	1.0416574	104.2		0.4	JDB
7/25/2019	Lead	227041.1	<0.005	1	1.0430644	104.3	1	0.9320653	93.2		0.6	JDB
7/25/2019	Lithium	227041.1	<0.001	0.2	0.2119096	106.0	0.2	0.2353987	117.7		0.1	JDB
7/25/2019	Lithium	226939.1	<0.001	0.2	0.2119096	106.0	0.2	0.2163799	108.2		0.4	JDB
7/25/2019	Magnesium	226939.1	<0.01	2	2.0868175	104.3	2	2.0877567	104.4		0.2	JDB
7/25/2019	Magnesium	227041.1	<0.5	2	2.0868175	104.3	2	1.9791333	99.0		0.6	JDB
7/25/2019	Manganese	227041.1	<0.001	0.2	0.2072869	103.6	0.2	0.16684	83.4		0.7	JDB

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7/25/2019	Manganese	226939.1	<0.001	0.2	0.2072869	103.6	0.2	0.2077536	103.9		0.2	JDB
7/25/2019	Molybdenum	226939.1	<0.005	0.2	0.2067657	103.4	0.2	0.2076129	103.8		0.4	JDB
7/25/2019	Molybdenum	227041.1	<0.005	0.2	0.2067657	103.4	0.2	0.197727	98.9		0.5	JDB
7/25/2019	Nickel	227041.1	<0.025	0.5	0.5192594	103.9	0.5	0.46183	92.4		0.6	JDB
7/25/2019	Nickel	226939.1	<0.025	0.5	0.5192594	103.9	0.5	0.5209379	104.2		0.6	JDB
7/25/2019	Potassium	226939.1	<0.01	10	9.3692109	93.7	10	9.4631223	94.6		0.2	JDB
7/25/2019	Potassium	227041.1	<0.01	10	9.3692109	93.7	10	11.11754	111.2		0.3	JDB
7/25/2019	Selenium	227041.1	<0.005	2	1.9998495	100.0	2	1.991203	99.6		0.7	JDB
7/25/2019	Selenium	226939.1	<0.005	2	1.9998495	100.0	2	1.9816300	99.1		0.8	JDB
7/25/2019	Silver	227041.1	<0.001	0.075	0.0712930	95.1	0.075	0.0708639	94.5		0.2	JDB
7/25/2019	Silver	226939.1	<0.001	0.075	0.0712930	95.1	0.075	0.0714285	95.2		0.1	JDB
7/25/2019	Sodium	226939.1	<0.01	3	3.1384831	104.6	3	2.4693667	82.3		0.1	JDB
7/25/2019	Sodium	227041.1	<0.5	3	3.1384831	104.6	3	2.3746333	79.2		0.0	JDB
7/25/2019	Strontium	226939.1	<0.001	0.2	0.2059899	103.0	0.2	0.2081687	104.1		0.4	JDB
7/25/2019	Thallium	226939.1	<0.005	0.4	0.4152040	103.8	0.4	0.4171124	104.3		0.0	JDB
7/25/2019	Thallium	227041.1	<0.005	0.4	0.4152040	103.8	0.4	0.3682771	92.1		1.2	JDB
7/25/2019	Tin	226939.1	<0.005	0.7	0.6995446	99.9	0.7	0.6930628	99.0		0.2	JDB
7/25/2019	Tin	227041.1	<0.005	0.7	0.6995446	99.9	0.7	0.644164	92.0		0.2	JDB
7/25/2019	Titanium	227041.1	<0.005	0.2	0.2109341	105.5	0.2	0.2098874	104.9		0.2	JDB
7/25/2019	Titanium	226939.1	<0.005	0.2	0.2109341	105.5	0.2	0.2124567	106.2		0.1	JDB
7/25/2019	Vanadium	226939.1	<0.001	0.3	0.3076519	102.6	0.3	0.3104754	103.5		0.4	JDB
7/25/2019	Vanadium	227041.1	<0.001	0.3	0.3076519	102.6	0.3	0.2997157	99.9		0.6	JDB
7/25/2019	Zinc	226939.1	<0.005	0.2	0.2091679	104.6	0.2	0.2081374	104.1		0.3	JDB
7/25/2019	Zinc	227041.1	<0.005	0.2	0.2091679	104.6	0.2	0.1851907	92.6		0.1	JDB

On 7/30/2019, Jill asked for us to add Chloride, Fluoride, and Sulfate.

Code	***Code Description***
H1	Sample analysis performed past holding time

Jonathan Barnhill
Quality Assurance Officer

08-Aug-19
Report Date

JOB 7-15-19

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Shreveport Chemical Laboratory (SCL)
502 N. Allen Ave.
Shreveport , LA 71101
Contacts: Jonathan Barnhill (318-673-3803)

Project Name: NE BAP Sediment sample
Contact Name: Bryan White
Contact Phone: 8-719-0873
Sampler(s): BRYAN WHITE

Analysis Turnaround Time (In Calendar Days) - **RUSH**

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 4/0115

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Li							Sample Specific Notes:
BAP Sediment	7-10-19	1600	grab	solid/water	1L		X							SPLP on the sediment particles, also run Li analysis of pore water
	JOB 7-15-19													

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

Special Instructions/QC Requirements & Comments: **Submit results to Jill Parker-Witt**

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
William Matthew Stephens	AEP-PSO	7/11/19 10:05		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
				7/12/19 14:34

SHREVEPORT CHEMICAL LABORATORY

502 N. Allen Ave.
Shreveport, LA 71101
Phone 318-673-3802
FAX 318-673-3960

PROJECT R

Container Type					Delivery Type				
Ice Chest	Bag	Action Pak	PCB Mailer	Bottle	UPS	FEDEX	US Mail	Walk in	Shuttle
(Other) Box					Other				
					Tracking #				

Client: Bryan White
Received By: JTD
Received Date: 7/12/19
Open Date:

Sample Matrix: DGA | PCB Oil | Water | Oil | Soil
Solid | (Liquid) | Other

Container Temp Read: 28 (Thermometer Serial #F04103)
Correction Factor: +1.2
Corrected Temp: 29.2

Project I.D.

Were samples received on ice? YES NO

Did container arrive in good condition?	(YES)	NO
Was sample documentation received?	(YES)	NO
Was documentation filled out properly?	(YES) JTD 7/12/19	(NO) Date and time for collection not filled
Were samples labeled properly?	(YES)	NO
Were correct containers used?	(YES)	NO
Were the pH's of samples appropriately checked?	YES	(NO) N/A

Total number of sample containers: 1

Was any corrective action taken? NO

Person Contacted: Jill Parker W.T.F
Date & Time: 7-12-19 1520

Comments: Informed Jill that No Date and time was entered for collection she said she would contact the sampler and get that information. JDB 7-12-19

ATTACHMENT B
Certification by Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that the selected and above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Bottom Ash Pond CCR management area at the Northeastern Power Station and that the requirements of OAC 252:517-9-6(g)(3)(B) have been met.

Beth Ann Gross
Printed Name of Licensed Professional Engineer

Signature

Geosyntec Consultants
2039 Centre Pointe Boulevard, Suite 103
Tallahassee, Florida 32308

Oklahoma Firm Certificate of
Authorization No. 1996
Exp. 6/30/2024

18167	Oklahoma	7/15/2022
License Number	Licensing State	Date