Pirkey Power Plant
East Bottom Ash Pond
Alternate Source Demonstration

The Pirkey East Bottom Ash Pond initiated an assessment monitoring program in accordance with 40 CFR 257.95 on April 3, 2018. Groundwater protection standards (GWPS) were set in accordance with 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted. The statistical evaluation revealed an exceedance of the cobalt GWPS on December 26, 2018. A successful alternate source demonstration (ASD) was completed per 257.95(g)(3). An alternate source demonstration is documentation that shows a source other than the CCR unit was responsible for causing the statistics to exceed the GWPS. The ASD document will explain the alternate cause of the GWPS exceedance. The successful ASD is attached.

ALTERNATIVE SOURCE DEMONSTRATION REPORT FEDERAL CCR RULE

H.W. Pirkey Power Plant
East Bottom Ash Pond
Hallsville, Texas

Submitted to

AMERICAN ELECTRIC POWER

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

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April 24, 2019

CHA8462

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LIST OF ACRONYMS

AEP	American Electric Power
ASL	Alternate Screening Level
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EBAP	East Bottom Ash Pond
EPRI	Electric Power Research Institute
GSC	Groundwater Stats Consulting, LLC
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
MCL	Maximum Contaminant Level
QA	Quality Assurance
QC	Quality Control
SPLP	Synthetic Precipitation Leaching Procedure
SSL	Statistically Significant Level
UTL	Upper Tolerance Limit
USEPA	United States Environmental Protection Agency

SECTION 1

INTRODUCTION AND SUMMARY

The H.W. Pirkey Plant, located in Hallsville, Texas, has four regulated coal combustion residuals (CCR) storage units, including the East Bottom Ash Pond (EBAP, Figure 1). In 2018, two assessment monitoring events were conducted at the EBAP in accordance with 40 CFR 257.95. The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the facility (AEP, 2017) and United States Environmental Protection Agency's (USEPA) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance; USEPA, 2009). The GWPS for each parameter was established as the greater of the background concentration and the maximum contaminant level (MCL) or alternate screening level (ASL) provided in 40 CFR 257.95(h)(2). 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.

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 GWPSs. An SSL was concluded if the lower confidence limit (LCL) of a parameter exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The following SSLs were identified at the Pirkey EBAP:

- LCLs for cobalt exceeded the GWPS of 0.0094 mg/L at AD-2 (0.010 mg/L), AD-31 (0.00949 mg/L), and AD-32 (0.0353 mg/L).
- LCLs for lithium exceeded the GWPS of 0.051 mg/L at AD-31 (0.0556 mg/L) and AD-32 (0.0722 mg/L).

No other SSLs were identified (Geosyntec, 2018).

1.1 CCR Rule Requirements

United States Environmental Protection Agency (USEPA) regulations regarding assessment monitoring programs for coal combustion residuals (CCR) landfills and surface impoundments provide owners and operators with the option to make an alternative source demonstration when an SSL is identified (40 CFR 257.95(g)(3)(ii)). 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 or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. 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 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this Alternative Source Demonstration (ASD) report to document that the SSLs identified for cobalt should not be attributed to the EBAP. The SSLs identified for lithium will be addressed in a separate submittal.

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 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 cobalt were based on a Type IV cause and not by a release from the Pirkey EBAP.

SECTION 2

ALTERNATIVE SOURCE DEMONSTRATION

The Federal CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for cobalt and the proposed alternative source are described below.

2.1 Alternative Source for Cobalt

Initial review of site geochemistry, site historical data, and laboratory QA/QC data did not identify alternative sources due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. As described below, the SSLs for cobalt have been attributed to natural variation associated with the underlying geology, which is a Type IV issue.

The onsite hydrostratigraphic unit for the EBAP was identified as the clayey and silty sand stratum located between an elevation of approximately 325 and 340 feet above mean sea level (Arcadis, 2016). This unit is within the Reklaw Formation, which consists predominantly of clay and fine-grained sand and is underlain by the Eocene-age Carrizo Sand. The presence of lignite in the area is well-documented (Broom and Myers, 1966; ETTL, 2010).

Soil samples collected across the site identified cobalt in the aquifer material at varying concentrations, including locations near the EBAP (Table 1). While data are not available for AD-2, the highest reported cobalt concentration of 15 milligrams per kilogram (mg/kg) was collected at AD-30, which is located approximately 650 feet to the northwest of AD-2 (Figure 2). In addition, up to 1.9 mg/kg and 9.1 mg/kg of cobalt were detected in the samples at EBAP downgradient wells AD-31 and AD-32, respectively. Up to 3.6 mg/kg of cobalt was detected in the samples at upgradient well AD-18.

Mineralogic samples collected from across the site identified pyrite (cubic FeS_2) and marcasite (orthorhombic FeS_2) at concentrations up to 3% by dry weight (Table 1). Pyrite and marcasite were detected in the shallow (12 feet below ground surface [ft bgs]) sample collected at AD-31 at a combined concentration of 2%. Cobalt is known to substitute for iron in crystalline iron minerals such as pyrite and marcasite due to their similar ionic radii (Krupka and Serne, 2002; Hitzman et al., 2019).

While cobalt was detected in the samples collected at AD-32, pyrite and marcasite were not detected. However, the boring log for AD-32 noted that iron ore was present at 16 ft bgs, which is within the screened interval of the well (Attachment A). The presence of limonite (FeO(OH)) in the Reklaw formation has been noted (Brooms and Myers, 1966), which is a likely weathering product of the iron ore identified in the boring log. In addition to iron sulfides, cobalt can also substitute in or adsorb onto iron oxides such as limonite (Hitzman et al., 2019; Appelo and Postman, 2005). While soil analytical and mineralogical data are not available for AD-2, the wide

distribution of cobalt and iron-containing minerals across the site suggests that naturally occurring cobalt may be present in the aquifer media near AD-2.

Naturally occurring cobalt in the aquifer media is presented as the alternative source for cobalt concentrations in the groundwater which exceed the GWPS at the EBAP. Evidence from the EBAP itself shows that a release from the pond is not a probable source for cobalt in groundwater. An analysis of a sample of the bottom ash sluiced to the EBAP gave a reported cobalt concentration of 6.1 mg/kg (Attachment B). When Synthetic Precipitation Leaching Procedure (SPLP) analysis (SW-864 Test Method 1312, [USEPA, 1994]) was conducted on the ash sample to evaluate cobalt mobility under simulated landfill conditions, cobalt was not detected above the reporting limit of 0.010 milligrams per liter (mg/L) in the leachate sample (Attachment B). Cobalt was detected with an estimated concentration of 0.0024 mg/L in a grab sample of the pond water (Attachment C). However, the reported concentration of cobalt in the pond water sample is more than an order of magnitude lower than the average concentration of cobalt observed at all three wells where SSLs were identified. Results of the pond sample analyses are summarized in Table 2.

Because cobalt mobility is affected by pH, the SPLP test results are likely even more conservative than actual pond conditions, as SPLP is run at a pH of 5 SU, whereas the operational pH of the pond varies between approximately 5.8 and 7.0 SU. According to a recent study, cobalt mobility increases under more acidic conditions, although even at a pH of approximately 5 SU, only 2% of cobalt in fly ash is mobile (Izquierdo and Querol, 2012).

The EBAP was not identified as the source of cobalt at AD-2, AD-31, or AD-32 based on the documented low mobility of cobalt under the pond conditions. This is further supported by the lack of detected cobalt in the SPLP analysis and the low observed cobalt concentration in the pond water itself. Instead, the widespread distribution of cobalt within the aquifer material is presented as the alternate source. This cobalt could be present as substitutions within iron-containing minerals such as pyrite, marcasite, or limonite, all of which are observed across the site.

SECTION 3

CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 40 CFR 257.95(g)(3)(ii) and supports the position that the SSLs for cobalt at AD-2, AD-31, and AD-32 identified during assessment monitoring in 2018 was not due to a release from the EBAP. The identified SSLs were, instead, attributed to natural variation in the underlying geology. Therefore, no further action for cobalt is warranted, and the EBAP will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in Attachment D.

SECTION 4

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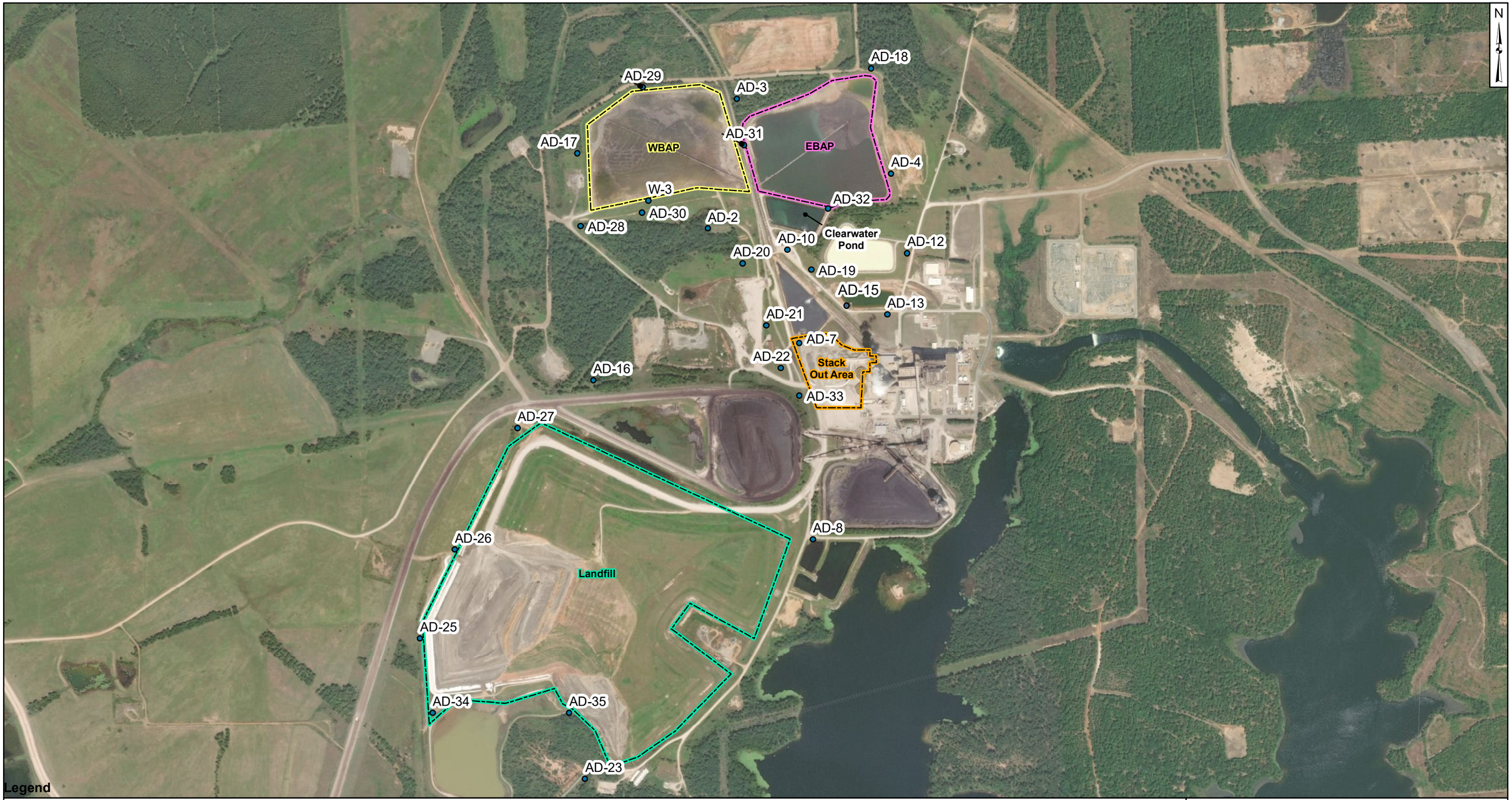
FIGURES



Legend

- AD-15
- Monitoring Wells

Location Boundaries

CCR Units

- EBAP
- Landfill
- Stack Out Area
- WBAP

Notes

- Monitoring well coordinates provided by AEP.
- Data provided by AEP, 2019
- AD-15 location is approximate.

0 380 760 1,520 2,280 3,040 Feet

Site Layout

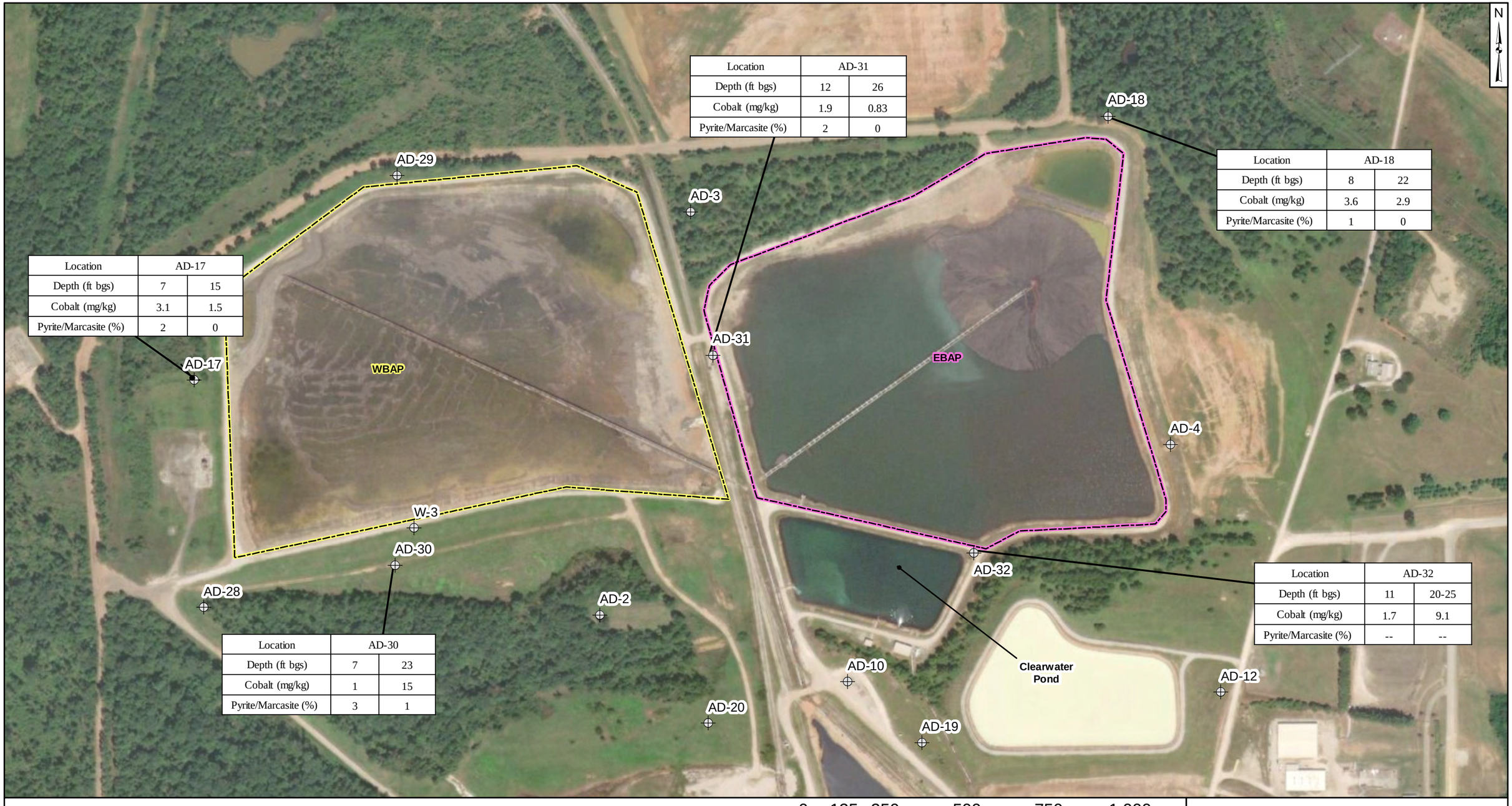
AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2019/03/25

Figure **1**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Pirkey\Site_Layout_20190322.mxd. HDuff. 3/25/2019. Project/Phase/Task.



Location	AD-31	
Depth (ft bgs)	12	26
Cobalt (mg/kg)	1.9	0.83
Pyrite/Marcasite (%)	2	0

Location	AD-18	
Depth (ft bgs)	8	22
Cobalt (mg/kg)	3.6	2.9
Pyrite/Marcasite (%)	1	0

Location	AD-17	
Depth (ft bgs)	7	15
Cobalt (mg/kg)	3.1	1.5
Pyrite/Marcasite (%)	2	0

Location	AD-32	
Depth (ft bgs)	11	20-25
Cobalt (mg/kg)	1.7	9.1
Pyrite/Marcasite (%)	--	--

Location	AD-30	
Depth (ft bgs)	7	23
Cobalt (mg/kg)	1	15
Pyrite/Marcasite (%)	3	1

Legend

Monitoring Wells

Notes
- Monitoring well coordinates provided by AEP.
- Data provided by AEP, 2019
- ft bgs: feet below ground surface
- mg/kg: milligrams per kilogram

0 125 250 500 750 1,000 Feet

Soil Chemical and Mineralogical Analysis Results

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2019/03/25

Figure 2

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Pirkey\Pirkey_SoilChem_minerals_March2019.mxd. SKaroly. 3/25/2019. Project/Phase/Task.

TABLES

Table 1: Soil Cobalt and Mineralogy Data
East Bottom Ash Pond - H.W. Pirkey Plant

Location ID	Sample Depth (ft bgs)	Cobalt (mg/kg)	Pyrite/Marcasite (%)
AD-15	13	0.85	--
	40-43	0.79	--
AD-16	10	0.17	0
	19	0.44	1
AD-17	7	3.10	2
	15	1.50	0
AD-18	8	3.60	1
	22	2.90	0
AD-30	7	1.00	3
	23	15.0	1
AD-31	12	1.90	2
	26	0.83	0
AD-32	11	1.70	--
	20-25	9.10	--
AD-33	11	0.61	1
	21	0.64	--
AD-34	6	1.10	1
	24	6.50	2
AD-35	2	2.10	2
	17	0.18	0

Notes:
'--' - analysis not completed
mg/kg- milligram per kilogram
ft bgs - feet below ground surface

Samples were collected from additional boreholes advanced in the immediate area of the location identified by the well ID. Samples were not collected from the cuttings of the borings advanced for well installation.

Table 2: Summary of Key Analytical Data
East Bottom Ash Pond - H.W. Pirkey Plant

Sample	Unit	Cobalt Concentration
Bottom Ash (Solid Material)	mg/kg	6.1
SPLP Leachate of Bottom Ash	mg/L	<0.01
EBAP Pond Water	mg/L	0.0024 J
AD-2 - Average	mg/L	0.0109
AD-31 - Average	mg/L	0.0107
AD-32 - Average	mg/L	0.0529

Notes:
mg/kg - milligram per kilogram
mg/L - milligram per liter
J - Estimated value. Result is less than the reporting limit but greater than or equal to the method detection limit.
Average values were calculated using all cobalt data collected under 40 CFR 257 Subpart D.

ATTACHMENT A
AD-32 Boring Log

Hydrex ENVIRONMENTAL, INC.

Monitor Well

Monitor Well No.: AD-32

PROJECT INFORMATION

PROJECT:	Pirkey Power Plant
PROJECT NO.:	I-04-1021
LOGGED BY:	Jeffrey D. Sammons, P.G.
SUPERVISING PG:	Jeffrey D. Sammons, P.G.
COMPLETION:	12/11/2015
DEVELOPMENT:	12/16/2015
SITE LOCATION:	2400 FM 3251, Hallsville, Texas
WELL OWNER:	AEP

DRILLING INFORMATION

DRILLER:	Buford Collier
DRILLER'S LICENSE NO.:	60089
RIG TYPE:	Geoprobe 3230DT
METHOD OF DRILLING:	Hollow Stem Auger
SAMPLING METHODS:	Split Core
SURFACE ELEVATION:	359.18 (Top of Casing)
HOLE DIAMETER:	8.25"
LATITUDE	32 27' 66.20" LONGITUDE 94 29' 11.86"

STATE OF TEXAS — JEFFREY D. SAMMONS — GEOLOGY #10070 — LICENSED PROFESSIONAL GEOSCIENTIST — JDS 1-21-16

▼ Water Level Upon Installation ▽ Water Level at Time of Drilling ■ Geotechnical Lab Sample TBPG No. 50027

DESCRIPTION	USCS	SAMPLE	% MOISTURE	% FINES	LL	PL	PI
CLAYEY SAND: very fine to fine sand, dark reddish brown, moist - interbeds of sand and clay, yellowish brown and light gray at 1' - reddish brown and light gray at 2' - light gray and yellowish brown at 4', - grayish brown and light gray at 6' - grayish brown, light gray, and reddish brown at 7'	SC		25	46	35	22	13
			26	44	37	20	17
SANDY LEAN CLAY: some gravel seams and thin interbeds of cemented sand, light yellowish brown and light gray, moist to saturated within gravel seams - some iron ore gravel at 16', very moist to saturated	CL		28	54	37	22	15
SILTY SAND: very fine to fine sand, trace clay, brownish gray and dark brownish gray, saturated - reddish brown and brown at 20'	SM						
SANDY LEAN CLAY: gray and dark gray, very moist	CL		26	51	37	24	13
CLAYEY SAND: fine to very fine sand, gray and dark gray, very moist to saturated	SC		26	47	41	22	19
SANDY LEAN CLAY: gray and dark gray, very moist	CL		26	59	35	21	14

WELL CONSTRUCTION

- Locking Well Casing Cover
- Locking Well Cap
- Protective Well Casing
- Concrete Pad
- Ground Surface
- Cement
- Bentonite
- 2" Sch. 40 PVC Riser
- 20/40 Silica Sand
- 0.010" Slotted Sch. 40 PVC Well Screen
- PVC Bottom Cap

NOTES: This log should not be used separately from the original report. Not all USCS descriptors were laboratory verified.

ATTACHMENT B
Bottom Ash and Bottom Ash SPLP
Laboratory Analytical Data

Client Sample ID: CCR SAMPLE-EBAP-1

Date Collected: 02/11/19 17:00
Date Received: 02/13/19 09:40

Lab Sample ID: 490-168389-2

Matrix: Solid
Percent Solids: 75.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	U	1.3	1.1	mg/Kg	☼		02/14/19 01:19	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	13	U	13	1.3	mg/Kg	☼	02/13/19 16:11	02/19/19 19:24	1
Arsenic	**3.1**		2.6	1.6	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Barium	**330**		2.6	1.3	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Beryllium	**0.64**	**J**	1.3	0.26	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Boron	**110**		13	5.7	mg/Kg	☼	02/13/19 16:11	02/18/19 22:55	1
Cadmium	1.3	U	1.3	0.13	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Chromium	**13**		1.3	1.2	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Cobalt	**6.1**		2.6	1.3	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Lead	**0.82**	**J**	1.3	0.66	mg/Kg	☼	02/13/19 16:11	02/19/19 19:24	1
Lithium	**3.7**	**J**	13	1.3	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Molybdenum	13	U	13	6.6	mg/Kg	☼	02/13/19 16:11	02/16/19 23:21	1
Selenium	2.6	U	2.6	1.5	mg/Kg	☼	02/13/19 16:11	02/19/19 19:24	1
Thallium	2.6	U	2.6	0.79	mg/Kg	☼	02/13/19 16:11	02/19/19 19:24	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.13	U	0.13	0.039	mg/Kg	☼	02/14/19 10:07	02/14/19 13:20	1

Client: Burns & McDonnell
Project/Site: CCR App III & IV GW Monitoring - Texas

TestAmerica Job ID: 490-168389-1
SDG: AEP-Pirkey Plant

Client Sample ID: CCR SAMPLE-EBAP-1
Date Collected: 02/11/19 17:00
Date Received: 02/13/19 09:40

Lab Sample ID: 490-168389-2
Matrix: Solid

Method: 9056 - Anions, Ion Chromatography - SPLP West

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	**0.023**	**J B**	0.10	0.010	mg/L			02/19/19 23:58	1

Method: 6010C - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.010	U	0.010	0.0050	mg/L		02/19/19 16:41	02/20/19 13:58	1
Arsenic	0.010	U	0.010	0.0086	mg/L		02/19/19 16:41	02/20/19 13:58	1
Barium	**0.23**		0.010	0.0050	mg/L		02/19/19 16:41	02/20/19 13:58	1
Beryllium	0.0040	U	0.0040	0.0020	mg/L		02/19/19 16:41	02/20/19 13:58	1
Boron	**0.032**	**J**	0.050	0.020	mg/L		02/19/19 16:41	02/20/19 13:58	1
Cadmium	0.0010	U	0.0010	0.00050	mg/L		02/19/19 16:41	02/20/19 13:58	1
Chromium	0.0050	U	0.0050	0.0030	mg/L		02/19/19 16:41	02/20/19 13:58	1
Cobalt	0.010	U	0.010	0.0050	mg/L		02/19/19 16:41	02/20/19 13:58	1
Lead	0.0050	U	0.0050	0.0020	mg/L		02/19/19 16:41	02/20/19 13:58	1
Lithium	**0.011**	**J B ***	0.050	0.010	mg/L		02/19/19 16:41	02/20/19 13:58	1
Molybdenum	0.050	U	0.050	0.030	mg/L		02/19/19 16:41	02/20/19 13:58	1
Selenium	0.010	U	0.010	0.0050	mg/L		02/19/19 16:41	02/20/19 13:58	1
Thallium	0.010	U	0.010	0.0050	mg/L		02/19/19 16:41	02/20/19 13:58	1

Method: 7470A - Mercury (CVAA) - SPLP West

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	0.00010	mg/L		02/19/19 16:03	02/21/19 15:47	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	**75.6**		0.1	0.1	%			02/17/19 12:25	1

ATTACHMENT C

Bottom Ash Pond Water Laboratory Analytical Data

Client: Burns & McDonnell
Project/Site: CSM Refinement

TestAmerica Job ID: 490-165222-1
SDG: AEP Pirkey plant

Client Sample ID: SW-EGAP-1
Date Collected: 12/15/18 14:50
Date Received: 12/18/18 10:30

Lab Sample ID: 490-165222-6
Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.30	J	1.0	0.010	mg/L			12/20/18 19:46	1
Sulfate	750		500	3.0	mg/L			12/30/18 09:58	100
Chloride	22	B	6.0	0.40	mg/L			12/30/18 09:41	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0030	U	0.0030	0.00080	mg/L		12/19/18 14:26	12/27/18 15:18	1
Arsenic	0.00055	J	0.0050	0.00040	mg/L		12/28/18 12:47	01/03/19 11:14	1
Barium	0.050	J B	0.20	0.00010	mg/L		12/19/18 14:26	12/27/18 15:18	1
Beryllium	0.0040	U	0.0040	0.00010	mg/L		12/19/18 14:26	12/26/18 22:18	1
Boron	4.5	J	5.0	0.18	mg/L		12/28/18 12:47	12/30/18 12:35	5
Cadmium	0.0050	U	0.0050	0.00010	mg/L		12/19/18 14:26	12/27/18 15:18	1
Calcium	140		1.0	0.053	mg/L		12/19/18 14:26	12/26/18 22:18	1
Chromium	0.0050	U	0.0050	0.00050	mg/L		12/19/18 14:26	12/27/18 15:18	1
Cobalt	0.0024	J	0.0050	0.00010	mg/L		12/19/18 14:26	12/27/18 15:18	1
Lead	0.0050	U	0.0050	0.00010	mg/L		12/19/18 14:26	12/21/18 21:34	1
Lithium	0.023	J	0.040	0.0030	mg/L		12/19/18 14:26	12/21/18 21:34	1
Molybdenum	0.0075	J	0.010	0.0010	mg/L		12/19/18 14:26	12/26/18 22:18	1
Selenium	0.0059	J	0.010	0.00030	mg/L		12/19/18 14:26	12/26/18 22:18	1
Thallium	0.0020	U	0.0020	0.00080	mg/L		12/19/18 14:26	12/21/18 21:34	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	0.00010	mg/L		12/20/18 12:26	12/21/18 12:23	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1100		25	7.0	mg/L			12/19/18 23:00	1

ATTACHMENT D
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 Pirkey East Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.95(g)(3)(ii) have been met.

Beth Ann Gross
Printed Name of Licensed Professional Engineer

Beth Ann Gross
Signature

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Texas Registered Engineering Firm
No. F-1182

79864	Texas	4/25/2019
License Number	Licensing State	Date