

CCR LOCATION RESTRICTION DEMONSTRATION

**BOTTOM ASH POND
MITCHELL POWER GENERATION PLANT
MARSHALL COUNTY, WEST VIRGINIA**

Prepared For:

**KENTUCKY POWER COMPANY
d/b/a AMERICAN ELECTRIC POWER, INC.
COLUMBUS, OHIO**

Prepared By:

**CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
CINCINNATI, OHIO**

CEC Project 110-416

DECEMBER 2015



Civil & Environmental Consultants, Inc.

TABLE OF CONTENTS

1.0	OBJECTIVE	1
2.0	BACKGROUND INFORMATION	2
2.1	CCR UNIT LOCATION.....	2
2.2	DESCRIPTION OF THE CCR UNIT	2
2.2.1	Embankment Configuration.....	3
2.2.2	Area/Volume.....	4
2.2.3	Construction and Operational History	4
2.2.4	Surface Water Control	5
2.3	SUPPORTING INVESTIGATIONS AND DOCUMENTS	5
2.4	HYDROGEOLOGIC SETTING	8
2.4.1	Climate.....	8
2.4.2	Regional and Local Geologic Setting	9
2.4.2.1	Regional Geomorphology and Bedrock Geology.....	9
2.4.2.2	Regional Groundwater Resources.....	11
2.4.2.3	Local Geology.....	11
2.4.3	Local Groundwater Use	13
3.0	§257.60 REQUIRED ISOLATION FROM UPPERMOST AQUIFER.....	14
3.1	§257.60 RULE DESCRIPTION	14
3.2	INFORMATION SUPPORTING RULE COMPLIANCE	14
3.2.1	Uppermost Aquifer Description.....	14
3.2.1.1	Groundwater Flow in the Uppermost Aquifer	14
3.2.2	Groundwater Monitoring Network Installation	15
3.3	COMPLIANCE WITH 40 CFR 257.60 REQUIREMENTS.....	15
4.0	§257.61 WETLANDS IMPACTS	16
4.1	§257.61 RULE DESCRIPTION.....	16
4.2	INFORMATION SUPPORTING RULE COMPLIANCE	17
4.2.1	Wetland Delineation and Permitting.....	17
4.2.2	Impoundment Design and Engineering Controls.....	18
4.3	COMPLIANCE WITH 40 CFR 257.61 REQUIREMENTS.....	18
4.3.1	Compliance With Requirements In 40 CFR 257.61(a)(1)	18
4.3.2	Compliance With Requirements In 40 CFR 257.61(a)(2)(i) through (a)(2)(iv).....	18
4.3.3	Compliance With Requirements In 40 CFR 257.61(a)(3)(i) through (a)(3)(vi).....	19
4.3.4	Compliance With Requirements In 40 CFR 257.61(a)(4)	20
4.3.5	Compliance With Requirements In 40 CFR 257.61(a)(5)	20
5.0	§257.62 FAULT AREAS	21
5.1	§257.62 RULE DESCRIPTION	21
5.2	INFORMATION SUPPORTING RULE COMPLIANCE	21
5.2.1	Determination of Potential Faults	21
5.3	COMPLIANCE WITH 40 CFR §257.62 REQUIREMENTS.....	21

6.0	§257.63 SEISMIC IMPACT ZONES.....	22
6.1	§257.63 RULE DESCRIPTION	22
6.2	INFORMATION SUPPORTING RULE COMPLIANCE	22
	6.2.1 Seismic Impact Zone Determination	22
6.3	COMPLIANCE WITH 40 CFR §257.63 REQUIREMENTS.....	22
7.0	§257.64 UNSTABLE AREAS	23
7.1	§257.64 RULE DESCRIPTION	23
7.2	INFORMATION SUPPORTING RULE COMPLIANCE	23
	7.2.1 Underground Mine Workings	24
7.3	COMPLIANCE WITH 40 CFR §257.64 REQUIREMENTS.....	24
8.0	SUMMARY AND PE CERTIFICATION.....	25
9.0	BIBLIOGRAPHY.....	26

FIGURES

- Figure 1 Site Location Map
- Figure 2 Plant and CCR Unit Location Map
- Figure 3 CCR Unit and Monitoring Wells
- Figure 4 USGS National Fault Zone Map
- Figure 5 USGS National Seismic Hazard Map

TABLES

- Table 1 EPRI Piezometer Static Water Levels (June 23, 2015)

APPENDICES

- Appendix A Bottom Ash Pond Dike Profiles
- Appendix B EPRI Geologic Drawings
- Appendix C Threatened and Endangered Species Correspondence
- Appendix D GA Response to WVOWWM Order Number DS2009-0002 (Item 3)

1.0 OBJECTIVE

This report has been prepared for Kentucky Power Company d/b/a American Electric Power, Inc. (AEP) to demonstrate that the Mitchell Bottom Ash Pond (BAP), a Coal Combustion Residuals (CCR) Unit by definition of the United States Environmental Protection Agency (EPA) CCR Rule which has been published in the Federal Register (FR) on April 17, 2015 and is an extension of the current Code of Federal Rules (CFR) Title 40, Part 257 (§257), meets or exceeds the requirements for Location Restrictions (LRs) as defined in §257.60 through §257.64. The Mitchell BAP is classified as an Existing CCR Surface Impoundment by definition in §257.53 and is required to meet the LRs for Placement Above Uppermost Aquifer (§257.60), Wetlands (§257.61), Fault Areas (§257.62), Seismic Impact Zones (§257.63), and Unstable Areas (§257.64).

2.0 BACKGROUND INFORMATION

Kentucky Power Company (KPC), a subsidiary of AEP, owns and operates the Mitchell Power Generation Plant. This facility is located along West Virginia Route 2 near the City of Cresap, West Virginia (WV) as shown on Figure 1 – Site Location Map. The mailing address of the Mitchell Power Generation Plant is P.O. Box K, Moundsville, WV 26041-0961.

The Mitchell Power Generation Plant uses bituminous coal as the primary fuel source for its two steam-turbine electric generating units. The total electric production capacity of this plant is 1,600 megawatts. Processes and equipment that control air emissions from the coal fired units generate CCRs comprised of fly ash, bottom ash and gypsum. Bottom ash produced at the Mitchell Plant is piped to the BAP and de-watered prior to beneficial reuse or transport and disposal at the Mitchell Landfill, which is located along Gatts Ridge Road (Marshall County Road 72), approximately 2 miles north of the intersection with County Road 74 (about 2 miles due east of the Mitchell Power Generation Plant).

The following subsections provide a summary of the Mitchell BAP CCR Unit.

2.1 CCR UNIT LOCATION

The Mitchell BAP is located on the southern portion of the Mitchell Power Generation Plant facility as depicted on Figure 2 – Plant and CCR Unit Location Map. The approximate center of the Mitchell BAP has the following coordinates:

- Latitude: 39 degrees 49 minutes 30.58 seconds North
- Longitude: 80 degrees 48 minutes 55.16 seconds West

2.2 DESCRIPTION OF THE CCR UNIT

The Mitchell BAP is an active CCR surface impoundment that is part of the Bottom Ash Complex at the facility. The Bottom Ash Complex is comprised of the BAP and the Clear Water Pond. Within the Bottom Ash Complex, the BAP is positioned immediately north of the Clear Water Pond and the south dike of the BAP separates the two ponds. The BAP outlet structure, located in the southwest quadrant of the pond, is hydraulically connected to the Clear Water Pond. The Clear Water Pond is not considered part of the BAP CCR Unit.

The BAP was constructed utilizing dikes comprised of compacted local sandy soils for the north, west and south perimeters and is partially incised into a natural hillside along the east side. The interior slopes of the BAP are lined with a polyvinyl chloride (PVC) liner which is overlain by 3 feet of composite soils. The exterior and interior pond/dike slopes are vegetated (above the pool level on the interior slopes) to minimize erosion.

The Mitchell BAP is divided into two primary areas for progressive settlement of the bottom ash that is sluiced into the CCR unit. Initially, the bottom ash is sluiced into the northeast corner of the eastern half of the pond for initial settling and primary excavation of the decanted material. The sluice water containing finer fractions of bottom ash flows toward the south end of the eastern half of the pond before flowing into the western half of the pond for final settlement of the suspended solids. A culvert pipe allows the sluice water to transition into the west half of the pond. The working bottom of the south half of the Mitchell BAP east side is above the normal operating pool level to allow excavation and load-out operations of the bottom ash collected within the eastern portion of the pond. The western half of the pond is separated from the east half by an interior “splitter” dike and is divided into four (4) individual containment areas separated by internal dikes that direct the flow of water into the containment areas and increase the retention time in order to promote further settling of the bottom ash. After the sluice water proceeds through the west half of the pond, the water is then released from the BAP through a 30-inch diameter reinforced concrete outlet pipe located at the southwest corner of the pond to the Clear Water Pond. The normal pool elevation in the west half of the pond is maintained at approximate elevation 676 feet above mean sea level (amsl).

A Plan View of the Bottom Ash Complex is included in Appendix A along with cross sections through selected portions of the BAP and Clear Water Pond perimeter dikes (identified as Profiles SP1 through SP5). Profiles SP1 through SP4 are applicable to the BAP. In addition, relatively current aerial photography (October 2014) of the BAP is depicted in Figure 2 – Plant and CCR Unit Location Map.

2.2.1 Embankment Configuration

The BAP is constructed with compacted soil dikes along the north, west and south perimeters. The east interior slope is incised within the natural hillside. The interior and exterior slopes are constructed to approximately 3 horizontal to 1 vertical (3H:1V). The crest of the dikes are 20 feet wide. The interior slopes are lined with a PVC liner that is covered with 3 feet of soil.

A summary of the BAP dike and pool operation details is provided below:

- Dike Crest Elevation: 690 feet amsl;
- Maximum Dike Height: 28 feet;
- Normal Operating Pool Level: 676 feet amsl;
- Maximum Design Storm Level: 678.37 feet amsl;
- Freeboard: 14 feet; and,
- Liner Bottom Elevation: 657 to 660 feet amsl.

2.2.2 Area/Volume

Mitchell BAP comprises a total area of approximately 11.9 acres (measured to the toe of the exterior dikes). Using the operating pool elevation of 676 feet amsl and the pond bottom elevation of 660 feet amsl, the maximum storage capacity of the BAP is approximately 123 acre-feet. However, the operating volume of water maintained in the pond is significantly less than the maximum capacity due to the relatively dry bottom ash load-out area, splitter dike and interior diversion dikes.

2.2.3 Construction and Operational History

The Mitchell BAP was constructed and began operation in the mid to late 1970's. The pond construction was approved by WVDEP Division of Water and Waste Management, Dam Safety Section in 1975 as a Hazard Class 2 structure under Dam ID #05108. In addition, the BAP was granted operational approval from WDEP, in conjunction with the Clear Water Pond, in 1977 under National Pollutant Discharge Elimination System (NPDES) Permit No. WV0005304.

The BAP receives approximately 27,000 tons of bottom ash per year that is transported from the Mitchell Power Station boilers to the pond via sluiced transport methods. The bottom ash that settles from the sluice water is regularly excavated from within the BAP and is either beneficially reused off-site or transported to Mitchell Landfill for disposal. The operational pool level is maintained and controlled at about elevation 676 feet amsl through the outlet structure located near the southwest corner of the pond.

The Bottom Ash Pond Complex, including the BAP, is regularly inspected and maintained in accordance with the Maintenance Plan that has been reviewed and approved by the WVDEP Division of Water and Waste Management, Dam Safety Section. As a minimum, Mitchell BAP

is inspected monthly by AEP plant personnel from the Mitchell Power Station and annually by AEP engineering staff. The inspections focus on the various structural and operation items associated with the pond and include: 1) interior and exterior dike maintenance and stability; 2) maintenance and operation of the internal water conveyance structures; 3) maintenance and operation of the inlet and outlet structures; and, 4) monitoring of established instrumentation. In addition to the owner inspection program, the WVDEP, Division of Water and Waste Management, Dam Safety Section completed an inspection on October 15, 2014. Required site and/or appurtenance maintenance or repairs identified during the inspections are completed by AEP plant personnel.

2.2.4 Surface Water Control

The Mitchell BAP is primarily designed to handle the operational inflow of sluiced bottom ash from the Mitchell Power Generation Station. Surface water from within the surrounding drainage area for the BAP is included to determine the maximum required design storage capacity. For this purpose, the design storm used in the analyses is one-half of the 6-hour Probable Maximum Precipitation (PMP) event. Based on the maximum design storm level and the normal operating pool elevation of 676 feet amsl, the maximum pool level increase is 2.37 feet (Elevation 678.37 feet amsl). The normal pool elevation is maintained by the 30-inch diameter reinforced concrete pipe outlet structure located near the southwest corner of the pond. Overflow from the BAP is conveyed to the Clear Water Pond via a concrete overflow shaft and a 30-inch diameter perforated distribution pipe that extends into the Clear Water Pond. Overflow from the Clear Water Pond is conveyed through a 36-inch diameter corrugated metal pipe; where after, it is discharged into the Ohio River in accordance with the referenced NPDES permit.

2.3 SUPPORTING INVESTIGATIONS AND DOCUMENTS

CEC has reviewed the following documents for evaluation of compliance with the CCR LRs:

1. Order Issued Under the Dam Control and Safety Act, West Virginia Code, Chapter 22, Article 14, WVDEP, Division of Water and Waste Management, January 30, 2009, Order No. DS2009-0002, Issued to Mr. Thomas Zelina, American Electric Power, 1 Riverside Drive, Columbus, Ohio 43215-2355.
2. Site Inspection and Observation Report, Mitchell Bottom Ash Complex, Marshall County, West Virginia WVOWWM 1.0. No. 05108, GA File No. 09-379, Prepared For

AEP Service Corporation, 1 Riverside Plaza, Columbus, Ohio 43215-2373, Prepared by Geo/Environmental Associates, Inc., 3502 Overlook Circle, Knoxville, Tennessee 37909, March 22, 2009.

3. Response to WVOWWM Order Number DS2009-0002 (Item 2), Mitchell Bottom Ash Complex, Marshall County, West Virginia WVOWWM 1.0. No. 05108, GA File No. 09-379, Prepared For AEP Service Corporation, 1 Riverside Plaza, Columbus, Ohio 43215-2373, Prepared by Geo/Environmental Associates, Inc., 3502 Overlook Circle, Knoxville, Tennessee 37909, March 18, 2009.
4. Response to WVOWWM Order Number DS2009-0002 (Item 3), Mitchell Bottom Ash Complex, Marshall County, West Virginia WVOWWM 1.0. No. 05108, GA File No. 09-379, Prepared For AEP Service Corporation, 1 Riverside Plaza, Columbus, Ohio 43215-2373, Prepared by Geo/Environmental Associates, Inc., 3502 Overlook Circle, Knoxville, Tennessee 37909, March 18, 2009.
5. CCW Impoundments Inspection Report, Mitchell Power Plant, Marshall County, West Virginia, Prepared for U.S. Environmental Protection Agency, Washington, D.C., Under Subcontract to Lockheed Martin, Edison, New Jersey, Prepared by Paul C. Rizzo Associates, Inc., 101 Westpark Boulevard, Columbia, South Carolina, USA 29210, Project No. 09-4157, October 2009.
6. 2010 Inspection Report, BAP Complex – ID # 05108, Mitchell Plant, Marshall County, West Virginia, AEPSC Document – GERS-10-042 Revision 0, Prepared By American Electric Power Service Corporation, Civil Engineering & Geotechnical Services, 1 Riverside Plaza, Columbus, Ohio 43215.
7. 2011 Inspection Report, BAP Complex – ID # 05108, Mitchell Plant, Marshall County, West Virginia, AEPSC Document – GERS-11-027 Revision 0, Prepared By American Electric Power Service Corporation, Civil Engineering & Geotechnical Services, 1 Riverside Plaza, Columbus, Ohio 43215.
8. 2012 Inspection Report, BAP Complex – ID # 05108, Mitchell Plant, Marshall County, West Virginia, AEPSC Document – GERS-12-035 Revision 0, Prepared By American Electric Power Service Corporation, Civil Engineering & Geotechnical Services, 1 Riverside Plaza, Columbus, Ohio 43215.

9. 2013 Inspection Report, BAP Complex – ID # 05108, Mitchell Plant, Marshall County, West Virginia, AEPSC Document – GERS-13-025 Revision 0, Prepared By American Electric Power Service Corporation, Civil Engineering & Geotechnical Services, 1 Riverside Plaza, Columbus, Ohio 43215.
10. 2014 Inspection Report, BAP Complex – ID # 05108, Mitchell Plant, Marshall County, West Virginia, AEPSC Document – GERS-14-025 Revision 0, Prepared By American Electric Power Service Corporation, Civil Engineering & Geotechnical Services, 1 Riverside Plaza, Columbus, Ohio 43215
11. 2014 Periodic Inspection, Mitchell Bottom Ash Dam (ID 05108), Marshall County, WV, West Virginia Department of Environmental Protection, Environmental Enforcement – Dam Safety, 2031 Pleasant Valley Road, Suite 1, Fairmont, West Virginia, dated January 12,2015.
12. Maintenance Plan, Bottom Ash Pond Complex, ID No. 05108, Located in Marshall County, West Virginia, Kentucky Power Company, Mitchell Plant, Issued: October 2013, Revision: August 2015, Issued By: American Electric Power Service Corporation, Civil Engineering and Geotechnical Services.
13. WV/NPDES Renewal Application, WV NPDES Permit No. WV0005304, Kentucky Power Company, Mitchell Plant, December 22, 2014.
14. BAP Piezometer and Pool Water Levels, September 2009 to December 2012 and May 2015, provided by Kentucky Power, Mitchell Power Generation Plant, Marshall County, West Virginia.
15. Groundwater Quality at the Kammer and Mitchell Power Plants, Marshall County, West Virginia, EPRI Research Project 9106, Site Investigation Report, May 1999.
16. State of West Virginia, Source Water Assessment and Protection Program, Source Water Assessment Report, Revised Report, Mitchell Plant, PWSID WV9925015, Marshall County, Prepared by: West Virginia Department of Health and Human Resources, Bureau for Public Health, Office of Environmental Health Services, Source Water Protection Unit, January 2014.

2.4 HYDROGEOLOGIC SETTING

Hydrogeologic conditions at the Mitchell BAP have been investigated, evaluated and reported in several documents including: 1) Groundwater Quality at the Kammer and Mitchell Power Plants by EPRI in 1999; 2) Site Inspection and Observation Report by Geo/Environmental Associates, Inc. (GA) in 2009; and, 3) CCW Impoundments Inspection Report by Paul C. Rizzo Associates, Inc. (PCR) in 2009. In addition, groundwater and pool level measurements recorded as part of the regular inspections were reviewed. Based on a review of the available information, the following sections provide a summary of the hydrogeologic conditions at the Mitchell BAP.

2.4.1 Climate

Climatic data for Mitchell BAP is summarized as follows:

Average monthly temperature:

Jan./July (degrees F)	Feb./Aug. (degrees F)	March/Sep. (degrees F)	April/Oct. (degrees F)	May/Nov. (degrees F)	June/Dec. (degrees F)
26.70	28.80	38.50	50.10	59.70	68.1
72.00	70.60	64.10	52.50	41.60	31.4

Average monthly precipitation:

Jan./July (inches)	Feb./Aug. (inches)	March/Sep. (inches)	April/Oct. (inches)	May/Nov. (inches)	June/Dec. (inches)
2.86	2.40	3.58	3.28	3.54	3.30
3.83	3.31	2.80	2.49	2.34	2.57

Evapotranspiration:

Jan./July (inches)	Feb./Aug. (inches)	March/Sep. (inches)	April/Oct. (inches)	May/Nov. (inches)	June/Dec. (inches)
0.603	0.467	1.022	2.826	2.477	2.315
2.485	2.087	1.607	1.633	1.349	0.896

2.4.2 Regional and Local Geologic Setting

2.4.2.1 Regional Geomorphology and Bedrock Geology

The Mitchell BAP site is located in the Ohio River valley and lies within the regional geologic area of West Virginia known as the Appalachian Plateau Province. The Ohio River Valley is a significant regional geomorphological feature in the region and is separated into the upper and lower parts. The upper Ohio River valley is entrenched in the unglaciated and dissected Allegheny Plateau and is characterized by valley walls incised commonly 200 feet below the regional upland surface. The valley is a remnant of the historic preglacial Teays Valley drainage system, which is an integral part of the history of the present Ohio River drainage basin. Dismemberment of the preglacial Teays Valley system and development of the present Ohio River valley began in the late Tertiary or early Pleistocene glacial age.

The width characteristics of the upper Ohio River valley upstream from Marietta, Ohio, indicates that at some time during the Pleistocene, the head of southwest-flowing drainage in the Ohio River valley originated in southern Marshall County, WV. Above this point, drainage flowed northeastward. Ray (1974) describes that somewhere near New Martinsville, WV there was a divide in the Ohio River valley between north- and south-flowing drainage. The north-flowing drainage followed the valley of Beaver Creek in Pennsylvania and was blocked by the advance of a continental glacier from the north. The glacial dam caused the formation of a lake in the valley of the Ohio River that rose high enough to overflow the divide. The divide was worn down rapidly by the overflow, and, when the glacial ice had finally melted back, the channel through the divide near New Martinsville was lower than the old north-heading channel at Beaver creek, which had been filled with morainal debris. As a result, the present headwaters of the Ohio River above New Martinsville were diverted to their present course.

By Illinoian time, the present Ohio River was largely established in its present course. The bedrock valley was deepened and broadened and filled with fluvio-glacial deposits during interglacial stages. Post-glacial activity has resulted in downgrading and cutting of terraces and floodplain surficial deposits. Alluvial sand, gravel and clay deposits in the Ohio River valley are more than 100 feet thick and more than one-half mile wide in some areas and are a significant regional groundwater resource. The alluvial sediments in the valley consist of a glaciofluvial fill of medium- to coarse-grained sand and gravel of Wisconsin age and postglacial terrace deposits mainly of the "point-bar" type of river sediment. Sedimentary structures are of the cut-and-fill type, characteristic of aggrading streams. The individual beds are highly lenticular, and there are abrupt changes in particle

size both horizontally and vertically. Lower terraces are often covered by 20 to 30 feet of silty clay and clay which contain some channel-fill sand lenses. These are interpreted as normal flood-plain deposits, mainly of the point-bar type. Flood plains are commonly underlain by thick sections of silt, sand, and clay.

The existing Ohio River bedrock valley has the shape of a trench with a flat bottom and abrupt, steep walls with buried rock benches (Carlston, 1962). Based on the Geologic Map of West Virginia (WVGES Publication: Map 25A), the bedrock in Marshall County predominantly consists of sedimentary bedrock of the Pennsylvanian and Permian age Dunkard, Monogahela and Conemaugh Groups. Bedrock forming the valley walls is composed of cyclic sequences of sandstone, siltstone, claystone, shale, limy shale, shaly limestone, and minor coal beds. While limestone is present within the region, the beds are generally thin and discontinuous. Most of the limestone is non-marine and there are no known karst features noted in the region. The literature indicates that the bedrock was deposited in a wide fluvial-deltaic plain where sediment eroding from the Appalachian Mountains traveled west to be deposited in a large shallow sea in the interior of the continent (Martin, 1998).

The Mitchell BAP is located approximately 5 miles northwest of the Proctor Syncline which strikes to the northeast/southwest. No evidence of folding or faulting was observed during at the site during field investigations completed at the Mitchell Landfill located approximately 2 miles east of the Mitchell BAP. Additional regional folds identified on the West Virginia GIS Technical Center website (<http://wvgis.wvu.edu/index.php>) are present southeast of the BAP which include the New Martinsville Anticline, the Loudenville Syncline, the Washington Anticline and Nineveh Syncline all striking northeast/southwest.

The Pittsburgh Coal has been mined extensively in this region of West Virginia. GA (February 2012) determined that the boundary of the abandoned Woodland Mines in the Pittsburgh Coal seam exists approximately 102 feet horizontally from the downstream toe of the BAP east dike and about 186 feet horizontally from the eastern pool limits in the BAP. The abandoned mine workings are at approximately elevation 490 feet amsl. The difference in elevation between the bottom of the BAP (elevation 660 feet amsl) and the adjacent mine workings is approximately 170 feet. The elevation difference between the downstream toe of the BAP east dike at elevation 680 feet amsl and the mine workings is approximately 190 feet. Further discussion of the abandoned Woodland Mine workings relative to the BAP is provided in Section 7.2.1.

2.4.2.2 Regional Groundwater Resources

The Ohio Department of Natural Resources (ODNR) has published the Groundwater Resource Map of Monroe County (1991), which is the neighboring county along the west side of the Ohio River across from the Mitchell Power Generation Plant. The ODNR map distinguishes groundwater well yields in the county, including bedrock strata and the Ohio River alluvium. Mapped well yields in Monroe County, Ohio are considered to be representative of groundwater yield conditions in neighboring Marshall County, WV. The ODNR Monroe County map indicates that the Ohio River alluvial deposits, referenced herein as the Ohio River alluvial aquifer, can provide yields of several hundred gallons per minute that will support large industrial and municipal supplies from sand and gravel deposits ranging from 55 to 75 feet thick which are hydraulically connected to the Ohio River. Comparatively, bedrock strata, positioned below and confining the lateral boundaries of the Ohio River alluvium, yield very limited groundwater supplies, typically less than 2 gpm. ODNR describes the bedrock strata groundwater resource potential as “very limited and often inadequate”.

CEC interprets that the Ohio River acts as a discharge boundary for the alluvial aquifer during low river flow and a recharge boundary during seasonal high river stage conditions. Seasonal water levels in the Ohio River are partially controlled by a series of locks and dams that are operated by the USACE. Thus, the seasonal high water elevation in the Ohio River alluvial aquifer is interpreted to be equal to the Ohio River Ordinary High Water Elevation published by the US Army Corp of Engineers (USACE).

2.4.2.3 Local Geology

The Mitchell BAP is constructed on the Ohio River floodplain and above the sand and gravel alluvial deposits. The saturated portion of these alluvial deposits, that are in direct hydraulic connection with the Ohio River, are the regional Ohio River alluvial aquifer. Ground surface elevations range from approximately 685 to 630 feet amsl at the Mitchell Power Generation Plant with surrounding hilltops reaching elevation 1,120 to 1,200 feet amsl. Local geologic conditions at the Mitchell BAP were primarily identified by the referenced EPRI report which included approximately 75 geotechnical borings and water level data from eight monitoring wells. These borings ranged in depth from about 36 feet below ground surface (bgs) to 116 feet bgs. Five of the borings were advanced into bedrock with core samples collected from depths of 98 feet bgs to 116 feet bgs. Additional boring data was developed as part of the referenced GA 2009 report that included 5 borings and installation of 4 piezometers. These supplemental

borings were advanced through the constructed perimeter BAP dikes and the investigated depths were limited to about 50 feet below the original ground surface. GA field boring logs describe subsurface soils to be primarily classified as sand, with occasional, thin silt or clay intervals. There is no indication on the boring logs that organic soils or dredge materials were encountered in the BAP dike borings. Laboratory analysis of select soils samples verified these field classifications.

Site specific geologic cross sections from the referenced EPRI report are provided in Appendix B. The cross section locations are presented on Figure 3-3. Figures 3-4 and 3-5 present Sections A-A' and B-B', which are oriented approximately perpendicular to the Ohio River. Section C-C' is presented on Figure 3-6 and is aligned with the river. These cross sections show the variability in the natural unconsolidated soils and strata beneath the Mitchell Power Generation Plant and that the confining bedrock strata rise steeply to the east along the eastern portion of the plant boundary. Generally, the stratigraphy of unconsolidated soil deposits consists of a surficial fill layer underlain by natural silts and clays, then sand and interbedded sand and gravel deposits. EPRI identified four generalized textural zones were within the alluvial deposits. Significant variability was noted with respect to both zone thickness and textural characteristics. The referenced EPRI textural zones and their thickness ranges are as follows:

<u>Textural Zone</u>	<u>Thickness (ft.)</u>
Clay	0-17
Sand	0-30
Gravel	0 - 97
Gravel lenses	0-50

Fill was used extensively for establishing the required land surface grade of about elevation 667 feet amsl at the BAP site. The fill is composed of light brown silts and clays with minor amounts of coal, sand, and gravel. The fill is up to 25 feet thick and covers the western portion of the site, where it was used to extend an upper river terrace toward the river and establish the required land surface grade of about 667 feet amsl for the Mitchell Power Generation Plant. Between the Ohio River and the eastern portion of the Mitchell Power Generation Plant, including most of the BAP, the bedrock is near level at about elevations 570 feet amsl or about 100 feet below the original ground surface as shown on Figures 3-4 and 3-5 in Appendix B.

2.4.3 Local Groundwater Use

The Mitchell Power Generating Plant withdrawals water from the Ohio River alluvial aquifer that serves as a source of potable water for the plant. Currently, there are two groundwater supply wells operating at the plant. Information provided by AEP indicates that the supply wells produced an approximate average of 628,000 gallons per month in 2014. The influence of the supply wells is shown on the EPRI Water Table Contour Map for the Mitchell Plant site (August 20, 1996) on Figure 3-7 in Appendix B. Water levels collected on May 20, 2015 from six of the eight original monitoring wells at the plant are similar to those used recorded during the EPRI study and also indicate the pumping well influence. A summary of the supply wells is provided below.

Supply Well #2

- Total Well Depth 92.6 feet
- Screen Length 15 feet with Top of Screen at 77 feet
- Well Diameter 10 inches
- Static Water Level 43.6 feet on 6/12/14 Step Test
- Step Test performed – specific capacity at 163 GPM = 233 GPM/FT
- End of Step Test 224 GPM = 1.10 feet drawdown

Supply Well #3

- Total Well Depth 91.6 feet
- Screen Length 20 feet with Top of Screen at 71 feet
- Well Diameter 14 inches
- Static Water Level 41.2 feet on 5/30/14 Step Test
- Step Test performed – specific capacity at 172 GPM = 82 GPM/FT
- End of Step Test 231 GPM = 2.70 feet drawdown

3.0 §257.60 REQUIRED ISOLATION FROM UPPERMOST AQUIFER

3.1 §257.60 RULE DESCRIPTION

40 CFR 257.60(a) states:

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table).

3.2 INFORMATION SUPPORTING RULE COMPLIANCE

3.2.1 Uppermost Aquifer Description

The referenced EPRI report identifies that the Mitchell Power Generation Station and subject BAP are positioned over Ohio River alluvial deposits consisting of 40 to 50 feet of lenticular sand and gravel overlain by a layer of fine grained material, consisting of approximately 20 feet of clay and clayey silt and 10 to 20 feet of clayey sand. The unconsolidated alluvial deposits pinch out against the confining bedrock strata that contains the Ohio River channel and form the adjacent ridges positioned east of the subject site and west of the Ohio River.

The Ohio River alluvial aquifer, which consists of the saturated portion of the sand and gravel alluvial deposits that are in direct hydraulic connection with the Ohio River, is appropriately defined as the Uppermost Aquifer (UA) beneath the Mitchell BAP. The elevations of the saturated sand and gravel deposits in the EPRI report range from approximately 570 to 624 feet amsl. The seasonal high water elevation in the Ohio River alluvial aquifer is equal to the Ohio River Ordinary High Water Elevation, which is elevation 627.3 feet amsl in the vicinity of the Mitchell BAP. The base of the BAP's PVC liner is positioned at elevation 657 to 660 feet amsl.

3.2.1.1 *Groundwater Flow in the Uppermost Aquifer*

Groundwater flow in the Ohio River alluvial aquifer in the vicinity of the Mitchell BAP was determined by the referenced EPRI report to be toward the Ohio River with some influence from the Mitchell Generation Power Station water supply wells as shown in Figure 3-7 in Appendix B.

Table 1 – EPRI Piezometer Static Water Levels (June 23, 2-15), presents groundwater levels measured on June 23, 2015 which are comparable to those reported by EPRI in 1999. The June 23, 2015 water levels range from 623.63 to 624.51 feet amsl and are below the Ohio River Ordinary High Water Elevation (Elevation 627.3 feet amsl).

3.2.2 Groundwater Monitoring Network Installation

In November 2015, AEP began installation of upgradient and downgradient groundwater monitoring wells and piezometers at the Mitchell BAP at the locations shown on Figure 3 - CCR Unit and Monitoring Wells, in order to comply with the groundwater monitoring requirements in 40 CFR 257.91. The wells will monitor the UA, defined in Section 3.2.1 as the Ohio River alluvial aquifer. Subsurface soil samples and groundwater elevations from these monitoring wells will be available to confirm the position of the phreatic surface (water table) in the Ohio River alluvial aquifer below the Mitchell BAP. Water levels from these monitoring wells will be used to prepare groundwater hydrographs depicting seasonal groundwater fluctuations and will be compared to water levels measured during the EPRI study completed in 1999, recent water levels in June 2015 from remaining EPRI wells, and the Ohio River Ordinary High Water Elevation in order to confirm the 5-foot separation requirement in 40 CFR 257.60. The locations of the monitoring well network at the Mitchell BAP presented in Figure 3 - CCR Unit and Monitoring Wells are based on the EPRI's interpretation of the alluvial aquifer flow paths. Following well installation and development, static water levels will be recorded monthly and compared to Ohio River water levels to further evaluated groundwater flow directions and seasonal high groundwater elevations in the UA beneath the Mitchell BAP.

3.3 COMPLIANCE WITH 40 CFR 257.60 REQUIREMENTS

The base of the Mitchell BAP PVC liner system is constructed at elevation 657 to 660 feet amsl. The seasonal high groundwater elevation in the UA, concluded to be the Ohio River alluvial aquifer, is the equal to the Ohio River Ordinary High Water Elevation determined by the USACE to be elevation 627.3 feet amsl in the vicinity of the Mitchell BAP. Thus, the separation between the Mitchell BAP and the UA is greater than 27 feet, which significantly exceeds the 1.52 meters (5-feet) requirement in 40 CFR 257.60. The currently available subsurface and groundwater data is sufficient to demonstrate compliance with the requirements in 40 CFR 257.60.

4.0 §257.61 WETLANDS IMPACTS

4.1 §257.61 RULE DESCRIPTION

40 CFR 257.61 states:

New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (a)(5) of this section.

(a)(1) Where applicable under section 404 of the Clean Water Act or applicable state wetlands laws, a clear and objective rebuttal of the presumption that an alternative to the CCR unit is reasonably available that does not involve wetlands.

(a)(2) The construction and operation of the CCR unit will not cause or contribute to any of the following:

(a)(2)(i) A violation of any applicable state or federal water quality standard;

(a)(2)(ii) A violation of any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act;

(a)(2)(iii) Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973; and,

(a)(2)(iv) A violation of any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary.

(a)(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors:

(a)(3)(i) Erosion, stability, and migration potential of native wetland soils, muds and deposits used to support the CCR unit;

(a)(3)(ii) Erosion, stability, and migration potential of dredged and fill materials used to support the CCR unit;

(a)(3)(iii) The volume and chemical nature of the CCR;

(a)(3)(iv) Impacts on fish, wildlife, and other aquatic resources and their habitat from release of CCR;

(a)(3)(v) The potential effects of catastrophic release of CCR to the wetland and the resulting impacts on the environment; and,

(a)(3)(vi) Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected.

(a)(4) To the extent required under section 404 of the Clean Water Act or applicable state wetlands laws, steps have been taken to attempt to achieve no net loss of wetlands (as defined by acreage and function) by first avoiding impacts to wetlands to the maximum extent reasonable as required by paragraphs (a)(1) through (3) of this section, then minimizing unavoidable impacts to the maximum extent reasonable, and finally offsetting remaining unavoidable wetland impacts through all appropriate and reasonable compensatory mitigation actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands); and,

(a)(5) Sufficient information is available to make a reasoned determination with respect to the demonstrations in paragraphs (a)(1) through (4) of this section.

4.2 INFORMATION SUPPORTING RULE COMPLIANCE

4.2.1 Wetland Delineation and Permitting

CEC conducted an evaluation of the presence of wetlands in the vicinity of the Mitchell BAP utilizing the background sources listed below to establish site characteristics that could aid in the identification of possible wetlands.

- U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory mapping;
- U.S. Department of Agriculture (USDA), National Resource Conservation Service Soil Survey Geographic Databases for Marshall County, WV; and,
- USDA National List of Hydric Soils.

Based on these sources, no mapped wetland features or suspect hydric soils were identified.

CEC also reviewed aerial photography of the immediate area surrounding the Mitchell BAP (dated June 3, 2015). Based on a review of the aerial and site photography and the above referenced background sources, no apparent wetlands were identified in the vicinity of the Mitchell BAP. In addition, CEC corresponded with the WV Department of Natural Resources

(WVDNR) and the USFWS to determine if threatened or endangered species or critical habitat areas were known to exist within the Mitchell BAP site. CEC received replies from both agencies indicating that there are no known records of rare, threatened and endangered species. Correspondence between CEC and the resource agencies is provided in Appendix C.

4.2.2 Impoundment Design and Engineering Controls

The Mitchell BAP has been designed, constructed and maintained to protect the environment both within the facility and beyond the boundary limits. The Mitchell BAP design and operational activities maintain stability of the CCR unit and protect the environment by the following: 1) regular collection and removal of bottom ash as it decants from sluice water within the pond resulting in minimal storage of bottom ash in the impoundment; 2) regular removal of suspended solids through high retention time prior to discharging to the Clear Water Pond; 3) containment of CCR materials within the impoundment through the use of stable exterior dikes that exceed the stability requirements established by WVDEP, Division of Water and Waste Management – Dam Safety; 4) providing an impermeable PVC barrier between the CCR materials and groundwater; 5) Best Management Practices (BMPs) for erosion and sediment control for the exterior and interior dike slopes; 6) an outlet control structure that is designed to maintain the normal pool elevation and maximum flood elevation well below the top of the dikes; and, 7) implementation of the WVDEP, Division of Water and Waste Management – Dam Safety approved Maintenance Plan that includes regular inspections and associated maintenance of the BAP.

4.3 COMPLIANCE WITH 40 CFR 257.61 REQUIREMENTS

4.3.1 Compliance With Requirements In 40 CFR 257.61(a)(1)

Wetlands do not exist in the vicinity of the existing Mitchell BAP, thus, an alternative to the Mitchell BAP is not necessary.

4.3.2 Compliance With Requirements In 40 CFR 257.61(a)(2)(i) through (a)(2)(iv)

The Mitchell BAP was issued a NPDES renewal Permit No. WV0005304 dated November 30, 2010 from the WVDEP. All discharge from the Mitchell BAP is routed through the Clear Water Pond and the permitted NPDES outfall, which discharges to the Ohio River to

the west. The outfall is subject to discharge monitoring and associated reporting in accordance with the NPDES Permit.

The USFWS and the WVDNR confirmed that threatened or endangered species or critical habitat areas are not present within the vicinity of the Mitchell BAP, based on the responses included in Appendix C. Thus, the BAP CCR unit will not jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973.

As part of the Mitchell Landfill Solid Waste/NPDES Permit Application, leach testing of the CCR materials, including bottom ash from the Mitchell Power Generation Plant, was completed via ASTM preparation (ASTM D3987, Standard Test Method for Shake Extraction of Solid Waste with Water) and/or Toxicity Characteristic Leaching Procedure (TCLP), U.S. EPA Method 1311 preparation. The test data identified that the CCR material leachate meets the corrosivity and toxicity criteria listed in CSR 33-20-3 and the criteria outlined in 40 CFR 261 Subpart C. In addition, two chemicals, organosulfide (NALCO Nalmet 1689) and a flocculant (NALCO 71301) are used for mercury treatment within the BAP. The Mitchell Bottom Ash Complex NPDES permit requires regularly scheduled monitoring of 27 water quality parameters to assure that treatment of effluent from the Clear Water Pond (through the BAP) is effective and that NPDES discharge limitations are not exceeded at the Clear Water Pond outlet. Therefore, based on the constructed engineering controls and systems to protect the environment (as described in Section 4.2.2) combined with the fact that the CCR material will not leach toxic concentrations of constituents, it is concluded that: 1) applicable state or federal water quality standards are not violated; and, 2) Section 307 of the Clean Water Act is not violated.

Mitchell BAP is not located in the vicinity of marine waters; therefore, this compliance requirement portion of the referenced subsection is not applicable.

4.3.3 Compliance With Requirements In 40 CFR 257.61(a)(3)(i) through (a)(3)(vi)

It is concluded that the Mitchell BAP was not constructed atop or using native wetland soils, muds and wetland deposits, or dredged materials because: 1) available wetland inventory mapping does not identify the presence of wetlands in the general area of the BAP; and, 2) subsurface explorations by GA in 2009 did not encounter wetland soils, muds or dredged materials within the perimeter dikes or the natural subsurface soil that the dikes are founded on.

Because Mitchell BAP has been designed with engineering systems and controls to protect the environment (as described in Section 4.2.2) and the BAP operates in accordance with the Maintenance Plan, a release of CCR materials from the facility is unlikely. Clogging of the BAP discharge pipe coupled with continued sluicing from the plant represents the most significant potential for an uncontrolled release. The BAP is observed and inspected monthly which greatly reduces the likelihood that clogging of the discharge pipe would go un-noticed. Minor contributions of stormwater enter the BAP; therefore, even an extreme precipitation event would have little effect on the BAP water level, the potential to overtop the dike or the dike stability. In lieu of these considerations, the Mitchell BAP will not cause or contribute to significant degradation or endangerment of fish, wildlife, aquatic resources and habitat, wetlands or the environment in the event of a catastrophic release for the following reasons: 1) there are no existing wetlands along the riverbank downgradient of the BAP; 2) the BAP is regularly excavated to remove settled coarse and fine bottom ash from the CCR Unit, thus, reducing the potential volume of bottom ash that could impacted these environments; and, 3) the dilution effect that the Ohio River would provide, compared to the relatively small volume of material that could reach the river from a release at the BAP, would not result in a significant environmental impact.

4.3.4 Compliance With Requirements In 40 CFR 257.61(a)(4)

As stated in Section 4.2.1, no apparent wetlands were identified in the vicinity of the Mitchell BAP, thus, the Mitchell BAP meets compliance with this subsection of the rule.

4.3.5 Compliance With Requirements In 40 CFR 257.61(a)(5)

The information presented in Sections 4.2 and 4.3.1 through 4.3.4 is sufficient to make a reasoned determination that wetlands and threatened and endangered species do not exist in the vicinity of the Mitchell BAP and that the CCR unit is constructed and operated in compliance with the requirements in 40 CFR 257.61(a)(1) through (a)(4).

5.0 §257.62 FAULT AREAS

5.1 §257.62 RULE DESCRIPTION

40 CFR 257.62 states:

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

5.2 INFORMATION SUPPORTING RULE COMPLIANCE

5.2.1 Determination of Potential Faults

The regional and local geologic setting for the Mitchell BAP site is discussed in Section 2.4.2. With respect to potential faults in the vicinity of Mitchell BAP, the nearest Quaternary fault zones identified by the USGS Quaternary Fault and Fold Database (<http://earthquake.usgs.gov/hazards/qfaults/>) are: 1) the Pembroke faults; and, 2) the Central Virginia seismic zone. The closest being the Pembroke faults that are located over 200 miles to the south of Mitchell BAP. Figure 4 – USGS National Fault Zone Map depicts location of the above referenced faults with respect to Mitchell BAP. In addition, the site investigations and explorations performed at a nearby location did not indicate evidence of faulting.

5.3 COMPLIANCE WITH 40 CFR §257.62 REQUIREMENTS

The available USGS data demonstrates that Mitchell BAP is not located within 60 meters (200 feet) of a fault that has displaced within Holocene time and complies with the requirement in 40 CFR 257.62 Fault Areas.

6.0 §257.63 SEISMIC IMPACT ZONES

6.1 §257.63 RULE DESCRIPTION

40 CFR 257.63 states:

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

6.2 INFORMATION SUPPORTING RULE COMPLIANCE

6.2.1 Seismic Impact Zone Determination

A seismic impact zone, as defined in the CCR Rule, is an area having 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g (10% of standard gravity) in 50 years. The peak ground (horizontal) acceleration for the Mitchell BAP site is estimated to range between 4% and 6% of the earth's gravitational pull according to the USGS "National Seismic Hazard Map – 2014 Peak Ground Acceleration (%g) with 2% Probability of Exceedance in 50 years." Figure 5 - USGS National Seismic Hazard Map, depicts the Mitchell BAP site with respect to the National Seismic Hazard Map.

6.3 COMPLIANCE WITH 40 CFR §257.63 REQUIREMENTS

Because the estimated peak horizontal acceleration from a potential seismic event is below 10% of standard gravity for the Mitchell BAP site, it is concluded that the BAP site is not located within a seismic impact zone and satisfies the requirements of 40 CFR 257.63 Seismic Impact Zones.

7.0 §257.64 UNSTABLE AREAS

7.1 §257.64 RULE DESCRIPTION

40 CFR 257.64 states:

(a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

(b) The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

- (1) On-site or local soil conditions that may result in significant differential settling;*
- (2) On-site or local geologic or geomorphologic features; and,*
- (3) On-site or local human-made features or events (both surface and subsurface).*

(c) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of paragraph (a) of this section.

7.2 INFORMATION SUPPORTING RULE COMPLIANCE

40 CFR 257.53 provides the following definition of Unstable Areas: “Unstable area means a location that is susceptible to natural or human induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains.” Review of existing information related to the design and construction of Mitchell BAP identified one local condition that could be considered to be a potential unstable area, underground mine workings near the Mitchell BAP. This potential unstable area was evaluated by GA in 2009 to determine whether the impoundment engineering systems could be impacted by the nearby underground mine workings.

The following section summarizes the unstable area evaluation related to underground mine workings that was completed for Mitchell BAP. Supporting calculations and reporting are contained in the GA report enclosed in Appendix D.

7.2.1 Underground Mine Workings

Site investigations by GA in 2009 identified that an underground coal mine was present in the vicinity of the Mitchell BAP. Based on available mine maps and records, the western limits of the Woodland Mine Workings terminated just east of the BAP and have since been abandoned. Specifically, the west limits of the Woodland Mine Workings extended to within 102 feet (laterally) of the BAP east dike slope toe. The Plan View figure within the Response to WVDWWM Order Number DS2009-002 (Item 3) prepared by GA on March 18, 2009 (within Appendix D) depicts the approximate location of the abandoned mine works that are near the BAP. Records indicate that the Pittsburgh Coal seam was mined from these workings at about elevation 490 feet amsl, varying from about 170 to 200 feet below the BAP.

Because abandoned mine works are present near the east boundary of the BAP and a potential collapse of these workings could impact the stability of the east dike, GA performed a calculation to determine the potential influence zone associated with a collapse of the mine workings. The influence zone calculation, contained in the above referenced report, determined that the maximum lateral distance for which ground surface deformations could occur from the western extent of the Woodland Mine Workings (as a result of a full collapse of the mine workings) would be about 86 feet from the mine boundary. Based on the location of the mine workings and the BAP, the calculated minimum distance between BAP and the potential mine collapse influence zone was at about 16 feet (maximum influence was 16 feet east of the BAP dike limits). Further, the referenced report concluded that in the event of a future underground mine failure, the Woodland Mine Workings would not have an impact on the BAP. The referenced report was submitted to the WVDEP Division of Water and Waste Management in response to an Order of Compliance issued to AEP on January 30, 2009.

7.3 COMPLIANCE WITH 40 CFR §257.64 REQUIREMENTS

The information presented in Section 7.2 is sufficient to make a reasoned determination that Mitchell BAP has been designed and constructed to ensure that the integrity of the structural components of the impoundment will not be disrupted by unstable areas in compliance with 40 CFR 257.64(a).

8.0 SUMMARY AND PE CERTIFICATION

This CCR Location Restriction Demonstration addresses compliance of the Mitchell BAP with the CCR Rule LR's. In summary, Mitchell BAP has been designed and constructed to meet the CCR Rule LR requirements including: Placement Above Uppermost Aquifer (§257.60); Wetlands (§257.61); Fault Areas (§257.62); Seismic Impact Zones (§257.63); and, Unstable Areas (§257.64). Sections 3.0 through 7.0 of this report provide supporting information and conclusions demonstrating that each LR has been met.

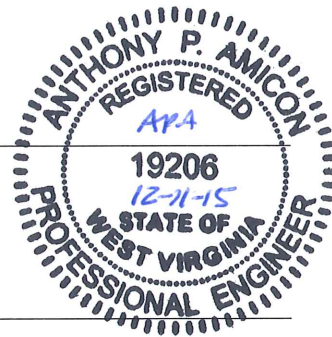
The following certification statement provides confirmation that this report was prepared by a qualified professional engineer and that there is sufficient information to demonstrate that the existing Mitchell BAP meets the LR requirements stated in 40 CFR 257.60 through 257.64.

Professional Engineer's Certification

By means of this certification, I certify that I have reviewed this CCR Location Restriction Demonstration Report, Mitchell Bottom Ash Pond, Mitchell Power Generation Plant, and the design and construction of Mitchell BAP meets the requirements of Section 40 CFR 257.60 through 257.64.

Anthony P. Amicon
Printed Name of Professional Engineer


Signature



19206
Registration No.

West Virginia
Registration State

6-23-11
Date

9.0 BIBLIOGRAPHY

Carlston, 1962. Character and History of the Upper Ohio River Valley, Geologic Survey Bulletin 1141-I, United States Department of the Interior, Geologic Survey, United States Government Printing Office.

Ray, 1974. Geomorphology and Quaternary Geology of the Glaciated Ohio River Valley, A Reconnaissance Study. Geologic Survey Professional Paper 826. United States Department of the Interior, Geologic Survey, United States Government Printing Office.

Mine Subsidence Analysis, Mitchell Landfill, Marshall County, West Virginia, Report to American Electric Power, 1 Riverside Plaza, Columbus, Ohio 43215, Prepared by Civil & Environmental Consultants, Inc., 4274 Glendale Milford Road, Cincinnati, Ohio 45242, CEC Project No. 110-416-2000, February 2012.

CCR Impoundments Inspection Report, Mitchell Power Plant, Marshall County, West Virginia, Prepared for U.S. Environmental Protection Agency, Washington, D.C., Under Subcontract to Lockheed Martin, Edison, New Jersey, Prepared by Paul C. Rizzo Associates, Inc., 101 Westpark Boulevard, Columbia, South Carolina, USA 29210, Project No. 09-4157, October 2009. Geology of the Dunkard Group (Upper Pennsylvanian – Lower Permian) in Ohio, West Virginia and Pennsylvania, Bulletin 73, Wayne D. Martin, 1998.

Ground-Water Resources of Monroe County, Ohio. Ohio Department of Natural Resources, Division of Water, Groundwater Resources Division, 1939 Fountain Square, Columbus, Ohio 43224.

Groundwater Quality at the Kammer and Mitchell Power Plants, Marshall County, West Virginia, EPRI Research Project 9106, Site Investigation Report, May 1999.

Response to WVOWWM Order Number DS2009-0002 (Item 2), Mitchell Bottom Ash Complex, Marshall County, West Virginia WVOWWM 1.0. No. 05108, GA File No. 09-379, Prepared For AEP Service Corporation, 1 Riverside Plaza, Columbus, Ohio 43215-2373, Prepared by Geo/Environmental Associates, Inc., 3502 Overlook Circle, Knoxville, Tennessee 37909, March 18, 2009.

Walker, Alfred C., February 1991. Ground Water Resources of Monroe County, Ohio Department of Natural Resources, Columbus, Ohio.

WVGES Publication: Map 25A, West Virginia Geological and Economic Survey Mont Chateau
Research Center 1 Mont Chateau Road Morgantown, WV 26508-8079 Phone: 304-594-2331.

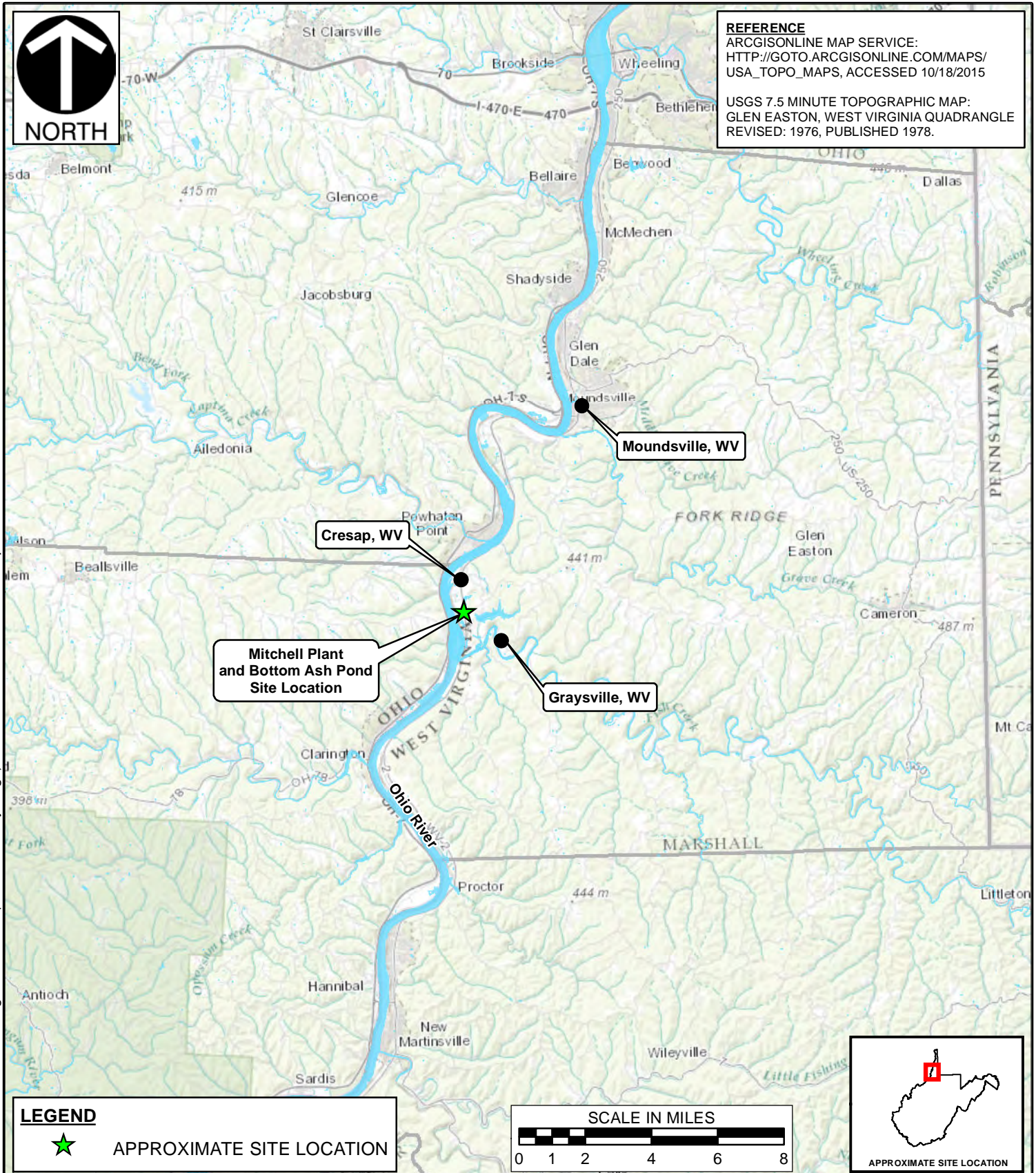
Web: www.wvgs.wvnet.edu, Map: Original 1968/1969 map revised, March 2011, Map Date:
May 16, 2011.

FIGURES




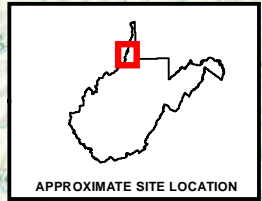
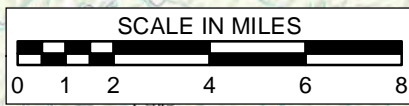
REFERENCE
 ARCGISONLINE MAP SERVICE:
 HTTP://GOTO.ARCGISONLINE.COM/MAPS/
 USA_TOPO_MAPS, ACCESSED 10/18/2015

USGS 7.5 MINUTE TOPOGRAPHIC MAP:
 GLEN EASTON, WEST VIRGINIA QUADRANGLE
 REVISED: 1976, PUBLISHED 1978.



P:\2011\110-4161-GIS\Maps\Task_7700\110416_7700_Figure1.mxd LS:(10/18/2015 - jfrogde) - LP:8/4/2015 3:59:54 PM - LExported:10/18/2015 3:28:13 PM

LEGEND
 APPROXIMATE SITE LOCATION



Civil & Environmental Consultants, Inc.

5899 Montclair Boulevard - Cincinnati, OH 45150
 513-985-0226 - 800-759-5614
 www.cecinc.com

AMERICAN ELECTRIC POWER
 MITCHELL BOTTOM ASH POND
 MITCHELL POWER GENERATION PLANT
 MARSHALL COUNTY, WEST VIRGINIA

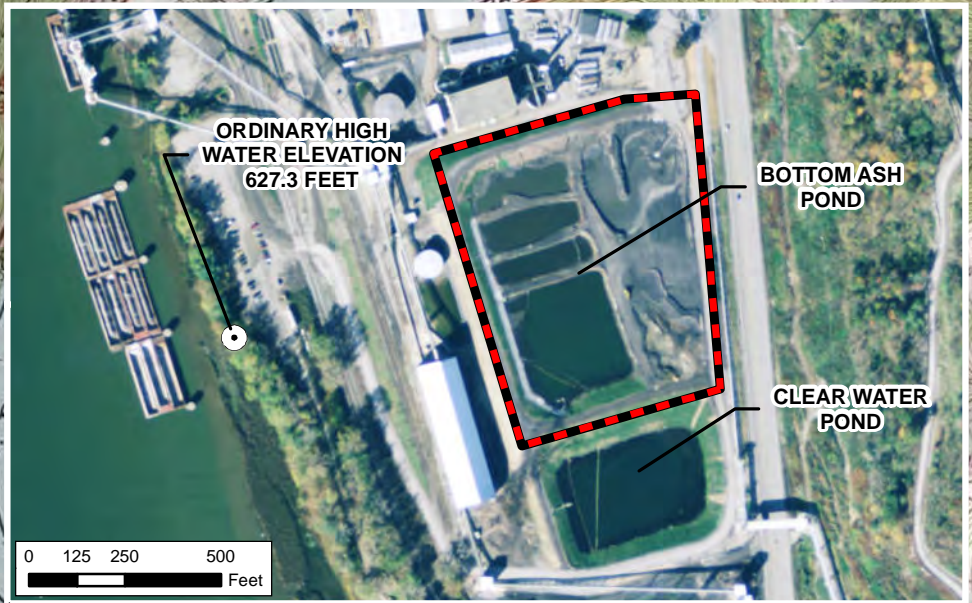
CCR LOCATION RESTRICTION DEMONSTRATION
 SITE LOCATION MAP

DRAWN BY:	MAD	CHECKED BY:	RAS	APPROVED BY:	APA*	FIGURE:	1
DATE:	10/18/2015	MAP SCALE:	1" = 4 miles	PROJECT NO:	110-416-7700		

*Hand signature on file



NORTH

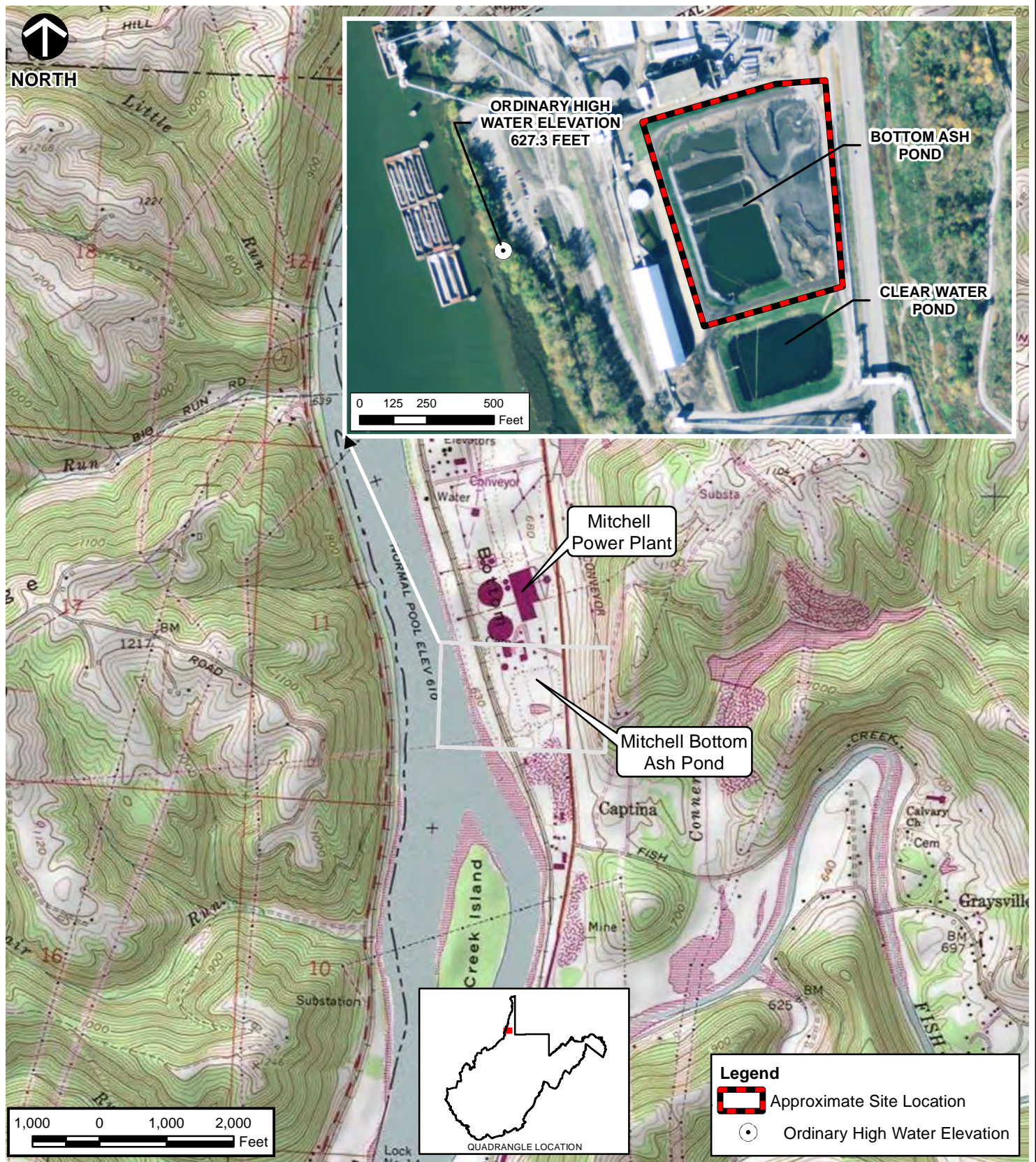


ORDINARY HIGH WATER ELEVATION 627.3 FEET

BOTTOM ASH POND

CLEAR WATER POND

0 125 250 500 Feet



Mitchell Power Plant

Mitchell Bottom Ash Pond

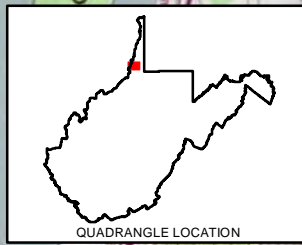
Legend



Approximate Site Location



Ordinary High Water Elevation



QUADRANGLE LOCATION

SOURCE: PORTION OF THE USGS 7.5-MINUTE SERIES TOPOGRAPHIC QUADRANGLE MAP - GLEN EASTON, WV - 1978 AND POWHATAN POINT, WV - 1978.

SOURCE: AERIAL PHOTOGRAPH - ARCGISONLINE MAP SERVICE: HTTP://GOTO.ARCGISONLINE.COM/MAPS/WORLD_IMAGERY, ACCESSED 10/19/2015 IMAGERY DATE 10/24/2014



Civil & Environmental Consultants, Inc.

5899 Montclair Boulevard - Cincinnati, OH 45150

513-985-0226 - 800-759-5614

www.cecinc.com

AMERICAN ELECTRIC POWER
MITCHELL BOTTOM ASH POND
MITCHELL POWER GENERATION PLANT
MARSHALL COUNTY, WEST VIRGINIA

CCR LOCATION RESTRICTION DEMONSTRATION
PLANT AND CCR UNIT LOCATION MAP

DRAWN BY:

JBF

CHECKED BY:

RAS

APPROVED BY:

APA*

FIGURE NO:

DATE: OCTOBER 19, 2015

DWG SCALE:

1" = 2,000'

PROJECT NO:

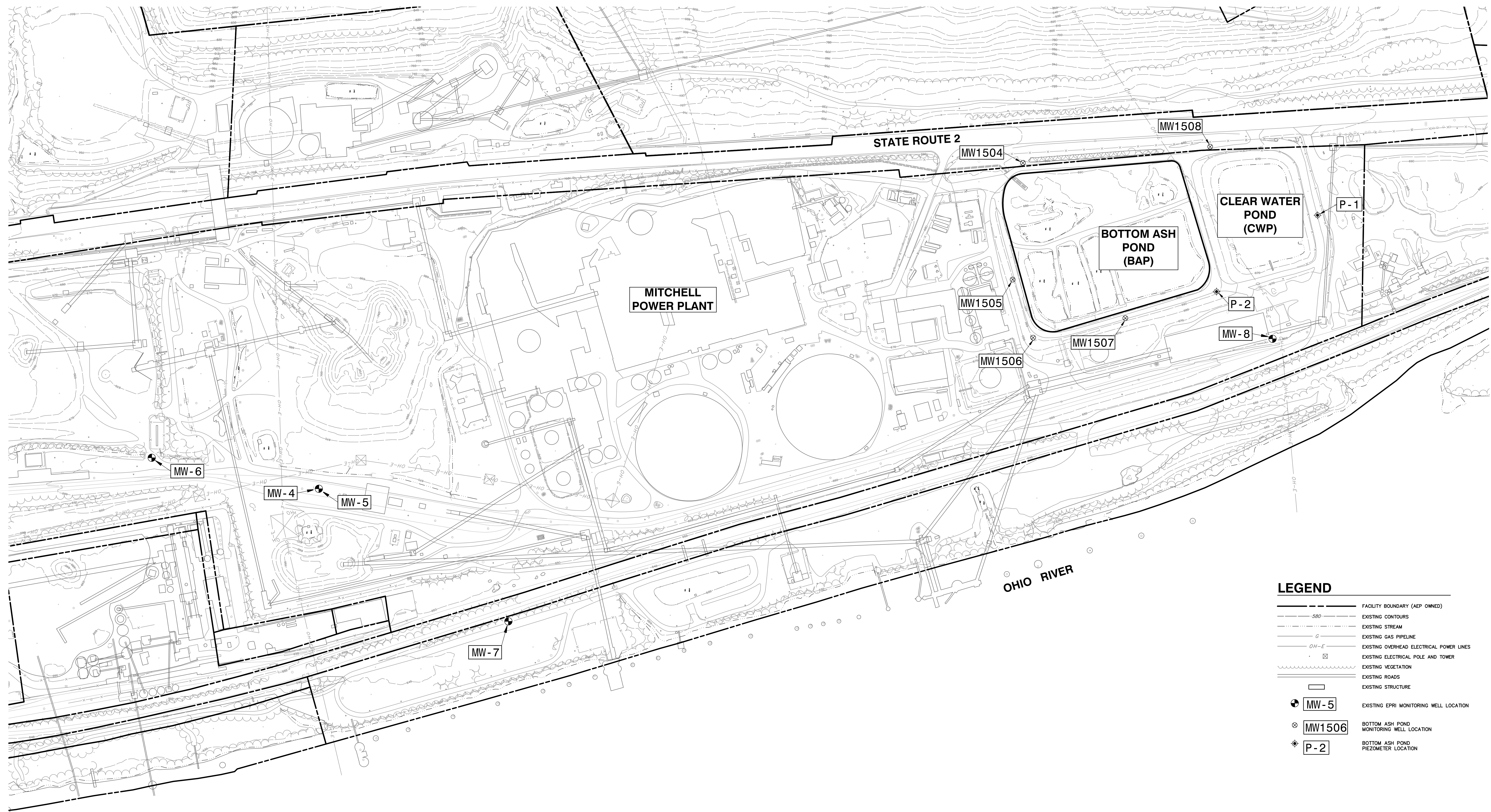
110-416-7700

2

Signature on File*

P:\2011\10-416-GIS\Maps\Task 7700\110416.t7700 Figure 2.mxd - 10/19/2015 - 9:45:55 AM

P:\2017\1150-491-000\0901.MXD C:\Users\j1046\OneDrive\Work\Projects\1150-491-000\1150-491-000.dwg - EP 12/22/2016 1:46 AM



LEGEND

	FACILITY BOUNDARY (AEP OWNED)
	EXISTING CONTOURS
	EXISTING STREAM
	EXISTING GAS PIPELINE
	EXISTING OVERHEAD ELECTRICAL POWER LINES
	EXISTING ELECTRICAL POLE AND TOWER
	EXISTING VEGETATION
	EXISTING ROADS
	EXISTING STRUCTURE
	EXISTING EPRI MONITORING WELL LOCATION
	MW-5
	EXISTING EPRI MONITORING WELL LOCATION
	MW1506
	BOTTOM ASH POND MONITORING WELL LOCATION
	P-2
	BOTTOM ASH POND PIEZOMETER LOCATION

NORTH

SCALE IN FEET

0 300 150

CONTOUR INTERVAL = 10 FEET

NO.	DATE	REVISION RECORD

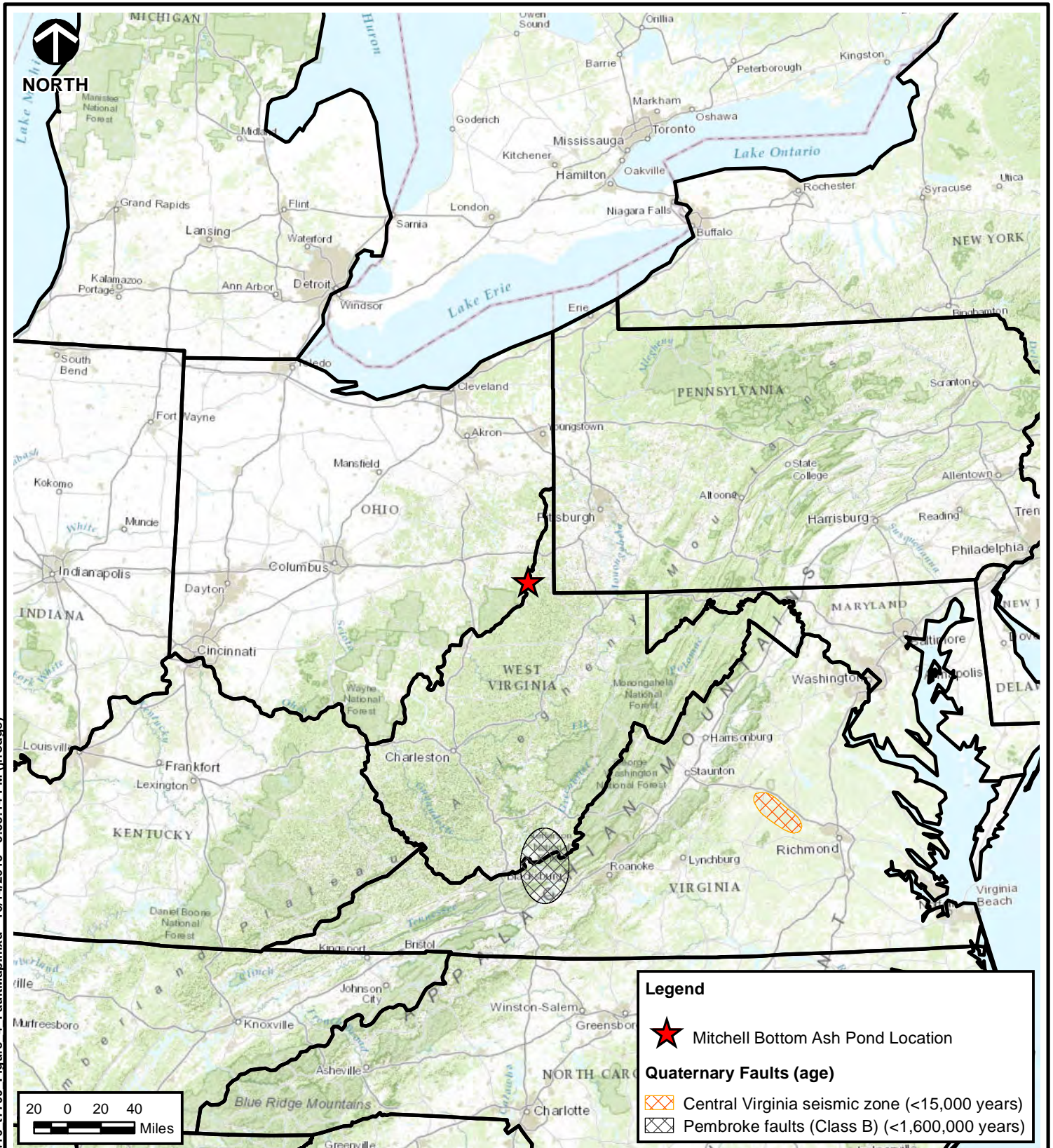
Civil & Environmental Consultants, Inc.
5899 Montclair Blvd. - Cincinnati, OH 45210
513-985-0226 - 800-759-5614
www.cerinc.com

**AMERICAN ELECTRIC POWER
MITCHELL BOTTOM ASH POND
MITCHELL POWER GENERATION PLANT
MARSHALL COUNTY, WEST VIRGINIA**




**CCR LOCATION RESTRICTION DEMONSTRATION
CCR UNIT AND MONITORING WELLS**

DATE: AUGUST 2016 DRAWN BY: DAR
DWG SCALE: RAS
PROJECT NO.: 110-416
APPROVED BY: APA

FIGURE NO.: **3**



Legend

-  Mitchell Bottom Ash Pond Location
- Quaternary Faults (age)**
-  Central Virginia seismic zone (<15,000 years)
-  Pembroke faults (Class B) (<1,600,000 years)

SOURCE: USGS NATIONAL FAULT AND FOLD DATABASE
 ACCESSED AT: <http://earthquake.usgs.gov/hazards/qfaults/>



Civil & Environmental Consultants, Inc.
 5899 Monclair Boulevard - Cincinnati, OH 45150
 513-985-0226 - 800-759-5614
 www.cecinc.com

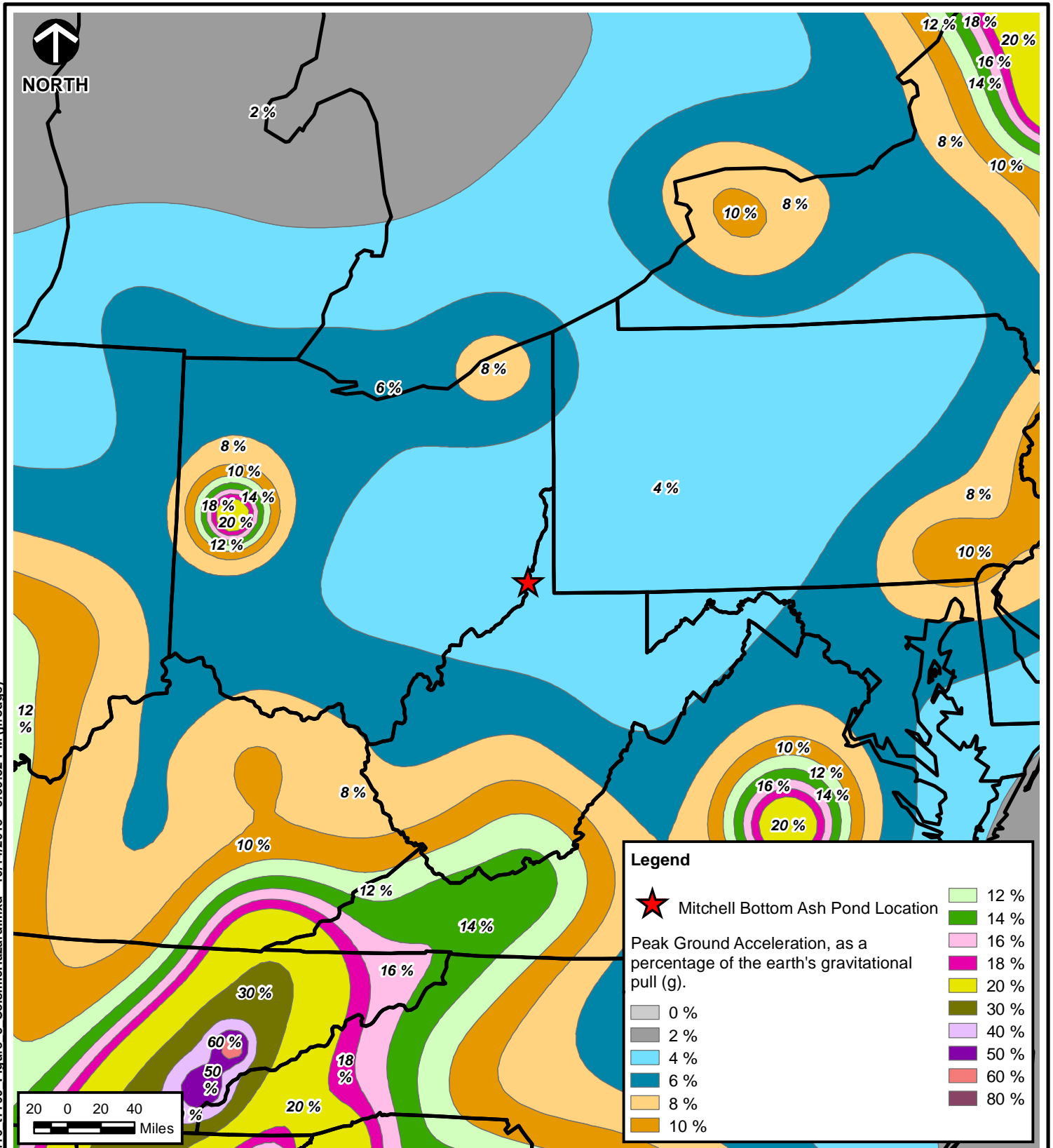
AMERICAN ELECTRIC POWER
 MITCHELL BOTTOM ASH POND
 MITCHELL POWER GENERATION PLANT
 MARSHALL COUNTY, WEST VIRGINIA

CCR LOCATION RESTRICTION DEMONSTRATION
 USGS NATIONAL FAULT ZONE MAP

DRAWN BY:	JBF	CHECKED BY:	BPA	APPROVED BY:	APA*	FIGURE NO:	4
DATE:	OCTOBER 14, 2015	DWG SCALE:	1" = 80 miles	PROJECT NO:	110-416-7700		

Signature on File *

P:\2011\110-416-GISMaps\Task 7700\110416-Figure 4 FaultMap.mxd - 10/14/2015 - 3:58:14 PM (jrodge)



SOURCE: USGS NATIONAL SEISMIC HAZARD MAP - 2014 PEAK GROUND ACCELERATION (%g) WITH 2% PROBABILITY OF EXCEEDENCE IN 50 YEARS.
 ACCESSED AT: <http://earthquake.usgs.gov/hazards/products/conterminous/>



Civil & Environmental Consultants, Inc.

5899 Monclair Boulevard - Cincinnati, OH 45150
 513-985-0226 - 800-759-5614
 www.cecinc.com

AMERICAN ELECTRIC POWER
 MITCHELL BOTTOM ASH POND
 MITCHELL POWER GENERATION PLANT
 MARSHALL COUNTY, WEST VIRGINIA

CCR LOCATION RESTRICTION DEMONSTRATION
 USGS NATIONAL SEISMIC HAZARD MAP

DRAWN BY: JBF
 DATE: OCTOBER 14, 2015

CHECKED BY: BPA
 DWG SCALE: 1" = 80 miles

APPROVED BY: APA*
 PROJECT NO: 110-416-7700

FIGURE NO: **5**

P:\2011\110-416-GIS\Maps\Task 7700\110416_r7700 Figure 5 SeismicHazard.mxd - 10/14/2015 - 3:59:32 PM (jfrogge)

TABLES

Table 1 - EPRI Piezometer Static Water Levels (June 23, 2015)
CCR Location Restriction Demonstration
Mitchell Bottom Ash Pond
American Electric Power Company – Mitchell Power Generation Plant
CEC Project 110-416.7700

Well ID	Northing^(1,2)	Easting^(1,2)	Top of Casing Elevation^(1,4)	Total Well Depth⁽¹⁾ (feet⁽³⁾)	Depth to Water⁽⁵⁾ (feet⁽³⁾)	Groundwater Elevation^(4,5)	Screen Length⁽¹⁾ (feet)
MW-4	488311	1598153	668.02	60.2	44.39	623.63	10
MW-5	488305	1598152	667.88	88.7	44.19	623.69	10
MW-6	488930	1598268	663.40	58.2	39.65	623.75	10
MW-7	487596	1597656	640.26	42.4	16.31	623.95	10
MW-8	484738	1598713	663.34	42.0	38.83	624.51	10

¹Information from EPRI (1999) report.

²West Virginia 1983 State Plane Coordinates.

³All measurements from top of casing (TOC).

⁴All elevations are feet above mean sea level.

⁵Measurements obtained on June 23, 2015.

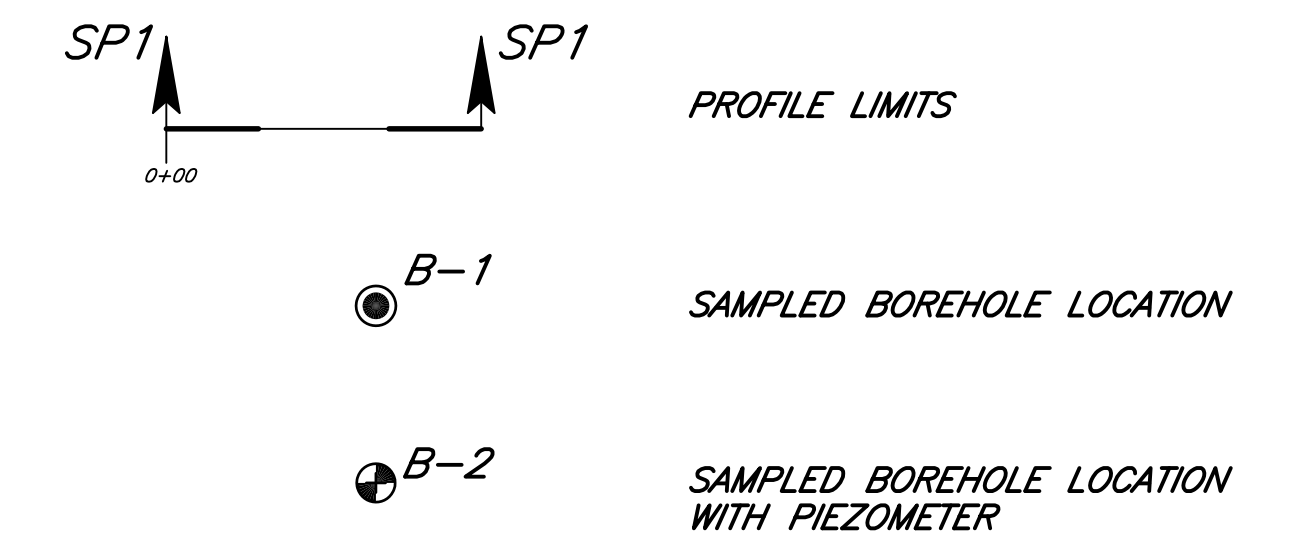
APPENDIX A

BOTTOM ASH POND DIKE PROFILES

NOTES

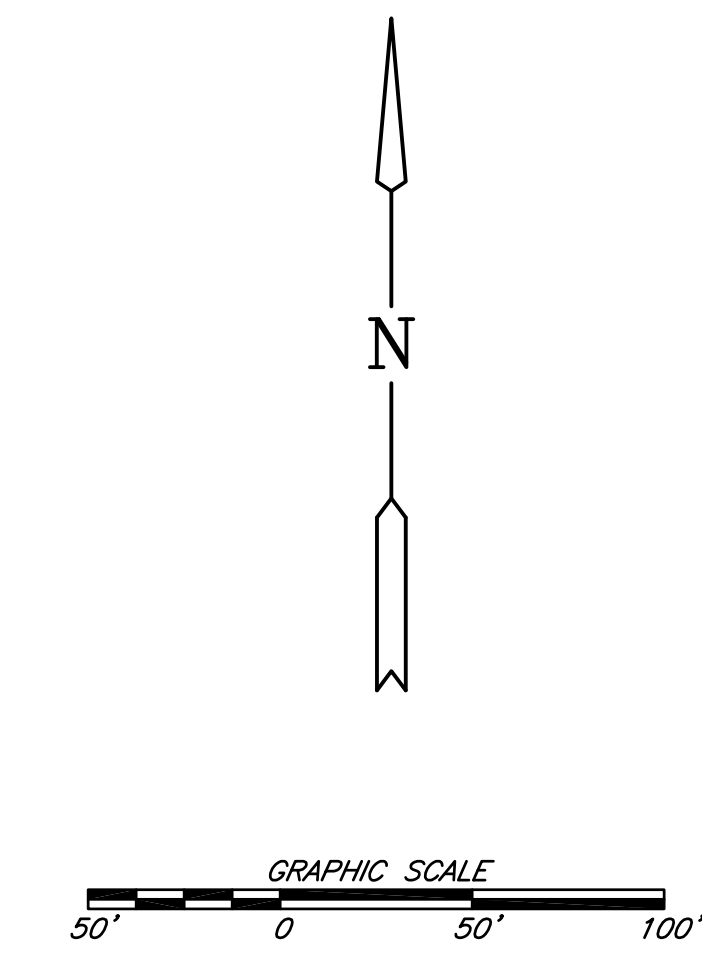
1. PLAN ADAPTED FROM DRAWINGS PROVIDED BY AEPSC, DATED 4-13-01
2. BOREHOLE LOCATIONS AND ELEVATIONS PROVIDED BY AEPSC, SURVEYED 3-5-09.

LEGEND



ID: 4106
 E: 1598326.62
 N: 485316.55
 ELEV: 646.06

ID: 4107
 E: 1599432.55
 N: 485009.99
 ELEV: 683.25



I, the undersigned, hereby certify that this map is correct and shows to the best of my knowledge and belief, all the information required by the surface mining laws of the State of West Virginia.

ROGER W. CECIL, R.P.L. No. 14367

State of Tennessee, County of Knox, taken, subscribed, and sworn to before me this _____ day of _____.

Notary Public
 My Commission Expires _____

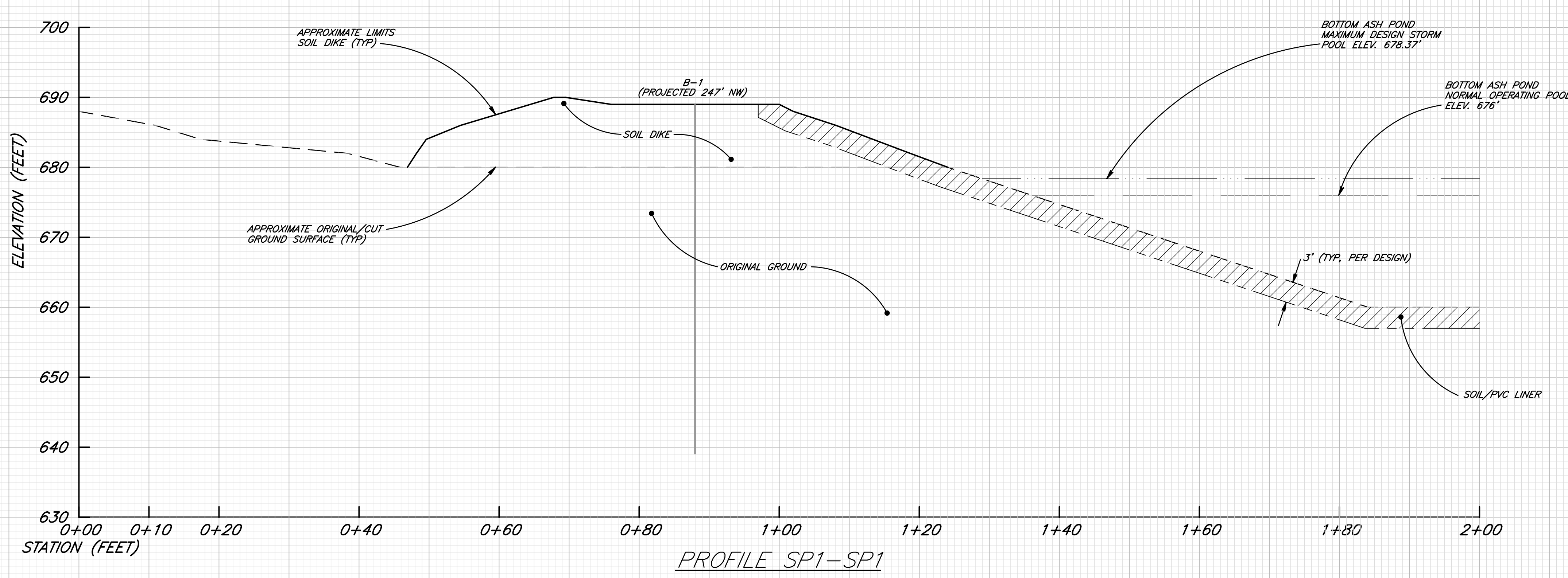
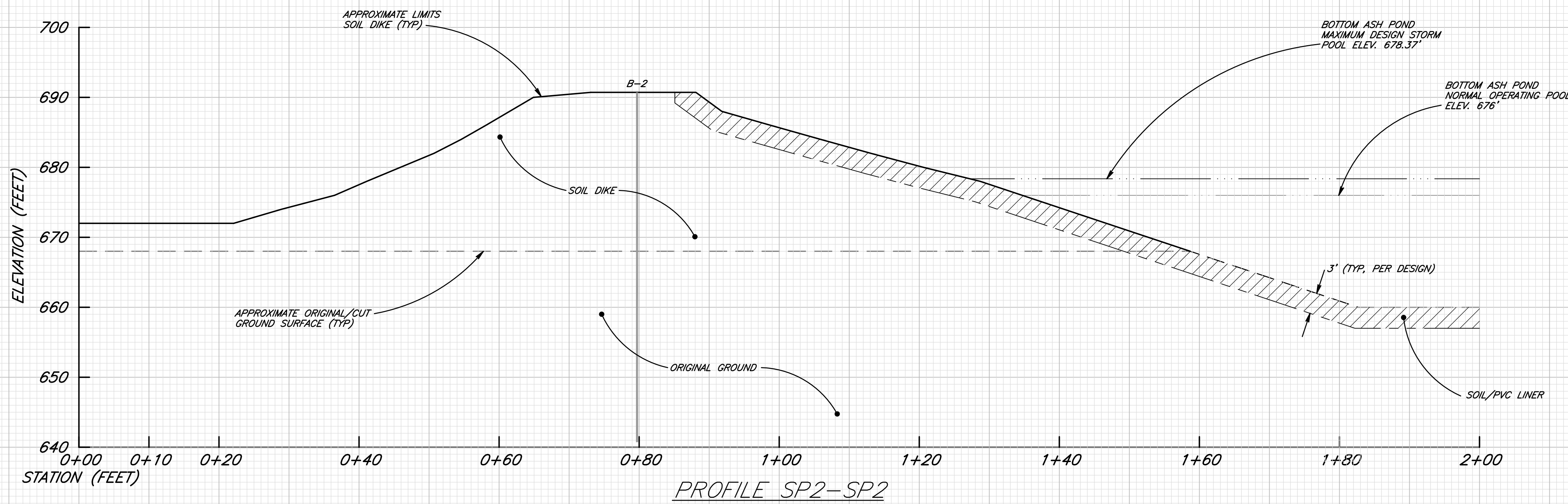
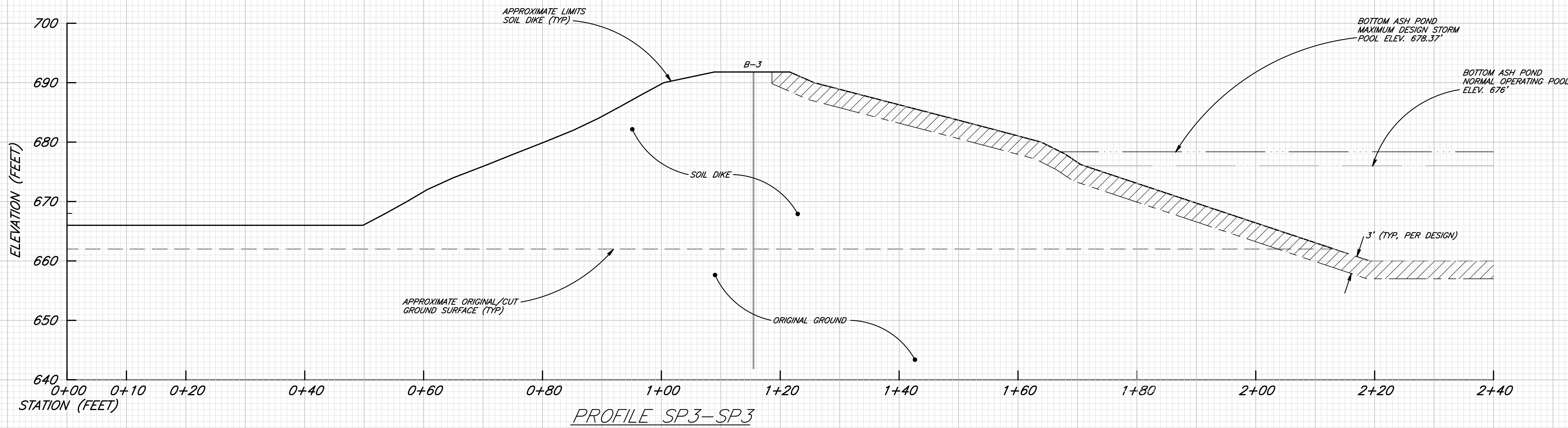
THESE DRAWINGS ARE PART OF A SET OF DESIGN DOCUMENTS WHICH ALSO CONTAINS A WRITTEN TEXT THAT TEXT EXPLAINS SOME OF THE DETAILS SHOWN HEREIN AND THEREFORE THESE DRAWINGS SHOULD ONLY BE USED IN CONJUNCTION WITH THE TEXT.

DATE	REVISIONS	BY

PLAN VIEW
SITE INSPECTION AND OBSERVATIONS
MITCHELL BOTTOM ASH COMPLEX
 MARSHALL COUNTY, WEST VIRGINIA

SCALE: AS SHOWN
 PREPARED FOR:
AEP SERVICE CORPORATION

PREPARED BY:
GA Geo/Environmental Associates, Inc.
 1402 OVERLOOK CIRCLE • KNOXVILLE, TENNESSEE 37909 • (615) 684-0344



NOTES

1. PROFILES ADAPTED FROM PLAN VIEW DRAWING PROVIDED BY AEPSC, DATED 4-13-01, AND FROM ORIGINAL DESIGN DETAILS.
2. BORING LOCATIONS AND ELEVATIONS PROVIDED BY AEPSC, SURVEYED 3-5-09.
3. NORMAL OPERATING POOL LEVELS BASED ON INFORMATION PROVIDED BY AEPSC. MAXIMUM DESIGN STORM POOL LEVELS BASED ON 1/2 OF THE 6-HOUR PMP EVENT.
4. SOIL DIKE AND ORIGINAL/CUT GROUND SURFACE BASED ON ORIGINAL DESIGN DETAILS AND BOREHOLES B-1 THROUGH B-5 DATA.

I, the undersigned, hereby certify that this map is correct and shows, to the best of my knowledge and belief, all the information required by the surface mining laws of the State of West Virginia.

ROGER W. COOK, R.P.E. No. 14367

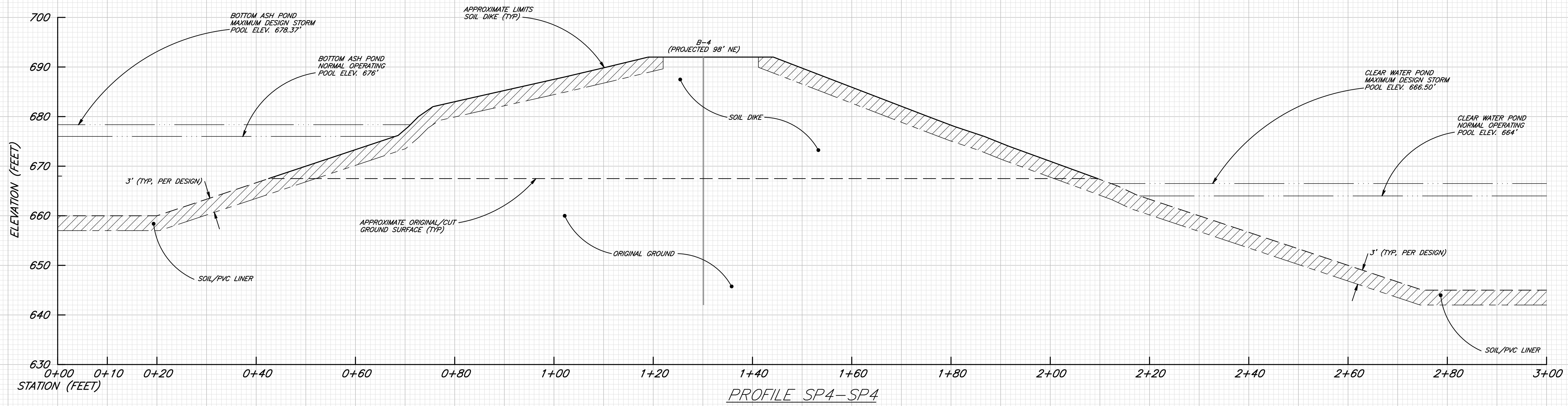
State of Tennessee, County of Knox, taken, subscribed, and sworn to before me this _____ day of _____, _____.

Notary Public

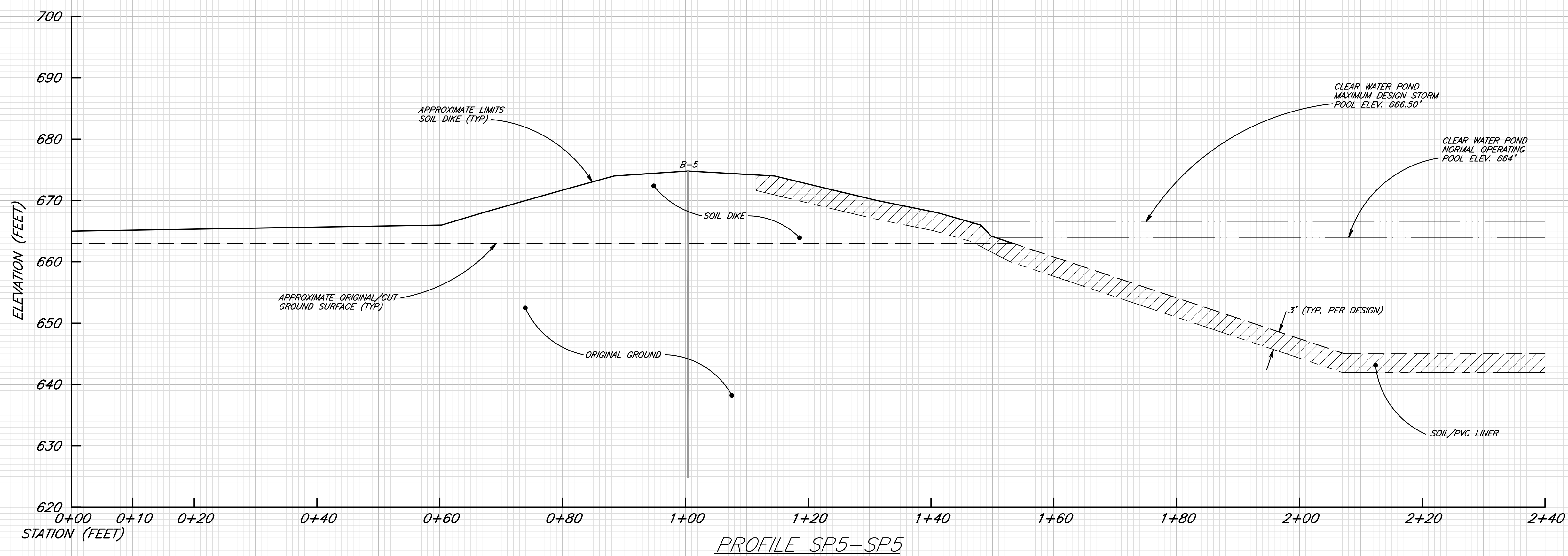
My Commission Expires _____

THESE DRAWINGS ARE PART OF A SET OF DESIGN DOCUMENTS WHICH ALSO CONTAINS A WRITTEN TEXT THAT TEXT EXPLAINS SOME OF THE DETAILS SHOWN HEREIN AND THEREFORE THESE DRAWINGS SHOULD ONLY BE USED IN CONJUNCTION WITH THE TEXT

DATE	REVISIONS	BY
PROFILES SP1, SP2, & SP3 SITE INSPECTION AND OBSERVATIONS MITCHELL BOTTOM ASH COMPLEX MARSHALL COUNTY, WEST VIRGINIA		
SCALE: AS SHOWN	DR: RWC	CHK: SWF
PREPARED FOR:		
AEP SERVICE CORPORATION		
PREPARED BY:		
Geo/Environmental Associates, Inc. <small>3602 OVERLOOK CIRCLE • KNOXVILLE, TENNESSEE 37909 • (865) 584-0344</small>		
PROJ: 09-379	DATE: 3-22-09	SHEET 2 OF 3



PROFILE SP4-SP4



PROFILE SP5-SP5

NOTES

1. PROFILES ADAPTED FROM PLAN VIEW DRAWING PROVIDED BY AEPSC, DATED 4-13-01, AND FROM ORIGINAL DESIGN DETAILS.
2. BORING LOCATIONS AND ELEVATIONS PROVIDED BY AEPSC, SURVEYED 3-5-09.
3. NORMAL OPERATING POOL LEVELS BASED ON INFORMATION PROVIDED BY AEPSC. MAXIMUM DESIGN STORM POOL LEVELS BASED ON 1/2 OF THE 6-HOUR PMP EVENT.
4. SOIL DIKE AND ORIGINAL/CUT GROUND SURFACE BASED ON ORIGINAL DESIGN DETAILS AND BOREHOLES B-1 THROUGH B-5 DATA.

I, the undersigned, hereby certify that this map is correct and shows to the best of my knowledge and belief, all the information required by the surface mining laws of the State of West Virginia.

ROGER W. COOK, P.E., No. 14367

State of Tennessee, County of Knox, taken, subscribed, and sworn to before me this _____ day of _____, 2009.

Notary Public
My Commission Expires _____

THESE DRAWINGS ARE PART OF A SET OF DESIGN DOCUMENTS WHICH ALSO CONTAINS A WRITTEN TEXT THAT EXPLAINS SOME OF THE DETAILS SHOWN HEREIN AND THEREFORE THESE DRAWINGS SHOULD ONLY BE USED IN CONJUNCTION WITH THE TEXT.

DATE	REVISIONS	BY

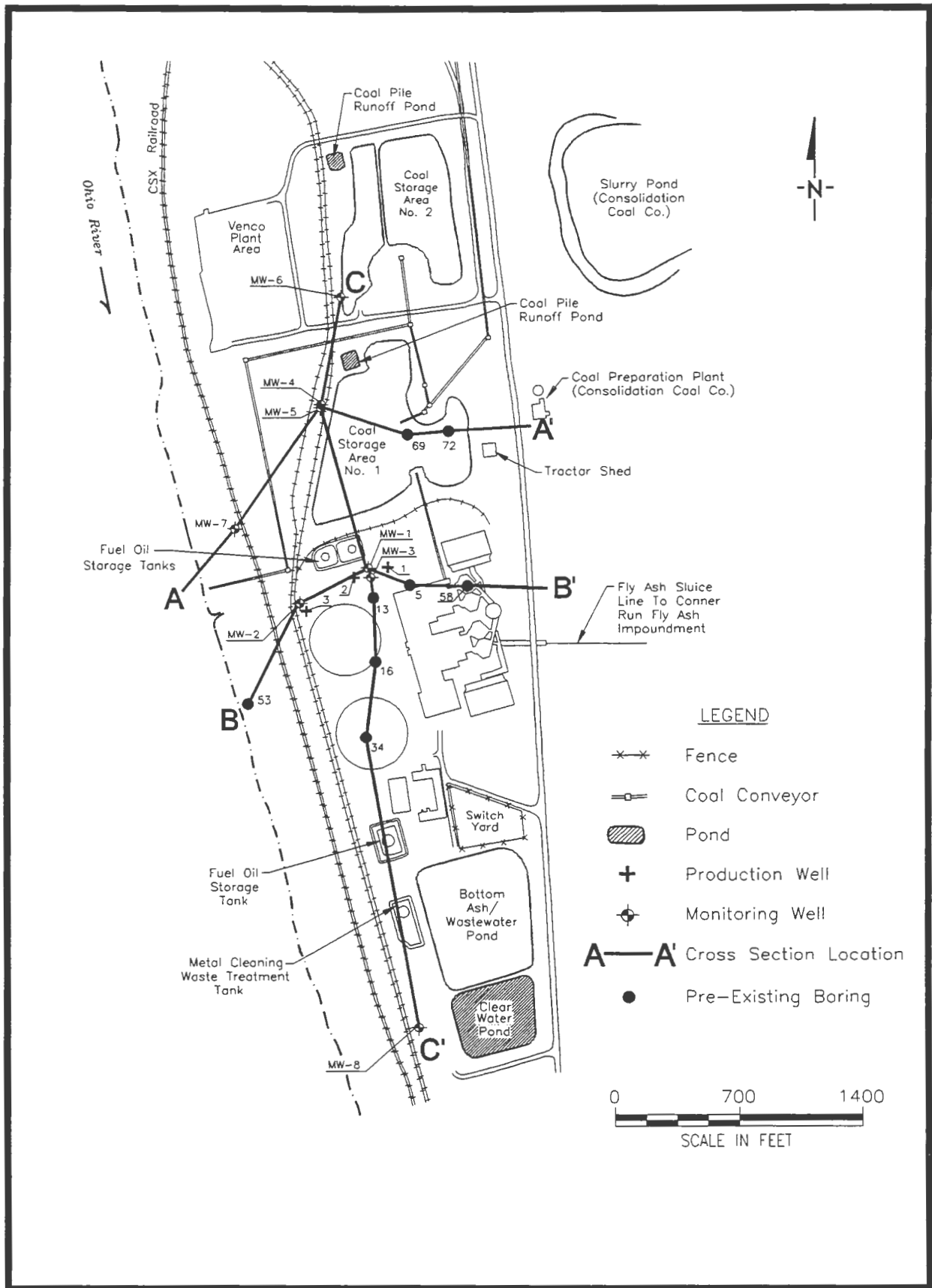
PROFILES SP4 & SP5
SITE INSPECTION AND OBSERVATIONS
MITCHELL BOTTOM ASH COMPLEX
 MARSHALL COUNTY, WEST VIRGINIA

SCALE: AS SHOWN
 PREPARED FOR:
AEP SERVICE CORPORATION

PREPARED BY:
GA Geo/Environmental Associates, Inc.
 8502 OVERLOOK CIRCLE • KNOXVILLE, TENNESSEE 37909 • (865) 684-0344

APPENDIX B

EPRI GEOLOGIC DRAWINGS



K001387A.DWG

Figure 3-3 Locations of geologic cross-sections at the Mitchell Plant site.

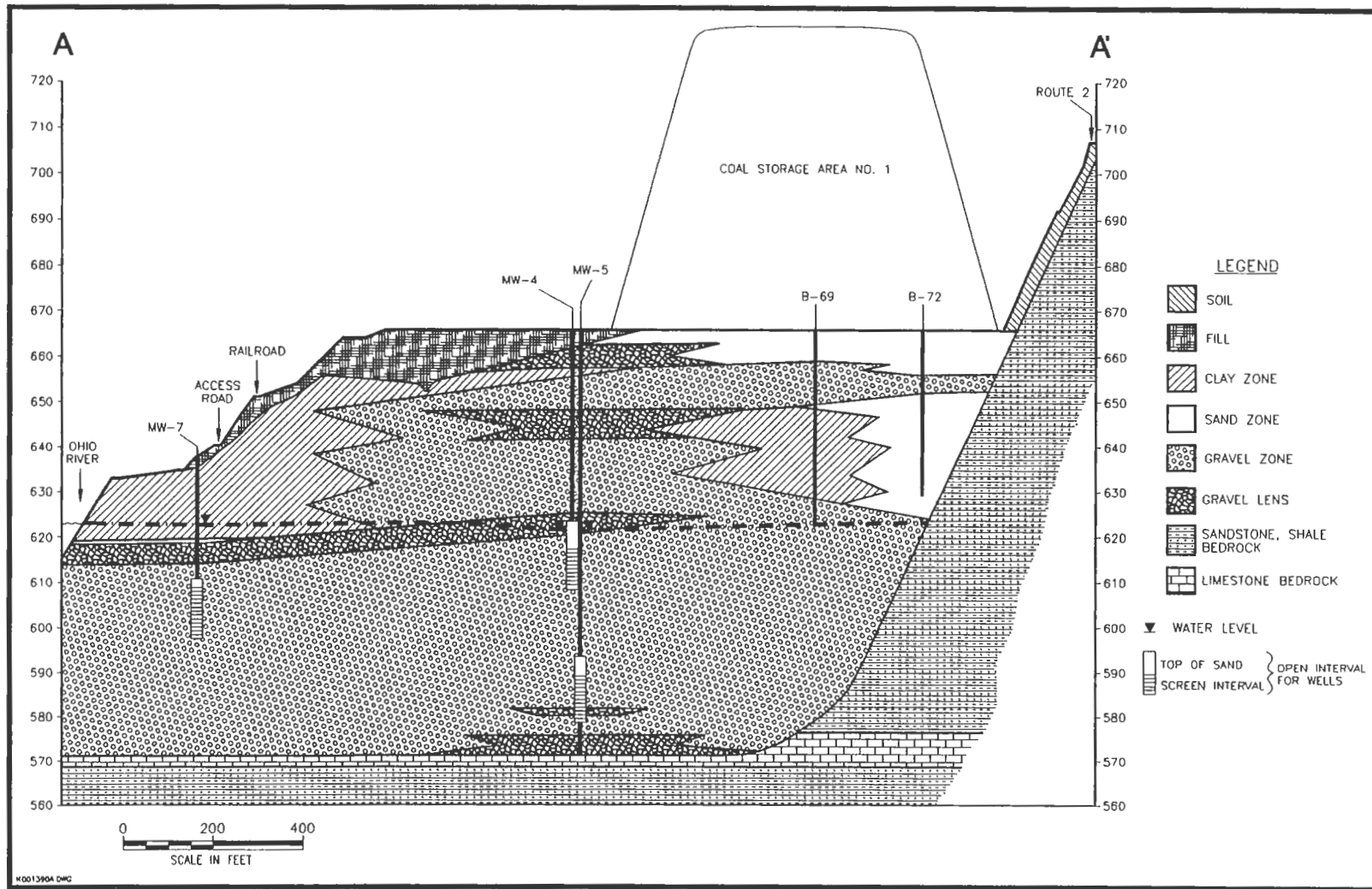


Figure 3-4 Geologic cross-section A-A' at the Mitchell Plant site.

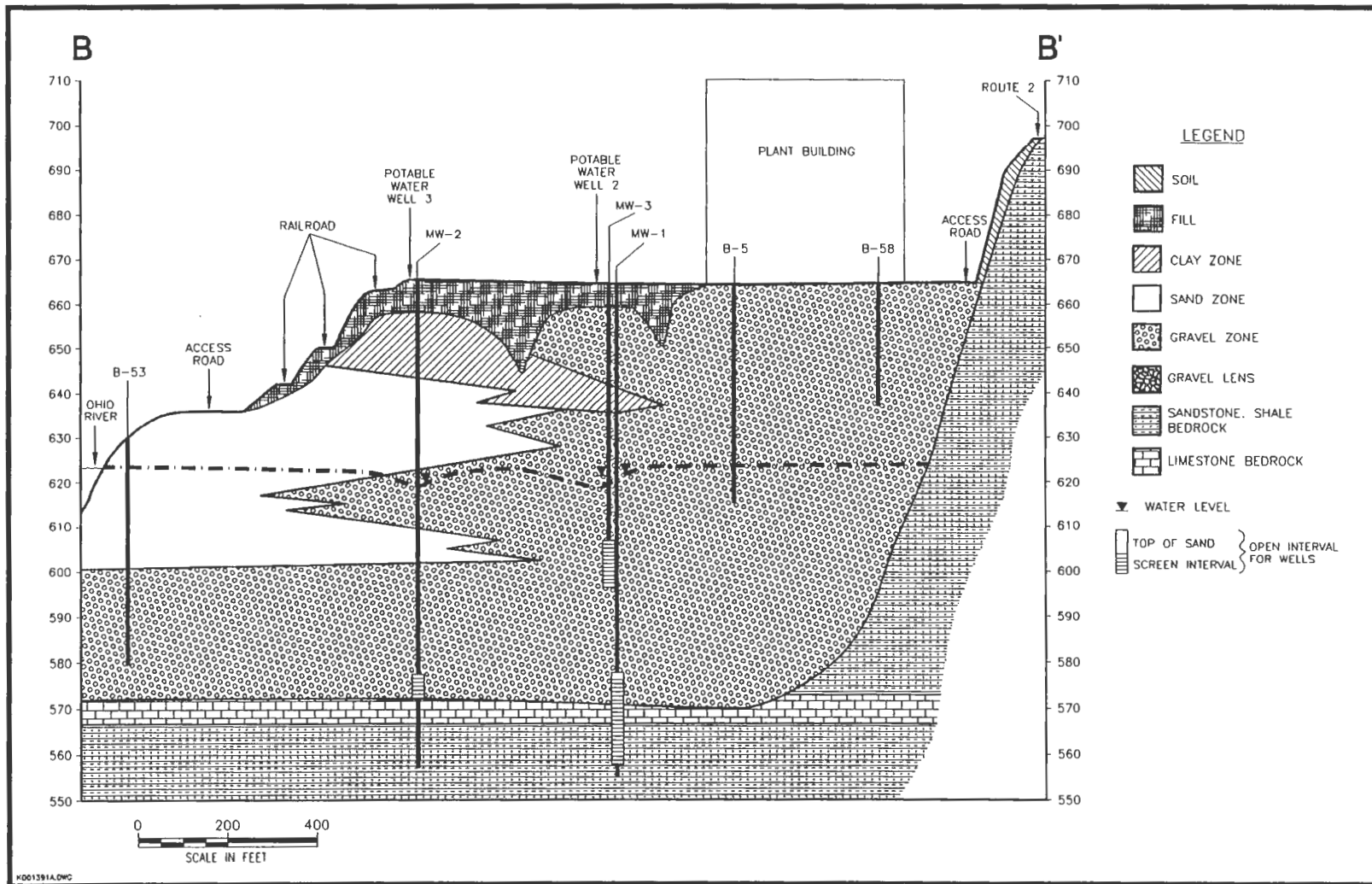


Figure 3-5 Geologic cross-section B-B' at the Mitchell Plant site.

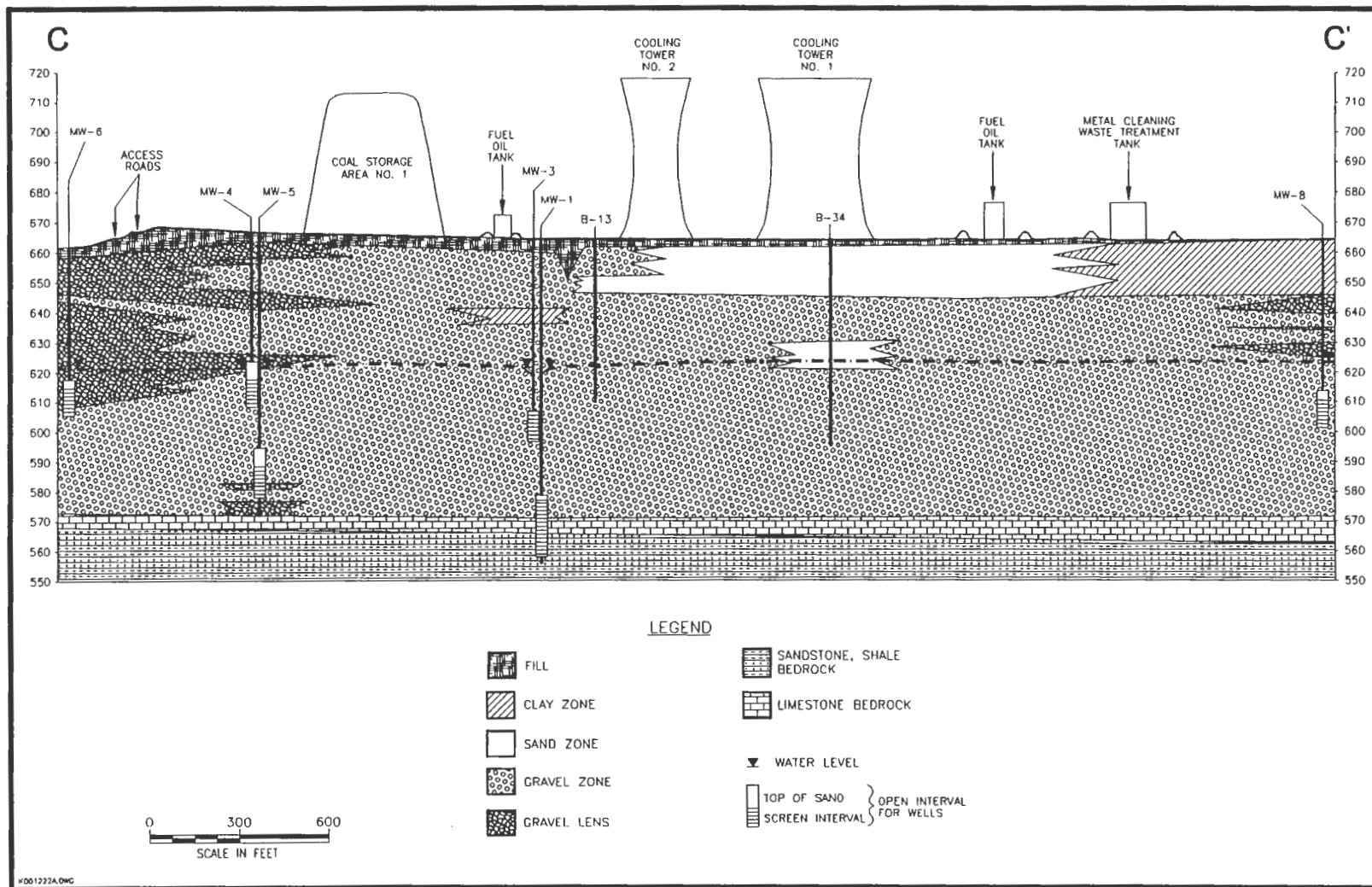


Figure 3-6 Geologic cross-section C-C' at the Mitchell Plant site.

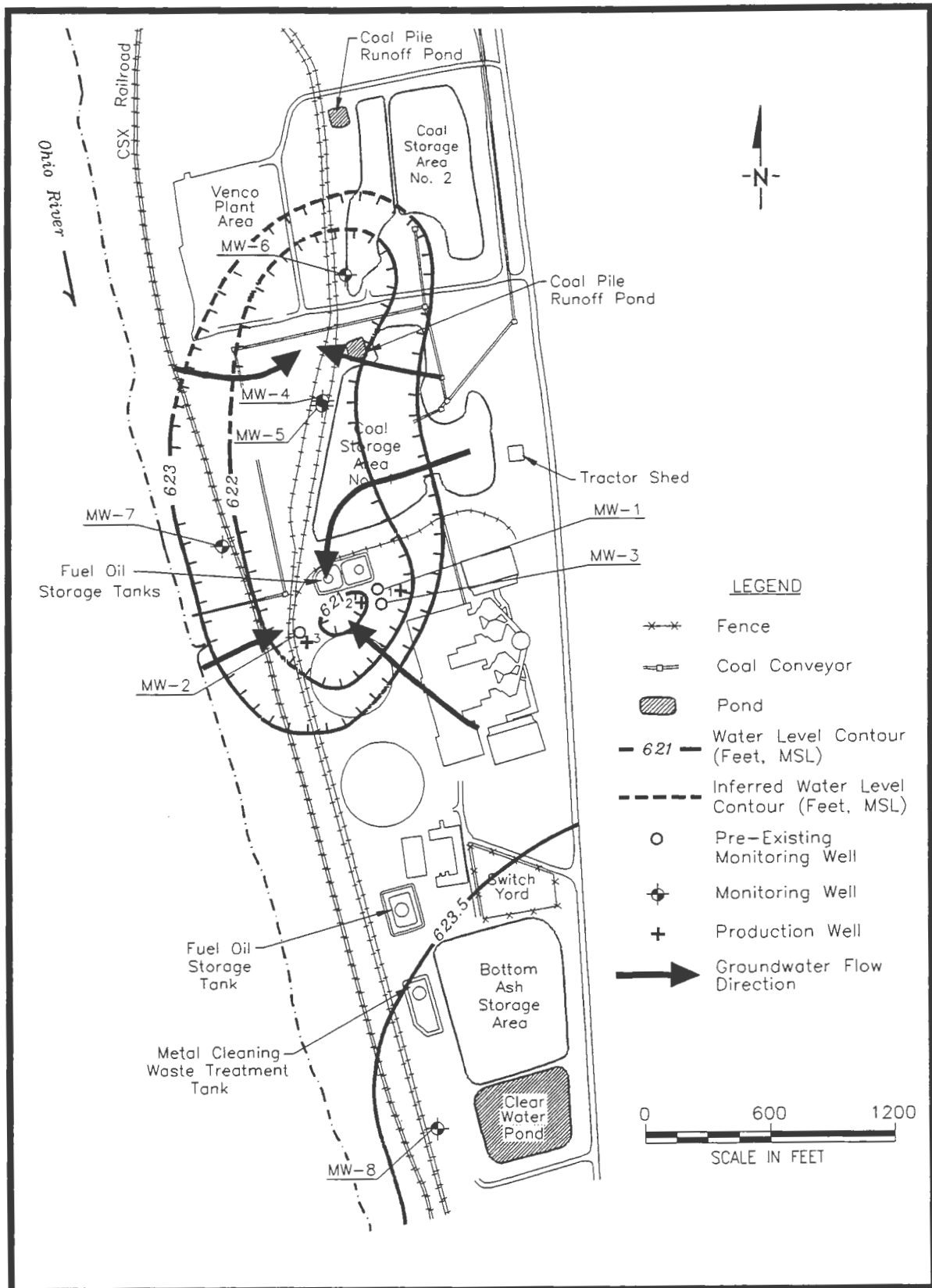


Figure 3-7 Water table contour map for the Mitchell Plant site (August 20, 1996).

K001246B.DWG

APPENDIX C

**THREATENED AND ENDANGERED
SPECIES CORRESPONDENCE**



June 2, 2015

Ms. Barbara Sargent
West Virginia Division of Natural Resources
Natural Heritage Program
PO Box 67 Ward Road
Elkins, WV 26241

Via email: barbara.d.sargent@wv.gov

Dear Ms. Sargent:

Subject: Environmental Review Request
American Electric Power Service Corporation
Mitchell Plant-Bottom Ash Ponds
Franklin District, Marshall County, West Virginia
CEC Project 110-416.7703

Pursuant to the forthcoming Federal Register publication of the Coal Combustion Residuals (CCR) compliance requirements, and on behalf of American Electric Power Service Corporation, Civil & Environmental Consultants, Inc. (CEC) is inquiring whether there are any records of rare, threatened and endangered species or unique habitats in the West Virginia Natural Heritage Program database relative to the existing Mitchell Power Plant's Bottom Ash Ponds, located in the Franklin District in Marshall County.

The Bottom Ash Ponds, which are unlined surface water impoundments contained by an elevated perimeter dike structure, are actively in use and are intended to remain in use. The locations of the Bottom Ash Ponds are depicted on the attached topographic map (Figure 1) and Background Environmental Data Map (Figure 2).

If you have any questions or need other information, please call Jamie VanDusen at 614-310-0175, or e-mail me at jvandusen@cecinc.com. Thank you for your time and I look forward to hearing from you soon.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Jamie VanDusen
Project Manager

Jonathan Demarest
Project Manager

Enclosures (2): Figure 1 – Site Location Map
Figure 2 –Background Environmental Data Map

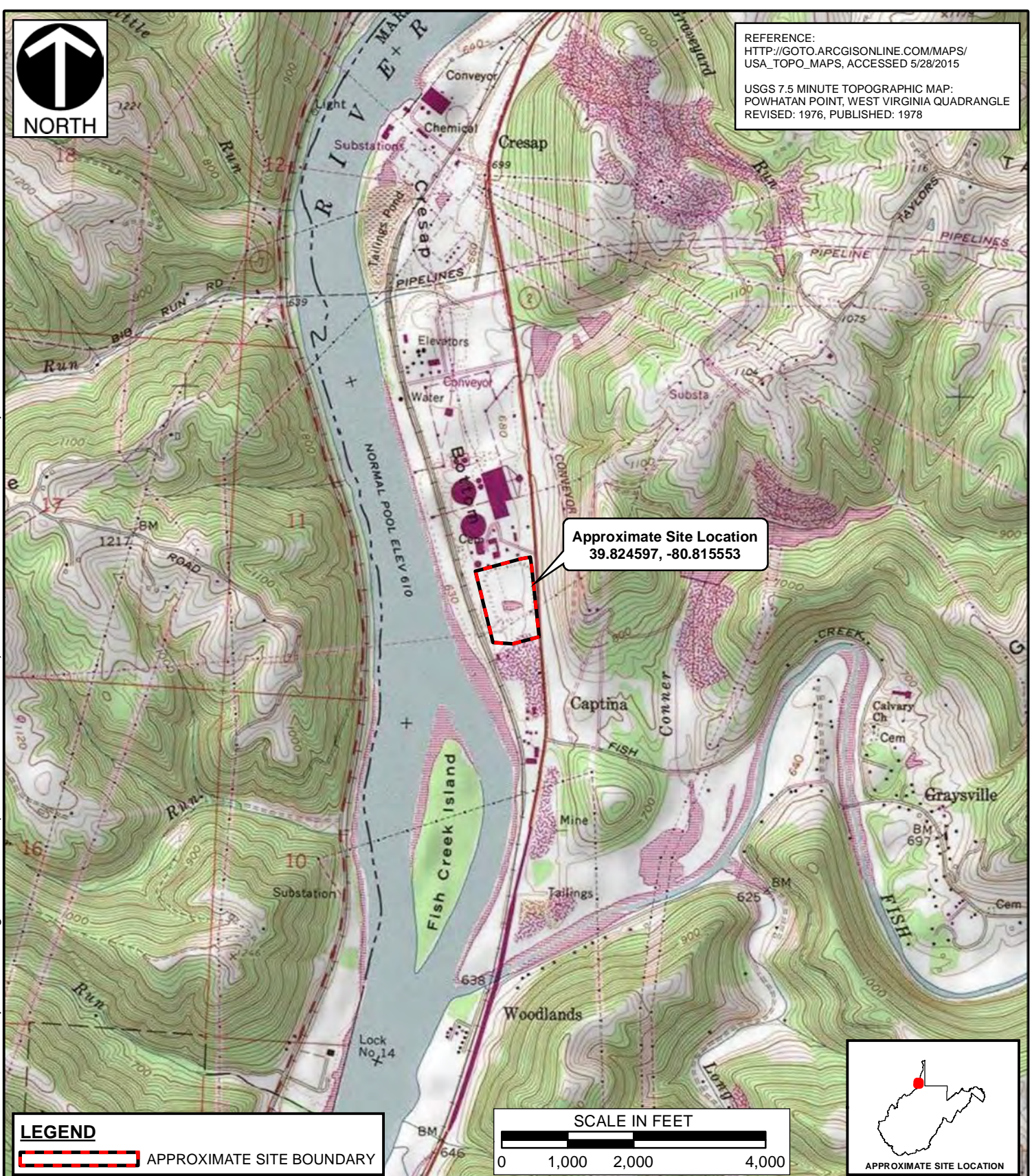
SITE LOCATION MAP



REFERENCE:
 HTTP://GOTO.ARCGISONLINE.COM/MAPS/
 USA_TOPO_MAPS, ACCESSED 5/28/2015


USGS 7.5 MINUTE TOPOGRAPHIC MAP:
 POWHATAN POINT, WEST VIRGINIA QUADRANGLE
 REVISED: 1976, PUBLISHED: 1978

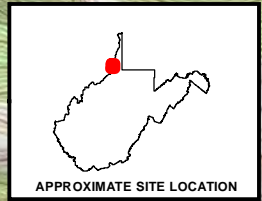
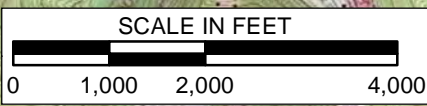
I:\svr-cinc\projects\2011110-416-GIS\Frm_Columbus\Maps\110416_Figure_1.mxd LS:(5/26/2015 - mdeliberato) - LP:10/25/2013 12:36:51 PM - LExported:5/28/2015 9:27:13 AM



Approximate Site Location
 39.824597, -80.815553

LEGEND

 APPROXIMATE SITE BOUNDARY



Civil & Environmental Consultants, Inc.
 250 Old Wilson Bridge Road, Suite 250 - Worthington, OH 43085
 614-540-6633 • 888-598-6808
 www.cecinc.com

AMERICAN ELECTRIC POWER SERVICE CORPORATION
 MITCHELL PLANT
 BOTTOM ASH POND
 FRANKLIN DISTRICT, MARSHALL COUNTY,
 WEST VIRGINIA

SITE LOCATION MAP

DRAWN BY: AMK	CHECKED BY: JMV	APPROVED BY: JCD*	FIGURE: 1
DATE: 5/28/2015	MAP SCALE: 1" = 2,000'	PROJECT NO: 110-416.7703	

*Hand signature on file

BACKGROUND ENVIRONMENTAL DATA MAP



REFERENCE
 USDA, NRCS SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR MARSHALL COUNTY, WV, 2014.
 USFWS NATIONAL WETLANDS INVENTORY (NWI) DATA BY STATE - WEST VIRGINIA, REVISED 2014.
 USGS NATIONAL HYDROGRAPHY DATASET (NHD) DATA BY STATE - WEST VIRGINIA, REVISED 2013.
 FEMA D-FIRM NATIONAL FLOOD HAZARD LAYER FOR WEST VIRGINIA - DATED 10/16/2012.
 ESRI WORLD IMAGERY / ARCGIS MAP SERVICE: http://goto.arcgisonline.com/maps/world_imagery, ACCESSED 5/28/2015, DATED: 2012.

I:\svr-cinc\projects\2011110-416-GIS\Frm_Columbus\Maps\110416_Figure_2.mxd LS:(5/28/2015 - jwalker) - LP:5/28/2015 9:35:01 AM - LExported:5/28/2015 3:00:15 PM



LEGEND		NWI WETLAND TYPE	
	APPROXIMATE SITE BOUNDARY		FRESHWATER POND
	SOIL MAP UNIT - NONE HYDRIC		OTHER
	100-YEAR FLOOD ZONE A		RIVERINE
	NHD STREAM		

SOIL MAP UNIT
 BrD - Brookside silt loam, 15 to 25% slopes
 Dsf - Dormont-Culleoka complex, 35 to 70% slopes, very stony
 M-W - Miscellaneous Water
 Uh - Udorthents-Urban land complex, 0 to 70%
 W - Water


Civil & Environmental Consultants, Inc.
 250 Old Wilson Bridge Road, Suite 250 - Worthington, OH 43085
 614-540-6633 • 888-598-6808
www.cecinc.com

AMERICAN ELECTRIC POWER SERVICE CORPORATION
 MITCHELL PLANT
 BOTTOM ASH POND
 FRANKLIN DISTRICT, MARSHALL COUNTY,
 WEST VIRGINIA

BACKGROUND ENVIRONMENTAL DATA MAP

DRAWN BY: AMK	CHECKED BY: JMV	APPROVED BY: JCD*	FIGURE: 2
DATE: 5/28/2015	MAP SCALE: 1" = 200'	PROJECT NO: 110-416.7703	

*Hand signature on file



RECEIVED JUN 15 2015

DIVISION OF NATURAL RESOURCES

**Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250**

**Earl Ray Tomblin
Governor**

**Robert A. Fala
Director**

June 12, 2015

Ms. Jamie VanDusen
Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road, Suite 250
Worthington, OH 43085

Dear Ms. VanDusen:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the Mitchell Power Plant's Bottom Ash Ponds in Marshall County, WV.

We have no known records of any RTE species or sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, or barbara.d.sargent@wv.gov. Enclosed please find an invoice.

Sincerely,

A handwritten signature in blue ink, appearing to read "Barbara Sargent".

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure



June 2, 2015

U.S. Fish and Wildlife Service
West Virginia Field Office
Attn: Environmental Review Request
694 Beverly Pike
Elkins, WV 26241

Dear Project Reviewer:

Subject: Environmental Review Request
American Electric Power Service Corporation
Mitchell Plant-Bottom Ash Ponds
Franklin District, Marshall County, West Virginia
CEC Project 110-416.7703

Pursuant to the forthcoming Federal Register publication of the Coal Combustion Residuals (CCR) compliance requirements, and on behalf of American Electric Power Service Corporation, Civil & Environmental Consultants, Inc. is inquiring whether there are any known occurrences of federally listed endangered, threatened, or candidate species relative to the existing Mitchell Power Plant's Bottom Ash Ponds, located in the Franklin District in Marshall County.

The Bottom Ash Ponds, which are unlined surface water impoundments contained by an elevated perimeter dike structure, are actively in use and are intended to remain in use. The locations of the Bottom Ash Ponds are depicted on the attached topographic map (Figure 1) and Background Environmental Data Map (Figure 2).

If you have any questions or need other information, please call Jamie VanDusen at 614-310-0175, or e-mail me at jvandusen@cecinc.com. Thank you for your time and I look forward to hearing from you soon.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.


Jamie VanDusen
Project Manager


Jonathan Demarest
Project Manager

Enclosures (2): Figure 1 – Site Location Map
Figure 2 –Background Environmental Data Map



United States Department of the Interior



FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Contact Name: Jamie VanDusen
Email Address or Fax Number: jvandusen@cecinc.com
Project Name & Location: Mitchell Plant - Bottom Ash Ponds, Marshall County
Date of Letter Request: June 2, 2015

This is in response to your letter requesting threatened and endangered species information in regard to the proposed project listed above. These comments are provided pursuant to the Endangered Species Act (ESA, 87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*).

We have made a "no effect" determination that the project will not affect Federally-listed endangered or threatened species. Therefore no biological assessment or further section 7 consultation under the ESA is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed and proposed species become available, this determination may be reconsidered.

Definitive determinations of the presences of waters of the United States, including wetlands, in the project area and the need for permits, if any, are made by the U.S. Army Corps of Engineers. They may be contacted at: Pittsburgh District, Regulatory Branch, William S. Moorhead Federal Building, 1000 Liberty Avenue, Pittsburgh, Pennsylvania 15222-4188, telephone (412) 395-7152.

Tienas Lennor 7/14/15
Reviewer's signature and date

E. H. Auld 7/14/15
Field Supervisor's signature and date

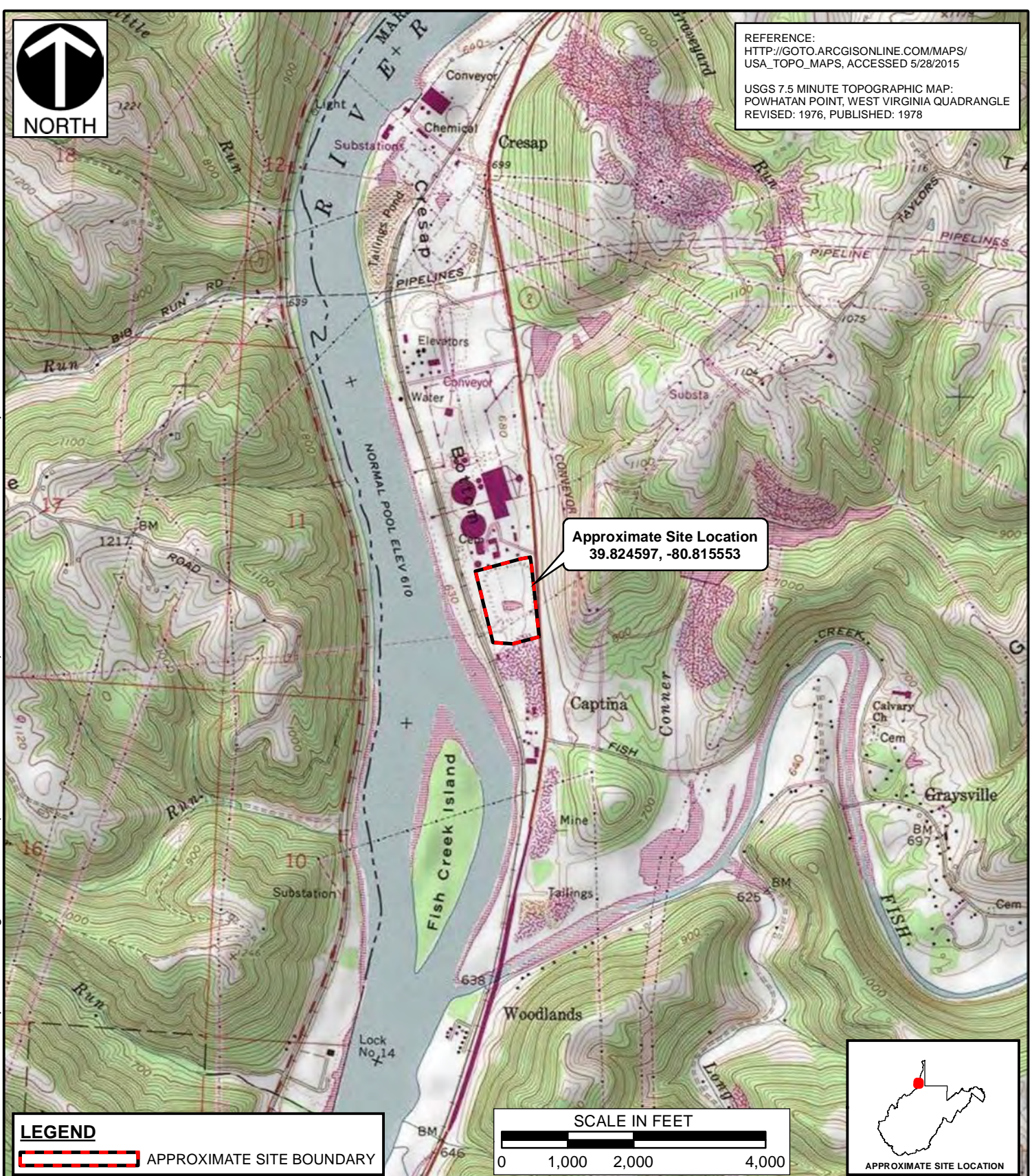
SITE LOCATION MAP



REFERENCE:
 HTTP://GOTO.ARCGISONLINE.COM/MAPS/
 USA_TOPO_MAPS, ACCESSED 5/28/2015


USGS 7.5 MINUTE TOPOGRAPHIC MAP:
 POWHATAN POINT, WEST VIRGINIA QUADRANGLE
 REVISED: 1976, PUBLISHED: 1978

I:\svr-cinc\projects\2011110-416-GIS\Frm_Columbus\Maps\110416_Figure_1.mxd LS:(5/26/2015 - mdeliberato) - LP:10/25/2013 12:36:51 PM - LExported:5/28/2015 9:27:13 AM

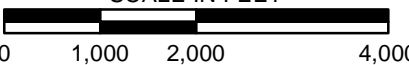
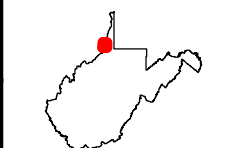


Approximate Site Location
 39.824597, -80.815553

LEGEND

 APPROXIMATE SITE BOUNDARY

SCALE IN FEET

APPROXIMATE SITE LOCATION



Civil & Environmental Consultants, Inc.
 250 Old Wilson Bridge Road, Suite 250 - Worthington, OH 43085
 614-540-6633 • 888-598-6808
 www.cecinc.com

AMERICAN ELECTRIC POWER SERVICE CORPORATION
 MITCHELL PLANT
 BOTTOM ASH POND
 FRANKLIN DISTRICT, MARSHALL COUNTY,
 WEST VIRGINIA

SITE LOCATION MAP

DRAWN BY: AMK	CHECKED BY: JMV	APPROVED BY: JCD*	FIGURE: 1
DATE: 5/28/2015	MAP SCALE: 1" = 2,000'	PROJECT NO: 110-416.7703	

*Hand signature on file

BACKGROUND ENVIRONMENTAL DATA MAP



REFERENCE
 USDA, NRCS SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR MARSHALL COUNTY, WV, 2014.
 USFWS NATIONAL WETLANDS INVENTORY (NWI) DATA BY STATE - WEST VIRGINIA, REVISED 2014.
 USGS NATIONAL HYDROGRAPHY DATASET (NHD) DATA BY STATE - WEST VIRGINIA, REVISED 2013.
 FEMA D-FIRM NATIONAL FLOOD HAZARD LAYER FOR WEST VIRGINIA - DATED 10/16/2012.
 ESRI WORLD IMAGERY / ARCGIS MAP SERVICE: http://goto.arcgisonline.com/maps/world_imagery, ACCESSED 5/28/2015, DATED: 2012.

I:\svr-cinc\projects\2011110-416-GIS\Frm_Columbus\Maps\110416_Figure_2.mxd LS:(5/28/2015 9:35:01 AM - LExported:5/28/2015 3:00:15 PM



LEGEND		NWI WETLAND TYPE	
	APPROXIMATE SITE BOUNDARY		FRESHWATER POND
	SOIL MAP UNIT - NONE HYDRIC		OTHER
	100-YEAR FLOOD ZONE A		RIVERINE
	NHD STREAM		

SOIL MAP UNIT
 BrD - Brookside silt loam, 15 to 25% slopes
 Dsf - Dormont-Culleoka complex, 35 to 70% slopes, very stony
 M-W - Miscellaneous Water
 Uh - Udorthents-Urban land complex, 0 to 70%
 W - Water


Civil & Environmental Consultants, Inc.
 250 Old Wilson Bridge Road, Suite 250 - Worthington, OH 43085
 614-540-6633 • 888-598-6808
www.cecinc.com

AMERICAN ELECTRIC POWER SERVICE CORPORATION
 MITCHELL PLANT
 BOTTOM ASH POND
 FRANKLIN DISTRICT, MARSHALL COUNTY,
 WEST VIRGINIA

BACKGROUND ENVIRONMENTAL DATA MAP

DRAWN BY: AMK	CHECKED BY: JMV	APPROVED BY: JCD*	FIGURE: 2
DATE: 5/28/2015	MAP SCALE: 1" = 200'	PROJECT NO: 110-416.7703	

*Hand signature on file

From: [VanDusen, Jamie](#)
To: [Stanley, Roy](#)
Subject: FW: Mitchell Landfill Bottom Ash Pond CEC #110-416. USFWS #TA-0582
Date: Monday, December 07, 2015 1:19:05 PM

Jamie M. VanDusen / Project Manager
Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road, Suite 250, Worthington, OH 43085
Toll-Free: 888-598-6808 · Direct: 614-310-0175 · Fax: 614-540-6638
Mobile: (517) 282-8575 · <http://www.cecinc.com>
Senior Leadership · Integrated Services · Personal Business Relationships

From: Lennon, Tiernan [mailto:tiernan_lennon@fws.gov]
Sent: Monday, December 07, 2015 12:22 PM
To: VanDusen, Jamie
Subject: Re: Mitchell Landfill Bottom Ash Pond CEC #110-416. USFWS #TA-0582

Jamie,

Since changes to the project plans for the Mitchell Landfill Bottom Ash Pond are minor, and will not affect federally listed endangered or threatened species, our previous concurrence still applies (letter sent on July 14, 2015). Thank you for the clarification.

Give me a call if you have any questions or concerns.

Thanks,

On Mon, Dec 7, 2015 at 10:40 AM, VanDusen, Jamie <jvandusen@cecinc.com> wrote:
Tiernan,

Regarding CEC's Environmental Review Request dated June 2, 2015, for American Electric Power Service Corporation's Mitchell Plant-Bottom Ash Ponds located in Franklin District, Marshall County WV, I would like to clarify that the bottom ash ponds are lined surface water impoundments. The June 2, 2015 letter stated that they were unlined.

Thank you for your time,

Jamie M. VanDusen / Project Manager
Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road, Suite 250, Worthington, OH 43085
Toll-Free: 888-598-6808 · Direct: 614-310-0175 · Fax: 614-540-6638
Mobile: (517) 282-8575 · <http://www.cecinc.com>
Senior Leadership · Integrated Services · Personal Business Relationships

This electronic communication and any attachments are intended solely for the use of the person or entity to which it is addressed, and may contain information that is confidential, privileged and exempt from disclosure under applicable law, including copyright law. If you are not the intended recipient of this message, you are prohibited from disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Please promptly notify the sender by reply electronic communication and immediately delete this message from your system.

--

Tiernan Lennon

Fish and Wildlife Biologist
West Virginia Field Office
U.S. Fish and Wildlife Service
694 Beverly Pike
Elkins, WV 26241
304-636-6586 Ext. 12
Fax: 304-636-7824
Tiernan_Lennon@fws.gov

APPENDIX D

**GA RESPONSE TO WVOWWM
ORDER NUMBER DS2009-0002 (ITEM 3)**

**RESPONSE TO WVDWWM
ORDER NUMBER DS2009-0002 (ITEM 3)
MITCHELL BOTTOM ASH COMPLEX
MARSHALL COUNTY, WEST VIRGINIA
WVDWWM I.D. No. 05108
GA FILE NO. 09-379**

**Prepared For:
AEP Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215-2373**

**Prepared By:
Geo/Environmental Associates, Inc.
3502 Overlook Circle
Knoxville, Tennessee 37909**

March 18, 2009



**RESPONSE TO WVDWWM
ORDER NUMBER DS2009-0002 (ITEM 3)
MITCHELL BOTTOM ASH COMPLEX
MARSHALL COUNTY, WEST VIRGINIA
WVDWWM I.D. No. 05108
GA FILE NO. 09-379**

**Prepared For:
AEP Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215-2373**

**Prepared By:
Geo/Environmental Associates, Inc.
3502 Overlook Circle
Knoxville, Tennessee 37909**

March 18, 2009



TABLE OF CONTENTS

SITE DESCRIPTION	1
General.....	1
Approximate Existing Conditions.....	2
SUMMARY OF UNDERGROUND MINING REVIEW AND EVALUATION.....	3

APPENDICES

WVDWWM ORDER NUMBER DS2009-0002	APPENDIX I
ZONE OF INFLUENCE CALCULATIONS	APPENDIX II
REFERENCE DRAWING.....	APPENDIX III



Geo/Environmental Associates, Inc.

3502 Overlook Circle • Knoxville, TN 37909 • 865-584-0344 • Fax 865-584-0778 • www.geoe.com

March 18, 2009

AEP Service Corporation
Geotechnical Engineering Section
1 Riverside Plaza
Columbus, Ohio 43215-2373

Attn.: Mr. Tim Howdyshell

RE: Response to WVDWWM
Order Number DS2009-0002 (Item 3)
Mitchell Bottom Ash Complex
Marshall County, West Virginia
WVDWWM I.D. No. 05108
GA File No. 09-379

Dear Mr. Howdyshell,

At the request of AEP Service Corporation (AEP), Geo/Environmental Associates, Inc. (GA) has prepared a response to the West Virginia Department of Environmental Protection – Division of Water and Waste Management (WVDWWM) Order DS2009-0002 (Order), issued for the Mitchell Bottom Ash Complex. Specifically, this letter addresses Item 3 of the Order which requests a review of underground mine workings (if applicable) and an evaluation of potential impacts that such workings may have on the facility. Provided herein is a brief site description and a summary of our review and evaluation. A copy of the Order is provided in Appendix I. Additionally, engineering calculations and a reference drawing are included in Appendices II and III, respectively.

SITE DESCRIPTION

General

The Mitchell Bottom Ash Complex is maintained and operated by Ohio Power Company (OPC) to provide disposal capacity for bottom ash generated at OPC's Mitchell Power Plant. The Mitchell Bottom Ash Complex is located near Cresap in Marshall County, West Virginia at approximately latitude 39° 49' 30" and longitude -80° 48' 56".

The complex is surrounded by: (1) the Mitchell Power Plant on its north side, (2) West Virginia State Route 2 on its east side, (3) the wallboard facility and ancillary structures on its south side, and (3) the metal cleaning tank, railroad tracks, and the Ohio River on its west side. As shown on the reference drawing in Appendix III, the Mitchell Bottom Ash Complex consists of two impounding facilities: (1) the Bottom Ash Pond and (2) the Clear Water Pond. The Bottom Ash Pond comprises the north portion of the complex and the Clear Water Pond comprises the southern portion. The Mitchell Bottom Ash Pond Complex is regulated by the WVDWWM as a Hazard Class "2" structure.

The Bottom Ash Pond is separated into ponding areas in its western and northeastern portions. In general, bottom ash is sluiced into the northeastern portion of the pond; where after, the sluice water is routed through a splitter dike to the western portion of the pond. The southeastern portion of the Bottom Ash Pond is above the operating pool (pond) level and is used as an excavation and loadout area for bottom ash collected from the eastern portion of the pond. The Bottom Ash Pond was constructed partially as an incised pond and partially using raised dike construction. Specifically, the pool level on the east side of the pond is generally below the bottom elevation of the east dike (i.e., it is incised). Based on detail drawings provided by AEPSC, the inside slopes of the Bottom Ash Pond are lined with a composite soil and PVC liner.

Overflow from the western portion of the Bottom Ash Pond is conveyed to the Clear Water Pond via an overflow shaft and 30-inch diameter concrete pipe. The Clear Water Pond was constructed using both incised pond and diked pond construction methods. In general, the pool levels along the southern and eastern sides of the Clearwater Pond are incised. Similar to the Bottom Ash Pond, the inside slopes of the Clear Water Pond are lined with a composite soil and PVC liner. Overflow from the Clear Water Pond is conveyed through an overflow tower into a 36-inch diameter corrugated metal pipe; where after, it is discharged into the Ohio River

Approximate Existing Conditions

A summary of the approximate existing conditions for the Mitchell Bottom Ash Complex is provided in List 1. Reference mapping for the facility is included in Appendix III.

LIST 1
SUMMARY OF APPROXIMATE EXISTING CONDITIONS
FOR MITCHELL BOTTOM ASH POND COMPLEX

Bottom Ash Pond Crest Elevation	690 feet, NAVD
Bottom Ash Pond Normal Operating Pool Level.....	676 feet, NAVD
Bottom Ash Pond Maximum Design Storm Level ⁽¹⁾	678.37 feet, NAVD
Bottom Ash Pond Bottom Level.....	660 feet, NAVD
Clear Water Pond Crest Elevation.....	675 feet, NAVD
Clear Water Pond Normal Operating Pool Level	664 feet, NAVD
Clear Water Pond Maximum Design Storm Level ⁽²⁾	666.50 feet, NAVD
Clear Water Pond Bottom Level	645 feet, NAVD

Notes:

- (1) The Bottom Ash Pond maximum design storm level is based on a normal pool elevation of 676 feet, NAVD and a pool increase of 2.37 feet during one-half of the 6-hour Probable Maximum Precipitation (PMP) event.
- (2) The Clear Water Pond maximum design storm level is based on a normal pool elevation of 664 feet, NAVD and a pool increase of 2.50 feet during one-half of the 6-hour Probable Maximum Precipitation (PMP) event.

SUMMARY OF UNDERGROUND MINING REVIEW AND EVALUATION

Our review of available mine mapping (as provided by Consolidation Coal Company) indicates that abandoned underground mine workings exist in the Woodland Mines in the vicinity of the eastern limits of the Mitchell Bottom Ash Complex. The reference drawing provided in Appendix III demonstrates the location of the mine workings with respect to the Mitchell Bottom Ash Complex. Specifically, the mapping indicates that the boundary of the abandoned Woodland Mines in the Pittsburgh coal seam exists approximately 102 feet horizontally from the downstream toe of the Bottom Ash Pond east dike and about 186 feet horizontally from the eastern pool limits (i.e., assuming a pool elevation of 678.37 feet, NAVD during the ½ 6-hour PMP maximum design storm) in the Bottom Ash Pond. The abandoned mine workings are at approximately elevation 490 feet, NAVD (i.e., about 130 feet below drainage) at this location. The bottom the Bottom Ash Pond is approximately elevation 660 feet, NAVD. Therefore, the difference



AEP Service Corporation

March 18, 2009

Page 4

in elevation between the bottom of the Bottom Ash Pond and the adjacent mine workings is approximately 170 feet. The elevation difference between the downstream toe of the Bottom Ash Pond east dike (i.e., at elevation 680 feet, NAVD) and the mine workings is approximately 190 feet. Finally, the elevation difference between the critical boundary point for the mine workings and its overlying ground surface is approximately 197 feet.

An accepted angle of influence for underground mine workings in the Appalachian region is established as approximately 23.5° (i.e., based on recommendations in the *SDPS Version 5.2 Quick Reference Guide* prepared by Virginia Polytechnic Institute for the Department of Mines and Minerals). We have prepared calculations in Appendix II to evaluate if the Mitchell Bottom Ash Complex is within the zone of influence of the abandoned Woodland deep mine workings based on the recommended influence angle. As shown in the calculations, the zone of influence of the mine workings extends approximately 86 feet horizontally from the critical boundary point in the Woodland deep mine workings. Based on the available horizontal distances of 102 feet from the downstream toe of the east dike and 186 feet from the maximum design storm pool level in the pond, the Bottom Ash Pond limits are outside of the zone of influence of the mine. Therefore, we do not expect that the abandoned Woodland mine workings will have an impact on the Mitchell Bottom Ash Complex.

Geo/Environmental Associates, Inc. appreciates this opportunity to be of continuing service to AEP Service Corporation. If you have any comments or questions regarding this response, we may be reached at (865) 584-0344.

Sincerely,

Geo/Environmental Associates, Inc.

Roger W. Cecil, P.E.

West Virginia P.E. No. 14,367



APPENDIX I

WVDWWM ORDER NUMBER DS2009-0002





west virginia department of environmental protection

Environmental Enforcement
601 57th Street SE
Charleston, West Virginia 25304
Phone: (304) 926-0470 Fax: (304) 926-0488

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

January 30, 2009

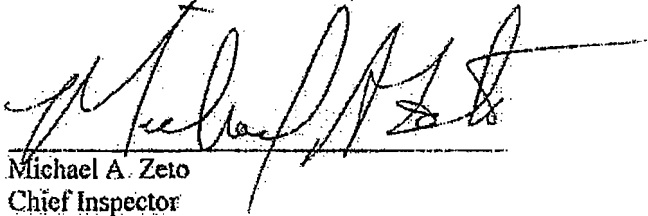
Mr. Thomas Zelina
American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215-2355

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Re: Mitchell Bottom Ash Dam, Woodlands, Marshall County, ID # 05108

Dear Mr. Zelina:

Enclosed is Order Number DS2009-0002 dated the 30th day of January, 2009. This Order is issued to American Electric Power by the director of the Division of Water and Waste Management under the authority of Chapter 22, Article 14 of the Code of West Virginia. This Order contains notification of the right of appeal under the provisions of Chapter 22, Article 14, Section 14.



Michael A. Zeto
Chief Inspector

MAZ/brl
Enclosures

cc: Scott G. Mandirolo, Acting Director, DWWM (via email)
Brian Long, EE/DS
Delbert Shriver, EE/DS
Joseph M. Hickman, Assistant Chief Inspector, EE/WW (via email)
Richard L. Pino, EE (via email)
Cynthia Musser, Environmental Inspector Supervisor, EE/WW (via email)
Brian Lemme, Environmental Inspector, EE/WW (via email)
Pedro Amaya, AEP

Promoting a healthy environment



west virginia department of environmental protection

Division of Water and Waste Management
601 57th Street SE
Charleston, West Virginia 25304
Phone: (304) 926-0495
Fax: (304) 926-0463

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

**ORDER
ISSUED UNDER THE
DAM CONTROL AND SAFETY ACT
WEST VIRGINIA CODE, CHAPTER 22, ARTICLE 14**

TO: Mr. Thomas Zelina
American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215-2355

DATE: January 30, 2009

ORDER NO: DS2009-0002

Re: Mitchell Bottom Ash Dam, Woodlands, Marshall County, ID # 05108

INTRODUCTION

The following findings are made and ORDER issued to American Electric Power pursuant to the authority vested in the Director of the Division of Water and Waste Management under Chapter 22, Article 14, Section 1 et seq. of the Code of West Virginia.

FINDINGS OF FACT

In support of this Order, the Director hereby finds the following:

1. The Mitchell Bottom Ash Dam meets the height and storage requirements necessary to be defined as a "dam" in the Dam Control and Safety Act (Section 22-14-3(f)). As a result, the dam is subject to regulation under provisions of the Dam Control and Safety Act and the Dam Safety Rules (47CSR34).
2. American Electric Power is the legal owner of the Mitchell Bottom Ash Dam.
3. American Electric Power was issued a Certificate of Approval based, in part, upon an acceptable calculated factor of safety regarding embankment stability, and low potential for reservoir failure into underground mines on March 13, 1975.
4. American Electric Power conducted most recent periodic inspection of the dam on October 17, 2008.
5. The recent flyash dam failure in Tennessee underscores the necessity to verify the condition, factors of safety, and potential for failure into underground mines of existing West Virginia waste disposal dams to identify necessary measures to protect the life and property of downstream persons.

Promoting a healthy environment

ORDER FOR COMPLIANCE

And now, this 30th day of January, 2009, American Electric Power is hereby ORDERED by the Director as follows:

1. Unless an equivalent inspection including the items listed below was accomplished within the previous twelve (12) months, in accordance with Dam Safety Rule provisions (47CSR34-15.4.a. and 47CSR34-15.4.c.) perform an inspection of the dam to evaluate and document the current condition of the dam, including but not limited to, the current reservoir elevation, location/elevation and extent of seepage zones, slopes, bulges, scarps, vertical/horizontal displacement, excessive erosion, piping, phreatic surface elevations indicated by instrumentation, and other visible factors which could indicate potential failure of the embankment, embankment foundation, spillways, or other appurtenances. The inspection must note any condition that may result in the release of waste material. The inspection must be performed within 30 days of receipt of this Order by an engineer registered in West Virginia. An inspection report with photographs documenting the results of the evaluation and inspection, and bearing the signature and seal of an engineer registered in West Virginia, shall be submitted within 45 days after receipt of this Order.
2. In accordance with Dam Safety Rule provisions (47CSR34-7.4.b.1.D.1.), determine the current minimum upstream and downstream embankment slope factors of safety for existing loading conditions and earthquake loading conditions. The determination shall utilize current embankment slopes, reservoir elevations, phreatic surface elevations, and seepage zones observed by inspection. The determination results in accordance with Dam Safety Rule provisions (47CSR34-7.4.b.1.D.4.) demonstrating adequate factors of safety and bearing the signature and seal of an engineer registered in West Virginia, shall be submitted within 45 days after receipt of this Order.
3. In accordance with Dam Safety Rule provisions (47CSR34-6.4.d.3.A.7.), document the location of operating, inactive, or abandoned underground mines beneath or in proximity to the dam or reservoir. In accordance with Rule provisions (47CSR34-7.3.a.), perform an evaluation of the potential for failure or breakthrough of the reservoir into operating, inactive, or abandoned underground mines and the potential for mine subsidence that may affect the safety of the structure. A report with the evaluation, and bearing the signature and seal of an engineer registered in West Virginia, shall be submitted within 45 days after receipt of this Order.
4. Two copies of all submissions required under Items 1, 2, and 3 of the Order for Compliance with this Order shall be directed to: Brian Long, West Virginia Department of Environmental Protection, DWWM EE/Dam Safety, 601 57th Street SE, Charleston, West Virginia 25304.

OTHER PROVISIONS

1. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving American Electric Power of the obligation to comply with any applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the

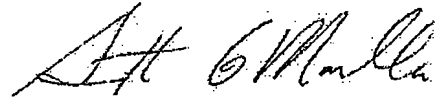
terms and conditions of this Order may subject American Electric Power to additional enforcement action in accordance with the applicable law.

2. The provisions of this Order are severable and should a court or board of competent jurisdiction declares any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.
3. This Order is binding on American Electric Power, its successors and assigns.
4. This Order shall terminate upon American Electric Power's notification of full compliance with the "Order for Compliance" and verification of this notification by WVDEP.

RIGHT OF APPEAL

In accordance with Section 14, Article 14, Chapter 22 of the Code of West Virginia, any person issued an order may file a notice of request for reconsideration with the secretary not more than seven days from the issuance of the order and shall have a hearing before the secretary contesting the terms and conditions of the order within ten days of the filing of the notice of a request for reconsideration. The filing of a notice of request for reconsideration does not stay or suspend the execution or enforcement of the order.

This Order shall become effective upon receipt.



Scott G. Mandirola, Acting Director
DIVISION OF WATER AND WASTE MANAGEMENT

APPENDIX II
ZONE OF INFLUENCE CALCULATIONS





Geo/Environmental
Associates, Inc.

Job Name: MITCHELL BOTTOM ASH COMPLEX

Job Number: 09-379

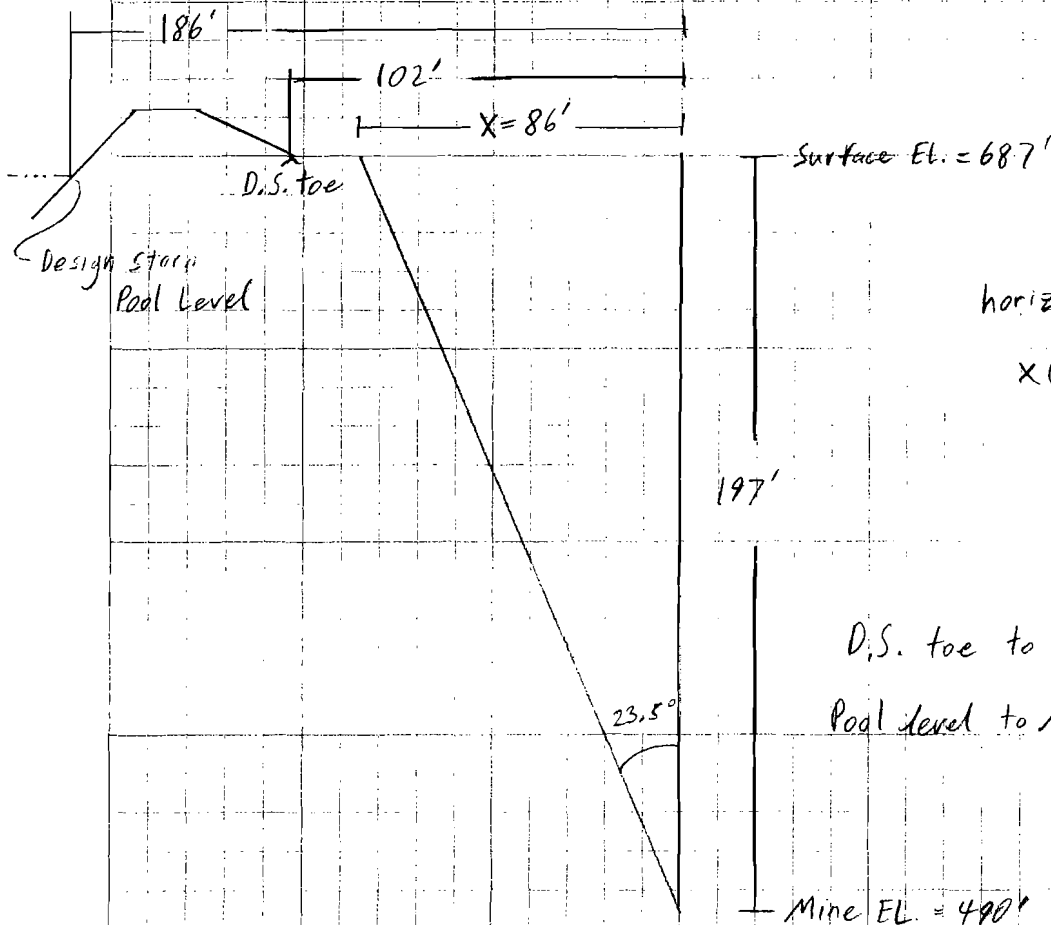
Title: Zone of Influence Calculations

Computed By: SWF Checked by: RWC

Date: 3-18-09 Sheet: 1 Of: 1

Required: Determine whether adequate distance exists between the toe of the Bottom Ash Pond east dike and pool limits with respect to the horizontal zone of influence from the abandoned woodland deep mine workings.

- Given:
- Accepted angle of influence for Appalachian Region = 23.5°
(From SDPS version 5.2 Reference Guide)
 - Elevation of coal seam = 490'
 - Elevation of surface above the critical boundary point in the Mine = 687'
 - Minimum horizontal distance between existing DS toe of the east dike & mine limits = 102'
 - Minimum horizontal distance between the maximum pool level & mine limits = 186'



horizontal extent of influence (x):

$$x(\text{ft}) = \text{cover}(\text{ft}) \cdot \tan(\text{influence } \angle)$$

$$x = 197' \cdot \tan(23.5^\circ)$$

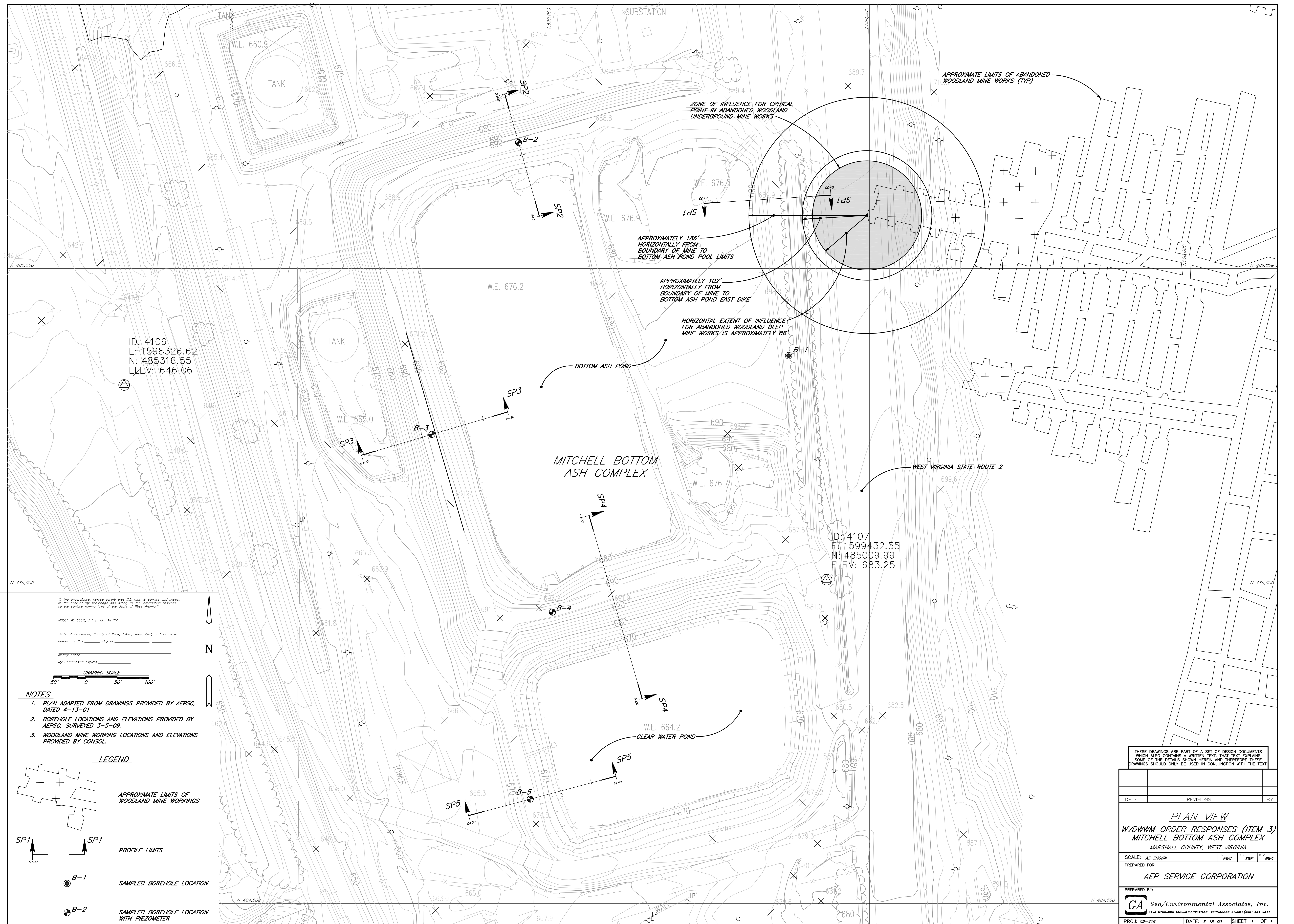
$$x = 85.7' \approx \underline{86'}$$

D.S. toe to Mine limits = 102' > 86' ∴ OK

Pool level to Mine limits = 186' > 86' ∴ OK

APPENDIX V
REFERENCE DRAWING





ID: 4106
 E: 1598326.62
 N: 485316.55
 ELLEV: 646.06

ID: 4107
 E: 1599432.55
 N: 485009.99
 ELLEV: 683.25

MITCHELL BOTTOM ASH COMPLEX

I, the undersigned, hereby certify that this map is correct and shows, to the best of my knowledge and belief, all the information required by the surface mining laws of the State of West Virginia.

RODGER W. COOL, R.P.L.E. No. 14567
 State of Tennessee, County of Knox, taken, subscribed, and sworn to before me this _____ day of _____
 Notary Public
 My Commission Expires _____



- NOTES**
1. PLAN ADAPTED FROM DRAWINGS PROVIDED BY AEPSC, DATED 4-13-01
 2. BOREHOLE LOCATIONS AND ELEVATIONS PROVIDED BY AEPSC, SURVEYED 3-5-09.
 3. WOODLAND MINE WORKING LOCATIONS AND ELEVATIONS PROVIDED BY CONSOL.

LEGEND

- APPROXIMATE LIMITS OF WOODLAND MINE WORKINGS
- PROFILE LIMITS
- SAMPLED BOREHOLE LOCATION
- SAMPLED BOREHOLE LOCATION WITH PIEZOMETER

THESE DRAWINGS ARE PART OF A SET OF DESIGN DOCUMENTS WHICH ALSO CONTAINS A WRITTEN TEXT THAT TEXT EXPLAINS SOME OF THE DETAILS SHOWN HEREIN AND THEREFORE THESE DRAWINGS SHOULD ONLY BE USED IN CONJUNCTION WITH THE TEXT.

DATE	REVISIONS	BY
PLAN VIEW		
WVDWMM ORDER RESPONSES (ITEM 3)		
MITCHELL BOTTOM ASH COMPLEX		
MARSHALL COUNTY, WEST VIRGINIA		
SCALE: AS SHOWN	SR: FWC	SWF: SWF
PREPARED FOR: AEP SERVICE CORPORATION		
PREPARED BY: Geo/Environmental Associates, Inc. 3602 OVERLOOK CIRCLE • KNOXVILLE, TENNESSEE 37909 • (865) 584-0344		
PROJ: 09-379	DATE: 3-18-09	SHEET 1 OF 1