



ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

Amos Plant Winfield Road Putnam County Winfield, West Virginia

October 15, 2018

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Amos Plant Winfield Road Putnam County Winfield, West Virginia

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ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power Service Cooperation
amsl	above mean sea level
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
BAP	bottom ash pond
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
EPRI	Electric Power Research Institute
FGD	flue gas desulferization
ft	feet
GA	Geo/Environmental Associates, Inc.

1. OBJECTIVE

This report was prepared by Arcadis U.S., Inc. (Arcadis) for American Electric Power Service Corporation (AEP) to assess location of the ash pond system relative to the location restrictions included in the Coal Combustion Residual (CCR) requirements, as specified in Code of Federal Regulations (CFR) 40 CFR 257.60 to 257.64, for the ash pond system (CCR Unit) at the AEP Amos Generating Plant (Plant) located on Winfield Road in Winfield, West Virginia (**Figure 1**). The CCR requirements include an evaluation of the adequacy of the groundwater monitoring well network to characterize groundwater quality up and down gradient of the CCR unit in the uppermost aquifer and an evaluation of whether the CCR unit meets up to 5 location restrictions. The restrictions include: 1) the base of the CCR unit is 5 feet (ft) above and isolated from the uppermost aquifer, and the CCR unit may not be 2) located in a wetland, 3) within 200 ft of the damage zone of a fault that has displacement during the Holocene, 4) within a seismic impact zone, or 5) in an unstable area. This report summarizes the evaluation of the location restriction criteria at the onsite ash pond system (Site). The evaluation of the groundwater monitoring well network in the uppermost aquifer is not included in this report and will be completed under separate cover.

Two regulated CCR units associated with the Plant were identified for review, which include the onsite ash pond system and the offsite flue gas desulfurization (FGD) landfill (**Figure 2**). The evaluation of the FGD landfill is not included in this report and will be completed under separate cover.

Initial evaluation of the monitoring well network was completed in November 2015 and included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the ash pond system, as well as publicly-available geologic and hydrogeologic data. Data gaps related to characterization of subsurface geology were identified during this initial evaluation. An electrical resistivity geophysical survey was conducted in December 2015, and additional monitoring wells were installed from April through May 2016 to address these data gaps. Drilling activities were performed by AEP personnel with Arcadis personnel completing borehole logging and well installation oversight. The following report presents the current Conceptual Site Model (CSM), combining the historical Site information with recently collected geologic and hydrogeologic data. This report also presents an evaluation of the 5 location restriction criteria listed above, and will further describe the uppermost aquifer.

2. BACKGROUND INFORMATION

The following section provides background information for the AEP Amos Generating Plant ash pond system.

2.1 Facility Location Description

The AEP Amos Generating Plant is located in Putnam County, bounded by U.S. Route 35 to the west and the Kanawha River to the east. The Plant is approximately 5 miles southeast of Winfield, West Virginia. The ash pond system CCR unit is immediately northwest of the Plant. The ash pond system is located south and adjacent to Bill's Creek and less than one quarter mile southwest of the Kanawha River (**Figures 1** and **2**).

2.2 Description of Ash Pond System CCR Unit

The following section will discuss the embankment configuration, area, volume, construction and operational history, and surface water control associated with the ash pond system.

2.2.1 Embankment Configuration

The ash pond system main dike extends 800 feet (ft) along the northwest side of the ash pond system. The maximum height of the dike is approximately 28 ft above ground surface with a minimum crest elevation of approximately 588 ft. Prior to 2010, the minimum crest elevation was 584 ft, however it was heightened to accommodate raising the operating pool level of the ash pond system. The main dike is approximately 10 to 26 ft wide and is primarily constructed of clay/shale fill above native clayey gravel and clay (GA, 2005).

Secondary splitter dikes were constructed that separate the ash pond system into individual ponds including: Bottom Ash Pond (BAP) 1A, BAP 1B, Reclaim Pond, and Clearwater Pond. The splitter dike separating BAP 1A and BAP 1B has a minimum elevation of 585 ft, but is typically greater than 587 ft. The splitter dike separating BAP 1A and the Reclaim Pond has a minimum elevation of approximately 584 ft while the splitter dike separating the Reclaim Pond and the Clearwater Pond has a minimum elevation of approximately 583.5 ft (GA, 2005).

2.2.2 Area/Volume

The ash pond system, consisting of BAP 1A, BAP 1B, Reclaim Pond, and Clearwater Pond occupies a total surface area of approximately 38.5 acres (**Figure 3**). The combined normal reservoir volume of BAP 1A and BAP 1B is 297 acre ft; the combined maximum reservoir volume of BAP 1A and BAP 1B is 312 acre ft (GA, 2008).

2.2.3 Construction and Operational History

The AEP Amos Generating Plant began operations in 1971 with Unit 1, Units 2 and 3 were brought online in 1972 and 1973, respectively. The first available design drawings of the ash pond system are dated June, 28, 1970. Fly ash and wastewater generated from Units 1, 2 and 3 were assumed to be transferred to the ash pond system as early as 1971 when Unit 1 became active. The ash pond system was constructed by excavation below natural ground surface. From 1970 to 1976 the ash pond system configuration changes included construction of a road embankment on the northwest corner of BAP 1B and removal of an emergency spillway from the northwest corner of BAP 1B. While some modifications to the ash pond system have been made since 1977, the present-day configuration of the ash pond system with respect to splitter dikes and individual pond units has remained the same since 1976 (GA, 2005; **Figure 3**). All ash ponds are un-lined (EPRI, 1999). In 2010, the main dike (northwest dike) was raised 5 ft using concrete block filled with compacted soil.

Currently, bottom ash and coal mill rejects from all three generating units are sluiced to the BAP 1A and BAP 1B for settling. The BAPs are filled in an alternating fashion, with one BAP generally receiving bottom ash while the other BAP is being cleaned out. Additionally, wastewaters from the generation building sumps are pumped to BAP 1A and BAP 1B. Finally, Unit 3 coal pulverizer wastewater is pumped to the Pyrites Pond (EPRI, 1999).

2.2.4 Surface Water Control

The perimeter of the ash pond system is graded such that surface runoff is directed away from the ponds. This grading is accomplished by either natural topographic relief or constructed embankments, for example the main dike along the northwest side of ash pond system (GA, 2008). Surface runoff is directed towards storm water ponds, which are unlined and were constructed by excavating into clayey silt soil (EPRI, 1999). The nearest storm water ponds to the ash pond system are located to the southwest and northeast of the system (**Figure 3**).

Surface water flow within the ash pond system is controlled by a series of embankments and splitter dikes. Pond elevations are maintained so that surface water flows via gravity through underground pipes to ponds in the following order: Pyrites Pond, BAP 1A and BAP 1B, Reclaim Pond, and Clearwater Pond (EPRI, 1999). A majority of water in the Reclaim Pond is pumped to the Plant for re-use. Water that is not recycled into the Plant continues to the Clearwater Pond (GA, 2005). From the Clearwater Pond, water flows to the Kanawha River through a National Pollutant Discharge Elimination System permitted outfall via underground piping.

Two spillway pipes are present in the ash pond system (**Figure 3**). These spillway pipes are intended to discharge excess storm flow into Bill's Creek in the event of a large storm event. One spillway pipe is located at BAP 1B, and the other is located at the Reclaim Pond. Both pipes cross the main dike and discharge in the watershed of Bill's Creek.

2.3 Previous Investigations

From 1995 through 1998, AEP worked in coordination with Ish, Inc., META Environmental, Inc., HIS GeoTrans, Inc., and Electric Power Research Institute (EPRI) to evaluate groundwater quality associated with a number of AEP power generating facilities, including the Amos Plant. The primary objectives of these site investigations were to characterize hydrogeology and identify potential contaminant source areas, establish existing groundwater quality, and identify constituents that exceeded West Virginia Groundwater Standards (WVGS). These studies are described in detail in the report *Groundwater Quality at the John E. Amos Power Plant, Putnam County, West Virginia* (EPRI, 1999). Field work for these investigations included 41 direct push technology groundwater sampling points, installation of 10 permanent monitoring wells (MW-1 through MW-10), surface water sampling from onsite ponds and Bill's Creek, and geotechnical soil characterization.

In 2005, Geo/Environmental Associates, Inc. (GA) performed site investigations at the direction of AEP associated with planned modifications to the main dike. Field methods involved drilling and logging 8 soil borings through the main dike (B-1 through B-8). Split-spoon samples were collected during installation of the borings for the purpose of slope stability analysis, and 3 of the borings were converted to standpipe piezometers (P1, P3, P6). Additionally, boring B-7 was converted to a 2-inch monitoring well, P7 (GA, 2005). This site investigation included numerical hydraulic and slope stability analysis.

The findings of the above-mentioned GA site investigation were submitted to West Virginia Department of Environmental Protection (WVDEP), and were subsequently returned to AEP with comments. This prompted a revision of the hydraulic analyses and construction design specification associated with the plans to raise the elevation of the main dike. No additional field work was performed as part of this scope (GA, 2008).

2.4 Hydrogeologic Setting

The Site is immediately underlain by Quaternary-aged alluvial deposits consisting of clay, silt, sand, and gravel. While there is a general coarsening downward pattern, the shallower clay matrix is interbedded with silty or sandy layers and the deeper sand matrix is interbedded with silty or clayey layers. The uppermost groundwater zone occurs in the confined to semi-confined deeper sand zones that exhibit a potential head. Maximum alluvium thickness is approximately 50 ft and thins towards the edges of the valley. Groundwater flow direction within the alluvium is towards the Kanawha River or Bill's Creek.

In the upland areas surrounding the Site, bedrock primarily consists of the Pennsylvanian age sandstones, shales, limestones, and coal of the Monongahela and Conemaugh Groups. At higher elevations, the hilltops are capped by the Permian age Dunkard Formation. The Conemaugh Group immediately underlies alluvial sediments at the Site, and gently dips to the north. Groundwater occurrence in the bedrock generally coincides with the stress relief fracture system and is not necessarily related to lithology. Bedrock groundwater flow generally mimics surface topography, flowing from ridges towards valleys.

These features are further illustrated on three lines of cross section that were prepared through the ash pond system. The cross section location map is included as **Figure 4** and the lines of cross section are

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included as **Figure 5A** (A to A'), **Figure 5B** (B to B'), and **Figure 5C** (C to C'). Boring logs and well construction diagrams are included in **Appendix A**.

2.4.1 Climate and Water Budget

The climate of Winfield, West Virginia is characterized as humid continental with an average rainfall of approximately 40 inches annually. The average maximum temperature is 66 °F and the average minimum temperature is 44 °F based on information from Southeast Regional Climate Center (SERCC, 2015).

2.4.2 Regional and Local Geologic Setting

The Site is located in the Appalachian Plateau physiographic province, and is also situated in the Kanawha River valley along the southern bank of the Kanawha River. Alluvial sediments consist of clay, silt, sand and gravel deposits that generally coarsen downward. Unconsolidated alluvial sediments are present in thicknesses to approximately 50 ft with thinning towards the valley walls.

Bedrock is present underlying the alluvial deposits, as well as in ridges located to the west of the Site. The primary bedrock units encountered are sedimentary rocks of the Permian age Dunkard Formation and the Pennsylvanian age Monongahela and Conemaugh Formations. The depositional environment for these formations is characterized by a gradually subsiding shallow sea with alternating marine and freshwater strata; the sedimentary units associated with the Monongahela and Conemaugh Formations consists of alternating shale and sandstone units, with occasional thin limestone beds. Several coal horizons are present in the region and often serve as marker beds for unit identification (EPRI, 1999).

Unconsolidated sediments in the upland areas are generally limited to nominal thicknesses of residuum overlying the bedrock. In incised valleys, there is generally a layer of colluvium or alluvium derived from eroded up-valley bedrock on top of the colluvium.

2.4.3 Surface Water and Surface Water/Groundwater Interactions

The Site is adjacent to the Kanawha River, and the ash pond system is located approximately 1,000 ft southwest of the Kanawha River. Bill's Creek, a tributary of the Kanawha River, is immediately adjacent and north of the Reclaim Pond. Groundwater flow direction is generally to the north, northeast, and east towards the Kanawha River and Bill's Creek. The Kanawha River stage level is dam controlled and is a gaining surface water feature. Groundwater elevations on site are higher than the normal stage elevation of the Kanawha River of 566 ft.

The stage levels of the ash pond system are generally maintained no greater than the normal operating levels ranging from 583 to 583.5 ft above mean sea level (amsl) (GA, 2008). Groundwater is generally present at lower elevations at around 570 ft amsl based on recently installed wells. The ponds are unlined and likely providing recharge to the uppermost aquifer resulting in groundwater mounding in the vicinity of the ash pond system.

2.4.4 Water Users

The Amos Plant uses Putnam County Public Service Department water supply. There are no active groundwater production wells at the Site. During the development of a water well inventory for the Site by Arcadis in 2014, no information was available regarding the location of nearby public or private water supply wells.

3. ISOLATION FROM THE UPPERMOST AQUIFER

Per 40 CFR 257.60(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 (5 ft) above the upper limit of the uppermost aquifer, or must demonstrate 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 conditions).

3.1 Uppermost Aquifer and Piezometric Analysis

3.1.1 Piezometric Analysis

3.1.1.1 Horizontal and Vertical Position Relative to CCR Unit

The uppermost unconsolidated aquifer consists of the saturated alluvial sediments beneath and surrounding the Site. The upper limit of the uppermost aquifer is defined by the elevation of the top of the saturated sand zone, which is variable across the Site. The uppermost aquifer is generally confined to semi-confined by clay and sandy clay deposits. However, alluvial sands may be semi-confined to unconfined in some areas of the Site (e.g. SB-1604, MW-1602A). The base elevation of the ash pond system varies, but ranges from approximately 559 ft amsl (SB-1604) to 584 ft amsl (SB-1603). Soil borings installed in 2016 indicate that the base of the ash pond system is likely in contact with the underlying uppermost aquifer. This is illustrated in cross sections A-A', B-B', and C-C' (**Figures 5A, 5B,** and **5C**).

The vertical extent of the aquifer extends to the base of the unconsolidated deposits in the valley at the bedrock interface. The uppermost unconsolidated aquifer is approximately 50 feet thick and appears laterally extensive to the north, south and east around the ash pond system. The uppermost aquifer pinches out towards the bedrock valley wall to the west.

3.1.1.2 Overall Flow Conditions

Groundwater recharge occurs from regional precipitation infiltration and from ash pond use. Bedrock, to a lesser extent, contributes recharge to the uppermost unconsolidated aquifer from the west of the Site were the alluvial valley is in contact with the valley wall.

Available groundwater elevations for 1995 through 1996, as well as groundwater elevations collected in July 2016 from the newly-installed wells, are summarized on **Table 1**. The average vertical hydraulic gradient from 1995 to 1996 between wells MW-2 and MW-3 was 0.008 in an upward direction from MW-2, which is screened in the shallow sandy clay, to MW-3, which is screened deeper in the basal gravel zone. In July 2016, a similar upward vertical hydraulic gradient of 0.009 was observed. Near the ash pond system, the average vertical gradient between wells MW-4 and MW-5 from 1995 to 1996 was -0.036 in a downward direction. In July 2016, a similar downward vertical gradient of -0.046 was observed. Both of these wells are screened in the uppermost aquifer (i.e. alluvial sands), indicating likely localized recharge from the ash pond system.

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The most recent groundwater data set, collected on July 25, 2016, is depicted with potentiometric surface contours on **Figure 6**. Groundwater flow is generally to the north and east towards the Kanawha River. There is also a northern component of groundwater flow towards Bill's Creek. As presented in **Table 2**, wells included in the monitoring network have been designated as up or down gradient.

3.1.2 Uppermost Aquifer

3.1.2.1 CCR Rule Definition

The CCR rule definitions for an aquifer and the uppermost aquifer as specified in 40 CFR 257.53 indicates an aquifer is a geologic formation capable of yielding usable quantities of groundwater to wells or springs while an uppermost aquifer is defined as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers, that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural groundwater surface to which the aquifer rises during the wet season.

3.1.2.2 Common Definitions

An aquifer is commonly defined as a geologic unit that stores and transmits water (readily or at sufficient flow rates) to supply wells and springs (USGS, 2015; Fetter, 2001). The uppermost aquifer is considered the first encountered aquifer nearest to the CCR unit.

3.1.3 Identified Onsite Hydrostratigraphic Unit

The identified Site hydrostratigraphic unit is the unconsolidated alluvial aquifer consisting of confined to semi-confined sands. This aquifer is not known to be used locally for groundwater supply or industrial water use.

3.2 Compliance with Isolation Distance

The unconsolidated unit underlying the ash pond system meets the regulatory definitions of an aquifer. During installation of confirmatory soil borings SB-1601 and SB-1604, the base of the CCR unit was observed to be immediately overlying the uppermost aquifer (i.e. saturated alluvial sands). At both borings, the contact between ash and sand occurred approximately 20 to 25 ft bgs. This is illustrated on **Figures 5A**, **5B**, and **5C**. Additionally, groundwater elevations measured on July 25, 2016 at MW-1606 (572.73 ft amsl), MW-1604 (568.10 ft amsl) and MW-6 (571.55 ft amsl) confirm that the elevation of saturation occurs higher than the base of the ash. This CCR unit does not meet the location restriction for separation of 5 ft from the uppermost aquifer based on these observations.

4. WETLANDS

CCR Rule 40 CFR Part 257.61 requires that existing and new CCR surface impoundments must not be located in wetlands.

4.1 Local Wetlands

Based on the August 11, 2015 site visit and review of available published information the ash pond system is not located within any areas that exhibited wetland characteristics that are classified as a regulated wetland. There were two potential wetland areas, Bill's Creek to the north of the BAP and a small area to the northwest of BAP 1B were observed in close proximity to this CCR unit. Bill's Creek is located adjacent to the exterior toe of the northwest pond embankment and discharges into the Kanawha River (**Figure 3** and **Figure 7**). However, Bill's Creek is located adjacent to and not within the limits of the ash pond system. The area northwest of BAP 1B is outside of the berm of the active area of the ash pond and above the historic extent of the ash. This area should be considered within the unit as opposed to the unit being within the wetland. Additionally, the current operations do not appear to be affecting the potential wetland area due to the presence of the existing berm, which was constructed in the 1970s. Photos of these areas are included in **Appendix B**.

4.2 Compliance with Wetland Restrictions

Based on the August 11, 2015 site visit and review of available information, the ash pond system is not located within wetlands. Therefore, this CCR unit meets the location restriction regarding wetlands.

5. FAULT AREAS

CCR Rule 40 CFR Part 257.62 requires that existing and new CCR surface impoundments must not be located within 200 ft of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates that the and alternate setback will prevent damage to the structural integrity of the CCR unit.

5.1 Description of Regional Geologic Structural Features

The Parkersburg Syncline is the predominant structural feature in the vicinity of the Site. It trends northeastward, and bedrock general dips gently to the northwest towards the axis of the syncline. Along the limbs of the Parkersburg Syncline there are subordinate anticlinal and synclinal folds which lead to minor warping of bedrock units in the ridges surrounding the Site to the west (EPRI, 1999).

5.2 Compliance with Fault Area Restrictions

A review of available geologic reports and maps has indicated that the Site is not located near any faults with displacement in the Holocene. **Figure 8** presents a map depicting known faults in the region. As shown on that map, the faults that do exist are of Paleozoic age (i.e. much older than Holocene) and a significant distance (at least 40 miles) from the site. Therefore, the CCR units at this Site meet the location restriction for faults.

6. SEISMIC IMPACT ZONE

CCR Rule 40 CFR Part 257.63 requires that existing and new CCR surface impoundments must not be located within a seismic impact zone unless the owner or operator demonstrates that all structural components of the CCR unit are designed to withstand the maximum horizontal acceleration in lithified earth material for the Site.

6.1 Definition of Seismic Impact Zone

CCR Rule 40 CFR Part 257.53 defines a seismic impact zone as an area having a 2% or greater probability that the maximum horizontal acceleration expressed as a percentage of the earth's gravitational pull (g) will exceed 0.10 g in 50 years.

6.2 Compliance with Seismic Impact Zone Restriction

Figure 9 presents the map of the peak ground acceleration with a 2% probability of exceedance in 50 years for Ohio, as published by the USGS Earthquake Hazards Program. As shown on **Figure 9**, the Site falls within the zone having a maximum horizontal acceleration of 0.06 to 0.1 g. Therefore, the CCR unit meets the location restriction for seismic impact zone.

7. UNSTABLE AREAS

CCR Rule 40 CFR Part 257.64 requires that existing and new CCR surface impoundments must not be located within an unstable area unless the owner or operator demonstrates that the design of the unit will ensure the integrity of the structural components of the unit.

7.1 Definition of Unstable Area and local Conditions

7.1.1 CCR Rule Definition

CCR Rule 40 CFR Part 257.53 defines an unstable area as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of the CCR unit. These may include poor foundation conditions, areas susceptible to mass movements (landslides), and karst terrains.

7.1.2 Poor Foundation Soils

Several investigation and stability reports have been prepared for the ash pond system. These include reports by Geo/Environmental Associates, Inc. dated 2005 and 2008, which included seepage, hydraulic, and static and seismic stability evaluations of the pond embankments, as well as an evaluation of liquefaction potential. These reports conclude that the embankments exhibit acceptable factors of safety and that the underlying foundation soils are not susceptible to liquefaction.

7.1.3 Mass Movements

The ash pond system is located within the valley floor area, and is therefore not an area subject to mass movements. **Figure 10** presents a map of known landslide activity in the area. This figure supports the conclusion the ash pond system is not located within an area susceptible to mass movements.

7.1.4 Karst

Figure 11 presents a map of known karst features in West Virginia. As shown on this figure, the ash pond system is not located in a karst area (GA, 2005).

7.1.5 Subsurface Mining

No subsurface mines are known to exist below the ash pond system (GA, 2005).

7.2 Compliance with Unstable Areas Restriction

Based on the Site visit and review of available information, the ash pond system is not located within unstable areas. Therefore, this CCR unit meets the location restriction requirements for unstable areas.

8. SUMMARY, CONCLUSIONS, AND PE CERTIFICATION

I, John W. Holm, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the Site, as well as the evaluations discussed within this report, the Amos ash pond system meets the CCR surface impoundment location restrictions of 40 CFR Part 257 for wetlands, fault areas, seismic impact zones, and unstable areas. However, the ash pond system does not meet the location restriction for separation from the uppermost aquifer.

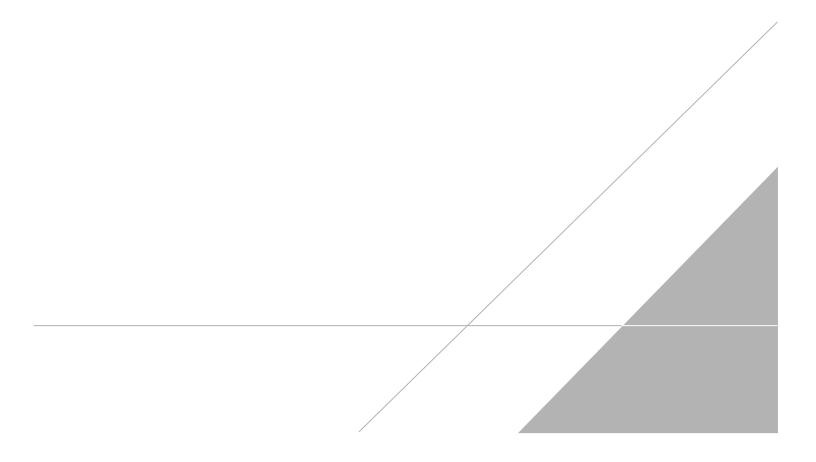
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Registration No.	Registration State	Date	

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TABLE





	Sep-95	Mar-96	Jul-96	Jul-16
Well ID	GW Elev ^a	GW Elev ^a	GW Elev ^a	GW Elev
	ft amsl	ft amsl	ft amsl	ft amsl
Sandy Clay Zone Wells				
MW-2	572.27	572.97	572.90	574.80
MW-6	571.21	572.71	572.47	571.55
MW-8	575.24	576.23	576.05	577.13
MW-9	572.26	572.77	572.58	
Sand Zone Wells				
MW-1	565.86	566.28	565.95	567.04
MW-4	569.84	570.35	570.31	570.99
MW-5	569.10	569.62	569.60	570.08
MW-7	573.84	574.84	574.88	
MW-1601				574.87
MW-1602A				576.11
MW-1603A				579.14
MW-1604				568.10
MW-1605				568.79
MW-1606				572.73
Basal Gravel Zone Wells				
MW-3	572.45	573.28	573.21	575.10
MW-10	572.21	572.76	572.51	

Notes:

Shaded - well abandoned or not verified

a. Source: EPRI. April 1999. Groundwater Quality at the John E. Amos Power Plant, Putnam County, West Virginia, Table 2-5.

-- - not measured

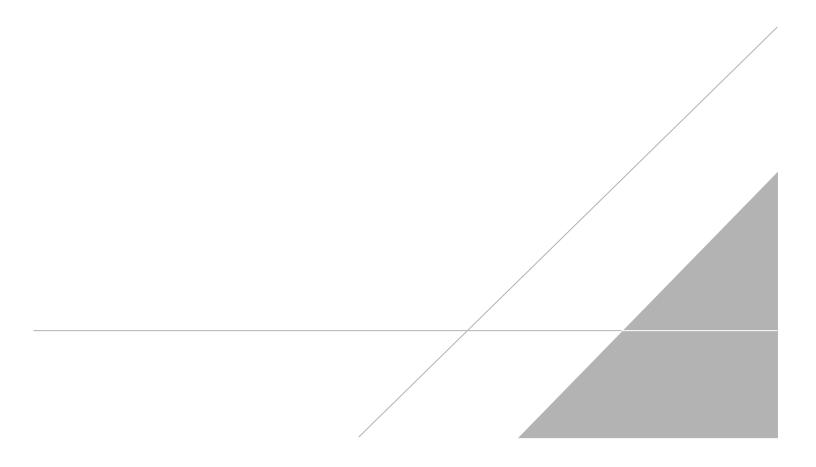
amsl - above mean sea level

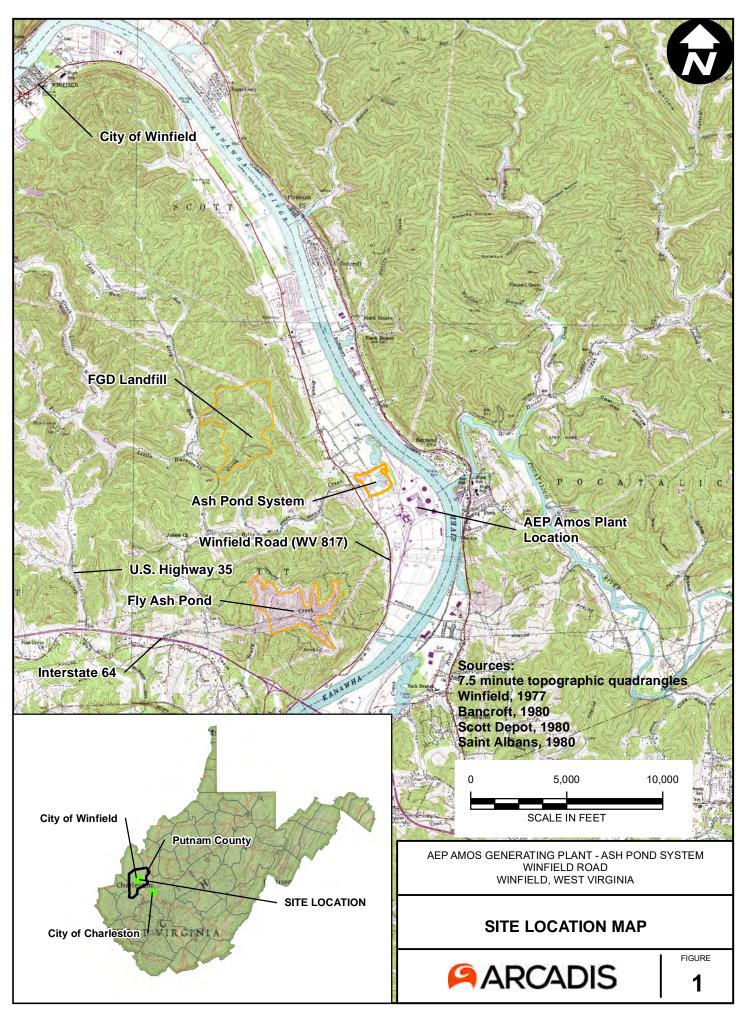
Elev - elevation

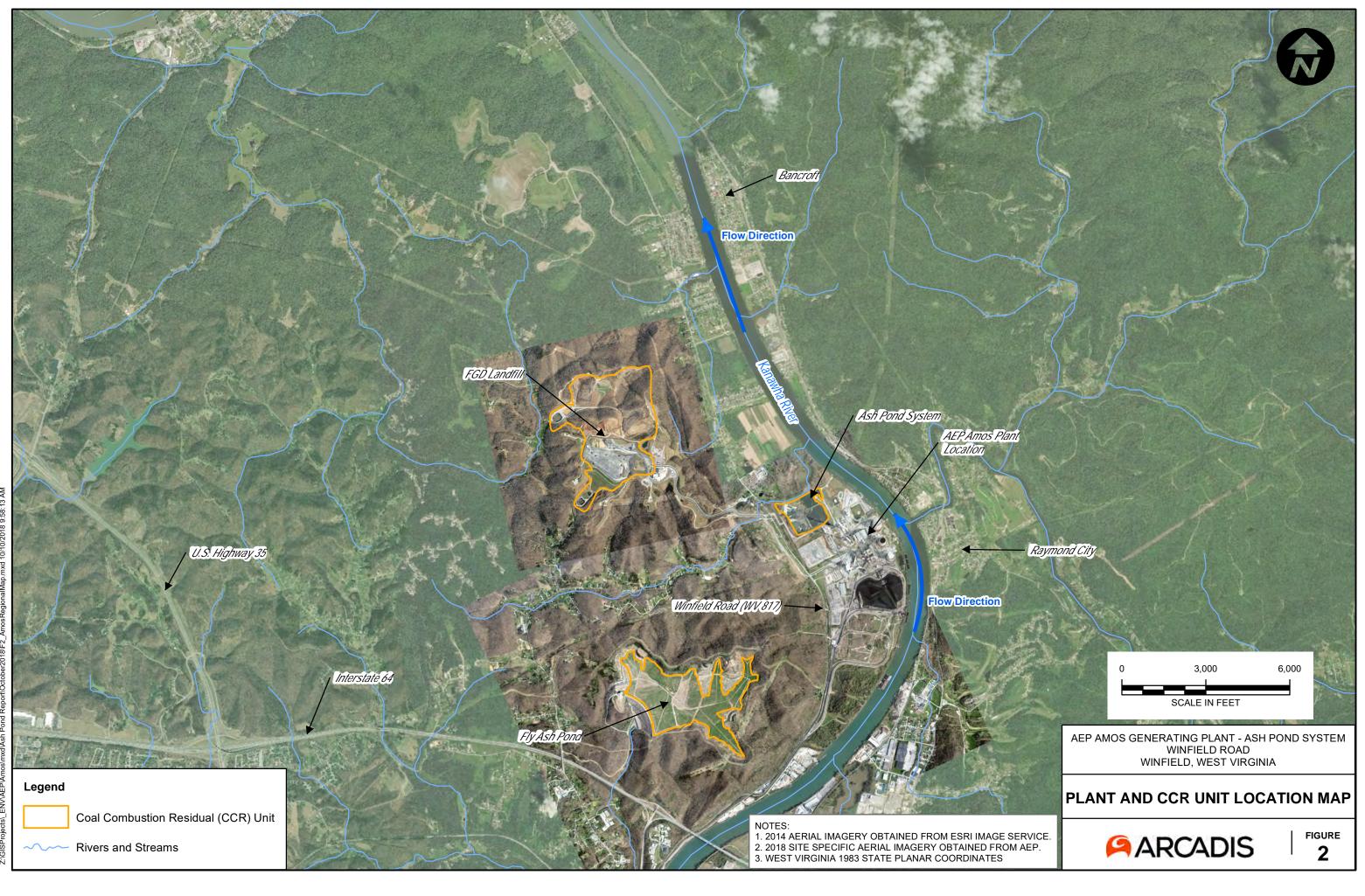
ft - feet

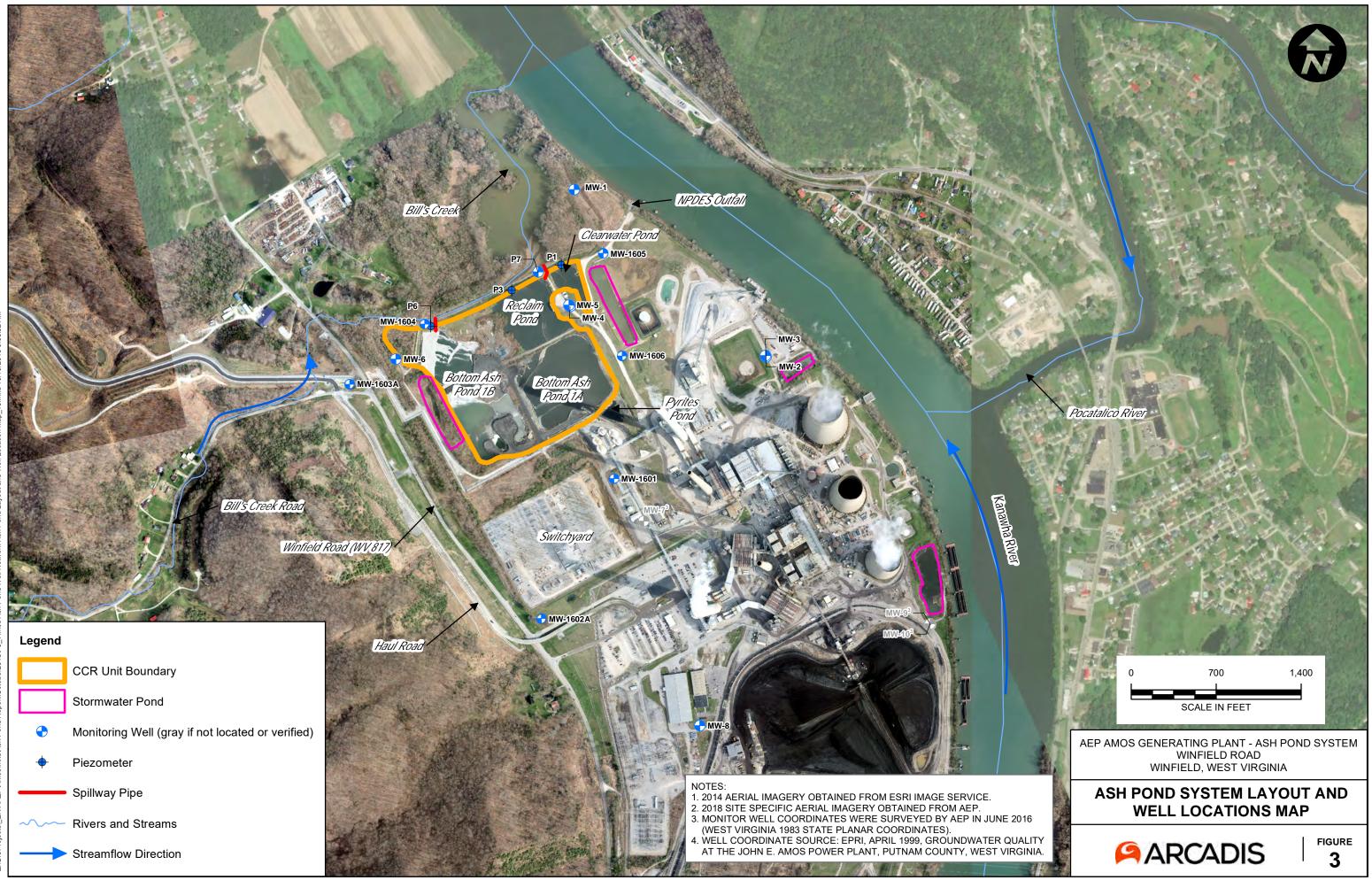
GW - groundwater

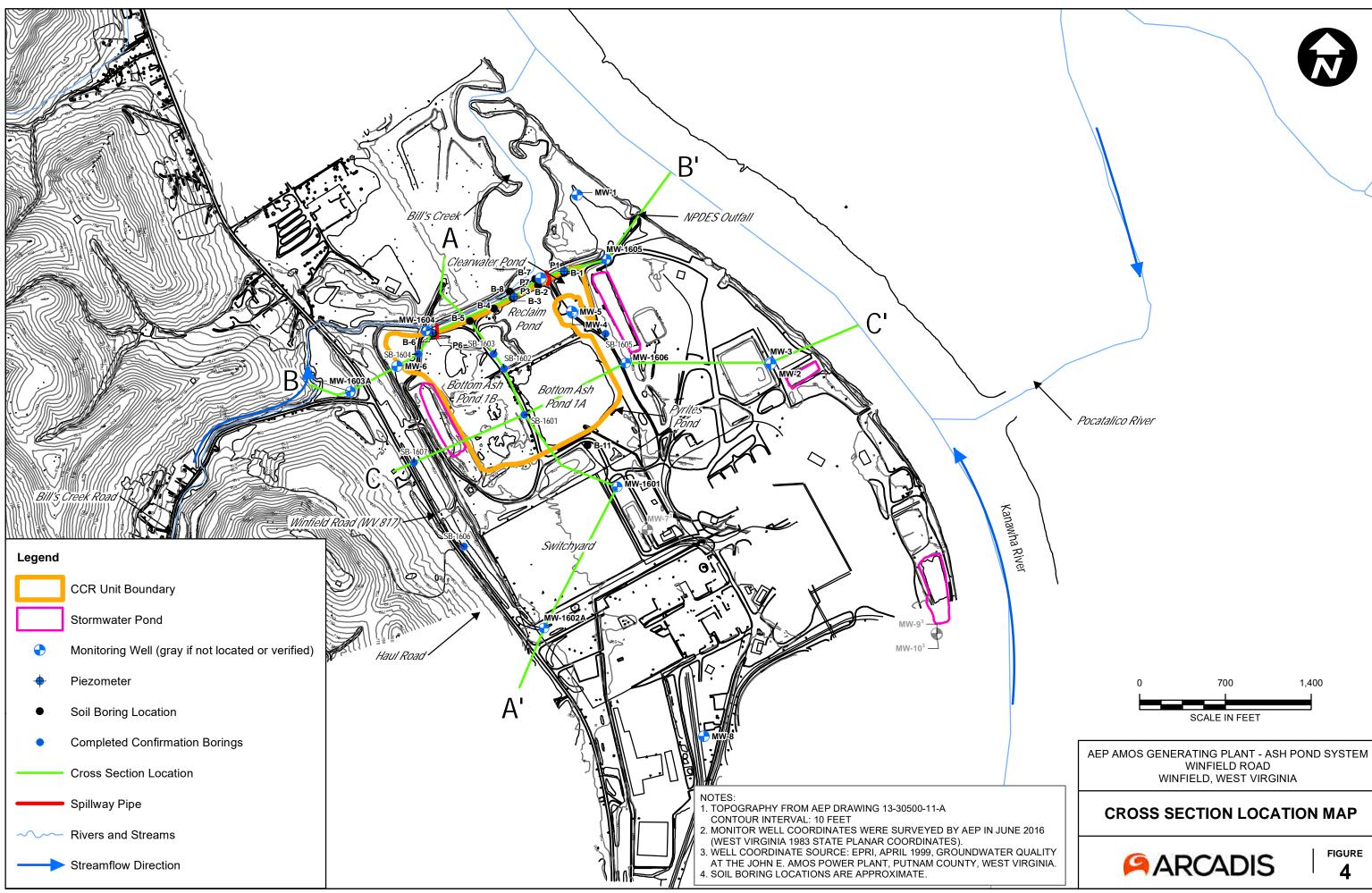
FIGURES







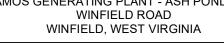


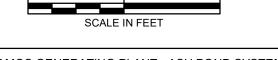


ARCADIS

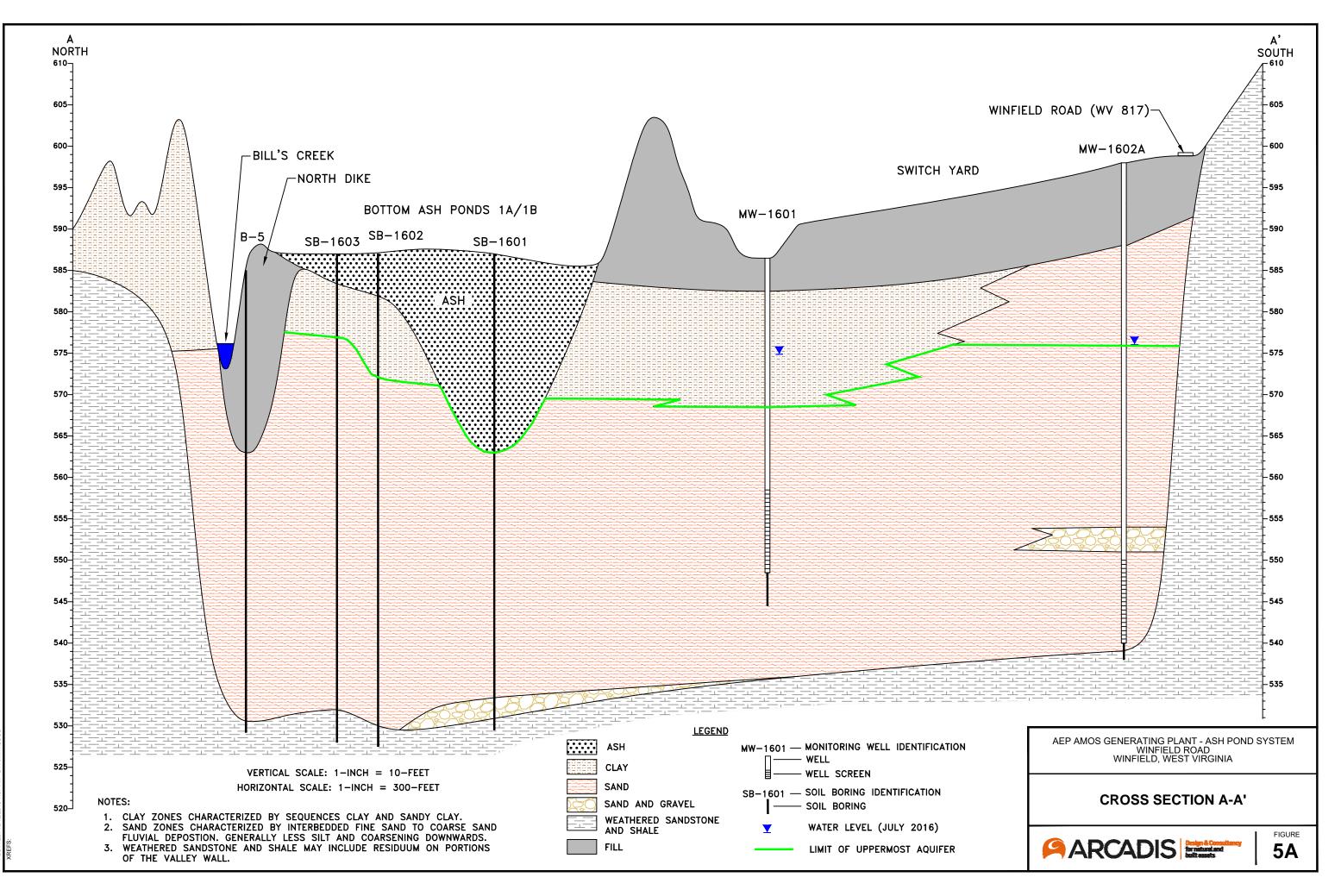
1,400

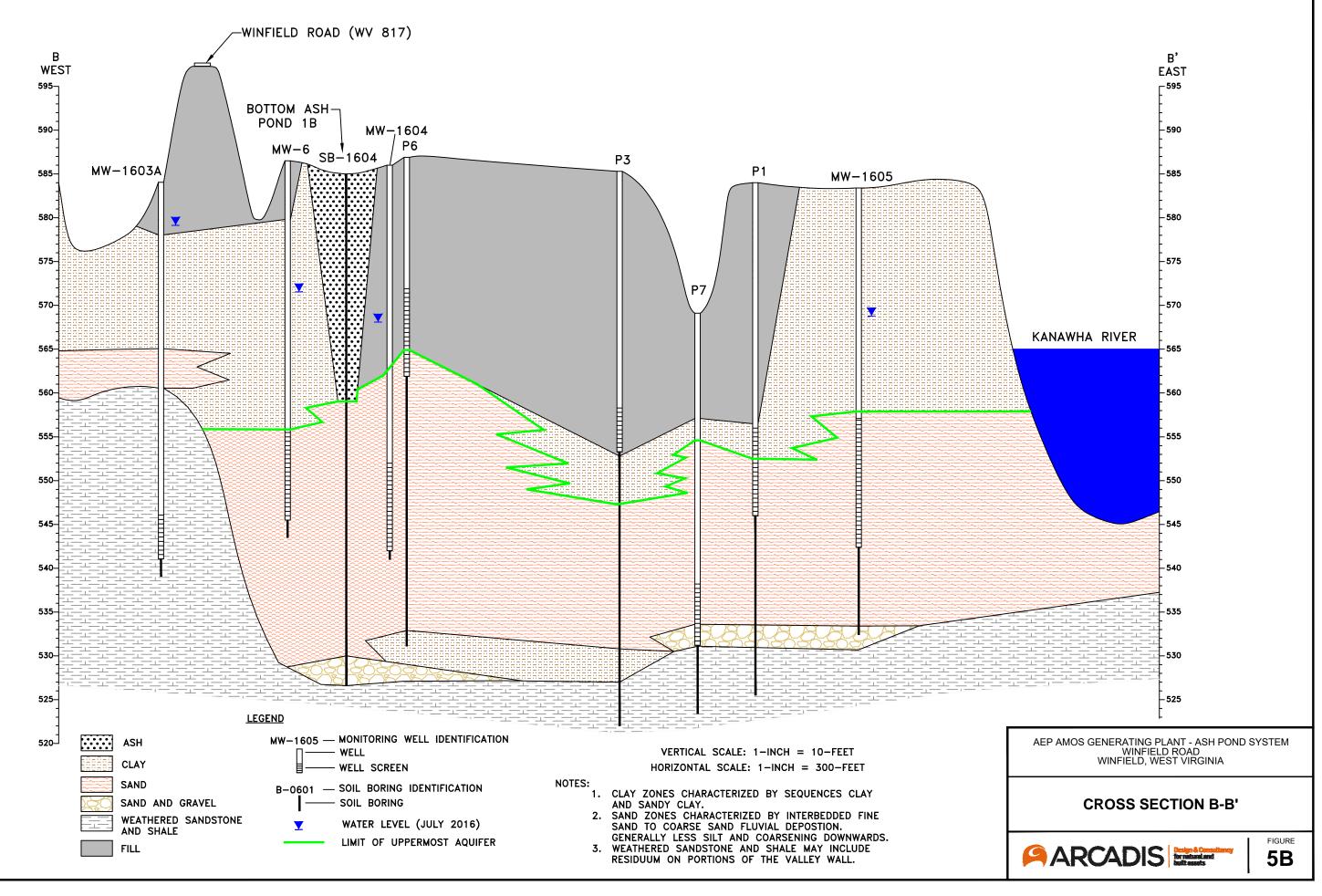
CROSS SECTION LOCATION MAP

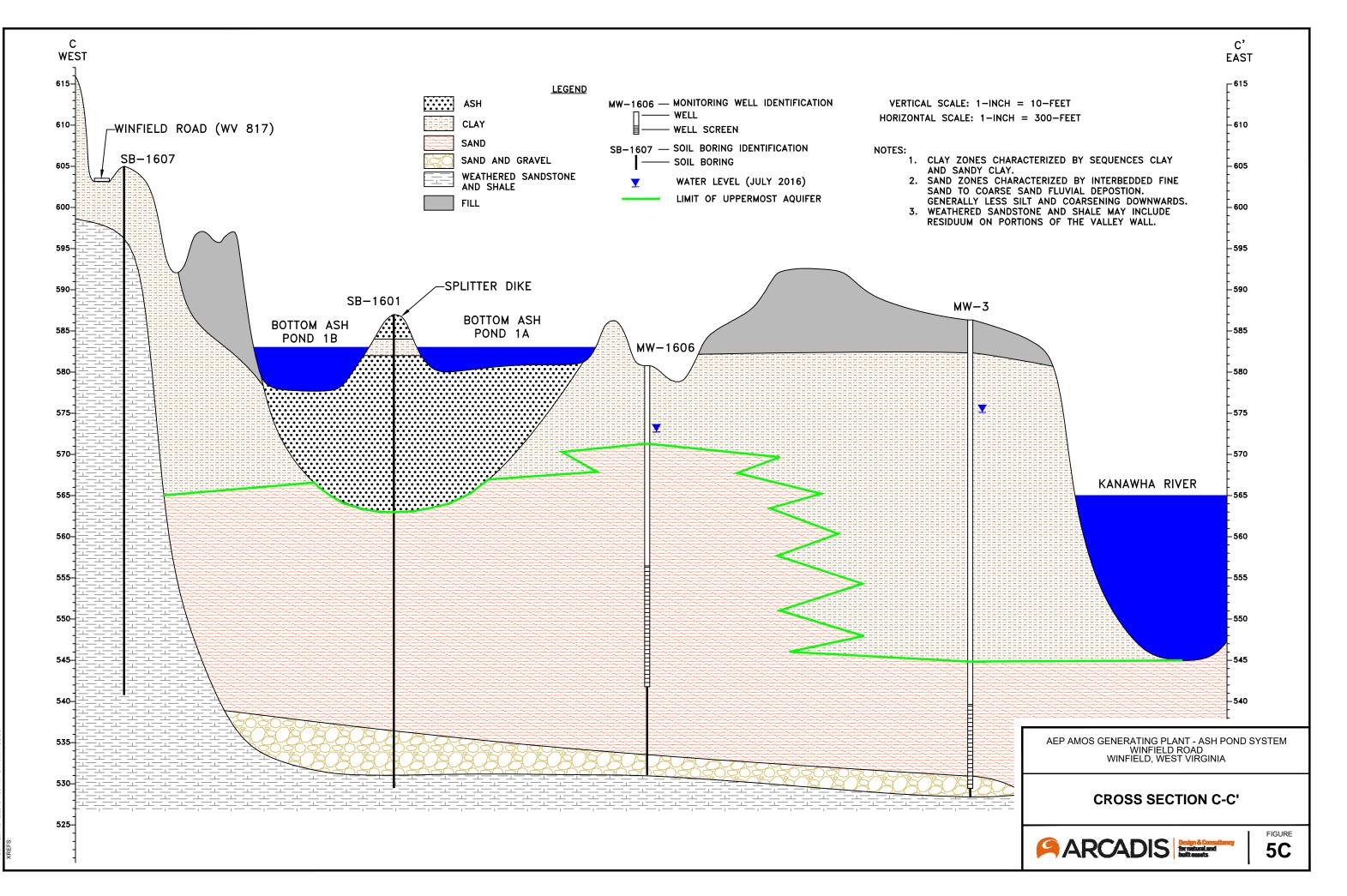


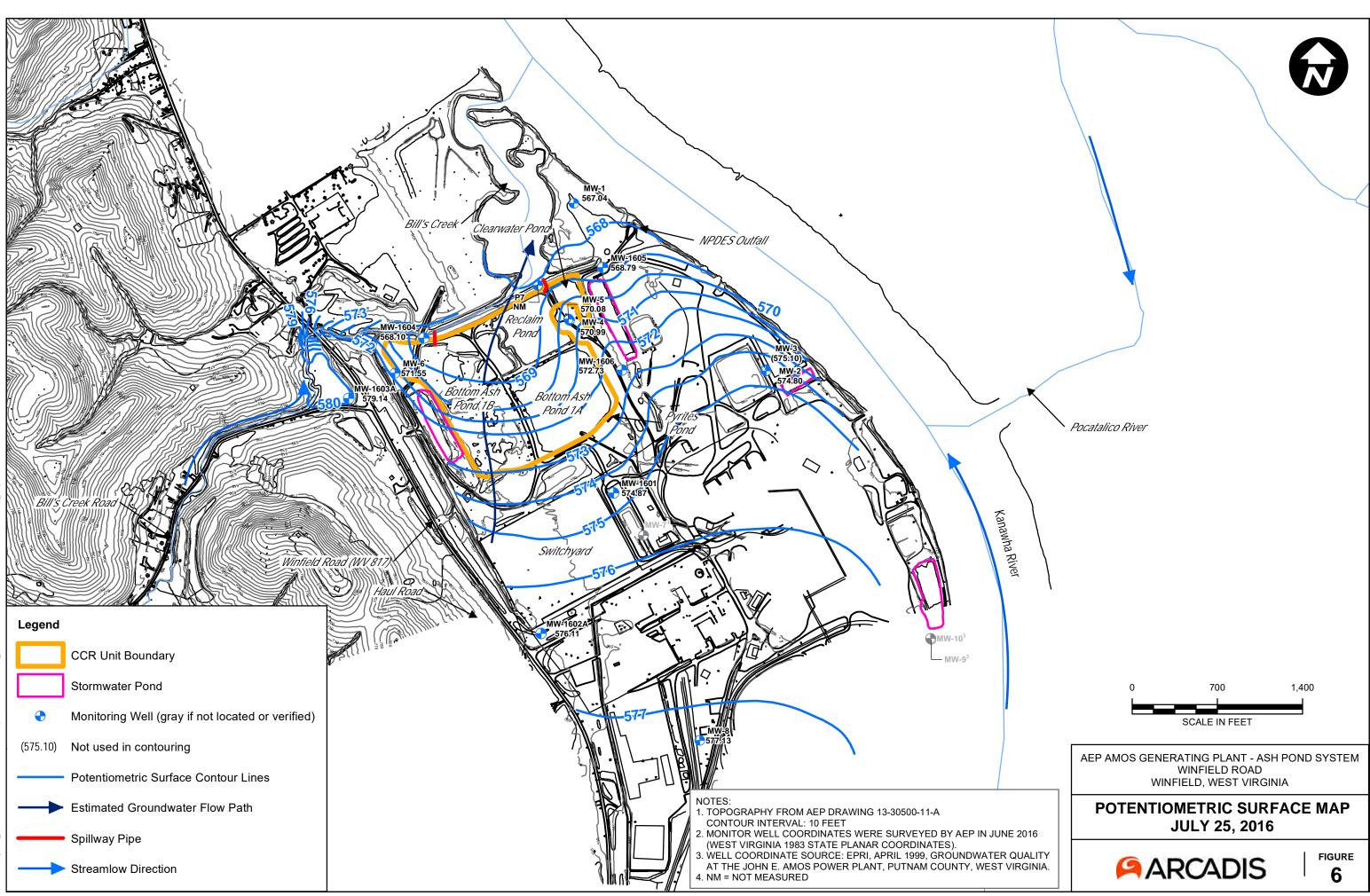


700

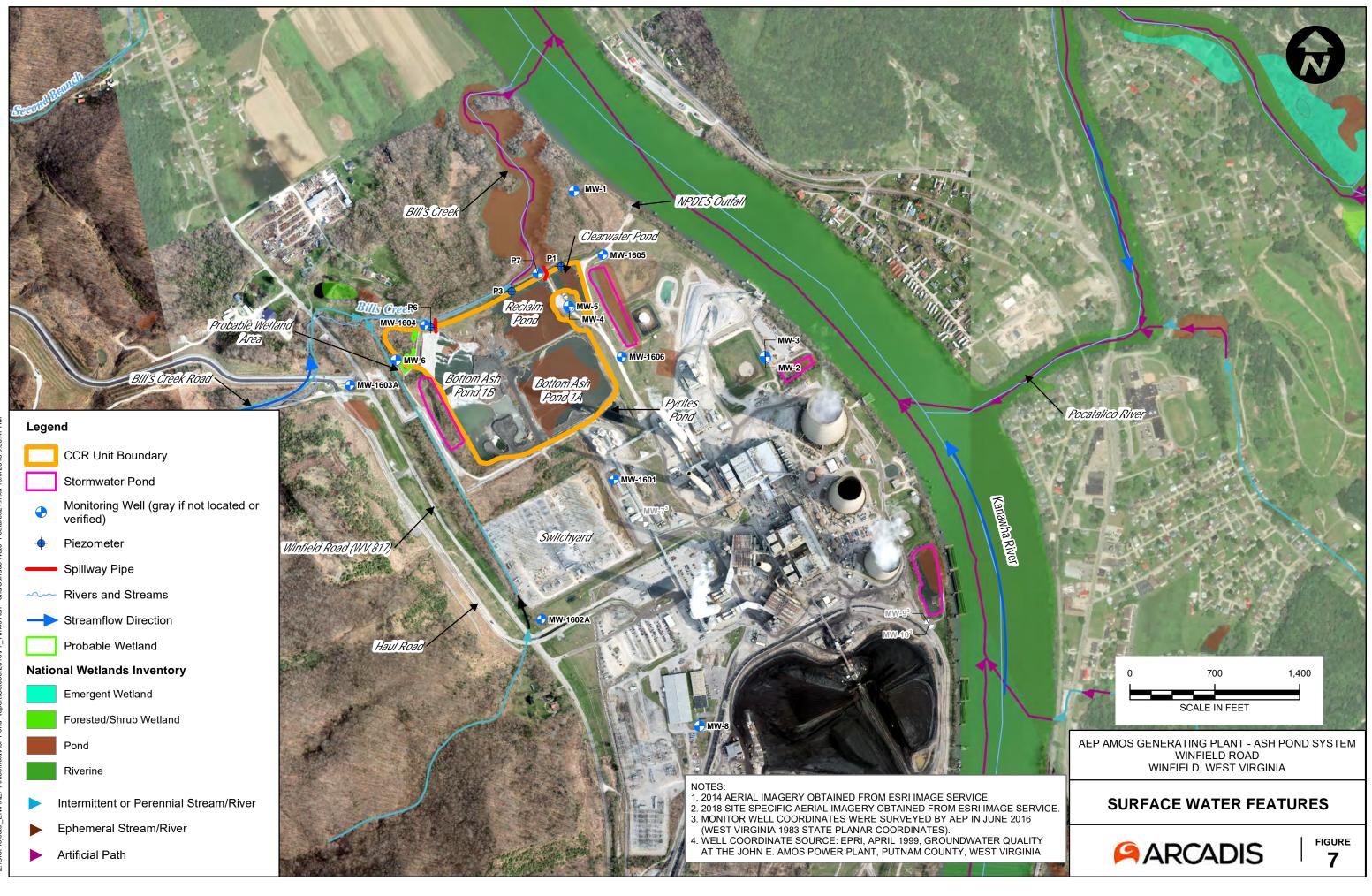


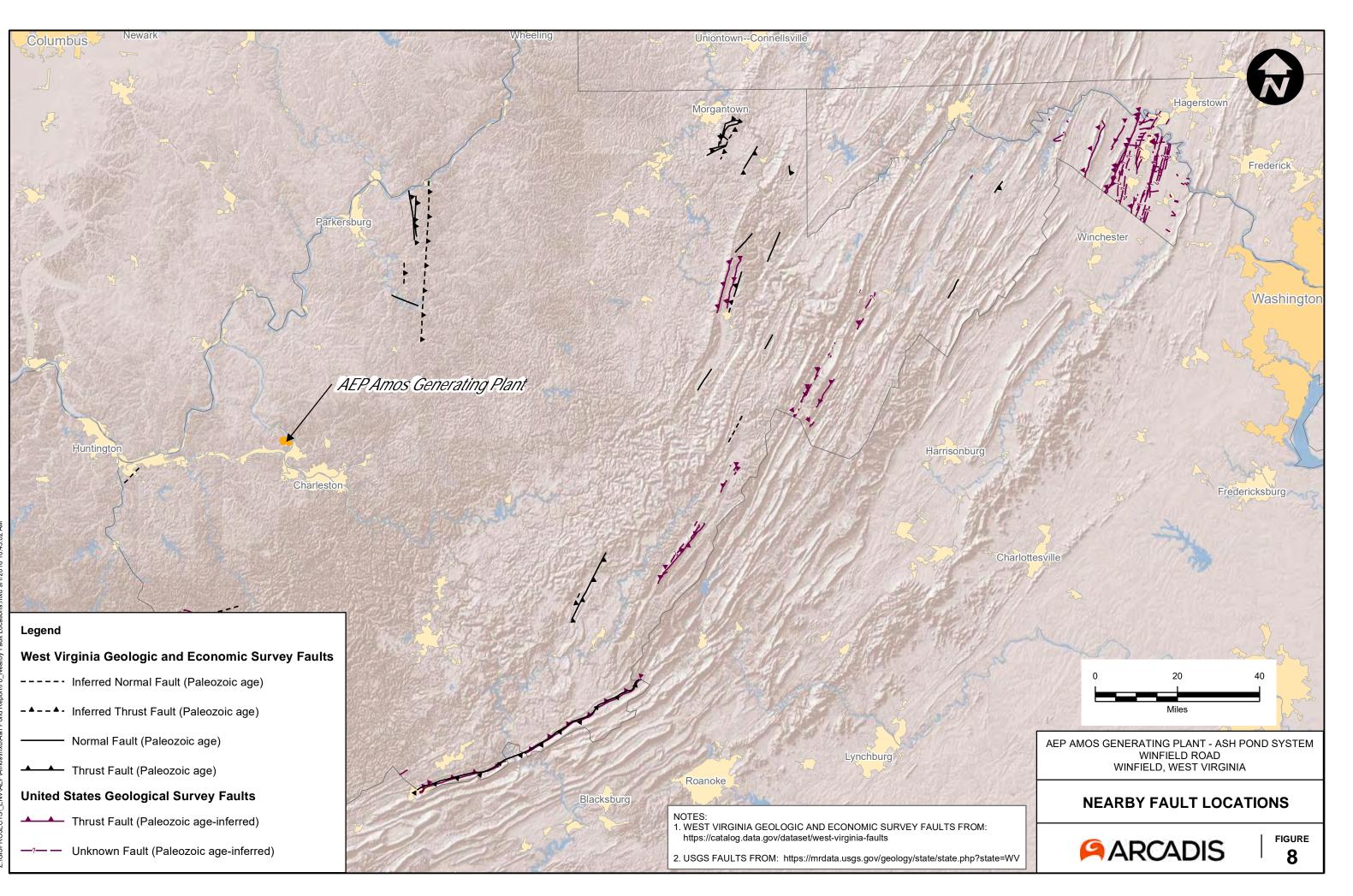


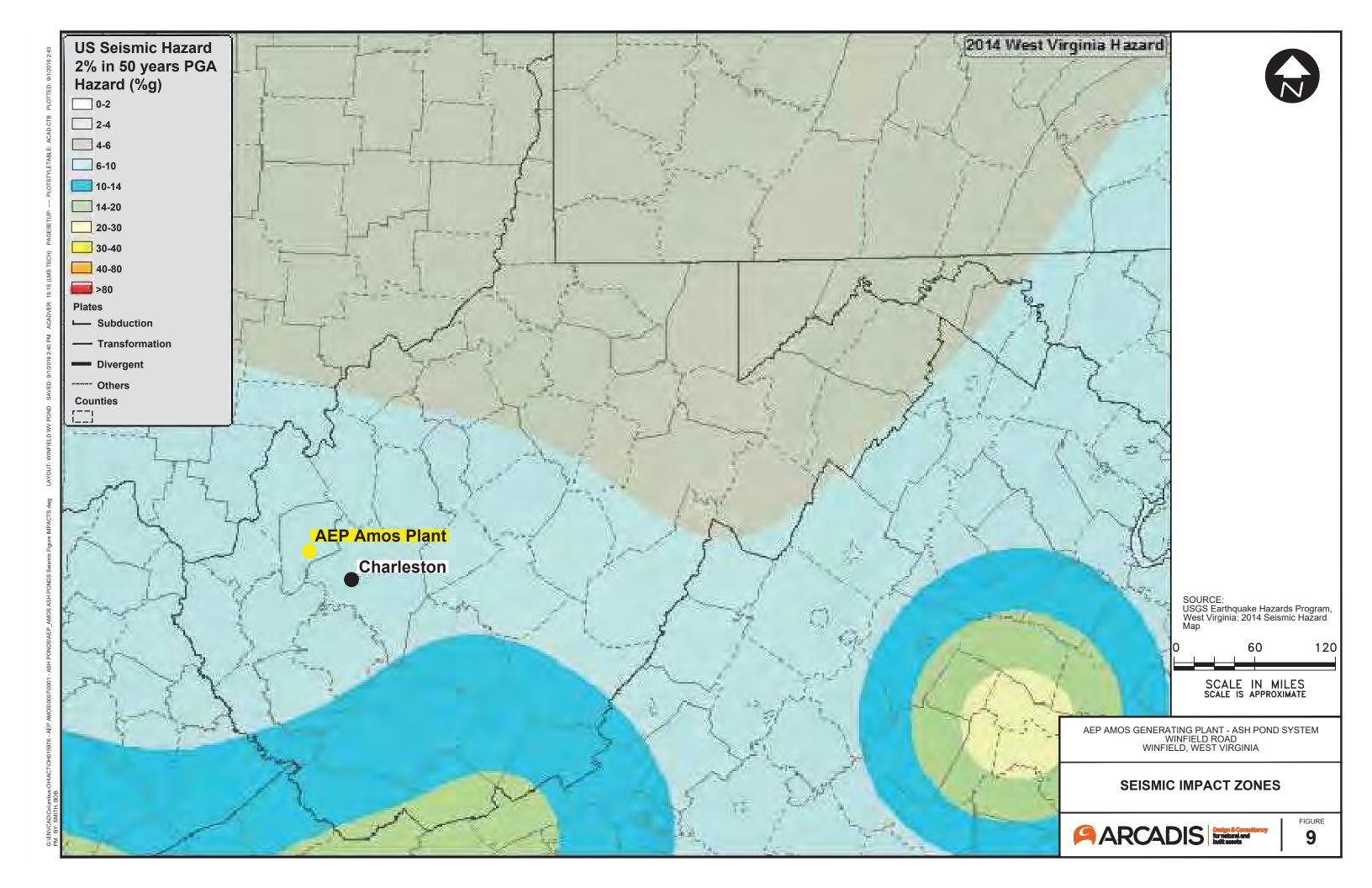


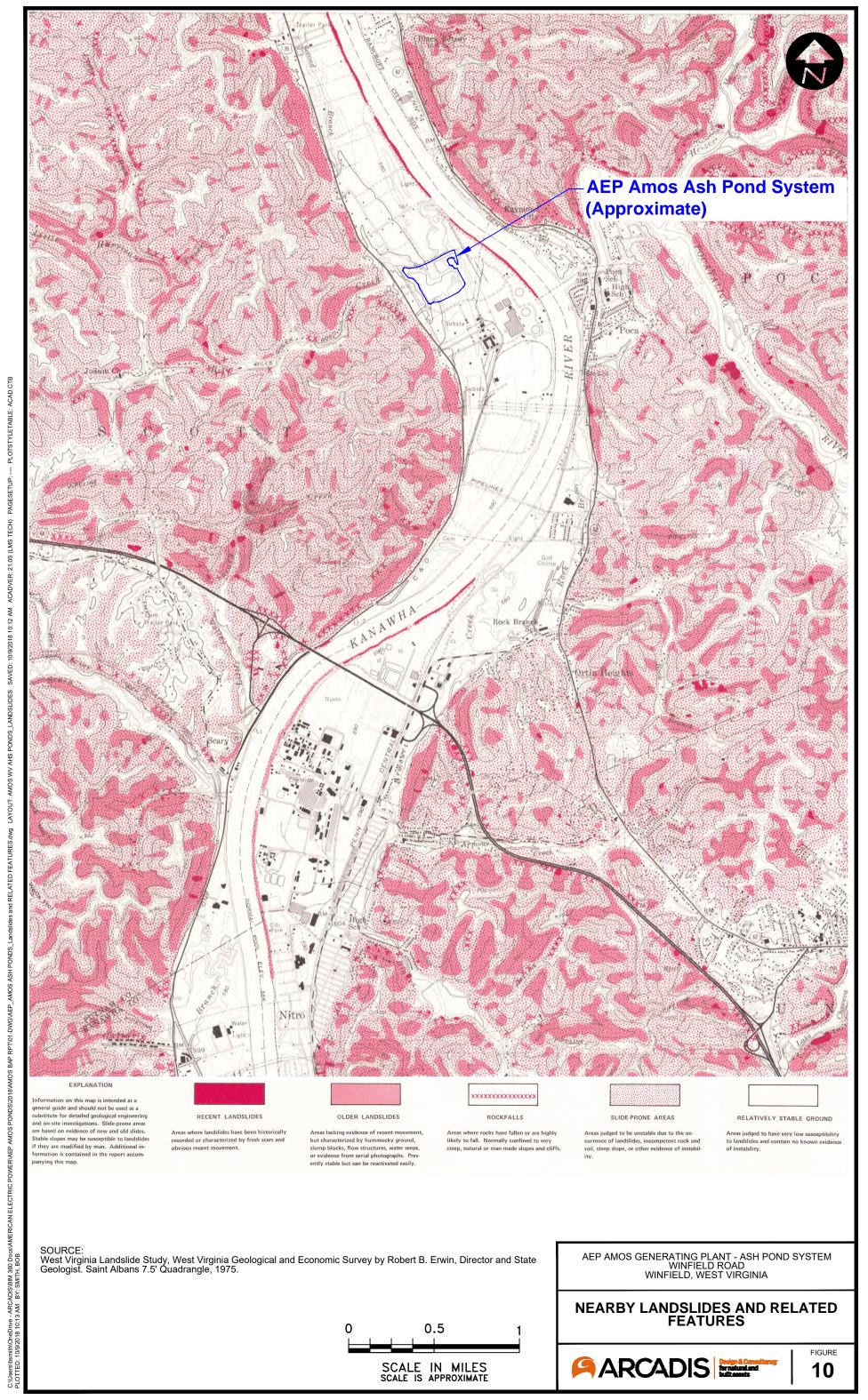




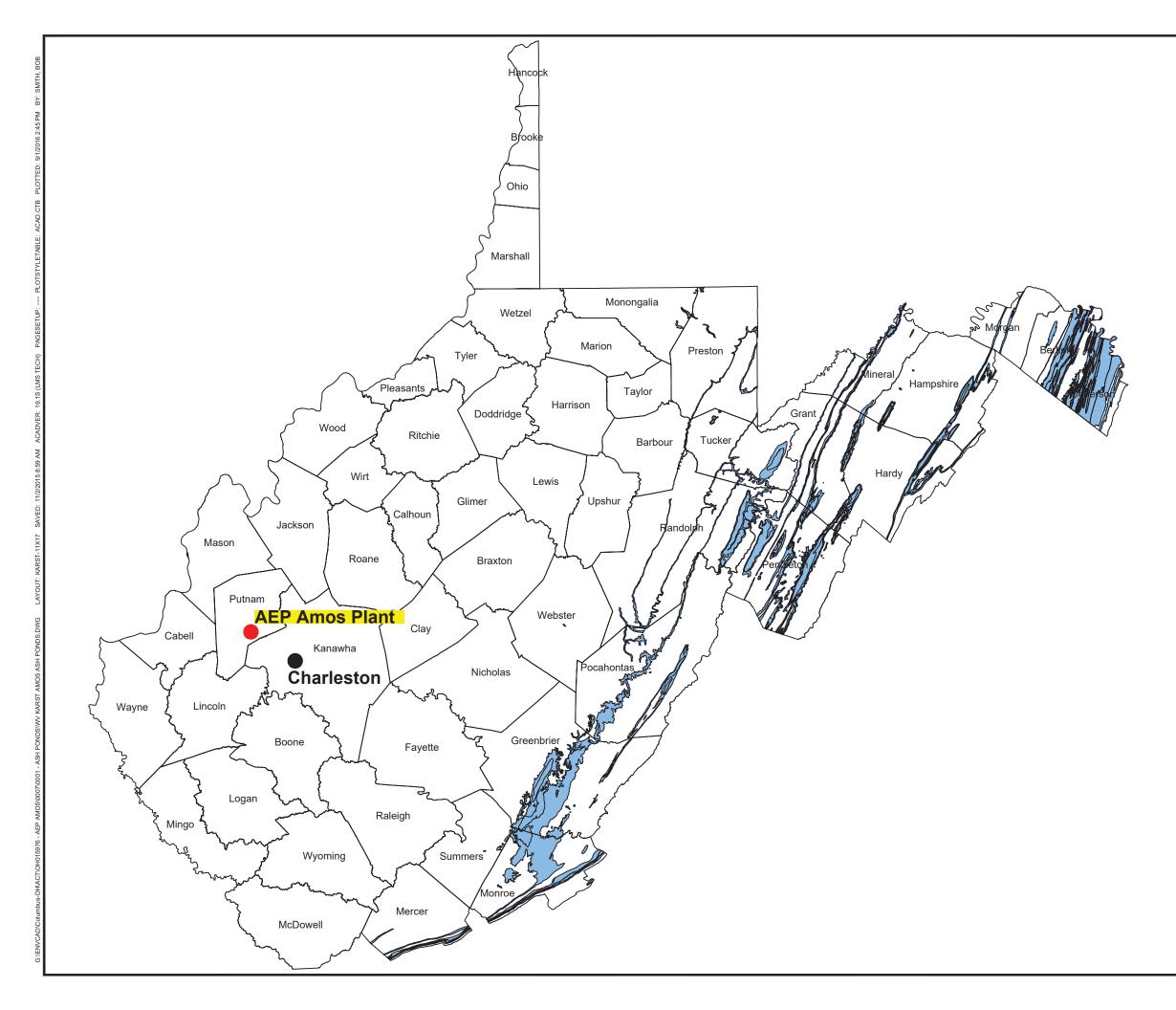


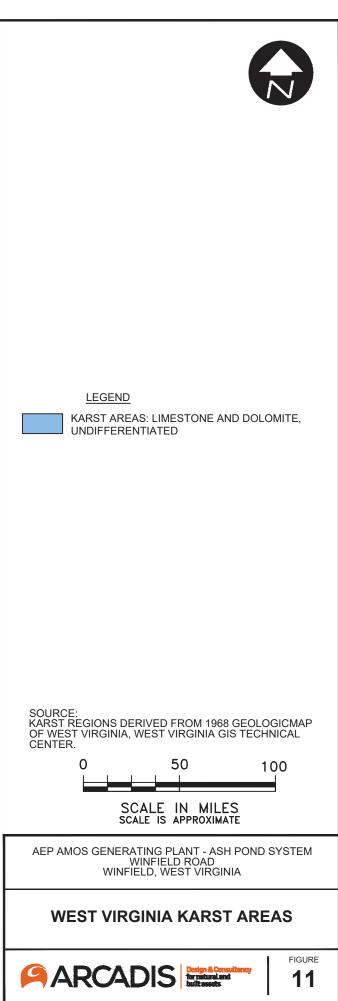






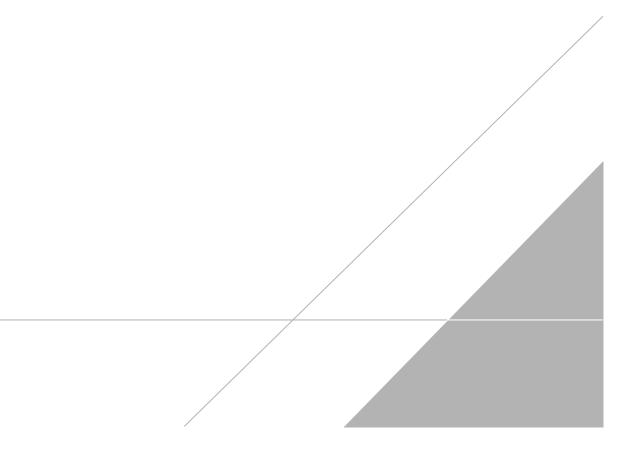
and RELATED FEATURES dwg LAYOUT: AMOS WV AHS PONDS_LANDSLIDES SAVED: 10/9/2018 10:12 AM ACADVER: 21.03 (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: ACAD/CTB 1-DWG\AEP_AMOS ASH PONDS_





APPENDIX A

Boring/Well Construction Logs





AEP 1995

Soil Boring Logs

MW-01 to MW-10

JO	B NU	IMBER	5423						Ľ	JG	OF BORING
СС	MPA	NY <u>A</u>	PPALA	CHIAN	POW	ERC	OMP	ANY			BORING NO. AMW-01
				ROUNE							BORING START 09/0
СС	ORD	INATES	<u>N 54</u>		PIEZOMETER TYPE						
GR	OUNI	D ELEVA	ATION _	581.5	S'	YSTEN	۸ <u>S</u>	TATE P	LAN	Е	HGT. RISER ABOVE GRC
WA	TERI	LEVEL	툳	*****	Ā		Ţ				DEPTH TO TOP OF WELL
TIM	E							******			WELL DEVELOPMENT
DAT	ΓE										FIELD PARTY
	1			CT AL			1	1	i		· · · · · · · · · · · · · · · · · · ·
SAMPLE	SAMPLE	DE	MPLE EPTH FEET I TO	PENET	DARD RATION TANCE	TOTAL LENGT ECOUE		DEPTH IN FEET	GRAPH LOG	U S C S	SOIL , IDENTIF
1	SS	0.0	2.0	3-5-		<u>∝</u> 1.4				CL	GRAVELLY SANDY CL
2	SS	2.0	4.0	7-6-	9-8	1.5		•		CL	fragments, hard, dry, n angular-subangular, 10 brown, poorly sorted, s grayish brown pebbles
3	ss	4.0	6.0	4-5-	8-7	1.9		- 5			SILTY CLAY 25%, 75%, 5yr5\4 and 10yr 6\2, ha
4	SS	6.0	8.0	4-5-	6-8	2.0		5 -			fine < 1/16 mm, no od <u>SILTY CLAY</u> 10%, 90%, 10yr6\2, damp, very sti
5	SS	8.0	10.0	4-5-	7-9	1.9		-			Some small inegular. b 1/4-1/2 x 1/2, damp,
	ST	10.0	12.0					10 -			A few black lens, damp
7	SS	12.0	14.0	4-5-7	77	1.8		-			Damp SANDY CLAY 30%, 70%

TIME DATE

BORING NO. AMW-01 DATE 11/17/95 SHEET 1 OF 2
BORING START 09/05/95 BORING FINISH 09/06/95
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND 2.0 DIA 2.0
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY TJH=REB RIG CME-75

								J			_	
SAMPLE	×ш	SA	MPLE	STANDARD	. нХ	RQD	DEPTH		S		1	
		D	EPTH	PENETRATION				Н	U	SOIL / ROCK	L	DRILLER'S
AM	AMPLE	IN	FEET	RESISTANCE	FOTA ENG	%	IN	RAP! LOG	s		MELL	
s د.	ZN	FROM	и то	BLOWS / 6"		/0	FEET	0	5	IDENTIFICATION	Ξ	NOTES
	ISS		2.0		2							
1.		0.0	2.0	3-5-7-8	1.4				CL	GRAVELLY SANDY CLAY Mixture,4" plant		
							-	[]		fragments, hard, dry, no odor,	0	
2	s	2.0	10	7000			_			angular-subangular, 10yr4\2, dark yellow		
1 -	00	2.0	4.0	7-6-9-8	1.5			\vdash	CL	brown, poorly sorted, second color 5yr3\2	1/ 1/	
	1						-			\grayish brown pebbles 4-6 mm areas, angular./	1 V V	
3	ss	4.0					_			SILTY CLAY 25%, 75%, <5% sand, moist,	11 10	
	100	4.0	6.0	4-5-8-7	1.9					5yr5\4 and 10yr 6\2, hard, dry, low plasticity,	12 6	1
							5 -			fine < 1/16 mm, no odor, no reaction to HCL	1	
4	ss	6.0					_			SILTY CLAY 10%, 90%, sand <2%, 5yr5\6 and	12 6	
17	133	0.0	8.0	4-5-6-8	2.0					10yr6\2, damp, very stiff.		
	1						i			Some small inegular, black, horizontal lens,		
5	1 00						_		1	$1/4.1/2 \times 1/2$. damp.	11 11	
1 3	SS	8.0	10.0	4-5-7-9	1.9		ļ					1
							4					
	·	1 10 0			I		10 -			A few black lens, damp.	10	
	ST	10.0	12.0		1		10				1 14	
							-1					
_		1			Ì					Damp		
7	SS	12.0	14.0	4-5-77	1.8		1			SANDY CLAY 30%, 70%, Moist, 5yr5\6, fine		
					Í		+			lining, v-fine, grains 1/16-1/8 mm, sand grains,	10	
		1					ŀ			soft-medium stiff, no odor		
8	ss	14.0	16.0	3-3-2-2	1.5		Ţ		SC		10	
	1	<u>.</u> I	1 1		<u> </u>		15 -			CLAYEY SAND 30%, 70%, v-fine-fine, angular		
							ľ			1/16-1/4 mm, sand grains, well sorted, poorly		
9	SS	16.0	18.0	1-2-2-3	2.0		1.		SC	graded, 10yr5\2, yellowish brown, moist,		
							-			loose, no odor, easy to auger, no HCL, no lens.	10	
										Wet		
10	SS	18.0	20.0	1-1-1-2	1.5	1	1.					17.9 Top of seal.
					i					SANDY CLAY 10%, 90%, Moist, 10yr5\4, v-soft,		F
										v-fine grain, sand grains, no odor, easy to		
11	SS	20.0	22.0	1-2-1-3	2.0		20 -			auger, well sorted, no odor.		19.9 Top of sand.
							-1-					····
							Ŀ					
12	SS	22.0	24.0	1-1-1-2	2.0		1-					
							E			•		
							F-	_				
13	SS	24.0	26.0	1-1-5-6	1.8			is	pή	10yr5\4-10yr5\2		24.0 Top of screen.
							25 -	-		SAND With little or no fines, medium 1/4-1/2		24.0 Top of screen.
İ					[mm sub-angular sand grains, 5yr5\6-10yr5\6,		
14	SS	26.0	28.0	6-6-7-8	1.0		-			light brown, well sorted, poorly graded,		
i				-			-			v-loose, no odor, no HCL, a clean sand, east to	日:	
			İ		i					auger, wet to moist.		
15	ss	28.0	30.0	5-4-3-3	1.0		-			Moist	日:	
!							-			Medium course 1/2-1.0 mm sand	日::	
1				ł	1		ł			<u></u>	日:十	
			05.04			<u> </u>		i			<u>H-i</u>	
		IYPE	OF CA	SING USED						Continued Next Page		
		NQ-2 F	ROCK C	ORE		1	PIEZOMET	ER TY	PF.	PT = OPEN TUBE POROUS TIP, SS =		
Х	(<u>6" x 3.</u> 2	25 HSA			- '				REEN, G = GEONOR, P = PNEUMATIC	OPE	
			25 HSA				0201	. 20	00	HELH, G - GEUNUR, P = PNEUMATIC		
				DVANCER	4"	\neg	VELL TYP	E: (ЭW	= OPEN TUBE SLOTTED SCREEN, GM		
		NW CA			3"				Ť			
					5 5"					RECORDER DG		
	SW CASING 6" RECORDER											

JOB NUMBER 5423



COMPANY APPALACHIAN POWER COMPANY

BORING NO. AMW-01 DATE 11/17/95 SHEET 2 OF 2 PROJECT W. VA. GROUND WATER STUDY BORING START 09/05/95 BORING FINISH 09/06/95

SAMPLE NUMBER		DE IN FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	%	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	HELL	DRILLER'S NOTES
16	SS SS	30.0	32.0	2-2-3-2 1-1-1-2	0		-		SC	CLAYEY SAND 50%, 50%, < 2% silt,		
18	SS SS	34.0 36.0	36.0 38.0	2-3-3-5 2-2-3-5	2.0		35		CL	fine-medium 1/8-1/2 mm, subangular to sub-rounded sand grains, 5yr5\6 and 10yr5\4, black smear n-1, no odor, easy to auger no HCL, moist, medium stiff. <u>SANDY CLAY</u> 30%, 70%, fine 1/8-1/4 mm, sub-angular sand, medium stiff to soft, well		34.0 Bottom of screen. 35.0 Bottom sand.
20 21	SS SS	38.0 40.0	40.0 42.0	3-4-5-8 5-6-8-8	2.0		40 -		SC	sorted, poorly graded, black smear N\1, no odor, no HCL, 10YR4\2 and 5YR5\6M, moist. CLAYEY SAND 25%, 75%, fine to medium 1/8-1/2 mm, sub angular-sub-rounded, medium stiff, well graded, no odor, moist to		
22 23	SS SS	42.0 44.0	44.0 46.0	4-6-7-8 4-4-6-6	1.7		لیں جا <u>میں ہے۔</u> لیں جا میں جا			wet, 5yr5\6, light brown, medium to very hard to auger, no HCL. CLAY 10% SAND 90% Fines <5%, sand 95% 10yr4\2-5yr4\1 brownish gray		
24	SS	46.0	48.0	8-9-9-9	1.4		45		SP SC	CLAYEY GRAVELLY SAND 50%, 10%, 40%, Mixture, 5yr6\1 light olive gray, gravel pebbles 2-4 mm, medium sand 1/4-1/2 mm, angular-		
25 26	SS SS	48.0 50.0	50.0	15-11-8-11 24-23-19-19	.1		-1		GC	sub-angular, well sorted, poorly graded, no odor, moist, loose. Sand 25% clay 10% gravel 65% Moist.		
27 28	SS SS	52.0 54.0	54.0 56.0	41-35-50-30	1.7					More gravel_hard_to_auger,loose medium_dense_dense_damp 		
							55 –			no odor, no HCL, hard to auger.		
									~			
								<u> </u>				

1	V	7	0
\square			

COMPANY A	PPALACHIAN	POWER COM	ΛΡΑΝΥ							
PROJECT W. VA. GROUND WATER STUDY										
COORDINATES <u>N 539,188.1 E 1,732,744.9</u>										
GROUND ELEVATION _ 585.1 SYSTEM _ STATE PLANE										
WATER LEVEL	¥ 13.8	Ā	Y							
TIME			<u> </u>							
DATE	8-23-95									

JOB NUMBER _______

BORING NO. AMW-02 DATE 11/17/95 SHEET 1 OF 1
BORING START 08/23/95 BORING FINISH 08/24/95
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND 1.64 DIA 2.0
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY

SAMPLE	SAMPL F	FRO		STANDARD PENETRATION RESISTANCE BLOWS / 6	TOTAL LENGT	ROD DEF % FE	PTH N ET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	НЕГГ	DRILLER'S NOTES
		S 0.0	2.0	2-3-4-5	1.5				GC	CLAYEY GRAVEL 45% 55%, first six inches includes plant material fragments, 5yr2\1, dry, <5% fines, 5yr3\2-5yr3\4, sub-angular, poorly sorted, poorly graded, no odor, no reaction to HCL, easy to auger.		
2	ss	6.0	8.0	3-4-5-4	1.7		ں 1		CL	SANDY CLAY 20%, 80%, <5% fines, v-fine grain 1/16-1/8 mm, well sorted, poorly graded, 5YR4\2, 5YR4\4, sub-angular sand, moist, no odor, medium stiff, no reaction to HCL, wood fragments, easy to auger.		6.9 Top of seal. 9.0 Top of sand.
3	ss	12.0	14.0	2-2-2-3	1.9	10 15				SANDY CLAY 40%, 60%, <2% silt, v-fine, sub-angular sub-rounded grains, well sorted, wet, soft, 5yr4\4-5yr4\6, no odor, grain size 1/16-1/8 mm, easy to auger.		13.0 Top of screen.
4	SS	18.0	20.0	1-1-1-3	1.8	20						
5	ss	22.0	24.0	1-2-2-2	2.0		<u></u>		sch	5yr5\5. medium to stiff, soft_no odor. wet CLAYEY SAND 40%, 60%, wet SANDY CLAY 45%, 55%, wet, v-fine sand 1/16-1/8 mm, well sorted, poorly graded, 5yr5\5-5yr6\5. no odor, no reaction to HCL,		23.0 Bottom of screen. 24.7 Bottom sand.
			OF CA	SING USED								
X	6 9 1	5" x 3.2 9" x 6.2 HW CA	25 HSA 25 HSA ASING A	4"	_ SL	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON						
		<u>NW CA</u> SW CA	ASING ASING		3" 6"				1	RECORDER _DG		

LOG OF BORING JOB NUMBER 5423 COMPANY APPALACHIAN POWER COMPANY BORING NO. AMW-03 DATE 11/17/9 PROJECT _____ W. VA. GROUND WATER STUDY COORDINATES N 539,199.9 E 1,732,739.4 GROUND ELEVATION 585.2 SYSTEM ______ WATER LEVEL $\overline{\Sigma}$ 14.5 T Y TIME DATE 8-23-95 SAMPLE L R R S DEPTH

				YI
95	SHEET_	1	_ OF	2
FIN	ISH <u>08</u>	3/23,	/95	

BORING START
HGT. RISER ABOVE GROUND <u>2.18</u> DIA <u>2.0</u>
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY

P	18	AMPL		PTH	PENETRATION	IGT N		IN	GRAPH LOG	U	SOIL / ROCK		DRILLER'S
SAI	NUMBE			EET	RESISTANCE	C E O	%		SR/	S	IDENTIFICATION	негг	NOTES
			FROM	то	BLOWS / 6"	ה שר		FEET		⊐			NOTES
	1 5	SS	0.0	2.0	10-15-18-20	1.6			.1.	GC	CLAYEY GRAVEL 30%, 60%, silt 10%, poorly		
									2		graded, v-course angular gravels and pebbles.		
	2 5	s									2-4 mm, 5yr2\1 mm, dry, no reaction to HCL,	00	
1	2 3	50	2.0	4.0	7-8-10-13	1.5			. 1		last 1.5 very hard, first 4" plant debris.	0 Ø	
								-				88	
	3 S	s	4.0	6.0	5-6-8-9	1.0		-	<u>a.</u>	<u></u>	Less gravel	10 Ø	
						1.5				CL	SANDY CLAY 20%, 80%, little of no silt, v-fine	00	
								5-			sand 1/16-1/8 mm well sorted, poorly graded,	12 IA	
4	4 S	s	6.0	8.0	4-6-9-10	1.8		-	1-1	(5YR3\ 4-5YR2 \4, no odor, dry, hard, easy to	Ø Ø	
				İ				-			auger.	00	
											Sand 30%-day70%.5yr3\4	88	:
1 5	5 S	s	8.0	10.0	4-4-6-8	1.6		-			SANDY CLAY 40%-60%, <2% silt, v-fine-fine	88	t
								-			sub-rounded grains, 1/16-1/8 mm, well sorted,		
-	+							10 —			5yr4\4-5yr4\6, no odor, dry, no reaction to	88	i
6	5 S	5	10.0	12.0	2-4-6-8	1.7		10			HCL, medium stiff to soft.	8 Ø	
								1					1
7	s	s .	12.0	14.0	2-2-3-4	1.8		-		·	Moist	a Ø	1
			12.0	14.0	2-2-3-4	1.0						a Ø	
					[Sand 35% moist_medium_stiff.	88	
8	S	s :	14.0	16.0	1-1-1-2	1.7		+				14	
								15 -				AN .	
						1					sand 45% clay 55%, wet, medium stiff-soft.	10	
9	S	5 1	16.0	18.0	1-1-1-2	1.5		4	_			10	
			Ì					4					
								ſ			5y14\4-5y14\6_wel_soft		
10) ss	5 1	8.0	20.0	1-1-2-2	2.0		ŀ					
								4	-		Wet		
11	ISS		20.0	22.0	1-1-1-1			20 –			.5y14\6_medium_stiff_soft_		
			.0.0	22.0	1-1-1-1	1.9		-			E CONTRACTOR OF CONTRACTOR OF CONTRACTOR OF CONTRACTOR OF CONTRACTOR OF CONTRACTOR OF CONTRACTOR OF CONTRACTOR		
								Ŧ		Sal	5y15\5	10	
12	SS	5 2	2.0	24.0	1-1-1-1	2.0		+		CL '	CLAYEY SAND 40%, 60%, v-fine sand, no odor.		
								Ļ			SANDY_CLAY 40%, 60%, Wet.		
											SANDY CLAY 40%, 60%, v-fine grain, 1/16-1/8		
13	SS	2	4.0	26.0	1-0-1-0	2.0		1			mm, sub-angular, well sorted, poorly graded, Syr5\5, medium stiff-soft, no odor, no reaction		
 								25 -			to HCL, moist to wet, very easy to auger.		
								Ļ			Clay 65%-sand 35%, wet.		
14	SS	2	6.0	28.0	1-1-1-1	2.0		-			Y		
								Ť			CLAYEY SAND v-fine grain 1/16-1/8 mm, wet,	10	
15	ss	2	8.0	30.0	1-1-1-1	10		į.	<u> </u>				
1.0			0.0	30.0	1-1-1	1.9		Ŀ.		sch	SANDY CLAY 55%, 45%, no odor, 5yr5\6, wet, medium stiff-soft, well sorted.	10	
								H			SANDY CLAY 55%, 45%, no odor, 5yr5\6, wet, medium stiff-soft, well sorted.		
						L.,_		<u>.</u>			112		
		1	YPE (JF CA	SING USED						Continued Next Page		
		NC	2-2 RC	DCK C	ORE			PIEZOME	דבף ד			0.5.5	
X				HSA								OPE	N TUBE
				HSA				3101			REEN, $G = GEONOR$, $P = PNEUMATIC$		
		HW	V CAS	SING A	DVANCER	4"		WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON					
			V CAS			3"	1			1			
<u></u>	ļ		/ CAS								RECORDER DG		

JOB NUMBER	5423		
COMPANY	APPALACHI	AN POWER	COMPANY

BORING NO. AMW-03 DATE 11/17/95 SHEET 2 OF 2 PROJECT W. VA. GROUND WATER STUDY BORING START 08/22/95 BORING FINISH 08/23/95 SAMPLE PLE PLE DEPTH

SAMPLE	AMPLE		EPTH FEET	PENETRATION				RAP! LOG	s c s	SOIL / ROCK	חברר	DRILLER'S
0.		FRO	м то	BLOWS / 6"		ال	FEET	ပ	∍	ISERTI ICATION	=	NOTES
16	5 SS	30.0	32.0	2-1-1-1	1.8	1	1	1		CLAYEY SAND Fine sand 1/8-1/4 mm, wet, no		
17	ss	32.0	34.0	1-1-1-1	2.0		-			odor. <u>SANDY CLAY</u> 35%, 65%, wet, easy to auger, soft, 5yr5\6-5yr6\6.		
18	ss	34.0	36.0	2-1-1-1	2.0		-	1				
19	ss	36.0	38.0	2-2-1-1	2.0		35 - -		SC CL			
20	SS	38.0	40.0	2-2-3-4	2.0		-		CL	1/8-1/4 mm, sub-angular, well sorted, poorly graded, v-loose, wet, faint musky odor, (swamp like), 5yr5\2-5yr5\1, no reaction to	~~ Y/	
21	SS	40.0	42.0	2-4-4-4	1.6		40 -			HCL SANDY CLAY 40%, 60%, <2% silt, well sorted,		40.0 Top of seal.
22	ss	42.0	44.0	2-2-4-5	1.7				SC	poorly grade, medium stiff, moist to wet, no odor, no reaction to HCL, easy to auger. Medium dark gray n\4. moist. no odor.		42.7 Top of sand.
23	SS	44.0	46.0	2-4-5-6	1 =		4			CLAYEY SAND fine grain 1/8-1/4, wet		
24	ss	46.0	48.0	5-6-8-4	1.5 .8		45 -		SP	sub-angular, sub-rounded,well sorted, poorly graded,n\5 medium gray, loose, no odor, no reaction to HCL Small wood fragments,		
25	SS	48.0	50.0	4-4-12-18	1.0					SAND Poorly graded, little or no fines, clay 10%, well sorted, medium course sand 1/4-1.0 mm, wet, 10yr6\2, sub-angular grains, loose, no odor, no reaction to HCL, easy to auger,		46.9 Top of screen.
26	SS	50.0	52.0	19-19-6-4	1.5		50 -			wood fragments. SAND <2%, poorly graded, medium -course	:目:	
27 28	SS SS	52.0 54.0	54.0	8-12-34-17 7-30-36-34	1.8		- -		SP	grain 1/4-1.0 mm, n\5-n\6, medium -course grain 1/4-1.0 mm, n\5-n\6, medium gray color, angular-sub-angular, very loose, no odor, wet, well sorted, last .5 small sub-angular gravels.		
29	SS	56.0	58.0	30-33-25-90	1.8		-8- -			pebbles, a4-6 mm, poorly sorted, poorly graded, pebbles content 10%, loose-medium stiff, no odor, wet. <u>Sand 60%, gravel 20%, pebbles 20%,</u> <u>Syrf6\1-5yr5\2, wet.</u> <u>Sand 60%, gravel 10%, pebbles 30%</u> <u>CLAYEY GBAVELLY SAND 20%, 30%, 50%.</u>		56.9 Bottom of screen. 57.9 Bottom sand.
										SANDY GRAVELLY CLAY Clay 40%, weathered bedrock, 5yr5\2-5yr5\6, sub-rounded-rounded, gravels and pebbles, hard to auger, refusal.		

AFP CIVIL ENGINEERING LABORATORY LOG OF BORING

JOB NUMBER 5423

COMPANY ______APPALACHIAN POWER COMPANY

PROJECT W. VA. GROUND WATER STUDY COORDINATES N 539,605.5 E 1,731,128.7

GROUND ELEVATION ______ SYSTEM _____ STATE PLANE

		3131EWL_	JIATE PLANE
WATER LEVEL	볼 26.0	<u>R</u>	Y
TIME			
DATE	9- 7-95		

BORING NO. AMW-04 DATE 11/17/95 SHEET 1 OF 2
BORING START 09/07/95 BORING FINISH 09/08/95
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND DIA
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY JCM=REB RIG CME-75

				······································		é						
SAMPLE	_	D IN FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	НЕГГ	DRILLER'S NOTES
1	55	6 0.0	1.5	11-15-50	1.1		-		SC	CLAYEY SAND AND GRAVEL 10%, 30%, 60%, mixture, first 3' plant fragments, gravels to cobbles, dry, 2-75 mm, fine to v-fine sand 1/16-1/4, very hard, 1-yr3\4=5yr3\4, hard to auger, no order. CLAY Lean, plant material through-out,		
2	SS	6.0	6.9	4-50/.4	.8		5			medium stiff to soft, smooth texture, 5yr5\2-10yr4\2, moist, hard to auger, musky organic odor, low plasticity, no reaction to HCL, olive gray.		
3	SS	14.0	16.0	6-6-7-7	2.0		10 — - - 15 —					
4	SS	20.0	22.0	3-3-5-5	2.0		20		21			18.0 Top of seal.
			22.0		2.0				SL SP	SANDY CLAY 5%, 95%, v-fine sand, small amount of silt, small irregular horizontal blackish, two colors 5yr5\6 50%, n\6 50%, moist to wet, sand 1/16-1/8 mm, sub-angular, well sorted, poorly graded, no odor. SAND 95%, <5% fines, medium-fine grain		19.9 Top of sand. 24.0 Top of screen.
5	SS	26.0	28.0	5-7-3-3	1.8		25 -		-	sand, sub-angular-sub-rounded, 1/8-1/2 mm, poorly graded, 5yr4\4-5yr3\4, no odor, v-loose, wet.		
1		TYPE		SING USED	ļ						: <u> </u>]	
	•									Continued Next Page		
Х							IEZOME SLOT			PT = OPEN TUBE POROUS TIP, SS = REEN, G = GEONOR, P = PNEUMATIC	= OPI	EN TUBE
	 H	9" <u>x 6.2</u> HW CA	DVANCER	4"	\neg				= OPEN TUBE SLOTTED SCREEN, GM	- 0		
	<u> </u>	W CA	SING		3*				1	RECORDER DG	= G	
·		SW CAS	SING		5"			·····				



JOB NUMBER 5423

COMPANY _ APPALACHIAN POWER COMPANY PROJECT W. VA. GROUND WATER STUDY BORING START 09/07/95 BORING FINISH 09/08/95

BORING NO. AMW-04 DATE 11/17/95 SHEET 2 OF 2

SAMPLE	SAMPLE	SAI DE IN FROM	MPLE EPTH FEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6*	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	ИЕЧС	DRILLER'S NOTES
6	ss	32.0	34.0	3-6-9-8	1.3		35 -			SAND Little of no fines, sub-angular to sub-rounded, course, medium grain, 1.0-1/2 mm, two colors n\3 dark gray =20% and 5yr6\6 light brown =80%, wet, no odor.		34.0 Bottom of
							33					screen. 35.0 Bottom sand.

JOB NUMBER _______

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COMPANY A	PPALACHIAN	POWER CO	MPANY								
PROJECT W.	VA. GROUND	D WATER STL	JDY								
COORDINATES	COORDINATES N 539,614.1 E 1,731,120.7										
	TION	SYSTEM _	STATE PLANE								
WATER LEVEL	¥ 23.8	<u></u>	Ē								
TIME											
DATE	9-1-95										

BORING NO. AMW-05 DATE 11/17/95 SHEET 1 OF 2
BORING START 08/31/95 BORING FINISH 09/07/95
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND DIA DIA
DEPTH TO TOP OF WELL SCREEN 44.0 BOTTOM 54.0
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY

SAMPLE	SAMPL	D IN FROM	MPLE EPTH FEET 4 TO	STANDARD PENETRATION RESISTANCE BLOWS / 6*			DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK	DRILLER'S NOTES		
2			2.0	3-7-12-15 12-9-6-6	1.67		-		GC SC	GRAVEL, 25% CLAY, 30% FINE SAND, 45% ANGULAR, POORLY SORTED FINE TO COARSE GRAVEL, POORLY GRADED, NO HCI, NO ODOR, PLANT FRAGMENTS FIRST 4*			
3	ss	4.0	6.0	3-3-5-5	1.91		5		CL	5YR4/4 - 5YR4/2 CLAYEY SAND, 55% FINE SAND, 40% CLAY, 5% GRAVEL, LOOSE, NO			
4	SS	6.0	8.0	3-2-3-3	1.67		5			ODOR, DAMP 5YA5/2-5YB6/4 LEAN CLAY, 2% SAND, MED. STIFF, SMOOTH TEXTURE, NO ODOR, NO HCI, DAMP, MEDIUM PLASTICITY			
5	SS	8.0	10.0	2-2-4-7	1.83					SYR5/2 - SYR6/4 DRY, SEMI-SMOOTH TEXTURE, MED-LOW PLASTICITY			
6	SS	10.0	12.0	5-6-9-11	2.0		10	크			•		
7	ss	12.0	14.0	2-5-9-11	1.83				CL	5YB5/2-5YB4/4 LEAN CLAY, LESS THAN 10% FINE SAND, STIFF, DRY, SMALL IRREGULAR BLACK LENSES, LOW	r :		
8	ss	14.0	16.0	4-5-7-9	1.83		<u>ן</u> ן						
9	SS	16.0	18.0	3-4-7-8	1.75		15			INCREASED No. OF VERY SMALL HORIZONTAL IRREGULAR BLACK LENSES, 5YR4/4 - 5YR5/2 ABSENCE OF BLACK LENSES, 5YR4/4, 5YR5/2, MOIST, NO ODOR, LESS THAN 5% FINE SAND 5YR4/4 = 20%, 5YR5/2 = 80%, MOIST-WET 5YR4/4 < = 10%, 5YR5/2 > = 90%, MOIST, NO ODOR			
10	SS	18.0	20.0	2-4-5-7	1.75					5YR5/2, MOIST, NO ODOR, LESS THAN 5% FINE SAND 5YR4/4 = 20%, 5YR5/2 = 80%, MOIST-WET			
11	SS	20.0	22.0	2-3-4-5	1.83		20						
12	SS	22.0	24.0	2-2-3-3	1.91					5YR4/4 <= 10%, 5YR5/2 >= 90%, MOIST, NO ODOR			
13	SS	24.0	26.0	2-5-5-8	2.0			1.1	SP SC	5YR4/4 = 20%, N5(MED GRAY) = 80%, MOIST, 5% V. FINE SAND .5YR4/4 - 5YR3/4 CLAYEY SAND, 10% CLAY,			
14	SS	26.0	28.0	4-6-8-8	1.33		25 -			MEDIUM SAND, SUB-ANGULAR TO SUB			
15	SS	28.0	30.0	5-7-7-9	1.91			· · ·		POORLY GRADED, WET, NO ODOR, NO HCI SYB3/4-SYR2/2 SAND. <2% FINES, FINE TO MEDIUM GRAIN, V. LOOSE, WET, NO ODOR, SUB ANGULAR SYR5/6 LIGHT BROWN			
		TYPE	OF CA	SING USED				*ł	·····	Continued Next Page			
X	NQ-2 ROCK CORE 6" x 3.25 HSA						PIEZOMET				TUBE		
	9" x 6.25 HSA						SLOTTED SCREEN, $G = GEONOR$, $P = PNEUMATIC$						
	1	NW CA	SING		4" 3"		WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON						
		SW CA	SING	i	6"					RECORDER DG			



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JOB NUMBER 5423

COMPANY ______APPALACHIAN POWER COMPANY PROJECT ______W. VA. GROUND WATER STUDY

 BORING NO.
 AMW-05
 DATE
 11/17/95
 SHEET
 2
 OF
 2

 BORING START
 08/31/95
 BORING FINISH
 09/07/95

ш	х ш	SA	MPLE	STANDARD	≿	RQD	0-0-		0	1	
SAMPLE	AMPLE		EPTH FEET	STANDARD PENETRATION RESISTANCE	TAL IGTH		DEPT				DRILLER'S
SA	SA	FROM		BLOWS / 6"	LEN	%	FEET	GRAPI	N L	SOIL / ROCK	NOTES
16	i ss		32.0	6-7-8-9	1.67			 : ·	I SN	N5-N6 MED GRAY SAND WITH FINES, 10%	
17	ss	32.0	34.0	4-4-7-9	1.83					NS-NG MED GHAY SAND WITH FINES, 10% CLAY, 10% SILT, FINE TO MEDIUM SAND ANGULAR TO SUB-ANGULAR, SOME BLACK STAINING, V. LOOSE, WELL SORTED, POORLY GRADED, UNCONSOLIDATED, WET, NO ODOR, NO HCI SAND = 90%, CLAY = 5%, SILT = 5%, WET	
18	SS	34.0	36.0	6-7-13-6	1.0			-		NO ODOR, NO HCI	
19	ss	36.0	38.0	3-2-3-8	1.5		35		SP	MEDIUM GRAIN, POORLY GRADED, V.	36.2 Top of seal.
20	ss	38.0	40.0	6-5-5-4	1.17			-		LOOSE, WET, UNCONSOLIDATED, NO ODOR, NO HCI	
21	SS	40.0	42.0	3-3-8-7	1.25		40 -		SM	N5-N4 SILTY SAND. 10% CLAY, 15% SILT, FINE TO MEDIUM GRAIN SAND, WELL SORTED, LOOSE, NO ODOR, WET	• 39.3 Top of sand.
22	SS	42.0	44.0	7-8-9-9	1.58					2" WEATHERED COAL DEPOSITS, WET	
23	ss	44.0	46.0	4-4-6-6	1.33						44.0 Top of screen.
24	ss	46.0	48.0	8-5-8-9	1.67		45 -				
25	ss	48.0	50.0	4-4-5-7	1.91					BOTTOM 6" 5YR6/1 LT. BROWNISH GRAY, WET WEATHERED COAL DEPOSITS, WET, NO	•
25	SS	50.0	52.0	5-10-7-7	2.0		50			ODOR	*
27	ss	52.0	54.0	22-22-11-14	1.17				CL	5YB3/4-5YB2/2 SANDY CLAY, 55% CLAY, FINE GRAIN, SUB ANGULAR SAND, LOOSE, WELL SORTED, POORLY GRADED, UNCONSOLIDATED, WET, NO ODOR	•
28	ss	54.0	55.0	15-63-53/3	1.0					SYB3/4-SYB2/2 GRAVELLY CLAY, 15% SUB ANGULAR TO SUB ROUNDED GRAVEL (2 - 25	•
							55 -			mm) POORLY SORTED, MOIST, NO ODOR, CONSOLIDATED WEATHERED BEDROCK AT 55'	55.0 Bottom sand.
						And the second distribution of the second distribution of the second distribution of the					54.0 Bottom of
											54.0 Bottom of screen.





JOB NUMBER	5423		LOG
COMPANY	PPALACHIAN	POWER CON	<u>MPAN</u> Y
PROJECT <u>W.</u>	VA. GROUND	D WATER STL	JDY
COORDINATES	<u>N 539,169.8</u>	B E 1,729,695	5.5
GROUND ELEVA	TION 587.5	SYSTEM _	STATE PLANE
WATER LEVEL	<u> </u>	No. 10 August 10	Ē
TIME			
DATE	8-30-95		

BORING NO. AMW-06 DATE 11/17/95 SHEET 1 OF 2
BORING START
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND DIA
DEPTH TO TOP OF WELL SCREEN <u>31.0</u> BOTTOM <u>41.0</u>
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY

SAMPLE	_	DI IN FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6*	N SI SI	RQD %	DEPTH IN FEET	ERAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	ИЕГГ	DRILLER'S NOTES
2	ss		4.0	3-4-5-6 3-3-5-7	1.5				CL	TOP 3" PLANT FRAGMENTS OLIVE GRAY SANDY LEAN CLAY, 10% FINE TO COARSE SAND, NO ODOR, NO HCI, MOIST TO DAMP MEDILIM BROWN (5YB3/4) SANDY LEAN		
3	ss	4.0	6.0	7-7-4-6	1.7		-	는	02	CLAY, 20% COARSE SAND, STIFF, NO ODOR, DAMP		,
4	SS	6.0	8.0	4-4-3-4	1.8		5 -					
5	SS	8.0	10.0									
6	SS	10.0	12.0	2-2-4-5	1.5		10 -	巨	CL	10YB5/4.5GY6/1.SANDY_CLAY, 40% FINE TO MEDIUM SAND, SOFT TO MEDIUM STIFF, NO		
7	SS	12.0	14.0	1-1-2-5	1.8		-			ODOR, MOIST TO WET		
8	ss	14.0	16.0	2-2-4-5	.83		-	티				
9	ss	16.0	18.0	1-2-2-3	2.0		15 -		СН	BENIONITE CHIPS. 40% HYDRATED, BACKFILL SEAL, WET, 2' THICK		
10	SS	18.0	20.0	3-3-5-5	1.83		-			5Y6/1 LEAN CLAY, LESS THAN 5% SAND, MEDIUM STIFF TO STIFF, MOIST, NO HCL		
11	SS	20.0	22.0	2-3-3-3	1.67		20 -			20' - 22' 5YR5/6 AND 10YR6/2		
12	SS	22.0	24.0	3-3-3-5	1.83					22' - 24' 10% SAND		
13	ss	24.0	26.0	3-3-4-6	1.91		05	크				
14	ss	26.0	28.0	5-4-6-8	1.83		25 -		-	SOME SMALL IRREGULAR HORIZONTAL LENSES 1.0 mm H X 1/4" L, N-1-N-2.		24.6 Top of seal.
15	SS	28.0	30.0	2-2-2-4	1.83					26'-28' 5YR5/6 LT. BROWN AND N-6 LT. GRAY 28'-30' LESS THAN 2% SAND, 5Y41 OLIVE		27.0 Top of sand.
	l	TYPE	OF CA	SING USED	1		ŀ			. ⁻	:	
		NQ-2 R	ОСК С			F	PIEZOMF		YPF	Continued Next Page PT = OPEN TUBE POROUS TIP SS -	OPE	NTURE
<u>X</u>	ļ	9" x 6.2	5 HSA 5 HSA				PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC					
	1	<u>NW CA</u>	SING		4" 3"	v	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON					
	5	SW CA	SING		6"					RECORDER <u>DG</u>		

NT:

JOB NUMBER 5423 COMPANY APPALACHIAN POWER COMPANY

PROJECT W. VA. GROUND WATER STUDY

SAMPLE NUMBER		DE	MPLE EPTH FEET TO 32.0	STANDARD PENETRATION RESISTANCE BLOWS / 6" 2-2-3-5	N LENGTH ORECOUFRY	RQD	DEPTH IN FEET	I GRAPH LOG	U S C S	SOIL / ROCK	HELL	DRILLER'S NOTES
17	SS	32.0	34.0	1-1-1-2	2.0				SC CL SW	5Y4/1 CLAYEY SAND, 10% CLAY, FINE TO MEDIUM GRAIN, POORLY SORTED, NO		31.0 Top of screen.
18	SS	34.0	36.0	4-2-2-3	2.0		35 -		CL	5Y4/1 SAND FINE TO MEDILIM GRAIN		
19	SS	36.0	38.0	1-1-2-3	1.91		-			LOOSE, WET <u>5YR4/1 SANDY CLAY</u> , 40% FINE SAND, BROWNISH GRAY, SOFT, MOIST NO ODOR		
20	SS	38.0	40.0	3-2-3-3	1.91		-			36' - 38' 20% SAND 38' - 40' 10% SAND		
21	SS	40.0	42.0	1-2-2-3	2.0		40 —					
22	SS	42.0	43.0	2-3	1.0					40' 42' LESS THAN 5% SAND 42' - 43' LESS THAN 2% SAND, 5Y6/1, MOIST,	Π.	41.0 Bottom of screen.
										DAMP, NO ODOR		42.7 Bottom sand.

AMERICAN ELECTRIC POWER SERVICE CORPORATION

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	JOB N	IUMBER	542	3						OF BORING		
				ACHIAN PC	WERC	 08/10						
F	ROJE	ECT W	/. VA. (GROUND W	ATER S		<u>AIN</u> 1			BORING NO. AMW-07 DATE 11/17/95	SHE	ET <u>1</u> OF <u>2</u>
C	COOR		6 N 5	37,838.4 E	1 721 7	257	ſ		-	BORING START BORING FI	NISH _	08/31/95
				587.1				[] A A		PIEZOMETER TYPE WELI	TYPE	W
1		RLEVEL	the second second second second second second second second second second second second second second second s		3131EA			PLAN	<u>יי</u> ב ר	HGT. RISER ABOVE GROUND <u>1.62</u>		
	IME			11.0 🕎		Ī			4	DEPTH TO TOP OF WELL SCREEN _28.0	BOTTO	ом <u>38.0</u>
-	ATE		0	31-95						WELL DEVELOPMENT YES B	ACKFIL	LQUICK GROUT
5				31-95]	FIELD PARTY	RIG	CME-75
SAMPLE	NUMBER SAMPLE		AMPLE EPTH FEET M TO	STANDAR PENETRATI RESISTANC BLOWS / 6	TOTAL ENGTH COUER		DEPT IN FEE1	RAPH				DRILLER'S NOTES
	1 S	· · · · · · · · · · · · · · · · · · ·	2.0	12-50/3								
	2 53	5 2.0	4.0	10-5-5-6	1.83				SM	SILTY SAND, 50% SAND, 50% SILT, VERY FINE SAND, DRY, DUSTY, SOME GRANULES		
	s	6 4.0	6.0	6-5-5-5	1.17		5			SANDY CLAY, 40% SAND, 40% CLAY, 20% SILT, VERY FINE (1/16-1/8) SANG, SAND		
4	ss	6.0	8.0	2-3-3-4	2.0		5			DAMP, 1ST COLOR 5Y6/1 LT. OLIVE GRAY, 2ND COLOR 5YRG/4 LT. BROWN, NO ODOR, NO HCI, LOOSE TO MED. DENSE		
5	ST	8.0	10.0						CL	10YR4/2 AND 5Y5/4 LEAN CLAY WITH SILT. DAMP, MED. STIFF TO STIFF, NO ODOR, LOW PLASTICITY		
6	SS	10.0	12.0	2-2-2-3	1.17		10 -		CL	SANDY CLAY, 5-10% V. FINE SAND, BOTTOM		
7	SS	12.0	14.0	2-2-2-3	2.0					HALF OF SPOON WET, MED. PLASTICITY, SOFT TO V. SOFT, NO ODOR		
8	ss	14.0	16.0	2-2-3-4	2.0					12'-14' 10YR5/4		
9	SS	16.0	18.0	4-5-8-8	2.0		15 -			14'-16' A FEW SM. BLACK HORIZONTAL DEPOSITS, ONE BLACK (N-2) LENS, 1/2 mm H X 1/4" LONG, 10YR6/6 DK YEL-ORANGE AND N-7 LT. GRAY, MOIST		
10	SS	18.0	20.0	5-5-8-9	2.0					18'-20' CLAY W/V. FINE SAND AND SILTS.		
11	SS	20.0	22.0	3-5-5-7	1.91		20 -			DAMP, NO ODOR, STIFF		
12	SS	22.0	24.0	2-3-5-5	1.75		-			20'-22' A FEW SM. IRREG. HORIZONTAL BLACK (N-2) LENSES AND DEPOSITS, DAMP		22.0 Top of seal.
13	SS	24.0	26.0	2-2-3-4	1.91		-			22'-24' (N-7) LT. GRAY = 80%, AND 5YR5/6 LT BROWN = 20%, NO DEPOSITS, DAMP		24.0 Top of sand.

<u>6" x 3.25 HSA</u>	SLOTTED SCREEN C CEONOD B SUTTED SCREEN C
<u>9" x 6.25 HSA</u>	SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
HW CASING ADVANCER 4"	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NW CASING 3"	CELEVER SCIENT GM = GEOMON
SW CASING 6"	RECORDER DG

25

SP

PIEZOMETER TYPE:

SS 14

15 SS

Х -1

> i 1

26.0

28.0

28.0

30.0

NO-2 ROCK CORE

<u>6" x 3.25 HSA</u>

TYPE OF CASING USED

1-1-2-2

1-1-2-2

1.67

1.91

26' - 28' LESS THAN 2% SAND

5YR4/1 OLIVE GRAY CLEAN SAND, MED

(1/4-1/2 mm) S. ANG. SAND, WELL SORTED, POORLY GRADED, NO ODOR, NO HCI, VERY

Continued Next Page

PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE

28.0 Top of screen.

JOB NUMBER 5423

LOG OF BORING



COMPANY __ APPALACHIAN POWER COMPANY PROJECT W. VA. GROUND WATER STUDY

BORING NO. AMW-07 DATE 11/17/95 SHEET 2 OF 2 BORING START 08/30/95 BORING FINISH 08/31/95

SAMPLE NUMBER SAMPLE	SAMPLE DEPTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	AL 3TH JERY	RQD	00.111	PH B	и С	SOIL / ROCK	L_	
SAM NUM SAM	IN FEET	RESISTANCE	TOT COL	%	IN	GRAPH LOG	s	IDENTIFICATION	негг	DRILLER'S NOTES
	OM TO	BLOWS / 6" 2-3-2-3			FEET		<u> </u>			
17 SS 3	2.0 34.0 4.0 36.0	2-3-7-6 5-3-6-8	2.0 1.17 1.67		-		CL SW SC	LOOSE, MOIST LEAN CLAY, WITH MEDIUM TO FINE S. ANG. SAND, MOIST, NO ODOR N-4 MED, DK GRAY SAND, 5% SILT AND CLAY, FINE TO MEDIUM (1/8-1/2 mm) GRAIN SAND, S. ANG., POORLY SORTED, NO ODOR		
19 SS 36	5.0 38.0	5-9-21-23	2.0		35			34' - 36' MOIST TO DAMP 37' - 38' HARD, CLEAN, MOIST		
								37' - 38' HARD, CLEAN, MOIST		38.0 Bottom of screen. 39.0 Bottom sand.

JOB	NUMBER	5423

COMPANY <u>A</u>	PPALACHIAN	POWER CO	MPANY						
PROJECT W. VA. GROUND WATER STUDY									
	N 536,151.7								
GROUND ELEVATION 584.9 SYSTEM STATE PLANE									
WATER LEVEL	<u> </u>	12	¥						
TIME									
DATE	8-29-95								

BORING NO. AMW-08 DATE 11/17/95 SHEET 1 OF 1
BORING START 09/13/95 BORING FINISH 09/13/95
PIEZOMETER TYPE WELL TYPEOW
HGT. RISER ABOVE GROUND DIA DIA
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY JCM=REB RIG CME-75

		- <u>_</u>		·	····			J				
SAMPLE	AMPLE	DI IN	MPLE EPTH FEET	STANDARD PENETRATION RESISTANCE	TOTAL ENGTH COVERY		DEPTH IN	GRAPH LOG	s c s	SOIL / ROCK	ELL	DRILLER'S
N.	z s	FRON	1 TO	BLOWS / 6"	R L		FEET	ß	5	IDEINTRICATION	Ξ	NOTES
1	SS	0.0	2.0	8-16-14-8	1.67				-OL	PLANT FRAGMENTS	FAF	
2	SS	2.0	4.0	6-7-11-9	1.67				CL SC	10RY5/4 AND 10YB5/6 GRAVELLY CLAY, 30% GRAVEL WITH SILT, 5% MEDIUM TO COARSE		
3	ss	4.0	6.0	5-7-3-3	2.0		5 -			10YR5/2 AND 10YR5/4 CLAYEY SAND, 45% CLAY, SAND S. ANGULAR WITH 5% 2 TO 4		4.0 Top of seal.
4	SS	6.0	8.0	5-3-5-4	1.67		5 -		CL	mm, LOOSE, DRY, NO ODOR, NO HCI 4' - 6' 5YR5/6 - 5YR6/6, DRY, 5% FINES 5YR4/4 - 5YR4/6 SANDY CLAY, 45% VERY FINE S. ANG, WELL SORTED, POORLY		6.0 Top of sand.
5	ST	8.0	10.0				-		SC	GRADED SAND, MOIST, NO ODOR		
6	SS	10.0	12.0	2-2-2-1	1.17		10 -		30	10YR5/4 - 5YB5/6 CLAYEY SAND, 50% VERY FINE TO FINE SAND, LOOSE, WET, NO HCI, NO ODOR		10.0 Top of screen.
7	SS	12.0	14.0	2-2-3-3	1.5		-			12'-14' SAND 65%, WET		
8	SS	14.0	16.0	1-1-3-3	1.5		-					
9	ss	16.0	18.0	2-2-3-2	1.67		15 -			14'-16' WET		
10	ss	18.0	20.0	1-1-2-3	1.83				CL	5YB5/4 - 5YB5/2 SANDY CLAY, 50% SAND, 50% CLAY, STIFF, MOIST, NO ODOR, NO HCI 18'-20' SANDY CLAY, SAND 40%, MOIST		
11	SS	20.0	22.0	8-10-9-4	1.83		20 -			20'-22' SAND 20%, DRY, N5 MED. GRAY =		20.0 Bottom of screen. 21.9 Bottom sand.
		TYPE	OF CA	SING USED	!	1	l_	l				
			OCK C									
Х		5" x 3.2				P	IEZOME		YPE:	PT = OPEN TUBE POROUS TIP, SS =	OPE	EN TUBE
	9	" x 6.2	5 HSA				SLUI			REEN, G = GEONOR, P = PNEUMATIC		
					4"	N	ELL TYP	PE: (<u>ow</u>	= OPEN TUBE SLOTTED SCREEN, GM =	= GE	
		W CAS			3"	_				RECORDER		
		IT UAL	DVINC	t	5"	1			1			



JOB NUMBER	_5423
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COMPANY <u>APPALACHIAN POWER COMPANY</u> PROJECT <u>W. VA. GROUND WATER STUDY</u> COORDINATES <u>N 536,983.3 E 1,734,099.7</u>

BORING NO. AMW-09 DATE 11/17/95 SHEET 1 OF 2
BORING START 08/29/95 BORING FINISH 08/29/95
PIEZOMETER TYPE WELL TYPE
HGT. RISER ABOVE GROUND 1.79 DIA 2.0
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY TJH=REB RIG CME-75

1 0.0 2.0 8-24-45-60 1.0 GC <u>5YR4/4 - 5YR3/4 CLAYEY GRAVEL</u> 30% CLAY, S. ANG. POORLY SORTED GRAVEL	
2 2.0 4.0 2-100 mm, VERY HARD, NO ODOR	
3 4.0 6.0	
4 6.0 8.0 6-6-9-9 1.67 5	
5 ST 8.0 10.0	
6 10.0 12.0 10 CL <u>5YB5/4 - 5YB5/5 SANDY CLAY</u> , FINE WELL	
7 12.0 14.0 3-4-5-6 2.0 1	
8 14.0 16.0	
9 16.0 18.0 15	15.0 Top of seal.
10 18.0 20.0 10 18.0 20.0 SC 5YB5/4 TO 5YR4/4 CLAYEY SAND, FINE GRAIN S. ANGULAR SAND (1/8 - 1/4 mm), V. LOOSE, WELL SORTED, POORLY GRADED, WET, 30% CLAY, NO ODOR, NO HCI	17.0 Top of sand.
11 20.0 22.0 1-1-1-2 2.0 20 - 20 - 20 - 20 - 20 - 20 - 20	
12 22.0 24.0	21.0 Top of screen.
13 24.0 26.0 1-1-1-2 2.0	
14 26.0 28.0 25 - 25 - 26.0 GRADED SAND, LOOSE, WET, NO HCI	
15 28.0 30.0 30.0 CLAY, 15% VERY 	
TYPE OF CASING USED Image	<u>±:- </u>
NQ-2 ROCK CORE	
X 6" x 3.25 HSA PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = O 9" x 6.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	JPEN TUBE
HW CASING ADVANCER 4" WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN GM = (GEOMON
NW CASING 3" RECORDER DG	



JOB NUMBER 5423

LOG OF BORING

COMPANY	_APPAL	ACHIAN	POWER	COMPANY
	144 144			

PROJECT W. VA. GROUND WATER STUDY

BORING NO. AMW-09 DATE 11/17/95 SHEET 2 OF 2 BORING START 08/29/95 BORING FINISH 08/29/95

SAMPLE	NUMBER SAMPLE	anirre	SAMP DEPT IN FE	TH ET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	ИЕГГ	DRILLER'S NOTES
- SAMPLE			DEPT IN FE	гн	STANDARD PENETRATION RESISTANCE BLOWS / 6" 1-1-1-1	C LENGTH C RECOVERY	8QD %	DEPTH			IDENTIFICATION		NOTES

3
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LOG OF BORING

1-	$\neg r$		
11	V	1	D
-	1	7	_

COMPANY A	PPALA	CHIAN	POWE	R CO	<u>MPAN</u> Y		
PROJECT W.	VA. GI	ROUNE	D WATI	ER STL	JDY		ł
COORDINATES	<u>N 53</u>	6,989.9) E 1,7	734,094	1.7		i
GROUND ELEVA		586.4	S`	STEM	STATE P	LAN	Ξı
WATER LEVEL	<u> </u>	1.8	Ţ		T		ſ
TIME					† -		١
DATE	9-6	-95					F
	MPLE PTH		DARD				S

BORING NO. AMW-10 DATE 11/17/95 SHEET 1 OF 2
BORING START 08/24/95 BORING FINISH 08/28/95
HGT. RISER ABOVE GROUND DIA DIA
DEPTH TO TOP OF WELL SCREEN BOTTOM
WELL DEVELOPMENT YES BACKFILLQUICK GROUT
FIELD PARTY TJH=REB RIG CME-75

1 SS 0.0 2.0 7-17-17-38 1.5	SAMPLE	SAMPL	D IN FROM	MPLE EPTH FEET 4 TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION	негг	DRILLER'S NOTES
3 SS 4.0 5.0 4.4.7-3 1.33 4 SS 6.0 8.0 5-6-6-7 1.5 5 SS 8.0 10.0 5-5-7 1.25 6 SS 10.0 12.0 3-3-4.4 1.33 10 7 SS 12.0 14.0 2-2-2.2 1.83 9 SS 16.0 18.0 1-1-2.3 1.67 10 SS 18.0 1-1-2.3 1.67 11 SS 20.0 22.0 1-2-1.3 1.67 11 SS 22.0 24.0 1-1-1.2 1.83 12 SS 22.0 24.0 1-1-1.2 1.83 13 SS 26.0 27.5 SAND 205.2 27.5 SAND 205.2 14 SS 28.0 1-1-1.2 1.83 20.0 21.2 1.83 15 SS 28.0 28.0 1-1-1.2 1.83 27.5 SAND 205.2 SAND 205.2 SY 21.0 LW 205.5 14 SS 28.0 1-1-1.2<										GC	5YR4/4 DARK BED-BROWN CLAYEY GRAVEL 25% CLAY, 30% FINE SAND, 45% SUB-ANGULAR TO ANGULAR GRAVEL (2 TO		
4 SS 6.0 8.0 5-8-6-7 1.5 5 SS 8.0 10.0 5-5-5-7 1.25 6 SS 10.0 12.0 3-3-4-4 1.33 7 SS 12.0 14.0 2-2-2-2 1.83 8 SS 16.0 1.1-1-2 1.91 9 SS 16.0 1.1-1-2 1.91 9 SS 16.0 1.1-1-2 1.91 9 SS 16.0 1.1-1-2 1.91 10 SS 18.0 1.1-1-2 1.91 11 SS 20.0 1-1-1-2 1.8 11 SS 20.0 1-1-1-2 1.8 12 SS 12.0 1-2-1-3 1.8 13 SS 24.0 1-1-1-2 1.8 14 SS 26.0 1-1-1-2 1.8 15 SS 28.0 1-2-1-2 1.8 15 SS 28.0 1-2-1-2 1.8 14 SS 26.0 28.0	3	ss	4.0	6.0	4-4-7-8	1.33			臣		/		
5 SS 8.0 10.0 5-5-5-7 1.28 10 6 SS 10.0 12.0 3-3-4-4 1.33 10 10 5''' FEWER LENSES STML X SUPPY FINE TO FINE SAND, MED. STIFF TO STIFF, LOW PLASTICITY, NO ODOR, DAMP, 2 7 SS 12.0 14.0 2-2-2-2 1.83 10 10 5''' S'''' 10'''' S'''''' S'''''''' S''''''''''''''''''''''''''''''''''''	4	ss	6.0	8.0	5-6-6-7	1.5		5		<u>CI</u>	VERY FINE SAND, 20% CLAY, MUSKY ODOR, DAMP. A FEW SMALL IRREGULAR HORIZONTAL (N1) BLACK LENSES (20 mm L		
6 SS 10.0 12.0 3:3:4:4 1.33 7 SS 12.0 14.0 2:2:2:2 1.83 8 SS 14.0 16.0 1:1:1:2 1.91 9 SS 16.0 18.0 1:1:1:2 1.91 10 SS 16.0 18.0 1:1:1:2 1.91 11 SS 0.0 1:1:1:2 1.67 12 SS 22.0 24.0 1:1:1:2 1.67 13 SS 24.0 26.0 1:1:1:2 1.67 14 SS 28.0 28.0 1:1:1:2 1.83 14 SS 28.0 1:1:1:2 1.83 26.27.5' SAND 40% 15 SS 28.0 1:1:1:2 1.67 26.27.5' SAND 40% 15 SS 28.0 1:1:1:2 1.67 27.2' SAND 20% 24'-26' SAND 20% 14 SS 28.0 1:1:1:2 1.5 26'-27.5' SAND 40% 26'-27.5' SAND 40% 15 SS 28.0 1:1:1:2:2 1.5 SC SC	5	ss	8.0	10.0	5-5-5-7	1.25		-			6'-7' FEWER LENSES, N4 - N5 SYBBS/6 - SYR4/4 SANDY CLAY, 30% VERY FINE TO FINE SAND, MED. STIFF TO STIFF,		
7 SS 12.0 14.0 22-2-2 1.83 8 SS 14.0 16.0 1-1-1-2 1.91 9 SS 16.0 18.0 1-1-2-3 1.67 10 SS 18.0 20.0 1-1-2-3 1.67 11 SS 20.0 122.0 1-2-1-3 1.67 12 SS 22.0 24.0 1-1-1-2 1.67 13 SS 22.0 24.0 1-1-1-3 1.57 14 SS 26.0 26.0 1-1-1-2 1.83 15 SS 28.0 30.0 1-1-2-2 1.83 15 SS 28.0 30.0 1-1-2-2 1.83 16 SS 28.0 1-2-1-2 1.83 25 17 SS 28.0 30.0 1-1-2-2 1.83 16 SS 28.0 1-2-1-2 1.83 26 26-27.5' SAND 40% 16 SS 28.0 1-2-1-2 1.83 SC SC VERY FINE TO FINE SAND. V. LOOSE TO LOOSE TO LOOSE, WER NO C	6	SS	10.0	12.0	3-3-4-4	1.33		10			LOW PLASTICITY, NO ODOR, DAMP. 2 LARGER LENSES 5mm L X 111/8 TO 1//4 mm		
0 0.3 1.0.0 11-1.2 1.91 15 35% CLX, POORLY SORTED, GRADED FINE TO MEDIUM SAND, UNCONSOLIDATED, LOOSE, A FEW ROUND SMALL IRREGULAR BLACK (N2) DEPOSITS, WET 10 SS 18.0 20.0 1-1-2-3 1.67 11 SS 20.0 1-1-2-3 1.67 11 SS 20.0 1-1-2-3 1.67 12 SS 22.0 24.0 1-1-1-3-3 1.57 13 SS 24.0 26.0 1-1-1-2 1.0 14 SS 26.0 28.0 1-2-1-2 1.83 15 SS 28.0 30.0 1-1-2-2 1.5 YYPE OF CASING USED Continued Next Page YPE OF CASING USED	7	ss	12.0	14.0	2-2-2-2	1.83		-			н.		
9 SS 16.0 18.0 1-1-2-3 1.67 TO MEDIUM SAND, UNCONSOLIDATED, LOOSE. A FEW ROUND SMALL IRREGULAR BLACK (N2 DEPOSITS, WET 10 SS 18.0 20.0 1-1-2-3 1.8. 11 SS 20.0 1-2-1-3 1.67 Figure 4.57E5/4 SANDY CLAY, 25% V. FINE SAND, SOFT, MED PLASTICITY, NO HCI, NO ODOR, MOIST 11 SS 22.0 1-2-1-3 1.57 20'22' SAND 20% 12 SS 22.0 1-1-1-3-3 1.57 20'22' SAND 20% 12 SS 22.0 1-1-1-2 1.0 25'-27.5' SAND 20% 13 SS 24.0 1-1-1-2 1.0 25'-27.5' SAND 20% 14 SS 28.0 1-2-1-2 1.83 25'-27.5' SAND 40% 26'-27.5' SAND 40% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Yd/JLDLME GBAY CLAYEY SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI Continued Next Page VO-2 ROCK CORE X 6'' X 3.25 HSA PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	8	ss	14.0	16.0	1-1-1-2	1.91		_		sc	10YR5/4 YELLOW BROWN CLAYEY SAND, 35% CLAY, POORLY SORTED, GRADED FINE		
14 SS 26.0 28.0 1-2-1-2 1.83 24'-25' SAND 25% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 26'-27.5' SAND 40% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Y4/1 DLIVE GEAY CLAYEY SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6'' x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	9	ss	16.0	18.0	1-1-2-3	1.67		15			TO MEDIUM SAND, UNCONSOLIDATED, LOOSE. A FEW ROUND SMALL IRREGULAR BLACK (N2) DEPOSITS, WET		
14 SS 26.0 28.0 1-2-1-2 1.83 24'-25' SAND 25% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 26'-27.5' SAND 40% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Y4/1 DLIVE GEAY CLAYEY SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6'' x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	10	ss	18.0	20.0	1-1-2-3	1.8.				SL	5YB4/4 - 5YB5/4 SANDY_CLAY, 25% V. FINE SAND, SOFT, MED PLASTICITY, NO HCI, NO ODOR, MOIST		
14 SS 26.0 28.0 1-2-1-2 1.83 24'-25' SAND 25% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 26'-27.5' SAND 40% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Y4/1 DLIVE GEAY CLAYEY SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6'' x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC				22.0	1-2-1-3	1.67		20 -			20'22' SAND 20%		
14 SS 26.0 28.0 1-2-1-2 1.83 24'-25' SAND 25% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 26'-27.5' SAND 40% 15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Y4/1 DLIVE GEAY CLAYEY SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6'' x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	12	SS	22.0	24.0	1-1-3-3	1.5		- - -			22: 24' SAND 20%		
14 SS 26.0 28.0 1-2-1-2 1.83 15 SS 28.0 30.0 1-1-2-2 1.5 TYPE OF CASING USED Continued Next Page NO-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6" x 3.25 HSA PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	13	ss	24.0	26.0	1-1-1-2	1.0		25 -					
15 SS 28.0 30.0 1-1-2-2 1.5 SC 5Y4/1 OLIVE GRAY CLAYEY_SAND, 40% CLAY, VERY FINE TO FINE SAND, V. LOOSE TO LOOSE, WET, NO ODOR, NO HCI TYPE OF CASING USED Continued Next Page NO-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6" x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	14	SS	26.0	28.0	1-2-1-2	1.83							
TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE X 6" x 3.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	15	SS	28.0	30.0	1-1-2-2	1.5			s	SC	~		
X 6" x 3.25 HSA 9" x 6.25 HSA SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC			TYPE	OF CA	SING USED								
9" x 6.25 HSA	X		NQ-2 F 5" x 3.2	NOCK C	ORE		F				PT = OPEN TUBE POROUS TIP, SS =	OPE	N TUBE
		<u> </u>	<u>9" x 6.2</u>	5 HSA		A"							
NW CASING 3" SW CASING 6" RECORDER			<u>NW CA</u>	SING		3"			<u> </u>				

JOB NUMBER 5423

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COMPANY <u>APPALACHIAN POWER COMPANY</u> PROJECT <u>W. VA. GROUND WATER STUDY</u>

BORING NO. <u>AMW-10</u> DATE <u>11/17/95</u> SHEET <u>2</u> OF <u>2</u> BORING START <u>08/24/95</u> BORING FINISH <u>08/28/95</u>

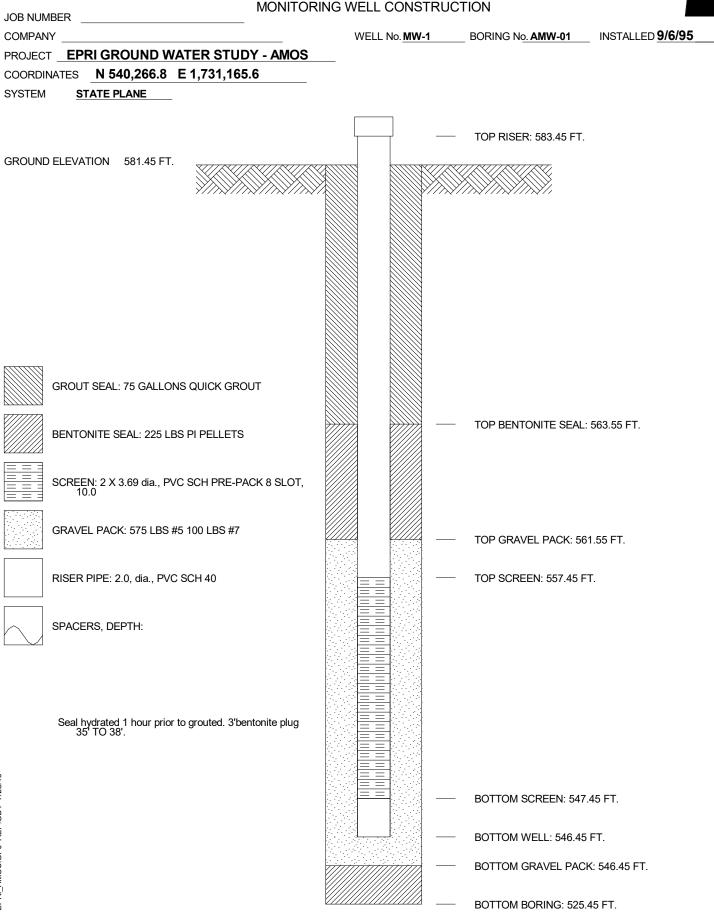
SAMPLE		D IN FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"		%	DEPTH IN FEET	GRAPH LOG	U S C S	SOIL / ROCK IDENTIFICATION		НЕЦС	DRILLER'S NOTES
16 17 18 19	ss	32.0 34.0	32.0 34.0 36.0 38.0	1-1-1-2 2-2-3-7 1-1-3-2 2-2-2-3	2.0 1.17 1.83		35 -		CL SC CL	10YB4/2 - 5YR4/6 MODEBATE BROWN CLAYEY SAND, 10% CLAY, VERY FINE TO FINE SAND, POORLY SORTED, GRADED, UNCONSOLIDATED, LOOSE, WET, NO ODOR, NO HCI			-
20	ss		40.0	2-2-2-3	2.0					10YR4/4 SANDY CLAY, 10% VERY FINE TO FINE WELL SORTED SAND, SOFT TO MED. STIFF, MED. PLASTICITY, MOIST, NO ODOR, NO HCI 38'-40' 10YR4/2 AND 5YR5/6			
21	SS SS	40.0	42.0	1-2-2-3 1-2-4-4	2.0		40 -			40'-42' 30% SAND			40.8 Top of seal.
23	ss ss	44.0	46.0	4-6-12-12	2.0		- 45 —		SC	42'-44' N4-N4 MED DARK GRAY, 40% SAND CLAYEY SAND, 20% CLAY, FINE TO MEDIUM GRAIN SAND, ANGULAR, POORLY SORTED, WELL GRADED, WET, LOOSE TO MED.	• • • •		43.0 Top of sand.
24 25	SS	46.0 48.0	48.0 50.0	4-6-11-17 12-5-5-10	1.91 1.17		-		sw	DENSE, NO ODOR, NO HCI <u>5Y6//1 LT. OLIVE GRAY SAND</u> , 2% CLAY, MEDIUM TO COARSE GRAIN, WELL GRADED, MOIST TO WET, SUB-ANGULAR TO SUB-ROUNDED, NO ODOR, NO HCI			7.5 Top of screen.
26 27	ss ss	50.0 52.0	52.0 54.0	9-13-16-18 9-60-23-9	1.5 1.33		50 -		SC GC	5Y4/1 - 5Y6/1 OLIVE GRAY GRAVELLY, CLAYEY SAND, CLAY 20%, 30% FINE TO COARSE SUB-ROUNDED, FRIABLE SANDSTONE GRAVEL, 40% FINE TO MEDIUM GRAIN SUB-ANGULAR TO SUB-ROUNDED		•••••	
28	ss	54.0	56.0	13-22-25-20	1.33		55 -			SAND, POORLY SORTED, NO ODOR, DRY TO MOIST 5Y4/1-5Y6/1 OLIVE GRAY SANDY, GRAVELLY CLAY 20% SUB DOUNDED			
	SS	56.0	59.0	13-14-16-30 32-100/4	.67					GBAVELLY CLAY, 30% SUB-ROUNDED FRIABLE SANDSTONE GRAVEL, 20% SAND 54'-56' GRAVEL 35%, SAND 10%, GRAVEL 4 - 256mm, DAMP WEATHERED BEDROCK, 5YR4/4 - FFYR3/4 - MOD. BROWN, DRY		s	7.5 Bottom of creen. 8.9 Bottom sand.

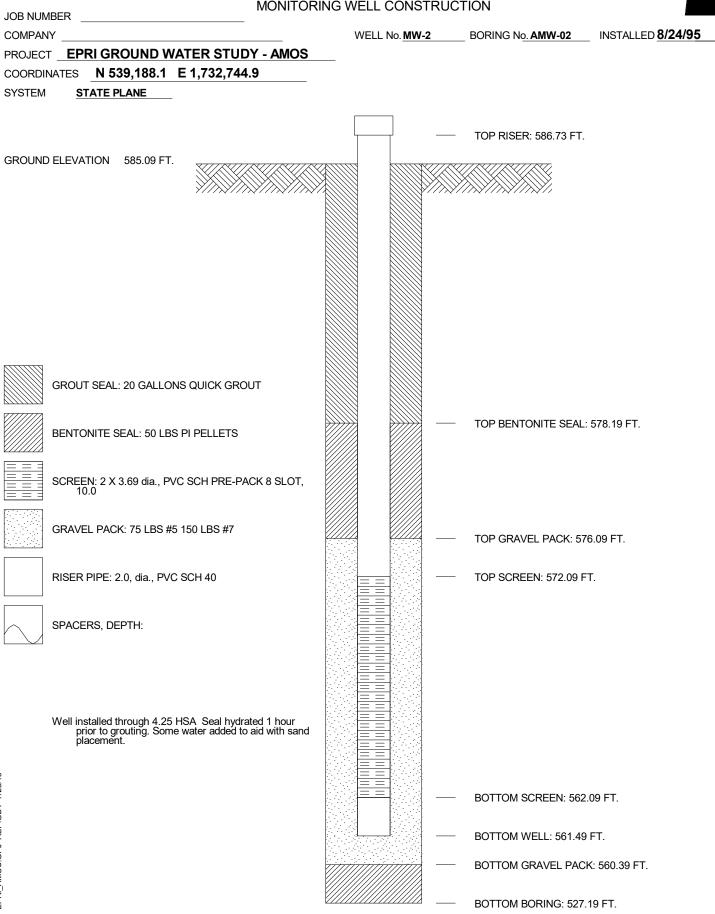


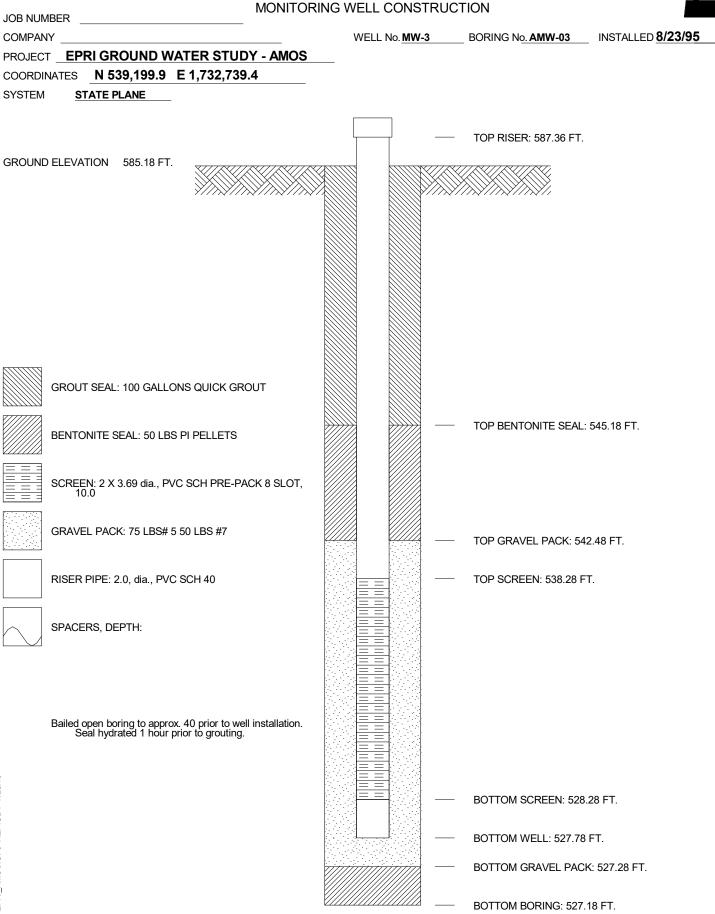
AEP 1995

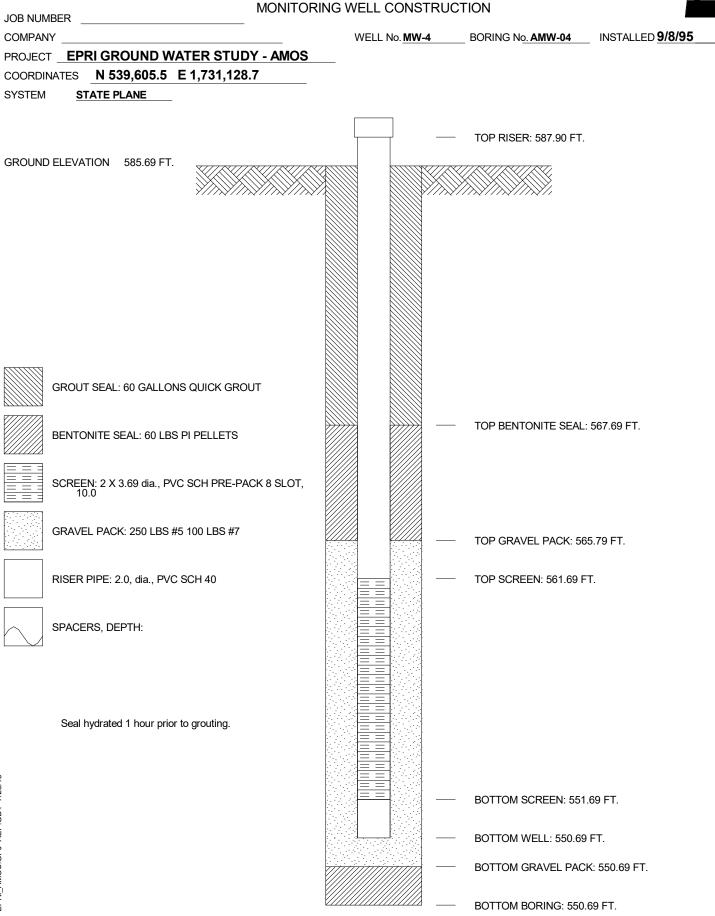
Well Construction Diagrams

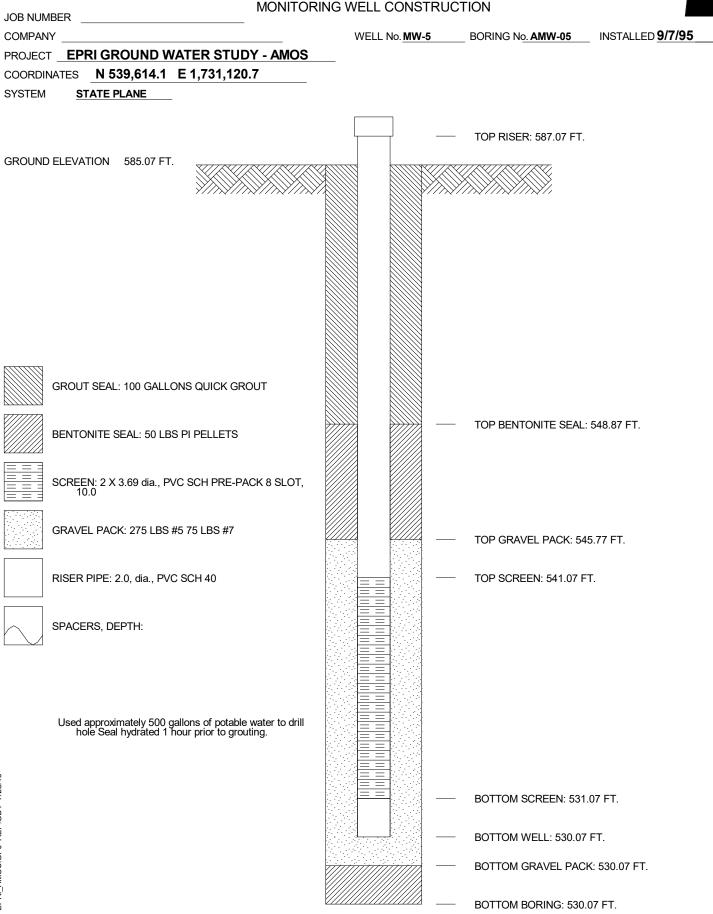
MW-01 to MW-10

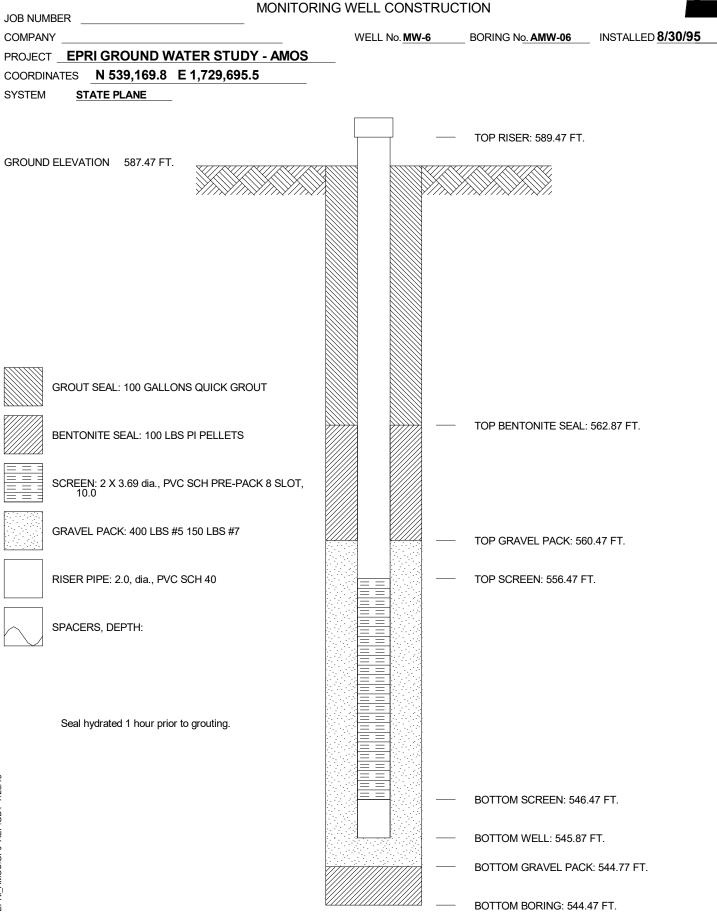


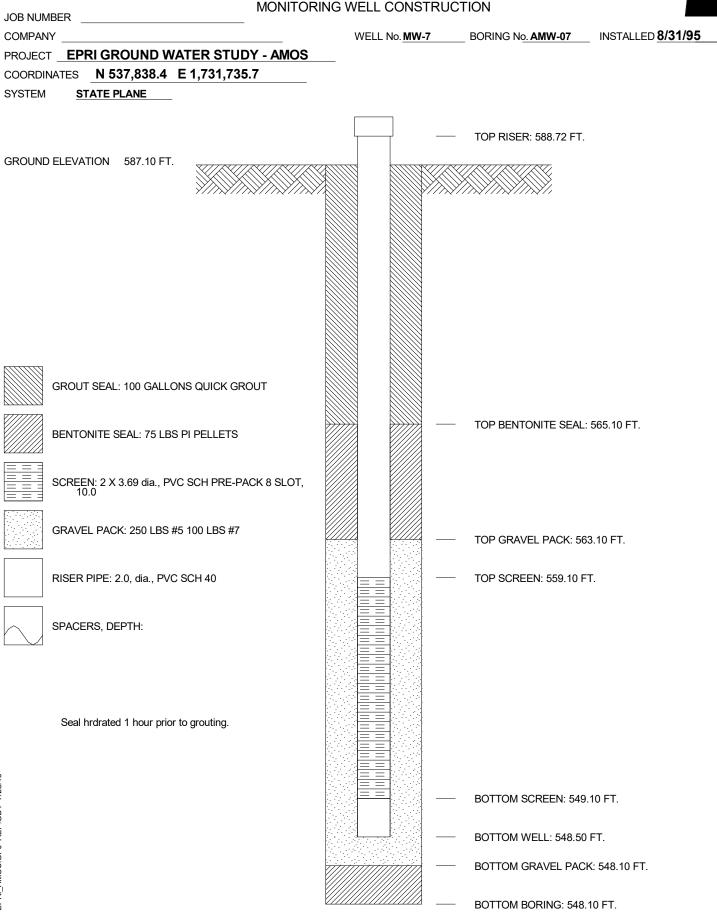


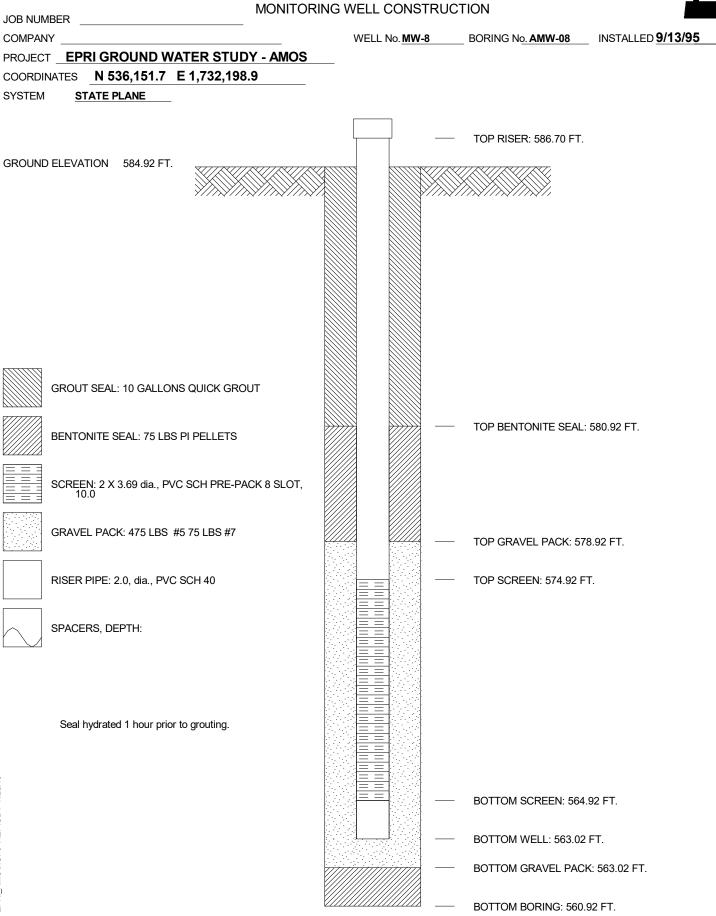


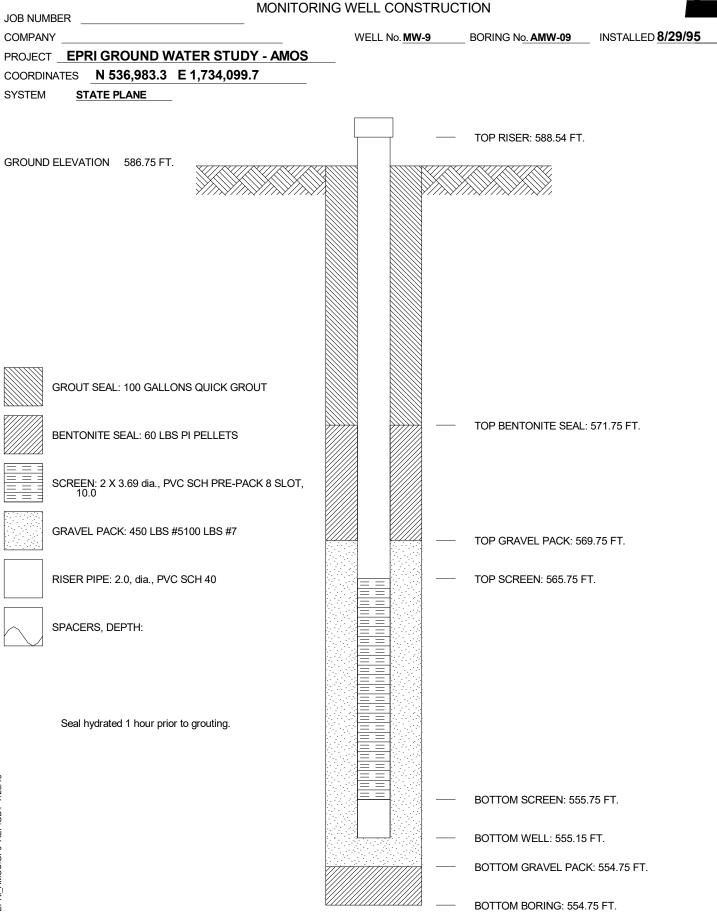


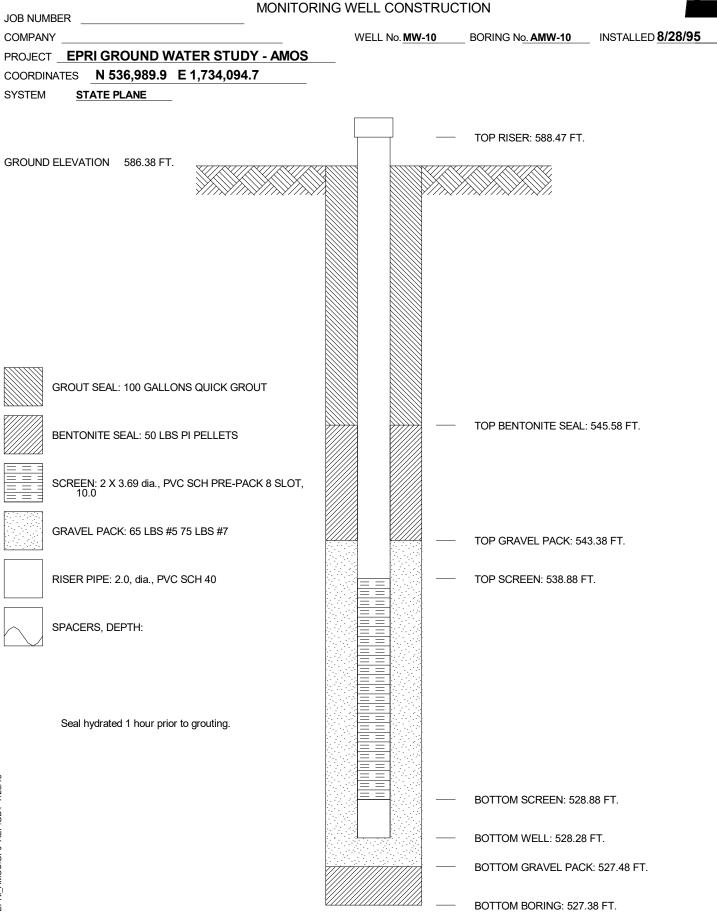










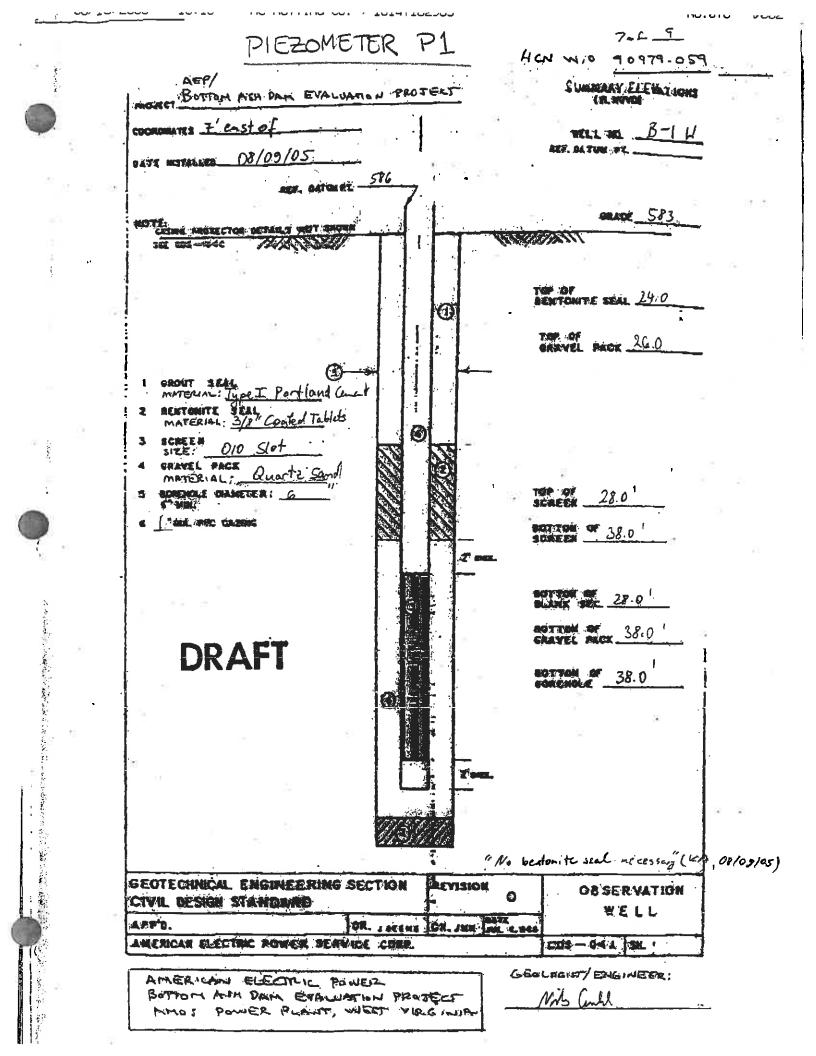




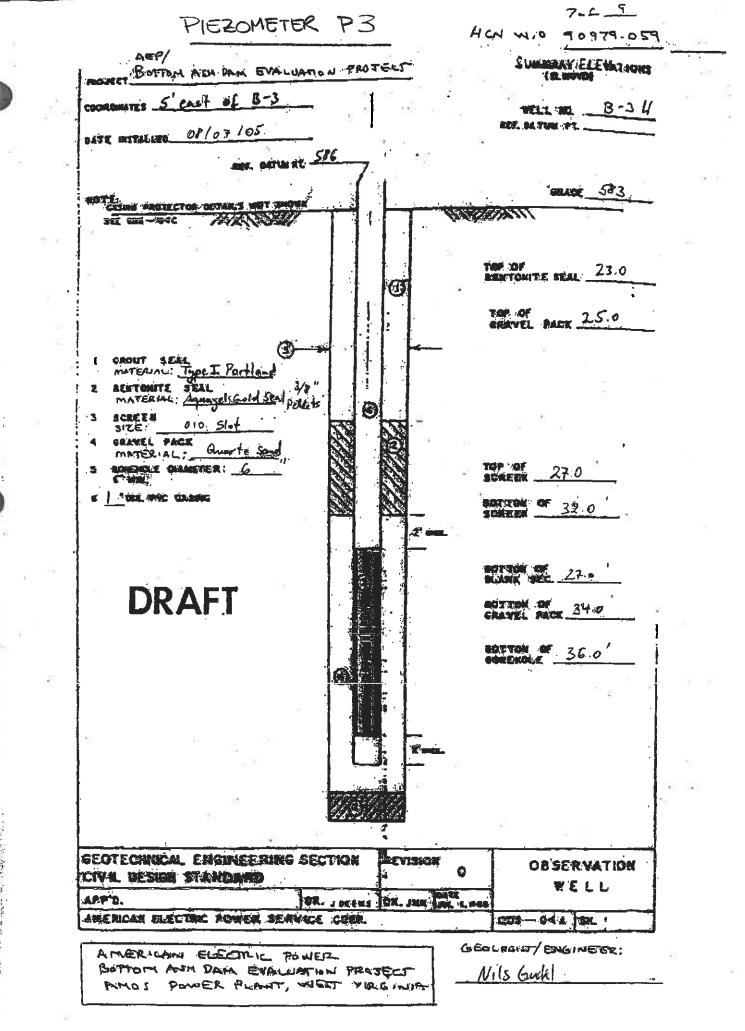
Geo/Environmental Associates, Inc. 2005

Piezometer Construction Diagrams

P1, P3, & P6



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7-6-9 PIEZOMETER PG HCN NO 90979-059 AEP/ SUMMARY ELEVATIONS MONET BOTTOM ASH DAM EVALUATION PROTECT (SLAGVOL COORDINATES 6 West of B-6 WELL THE B-6 H AST. OL THE ML. 08/06/:05 SATE MITALEED. ART. DATIN AL SEC GRADE S83 ANDRECTOR DETAR I NOT DOWN SHE ENS-444C TOP ST BENTOMTE SEAL 10.5 Ð BRAVEL BACK 13.0 (D 1 GROUT SEAL materin: TypeI Partland Come BENTONITE SEAL MATERIAL: Aquasel Gold Seal (3) 2 S) · Pates) SIZE DIO SIST х MATERIAL; Qualt' Snod TOP OF 15.0 6 C 1 CONCINCTING SCREEN 25.0 21 15.0 DRAFT STATEL MEX 27.0 and the second $\langle t \rangle$ and a local and a second GEOTECHNICAL ENGINEERING SECTION Incrusion OB SERVATION 0 CTVIL DESIGN STANDARD 戦害しし SH. JOCEES DH. JAN AN. C. BES 427D. AMERICAN ELECTRIC POWER SERVICE CORR. COS - 04 1 191. GEALAGIST ENGINEER; AMERICANI ELECTRIC POWER BOTTOM ANT DAM EXALUATION PROJECT Nils Guhl MMOS POWER PLANT, WEET VIRGINUR



H.C. Nutting Company 2005

Test Boring Logs

B-1 to B-8, B-11

14/2005	23:1	.8	HC NUTTING CO. → 1614716	2963		IAI				r	10.6		000
			H.C. NUTTING COMPANY	T	T	DJ.	L .OG OF	TFS	r Rr		NC		age 1
			CHARLESTON. WV 23301 (304) 344-0821 FAX (304) 342-4711		TORAT						NG		RASS REQN
GEI		and the second sec	MALOYEE OWNED	័ព	LUNKEN P , (513) 221	ark Dryn oh 48322 4816	CENTIAL CHIO REGIO 799 MORRISON REAL COLUMBUS, SH 43230 (014) 803-3113	345 ¥4	LNUT STR ENCEBURG (\$12) 538-4	EET, STI 3, 3N 470		176-5 COM LEXINO	WAY CT. 9 TON, KY 60 5 455-0120
Client			Brican Electric Power		E (EFB) JEAN	Boring	FAX (FIII) BID GATS	F/	B-	10201		FAK (I	61) 435-803
Project			ttom Ash Dam Evaluation - Amos Plant, V	w			Started	8/8/200			_		
	Location					Date C	Completed	8/8/200	5				
Elevatio ELEV.		AE	P Boring Location Plan	<u> </u>		Work (Order No.	90979.0 SAMPLE					
ft. 583_00	ft.	color, m	DESCRIPTION OF MATERIALS alerial description, molsture, stiffness/geneity/haran (visuel classification unless otherwise noted)	- 1	ю. т	DEPTH	1 BLOWS/ (N Value	6" REC	ROD	W	u.	PI	HCSI
582.60	0.4	77	0.4 Topsoil with organics		-		700		8	×	1%	56	
581.00	2.0	A	1.6 FILL: BrownIsh gray, silty sand with gravel (SM) nonplastic, dry, medium dense		1 5	S 0.0-1.9	(18)	40				\vdash	
		\mathcal{D}	FILL: Reddish brown and gray, lean clay (CL) (shale fill), dry - very moist stiff - medium stiff				ŀ						
			- some semi-durable shale fragment	2	2 5	S 5.0-6.5	5-6-5	100					
			at 6.0'	ه ا	+							+	
			3.0										
		Ŋ.	- little sandy shale fragments at 11.0' - very moist from 11.0'	3	s	\$ 10.0-11.	5 1-4-4 (8)	80		\square		\square	2
					SI	11.5-13.5	5	85	\square				
568.00	15.0	A-	FiLL: Reddish brown, blueish gray, and yellowish gray, clayey gravel with	4	ss	15.0-16.5	3-4-4	73					
			sand (GC) (gravel=sandstone fragments), moist - very moist, loose dense		\pm		(8)						
		9.	0	2	ST	17.5-19.5		80			R	<u>A</u>	
				5	SS	20.0-21.5	3-17-22 (39)	60					
559.00	24.0	2_		6	5\$	22.5-24.0	5-10-8 (18)	100	+	+	+	╉	+
		3.5		7	ŝŝ	24.0-25.5	1-2-1 (3)	100					
555.50 2	27,5	4	- abundant non-durable to semidurable shale fregments Gray, LEAN CLAY with SAND (CL).	L	ļ	ļ							
et 1405		4.0	wet, very soft	8	SS	27.5-29.0	WOH-WOH WOH	100					0.2
	1.5		Crow SU TH D LUD	3	ST	29,5-31.5		100			Ţ	T	T
		4.5	Gray, SILTY SAND (SM) low plasticity to non-plastic, wet, very loose - loose	9	SS	31.5-33.0	1-2-2 (4)	100	\square			$\frac{1}{1}$	1
100 551.50 3	nal Notee		Romanica										
	HCN	_ <u> </u>	Located boring 1' off edge of Rd. (approx.	7' off i	Rd. CI	.) on natural	side of Imm	Wate Hodiete	r Level		iesval 24.0	lons	
Kig No. J Rig Type Method	Johnson ATV	1 19	pain. vvatar at completion measured through	iah the	e avoe	rs. Boring c	aved at ALC	ompletio			24.2		_ิก. 🗸
Method	SS/ST	- h	34' after 24 hrs. Installed MW with screen B-1.	rrom 2	:8 to 3	ia' in hole 7'		r er used in		4	Hrs.	33.0	_t. ▼

5	H.C. NUTTING COMPANY APPALACHIAN REGION - 912 MORRIS STREET			LC)g of	TESI	r BC	RI	NG		ige 2	2 01
GEOTECHNICA	CHARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711	CINCIN CINCIN (51)	NRATE CÊN (EN PARK NATL OH 4 N 821-8611 S12) 921-86	1745 CENT DANE 7301 4230 COLO	AL ONO REGION MORRIDON ROAD UNBUR, OH 49250 814) 883-8115 X 1914 853-8475	S43 WA LAWRY	CANA REALANT STRI ENCEBURG (412) 00944 (412) 535	CHON: EE7, STE L IN 4702 500	EB 4	9LUE3 76-8 CON LEXING (169	RASS RE WAY CT. 1014, IXI 1433-45. 89) 435-15.	, 87E 4051 1 10
Cilent	American Electric Power			Boring No			B -	-		PAC	03) 436-1	30
Project	Bottom Ash Dam Evaluation - Amos Plant, WV		<u> </u>	Date Star	-	8/8/200				<u> </u>		
Boring Location		_		Date Con	-	8/8/200	_					
Elevation Ref.	AEP Boring Location Plan			Work Ord	• -	90979.0						
ELEV. DEPTH	DESCRIPTION OF MATERIALS					SAMPLE						
ft. ft.	color, material description, molsture, stiffness/density/hardness (visual classification unless otherwise rated)	NO.	TYPE	OEPTH (BLOWS/6 (N Value)		RQD %	w *	LL %	P! %	HCSI	Pf E
547,00 36.0	- little organics (wood framents) throughout	10	SS	35.0-36.5	4-8-6 (14)	100						
	Gray, SILTY SAND with GRAVEL (SM) (grave=sandstone fragments) non-plastic, wet, medium dense - loose											
<u>542.50 40.5</u>	- cobbles at 38.0' to 39.0' - trace organics (peal) Gray, SILTY SAND (SM) non-plastic,	11	SS	40.0-41.5	2-2-3 (5)	67				-	_	
	wet, loose 4.5 - trace cost fragments and organics				(0)							
538.00 45.0	(pest)											
	Gray, POORLY GRADED SAND with SILT (SP-SM), wet, loose	12	SS	45.0-46.5	3-3-2 (5)	100		~		-+		
	- trace organics (peat)			-				D	R	A	F	ſ
		13	ss	50.0-51.5	3-3-7 (10)	100			+	-+		
529.50 53.5	 little gravel (sendy shale fragments) at 51.5' 							-+		\uparrow	-	
	Blueish gray and reddish brown, LEAN CLAY with SAND (residual SHALE), wet - moist, stiff - very hard			· · · ·								
	5.0	14	SS	55.0-56.5	5-10-26 (36)	100			\downarrow	\downarrow	_	
24.50 58.5		15	ss	57.5-58.5	26-50/0.5	100	~+	-+-		-+-		
	BORING COMPLETED @ 58.5'				20-30/0.5		-+		-	+-		
F												
F												
F												
General Notes												
iller <u>HCN</u>	Toritorica	. M ID -	- 01-5		[.		r Leve			tions		
No. J. Johnso		the a	erenu	Borton on	ad at . At C	ediate omplotio	. —		24.0		_ft,	
Type ATV	34' after 24 hrs. Installed MW with acreen from	m 28'	to 38'	in hole 7' en	st of After				24.2 Him	33.0	ft.	
thod <u>SS/ST</u>	<u>B-1.</u>					Brused i		 0		<u>33.</u> 1.5	<u>г</u> п. ћ.	*
pector <u>NG</u>						BF = BAC		NN C		WAT		

Ø8/1	4/2005
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23:18

s.

					H.C. NUTTING COMPANY					· · · · · · · · · · · · · · · · · · ·					Pa	age i	l c
		AIC N			APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 PLOYEE ONMED	011 L CH	IPORA I JNKEN CINKA IST3) 82	PARK 13 0H 46	'EA CEN' AIVE 790 238 COL	DG OF	بن پیروسر اورسر		DON BET, STE		BLVEG 70-8 COM LEXING	RA23 R2 WAY CT, TCN, KY	. ST
		_			WENTAL AND TESTING ENGINEERS SINCE 1921		UL (613)			(814) 883,3113 V. (814) 885,0679		X (#12) 530	4301	_	FAX	30) 406-1	jes:
	Client				erican Electric Power			-	Boring N	-		<u>B-</u>	2				
	1	u 1 Locati		001	tom Ash Dam Evaluation - Amos Plant, V	<u>vv</u>	~	-	Date Sta Date Cor		8/1/200				-		
		tion Ref		AEF	Boring Location Plan			-	Work Ord		8/2/200						
	ELEV	_	_						THUR ON	the second second second second second second second second second second second second second second second se	SAMPLE				<u> </u>		—
	ft. 583 0	n. 01 0.0	`	color, me	DESCRIPTION OF MATERIALS Kertal description, molsture, softmess/density/hardin (visual classification unless otherwise noted)		о. Iт	YPE	DEPTH	BLOWS/	· · · · · ·	RQD	W %	LL %	РІ %	HCSI	1
		Ļ		\overline{A}	FILL: Brown, silty sand with gravel (SM) nonplastic, dry - moist, dense		-	55	0.0-1.5	28-25-1 (42)	· · · · · · · · · · · · · · · · · · ·	//	70			<u> </u>	┞
		F	Ê	Δ	i.5		T										ŀ
		-															
	577.50	<u>5.5</u>	┦	A	FILL: Reddish brown, lean clay with sand (CL) (shale fill), dry - moist, stif	2		is	5.0-6.5	7-6-7 (13)	67	┟╌╴┤	-+				╞
1		F			very stiff	1	5	π	6.5-8,5		100				- [
		-					+	+							-+	-	
		F		Ŋ.	 little friable sandstone fragments at 10.0° 	3	s	s	10.0-11.5	5-6-10 (16)	100			-+			-
		F		A 15	5	2	s	т	11.5-13.5		100						
		F					┥		6	<u>_</u>	-	+	D	R	A	F	
	•	4	Ø		- multi-colored, moist, and trace	4	S	s ·	15.0-16.5	4-11-8 (19)	100					-+	-
		-			organics (grass/roots) at 18.0'	3	ร	r 1	6.5-18.5		100	_		T	T		
														╈			~
$\left \right $	562.00	21.0	K		FILL: Reddish brown and gray, sandy lean clay with gravel (CL)	5	s	3 2	0.0-21.5	3-4-14 (18)							
		-			(gravel), moist - wet, medium stiff - stiff	4	SI	2	1.5-23.5		60			\downarrow		\downarrow	
	ļ	-		7.5	- VARY ARTIVALLY ALC: A	6		+		8-10-7						\downarrow	
	Ť	-			- wet from 26,5'	<u> </u>	SS	┢	5.0-26.5	(17)	80			+-		-+-	
	554.50	<u>28.5</u>	Ĥ	4-	Gray, SANDY LEAN CLAY (CL), very	5	ST	-20	5.5-28.5		90	~	+-	\downarrow		_	
	<u>552.50</u>	<u>-30.5</u>	Щ	2.0	moist - wet, soft Gray, SILTY SAND (SM) nonplastic,	7	ss	31	0.0-31.5	1-2-4		4		+-	+-		
	F		/	4.5	wet, loose			ļ"		(6)	100		+-	╞	+	+	_
5 D R R M In	48.00	35.0															
Ľ		eral No	tes	┶╌┲	Remarks		_	L		- <u> </u>	Nat-t-		1				
D	filer	нс		- L	ocated boring 2' off Rd. CL on natural da	m skie	No	indic	ation of vo	id Imn	wata Jediate	r Leve		ervai 26.5	uo ns	fl.	ς.
R	ig No. Ig Type	D. Sn AT		- 4	oted in NQ2 #2. Material probably washe	d out (due t	she o	ort run.	At C	ompletio	n		18.0		_ ft.	
M	leihod	NQ2/S		- -				_		Afte	r	2	4	Hrs.	16.0	<u>F</u> t.	۷
	spactor			~ H						- Wai	er used i	n drillia			5.0	Ĥ.	

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	ICA TECHNICA		APPALACHIAN REGION - 912 MORRIB STREET CHARLESTON. WY 26301 (304) 344-0821 FAX (304) 342-4711 EMPLOYEE OWNED INMENTAL AND TESTING ENGINEERS SAICE 1921		CHCN CHCN	28478 CEA KEN PARK NATL OF A 27 22 1-05 1 5 13 32 1-07	ITER C'EN DRAVE 780 0228 cou B	DG OF	t s Ses wi Lawit		01254 (BET. 87) 2 94 470)	64 A	BLUGA *0-8 CON LEXING (154	nast re	. 378 94 40\$13 19
Client		<u>A</u>	merican Electric Power				Boring N	io.		B-	2				
Project		_ <u></u> B	ottom Ash Dam Evaluation - Amos Plan	e, wiv		_	Date Sta	rted	8/1/200	5					
Boring L	ocation						Date Cor	mplated	8/2/200	5					
Elevatio	Ref.	A	EP Boring Location Plan	_			Work Or	der No.	90979.0	159					
ELEV.	DEPTH		DESCRIPTION OF MATERIALS	· ·			<u></u>		SAMPLE						
ft.	ft.	color, i	material description, moisture, attimess/density/ha (visual classification unless otherwise noted)		NQ.	TYPE	DEPTH	BLOWSA		1	W	LL.	Pi	HCSI	PPR
		• • •	Gray, POORLY GRADED SAND	with	8	SS	n. 35.0-36.5	(N Value 2-2-2) %	*	%	%	*		ts1
ļ	-	••••	SILT (SP-SM), wat, very loose - I	oose	-	33	35.0-30,5	(4)		 					
	-	••••													
ŀ				Γ	9	SS	40.0-41.5	10-10-9 (19)	80						
		••	15.0												
-		•••			10	SS	45.0-46.5	3-2-4 (6)	67						
		•••										D	A	C 1	-
F	[.									-		Ŋ	4	F	
533.00	50.0		Gray, SILTY SAND with GRAVEL						\downarrow		\downarrow	_			
F			(SM) (gravel=sandstone fragments nonplastic, wet, medium dense	». ¹	11	SS	50.0-51.5	4-5-11 (16)	80		_				
F	ł	·/ '	40												
29.00	54.0	$\overline{\mathbf{H}}$	Gray and brown, LEAN CLAY with				Ì								
27.00	56.0		2.0 SAND (CL) (residual sendy SHALE wet, very stiff - hard		2	ss	55.0-56.0	26-50/0.5	90		-+	4	_		
	56.4	\$	Gray, sandy SHALE, completely to highly weathered, extremely soft -		-+			20-50/0.5	190		-+-	+	-+-	+	
- -			Reddish brown, CLAYSTONE, completely to highly weathered, extremely soft - very soft	-/ ,	1	NQ2 !	56.0-60.4		98	0			0	-1	
<u>2.00 e</u>	<u>1.0 X</u>	전_		2	1	102 E	50.4-61.0		0	0	╇	+		.	
-			BORING COMPLETED @ 61.0								-		1	+	-
Gener	El Notos		Rema	rka											
riller	HCN	_	Localed boring 2' off Rd. CL on natural		da I	No ind	cation of	ы I		r Lova			lions	_	
g No. 📃	D. Smith	_	noted in NO2 #2. Meterial probably was	shed ou	t du	e to sh	ort run.		ediata completio		_	<u>28.5</u> 16.0		t.	¥
	-														
ід Туре 📜	ATV 02/SS/S	,						Afte					16.0		

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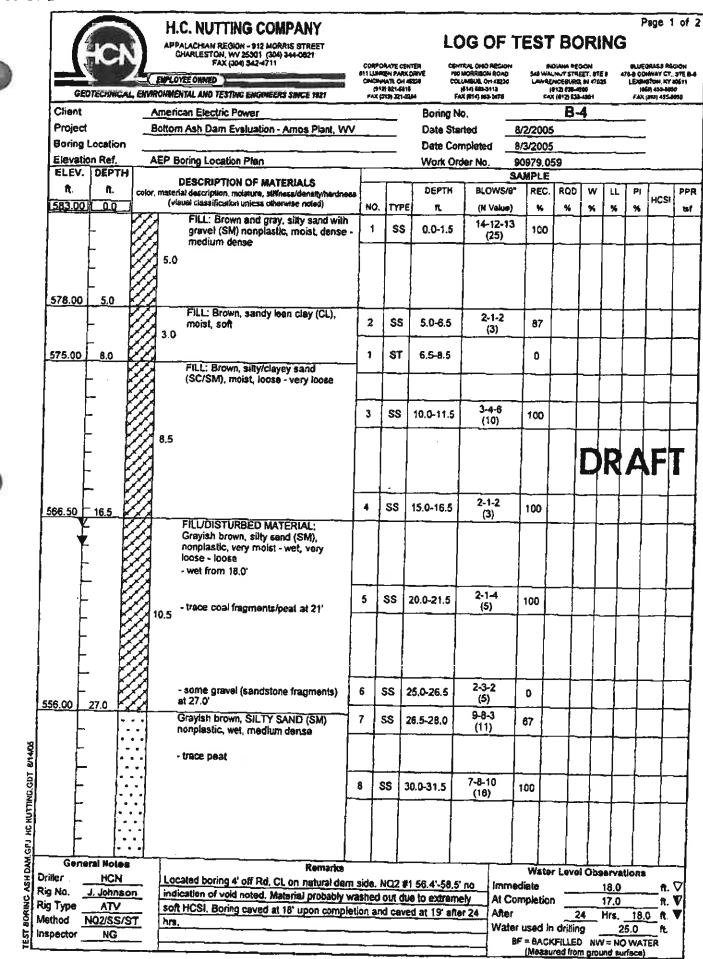
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	4	0	Ĩ		H.C. NUTTING COMPANY PPALACHIAN REGION - 912 MORNIS STREET CHARLESTON, WW 25301 (304) 344.0021				LC)G OF	TES	ST BO	DR	NG		3 0 e -
	_	CHINCA	L, ENM		FAX (204) 342-4711 LOYEE OWNED MENTAL AND TESTING ENOINEERS SINCE 1921	6911 QB	UNICEN		E 710 COL	NAL DHQ REON MOARSON ROA UNDUS, OH 4523 (814) 453-3113 X (814) 453-3113 X (814) 453-3113	D 34	PICIANA AG WALNUT STF WRENCEBUR (812) 596- FAX (812) 53	LEET ST 0, IN 470 4300 194501	E1 4 23	76-B CON LEXING (85)	MASS N MAY GT TON KY R AGE-BE 850) ASS
CI			_	_	arican Electric Power			. '	Boring N	0 .		B	3			
	ject			Bott	om Ash Dam Evaluation - Amos Plant,	<u>w</u>		, I	Date Star	rted	8/7/2	005	-			
	ing Lo vation I		_						Date Con	•	8/7/20			<u> </u>		
	EV. D	-			Boring Location Plan		_		Work Ord	ler No.	90979 SAMPI					_
f		ft.		'. mai	DESCRIPTION OF MATERIALS Lerial description, moisture, stiffness/density/hard		T		DEPTH	BLOWS			W	Tu.	P)	
563	.001	00		((visual clausification unlace chowice noted)		о. п	PE	ft.	(N Velu	- 1	6 %	56	1%	%	HCSI
	7			3	FILL: Brown, silty sand with gravel (SM) non-plastic, dry - moist, medi 0 dense	im _	1 5	is i	0.0-1.5	4-9-7 (16)		0			Ť.	
580	.00	3,0			FILL: Reddish brown and							Ţ				
	L				multi-colored, lean clay (CL) (shale fill), moist, medium stiff - very stiff				1							
	F					2	s	s s	5.0-6,5	7-4-4 (8)	9	3				
	Ē	i				1	s	те	5-8.5		80					
	F			13.	5 - little sandstone/sandy shale											
			Ĵ		fragments	3	SS	5 10	.0-11.5	4-3-6 (9)	93			_	_+	
	F		ß			2	SI	r 11.	.5-13.5		100			R		
	+		Ŋ			·				3-7-9		\downarrow	4		1	
566.5	0 - 10	<u>5.5</u>	A		FILL: Brown and gray, clayey gravel	4	SS		0-16.5	(16)	100		_			
	Ŧ		β		with sand (GC) (gravel=sandstone fregments), moist, medium dense	3	ST	16	5-17.0		100	╞╼╌╊				7
	F	Ē	β	5.5	- very gravelly at 20.0°	4	ST	18.	5-20.0		67					
561.0	22	<u>.</u>	A		- clay component vary moist to wet and soft at 21.0' to 21.5'	5	SS	20.0	21.5	11-6-5 (11)	80					\downarrow
	F	Ê	Ð.	4.0	FILL: Brown and gray, silly gravel with sand (GM) (gravel=sandstone fragments) non-plastic, vary moist,	6	SS	22.0	-23.2 7	-17-50/0.2	2 117	┝╌┼	_	_	—	_
557.00	26.		A		medium dense - very dense - thin clayey gravel seams	7	ss		-26.5	38-19-6			-+-	_	+	_+-
<u>555.50</u>	27.	5	20	1.5	FILUDISTURBED Material: brown and greenish gray, clayey gravel with sand (GC) (gravel=sandstone	8	55 55	┣	-28.0	(25) 4-2-2	100 87		+		+	
ş	F	K	7 7	<u>2.0</u> 2.0	fragments), wel - very moist, very loose FILUDISTRUBED MATERIAL: gray,	9	S S	28.0	-29.5	(4) 3-1-2 (3)	47		+	+	┿	-
5	<u>30.</u> -		ÎÎ,	.5	lean clay (CL), slight organic odor, wat, soft	5	डा	30.0-	32.0		100		┾	+	+	╪
550.50	- <u>32.</u>	₽	Щ.		recrish gray, sity/clayey gravel with sand (GC/GM) (gravel⇒sandstone (regments), wet, very loose	10	58	32.0-		2-5-4	100		+-	+-	+-	+-
SHILL 550.50 G Driller Driller	 ,_	Ľ			Gray, LEAN CLAY with SAND (CL). wet, very soft - soft	+				(9)	+		+	+-	╀╾	+-
E) G Driller Rig No.		Notes HCN ohnso	_	Le	Remarks ocated boring at edge of Rd. (approx. 6'	off Rd	CL) 0	n natu	mal side o	1 <u>f</u> Imn	Wa Wa	ter Leve		ervati 26,0	iona	
Rig Typ Method	<u>,,,</u> /	<u>onnso</u> ATV	<u>n</u>	08	m. STK3 failed due to presence of grav presence of gravel. Installed MW with s	el STE	4 terr	unster	1 of 201 de		Complet	ion		17.5		ft. \ ft. \
Method		ISS/S	-	1	A REAL PLANE, THE REAL MAA MULT	icreen l	rom 2	7.0° to	32.0' in t	hole Afte	1	2	4	Hrs.	00.5	

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	1CN	H.C. NUTTING COMPANY APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON. WY 25301 (304) 3040821			L	DG OF	TES	T B	ORII	NG	Page	2
GEO	TECHNICAL,	FAX (304) 342-4711 EMPLOYEE OWNED ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921	DIT LI	PORATE C INIGEN PAI (INIGEN PAI (INIGEN PAI (INIGEN PAI (INIGEN PAI (INIGEN PAI)	ik DRIVE 73 t eszze GC i W	NT-RAL, OHO REGION 10 MORESON ROAD 21.JHNUUS, OH 43230 1014) UG-2113 7AL (014) 102-0175	Liw		REET. STE 10. IN 47021 4300	8 470- L	LUEGRADI 5 CONWAY EXINGTON (459) 455 FAT (659) 4	C7.9 KY 40
Client	-	American Electric Power			8oring 1	No.		B				
Project		Bottom Ash Dam Evaluation - Amos Plant, W	v		Date St	-	8/7/200					
Boring L	ocation				Data Co	mpieted _	8/7/200					
Elevation	n Ref.	AEP Boring Location Plan		,	Work Or	-	90979.					
ELEV.	DEPTH	DESCRIPTION OF MATERIALS					SAMPLI					-
ft.		color, material description, moleture, stiffness/density/hardne (visual classification unless otherwise noted)	\$\$ N). TYP	DEPTH	BLOWS/6		ROC	W 156		PI HC	Si
		- trace wood and coal fragments at	+	-			-		┼┈┼			-
		34,0 Gray, SILTY SAND (SM) non-plastic, wet, loose (LAYER CONTINUED DESCRIPTION REPEATED)			35.0-36.6	(6)	100	<u>}</u>		-+	+-	
	-	12.5 - trace peat										
			12	SS	40.0-41.5	2-4-6 (10)	100					
538.00	45.0											
		Gray, POORLY GRADED SAND with SILT (SP-SM), wet, medium danse	13	SS	45.0-46.5	5-6-5 (12)	100					1
									D	R/	4F	
	 	9.5 - trace coal fragments at 50.0'	14	SS	50.0-51.5	4-6-14 (20)	100			+		
526.50	54.5											
		Blueish gray to reddish brown, LEAN CLAY with SAND (CL) (residual 3.8 SHALE), very stiff - very hard	15	SS	55.0-56.5	21-44-25 (69)	100			-	-	╞
						(03)	┼╌╌╋		╶╌┼╌╸			┝
524.70 - 5	83	4	16	SS	57.5-58.3	30-50/0.3	100			+	<u> </u>	┝
<u>522.40 6</u>	0.6	2.3 CLAYSTONE, completely to highly weathered, extremely soft - very soft Blueish gray, SANDY SILTSTONE,	1							<u>+</u>		
<u>519.70 - 6</u>	3.3	2.7 Slightly weathered, soft - medium hard		NQ2	58.3-63,3		100	25			0-3	
Ganera		BORING COMPLETED @ 83.3'										~
Ganera	I Notes											
Driller	HCN	Remerks	KDJ -	N 1 k -				r Leve	i Obee			
Rig No, J.	Johnson	Located boring at edge of Rd. (approx, 5' of dam. ST#3 failed due to presence of gravel	. ST#4	termi	nated at 201	due lato	diate		_	3.0	fl	. 1
Rig Type	ATV	to presence of gravel, installed MW with sci	een fr	om 27	0' to 32.0' in	hole After	mplatio	·		7.5		
Method NC	12/55/51 NG	5 east of B-3.					r used i			тв. <u>2</u> 35.0		
	FILS										ATER	

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Client Project Boring Lo Elevation	DCation 1 Ref. DEPTH ft.	Ame Bott AEF	MEMTAL AND TESTING ENGINEERS SINCE 1921 erican Electric Power tom Ash Dam Evaluation - Amos Plant, WA P Boring Location Plan DESCRIPTION OF MATERIALS storad description, maisture, stiffnast/density/hardnas (visual classification unless otherwise noted) 5.0 Gravish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED DESCRIPTION REPEATED)	, 		Boring N Date Sta Date Co Work Or DEPTH	rted 8/ mpleted 8/ der No, 9/ BLOWS/8* (N Value)	2/2005 3/2005 3979.02 MPLE REC. % 100	;		L %	P1 %	HCSI	2
Project Boring Lo Elevation ELEV. fl.	Ref. DEPTH ft.	Bott	tom Ash Dam Evaluation - Amos Plant, WA P Boring Location Plan DESCRIPTION OF MATERIALS areful description, melsairc, stiffnass/density/hardnass (visual classification unless otherwise noted) 5.0 Gravish brown, SiLTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED	• NO		Dete Sta Date Con Work Or DEPTH it.	rted <u>8</u> / mpleted <u>8</u> / der No, <u>9</u> (SA BLOWS/6* (N Value) 6-8-5	3/2005 979.0 MPLE REC. %	59 RQD	w			HCSI	1
Boring Lo Elevation ELEV. fl.	Ref. DEPTH ft.	AEP cotor, ma	Boring Location Plan DESCRIPTION OF MATERIALS xertal description, maissure, stiffnass/density/hardnass (visual casefficcition unless otherwise noted) 5.0 Grayish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED	• NO		Date Cor Work Or DEPTH it.	mpleted 8/ der No, 94 BLOWS/6* (N Value) 6-8-5	3/2005 979.0 MPLE REC. %	59 ROD				HCSI	-
Elevation ELEV. fL	Ref. DEPTH ft.	cator, ma	DESCRIPTION OF MATERIALS serial description, melsure, stiffnass/density/hardnas (visual classification unless otherwise noted) 5.0 Grayish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED	NO		Work Or DEPTH	der No, 90 SA BLOWS/8* (N Value) 6-8-5	979.0 MPLE REC. %	59 ROD				HCSI	
ELEV. fl.	DEPTH ft.	cator, ma	DESCRIPTION OF MATERIALS serial description, melsure, stiffnass/density/hardnas (visual classification unless otherwise noted) 5.0 Grayish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED	NO		DEPTH It.	SA BLOWS/6* (N Value) 6-8-5	MPLE REC.	ROD				HCSI	
fL	ft,		 Kental Gescription, melsture, stiffnass/density/hardnass (visual classification unless otherwise noted) 6.0 Grayish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED) 	NO		ñ.	BLOWS/6" (N Value) 6-8-5	REC.					HCSI	ſ
540.00	-		5.0 Gravish brown, SILTY SAND (SM) nonplastic, wet, medium dense (LAYER CONTINUED				6-8-5	┿╾┷	 *-	%	%	<u>%</u>		ι.
540.00	-	•••				1		<u> </u>				-		
540.00 -	}		little and formatic and next at At A	10	ss	40.0-41.5	7-9-11 (20)	73						
F			- little coal fragments and peat at 41.0 Gray, POORLY GRADED SAND with											-
-	· • •	• •	SILŤ (SP-SM), wet, medium dense				4-7-5				_			
F	-		0 - trace coal fragments at 46.0°	11	SS	45.0-46.5	(12)	73						
<u>33.00</u>	-										K	Ą		ļ
30.00	-	3,	Gray, POORLY GRADED SAND with SILT and GRAVEL (SP-SM) 0 (gravel=sandstone fragments), wet, dense	12	SS	50.0-51.5	5-20-18 (38)	67		-	_	-		_
	53.0	3.	Reddish brown and gray, LEAN CLAY (CL) (residual SHALE), wet - molet, 4 stiff - hard											
26.60 - 5	56.4			13	ss	55.0-56.4	10-27-50/0.4	100				1	\top	
		5.1	Reddish brown and gray, CLAYSTONE, completely to highly weathered, extremely soft	1	NQZ	56.4-61.5		69	0				0	
2 <u>1,50 </u>	<u>)1.5</u>		BORING COMPLETED @ 61.5									+	-	
	al Notes		Remarka					Wate	er Leve	el Obu	serva	tione		-
lier	HCN	~	Located boring 4' off Rd. CL on natural dar	n side	. NQ2	1 56.4'-58.		diale			18.0		ft,	٢
No. <u>J</u> Type	<u>Johnso</u> ATV	<u>e</u>	indication of vold noted, Material probably	washe	d out d	ue to extrem	nely At Co	mpletic	_		17.0		ft.	
	02/55/5	; – ⊢	soft HCSI. Boring caved at 18' upon compli-	etion	and cav	<u>(ed at 19' al</u>		'used i			Hrs.	18.	<u>0</u> n.	۲

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4			APPA	C. NUTTING COMPANY			LO	GO	F TEST	BC	DRI	NG		age	1 of
GEO	TECHNICAL	1_	C+	VARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE ONIMED TAL AND TESTING ENGINEERS SINCE 1121	CINCIN CINCIN (51	20.475 CE 1014 PARM NATL ON 1 91 321-081 6131 321-0	04WE 780 / 1228 COLL	WL 040 AE MORASON R JP903, 044 514) 663-3113 1 (514) 503-64	0AD 348 WA 3230 LAWRE	(Judaia, RE LINUT BTR INCEBURI 012) 530-4 X (012) 631	16, 14: 476 2, 14: 476 1900		76-6 00 LÉXN	08488 RE NWAY CT STON, KY M) 435-86 (134) 435-1	1, BTE (140511 149
Client		_		an Electric Power			Boring No	.		8.	5				
Project				Ash Dam Evaluation - Amos Plant, W	1		Date Star	ted	8/3/2005	5					
BoringL	ocation	_					Date Con	npleted	8/13/200)5					
Elevatio	n Ref	AE	P Bo	oring Location Plan			Work Ord	ier No.	90979.0	59					
ELEV.	DEPTH		ŕ	ESCRIPTION OF MATERIALS					SAMPLE						
ft. 583.00/	lt. 0.0	color, m	nateria	al description, moistura, stiffness/deneity/hardness un classification unless otherwise noted)		TYPE	DEPTH ft.	BLOV		RQD	w %	۲.L	Pi %	HÇSI	P
			5.5	FILL: Brownish gray, sity sand with gravel (SM) nonplastic, moist, dense medium dense	1	SS	0.0-1.5	10-1: (3)		 					-
<u>577.50</u>	- - 5.5			- trace cost fragments at 5.0'				3-4	-3			 			
	-		3.5	FIN: Brown, poorly graded sand (SP), dry - moist, loose - uniform appearance	2	ss	5.0-6,5	(7	- / 100		[
574.00	9.0			FILL: Brown, poorly graded sand with silt (SP-SM), moist, loose	3	SS	10.0-11.5	2-1			 		 		
	- 2		6.5	- uniform appearance				(5)			D	R	4	F	T
567.50 V	<u>15,5</u>		2.5	FILL: Brown, sity/clayey sand (SC/SM), very moist - wet, loose - wet from 18.0"	4	SS	15.0-16.5	4-3- (5)							
565.00	<u>18.0</u>			- uniform appearance FILL: Grayish brown, silly sand (SM), nonplastic to low plasticity, wat, loose											
61.00	22.0				5	SS	20.0-21.5	1-2- (6)		_	_		_		
ŀ	.			Brown and gray, SILTY SAND (SM), nonplastic to low plasticity, moist - wat, loose - medium dense				_							
Ļ		•••		- trace peat from 26.5'	6	SS	25.0-26.5	5-5-9 (14)							_
		•••			-										-
+ - -	•				7	SS	30.0-31.5	4-6-9 (15)		-+		-+		-+	
Gene		• • • • •	7-	Remarks				·							
niller	HCN	-	Loc	cated boring 3' off Rd. CL on natural da	n side	Borin	a caveri et 1/	R ·	wat Immediate	er Lev	ei Ut	16 (t. V
	J. Johns	on		er 24 hrs.					At Completi	on		17.	_	"	¥
g Type _	ATV								After		24	Hrs	_	w'n	
ethod spector	SS NG								Water used BF = BAG		ing		20 0	ft	

	1Ch		APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25201 (304) 3440821 FAX (304) 342-4711	411 LUN	HATE CEA GEN PARK NAT, OH 4	TER CENTI DAVE 700 N		n Sas Wa		GION SET. STE	1 1 470-	LUEGRASS	¢1
GEO	TECHNICAL		CHIMENTAL AND TESTING ENGINEERS SINCE 1821	(31)	1) 521-54 H) (14) 463-3113 (814) 863-0478		(8 12) 539-4 X (812) 99	200		(160) 4684 FAX (169) 43	-65
Client		A	merican Electric Power			Boring No),		B-	5			
Project		В	ottom Ash Dam Evaluation - Amos Plant, W	V		Date Star	_	8/3/200					
Boring L	ocation			•		Date Corr	-	8/13/200					
Elevatio			EP Boring Location Plan			Work Ord		90979,0			_		
ELEV.	DEPTH							SAMPLE	_				_
ft.	ñ.	colar,	DESCRIPTION OF MATERIALS melensi description, moisture, stillness/deneky/hardne (visual classification unless otherwise noted)	IS NO.	TYPE	DEPTH fl.	BLOWS/6 (N Value)	1 -	ROD %	W %	LL %	PI %	s
	-	• • •	Brown and gray, SiLTY SAND (SM). nonplastic to low plasticity, moist - wet, loose - medium dense (LAYER CONTINUED DESCRIPTION REPEATED) 32.5 - clayey seam at 36.0'	8	SS	35.0-36.5	2-5-6 (11)	100					
	-	•••	aayoy scam at so.v										
		• • •		9	SS	40.0-41.5	3-5-8 (13)	100					-
	-												
ľ I	-	• • •		10	SS	45.0-46.5	6-8-8 (16)	100			_		
ŀ										D	R	AF	
F	- .						5-8-11	┽╍┥		-+			
			 little gravel (sandstone fragments) at 51.0^o 	11	SS	50.0-51.5	(19)	100	_	_+		+	
528.50													ĺ
	55.8		1.3 Reddish brown and gray, LEAN CLAY (CL) (residual SHALE), moist, hard	12	SS	55.0-55.8	30-50/0.3	100		+		₋	
Ē		1	BORING COMPLETED @ 55.8				00-00-0.0		-+	+	╶┼╾	+	
1- <u>1</u> - 1- 1-													
	Tal Notes												
Gene riller	HCN	5	Remerke Located boring 3' off Rd, CL on natural dat	n eide	Por:or				or Leve		ervalle		-
-	J. Johned ATV	n	after 24 hrs.		ooning	<u>cave</u> at 18		iediale Ompletia			<u>16.5</u> 17.5 H <i>r</i> s,		fi fi R

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	fici		API	C. NUTTING COMPANY	CONF 011 LUN	ORATE DE	NTER CE				BC	3iON		BLuck	age 1	0)CI+
	C Olecanac			ITEE OWNED	CINC) (6	HUGT OH 13) 321-36 (613) 321-4	4720 GC 16	01.04004, 0 (814) 885-3 PAK (814) 88	H1 42230	LAWRE	NCEBURG 412 338-4 412 338-4) (M 1470 300	a		100 LIT	436(1 10
Client		_		can Electric Power		10 139 3 5 14	Boring I	_			B -			744	(03) 433-4	466
Project	t		_	n Ash Dam Evaluation - Amos Plant, W	v		Date St			/4/2005		<u> </u>				
	Location			Cart Brint Presentation - Feited I Iding 43			Date Co			/5/2005						
Elevati		_		Joring Location Plan			Work O		_	0979.0						
	DEPTH								_	MPLE				<u> </u>		
n.	n.			DESCRIPTION OF MATERIALS risk description, malsture, stiffness/density/hardner			DEPTH	BLO	OW\$/6"	REC	ROD	Tw	11	PI	<u> </u>	PPR
583.00	0.0			sual classification unless otherwise noted)	" NO		E R.	ON	Value)	%	56	56	1%	34	HCSI	lsf
582.50			0.5		<u></u>			_ 	-5-4	+	<u> </u>	 ~	<u> </u>	<u> </u>		
582.00			4.5	nonplastic, dry - molst, loose FILL: Brown, sendy lean clay (CL),	7-	SS	0.0-1.5		(9)	100						
<u>577.50</u>	<u>- 5.5</u>	\mathcal{U}		FILL: Reddish brown and	2	ss	5.0-6.5		-5-5 10)	87						
	-		5.0	multicolored, lean clay with gravel (CL) (gravel=sandstone fragments) (shale fill), moist, stiff	1	ST	6.5-8.5			85						
<u>572.50</u>	- 			Brown to light brown, sandy lean clay	3	ss	10.0-11.5		-8-7 15)	100						
	-			(CL), moist, stiff	$\left \right $	 		<u> -`</u>		╎──┦						
	-		4	- uniform appearance	1	· ·	1			1		K	A	\F	•	
	L~		8.0	- trace organics (hair roots)				ł				Ĩ			-	
	-				4	ss	15.0-16.5	-	4-8 10)	100		-				4.5
564.50	- 7 <u>18.5</u>	\square			2	ST	16.5-18.5			45						
ļ	-	\int	3.5	FILL/DISTURBED MATERIAL, silty/clayey sand (SC/SM), wet, loose				<u> </u>								
561.00	- 22.0	$\langle \rangle$		- uniform appearance	5	SS	20.0-21,5	3.4	5-2 7)	100						
	-	711	2.0	Brown, LEAN CLAY with SAND (CL), wet, soft	 											
59.00	<u>24.0</u> -		` _	- logged from cuttings and ST Brown, SiLTY SAND (SM), nonplastic, wet, loose	3	ST	23.0-25.0			100						
F					6	SS	25.0-26.5	2-5 (9		100		\downarrow	_			
			11.5													
					7	ss	30.0-31.5	2-3- (5)	1	100				Ţ		
		Δ				1										
	eral Note		T	Remarks				·		Wate	r Leve	i Ob		tions] 6	4
riller in No	J. Johns		Lo	cated boring 3' off Rd, edge (approx, 8')	off Rd.	CL) or	natural dai	m	Imme		_		18.5		ī.	∇
ig No. g Type	J. Johns ATV	01	84	e. Water level at completion measured	through	h the a	ugers, Insta	lied	1	mpletio			24.5		R	V
ethod	SS/ST	<u>г</u>		W with screen from 15.0' to 25.0' in hole	6' Wes	t of B-	<u>.</u>		After			24	Hrs.	_		
spector	NG									' USOC İI		•		25,0	ft.	
		_		······································					1 81	F = BACI	KFILLEI					

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	tch	ł	H.C. NUTTING COMPANY APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WY 25301 (304) 3440821 FAX (304) 342-4711		VATE C E N				BC		NG	1	998 2	
GEO	TECHNICAL		MPLOYEE OWNED	GINCRO CINCRO (INS	CATE CEN EN PARK I IATI, OH 40) 321-3614 13) 521-62	DAUVE 740 % 1224 COLU 1 40	(ORRISON ROAD NEUS, OH 41228 110) 815-3115 1 (014) 823-6475	SAD WAL	MUT STRE NCEBURG 812) 538-43 1 (812) 538	EET, STE 5, IN 4792 500		76-8 (C) LC204 (K	NWAY CT GTON, XY 20) - 66-64 (8:38) 456-	1
Client		A	merican Electric Power			Boring No),		B -	6				
Project		B	ottom Ash Dam Evaluation - Amos Plant, WV			Dale Star	ted	8/4/2005	5					
Boring	ocation			<u> </u>		Date Com	·	8/5/2005	i					
Elevatio	n Ref.	A	EP Boring Location Plan			Work Ord		0979.0	59					•
ELEV.	DEPTH		DESCRIPTION OF MATERIALS		т	DEPTH	BLOWS/6	AMPLE REC.	ROD	W	l u	PI	1	
ft.	ħ.	color,	material description, moislure, etilinesa/denality/hardnes (visual classification unless otherwise noted)	NO.	TYPE		(N Value)	*	%	*	%	%	HCS	
547.50	35.5		Gray, POORLY GRADED SAND with SILT (SP-SM), wet, medium dense	8	SS	35.0-36.5	6-6-6 (12)	80						
]	_								}					
	-			i	1				i					
1 1	-		- trace peet	1									1	
	_								<u> </u>		<u> </u>	┝	↓	-
	-		10.5	9	SS	40.0-41.5	4-7-8 (15)	87						
	-											-	-	`
	_													
	_ {												}	
	_													
537.00	46.0		Gray, POORLY GRADED SAND with	10	\$ \$	45.0-46.5	6-7-7 (14)	80						
	-		SILT and GRAVEL (SP-SM) 3.0 (gravel=sandstone fragments), wet.											
534.00	49.D		medium dense Gray, POORLY GRADED SAND						Ļ	개	<		FT	
	-		(SP), wet, medium dense			50.0 St 5	5-6-7						<u> </u>	1
	•		5.0	11	SS	50.0-51.5	(13)	100		{		_		
											ļ			
529.00	54.0	Π	Blueish gray, SANDY LEAN CLAY 1.8 (CL) (residual sandy SHALE), moist -											
527.20	55.8		1.8 (CL) (residual sandy SHALE), moist - dry, very stiff - very hard BORING COMPLETED @ 55.8'	12	SS	55.0-55.8	40-50/0.3	100						ļ
	-													
Driller	eral Note HCN J. Johns		Remarks Located boring 3' off Rd, edge (approx, 8' side. Water level at completion measured	off Rd.	CL) or	n natural dan	n imn	Wat	ber Lev	rei Ot	18.5 24.5	5	18- 	
Rig Type	ATV		MW with screen from 15.0' to 25.0' in hole	6' wes	of 8-		Afte	•	<u> </u>	24	Hrs		35 1	
lethod	SS/ST	• · · ·						ler used	in drill			25.0		
nspector	<u>NG</u> _							BF = BA	CKFILU	ED N	W = 1	N OI	ATER	

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4	ICN		H.C. NUTTING COMPANY APPALACHAN REGION - 912 MORRIS STREET CHARLESTON, WY 25501 (2004) 344-3421			LC	og of 1	EST	BC	RI	NG		19e -	
GEO	TECHNICAL		FAX (304) 342-4711 MPLOYEE OWNED	CINCI CINCI U	NORATE CE NUEN PARI NUEN PARI NUEN PARI SISI SIT-SI SISI SIT-SI SISI SIT-SI	K DRIVE 130 46236 COL 10	784, OHIO REGION MISERIDON ROAD (MISUR, OH 43230 (14) 693-3115 X (114) 693-3175	LAWRE	(112) 530-4 500 (12) 530-4 50 (12) 530-4 50 (12) 530-4 50 (12) 530-4	667 STI 1 1470 300	E 6 4 26	70-8 CON LEXING (859	RASS 11 NAY (1 70N(1() 1) 433-40 1521 435	7 7 5
Client		Ar	merican Electric Power			Boring N	0.	······································	B-	7				
Project		Bo	ottom Ash Dam Evaluation - Amos Plant, WV	1		Date Sta	rted _(<u>3/11/20</u> 0	05					
Boring L	ocation			_		Date Cor	nplated	/11/200	05					
Elevatio			EP Boring Location Plan			Work Ore		0979.0						
ELEV.	DEPTH		DESCRIPTION OF MATERIALS			- 	1	AMPLE	-7	,	-			-
t.	ft.	color, n	naterial description, moleture, stiffness/density/herdnes			DEPTH	BLOWS/6"	REC.	1	W	1 lt	PI	HCS	1
568.00	0.0	<u> </u>	(visual classification unless otherwise noted)	NO	I. TYP	E R.	(N Vakie)	<u>*</u>	%	%	%	%		-
<u>.567.70</u>	0 <u>,3</u>		FILL: Reddish and yallowish brown, lean clay with sand (CL), dry, stiff 3.7 - some semi-friable shale fragments	1-	SS	0.0-1.5	3-4-10 (14)	100						
564.00	7 4.0		FILL: Gray, poorly graded gravel with silt and sand (GP-GM), wet. loose	-										
	-		5.5	2	SS	5.0-6.5	3-4- 1 (5)	47						1
558.50	9,5		<i>4.</i> 2							D	R	A	F	
335.30			FILUDISTURBED MATERIAL, gravelly lean clay (CL), wet, soft - very	1			3-2-1					_		1
556.00	12.0		2.5 soft	3	SS	10.0-11.5	(3)	40				_		
			Gray, LEAN CLAY (CL), wet, very soft 2.5	-	ST	42.0.45.0	·							
553.50	14.5		Gray, SILTY SAND (SM), wet, very loose - loose		ss	13.0-15.0	1-2-2	100		_	-	-+		ŀ
			- trace organics (wood fragments) at 16'	-	33	13.0-18,5	(4)	100		-	_	-+		ſ
- -			3.5											
F			- trace friable sandstone fragments	5	SS	20.0-21.5	1-3-4 (7)	100		1				•
545.00	23,0		and little coal fragments/peat at 21'	-						-+				
	•		Gray, POORLY GRADED SAND with SILT (SP-SM), wet, loose											
F	-		- trace coal fragments/peat	6	SS	25.0-26.5	3-4-3 (7)	100						
F														
F		12	2.5											
F			r	7	SS	30.0-31,5	3-2-3 (5)	100					Ţ	
F	-													
	ral Notes													_
Genei Sriller	HCN	•	Remarks			- 41-1			er Leve	il Ob		tions		•
_). William	ns	Located boring at dam toe, appr. 3.5' above sediment control. Water level upon complete	s créé ation -	K. Hay	SUCK used for		adiate	_ ~		4.0		ft	
Rig Type 🗌	Track		augers before NQ2, 24 hr. water level mea	anueq	through	an the augers	After	mpletic		24	3,0 Hrs.	3.0		
lethod N	102/\$5/5 NG	ST 1	Installed MVV with screen from 40.9' to 30.9	1				r used i				<u>3.0</u> 20.0	<u>ւ</u> ռ ք	

08/:	14/2005	23:	18	HC NUTTING CO.	→ 161471629	963						t	۷D. E
D				I.C. NUTTING CO PALACHIAN REGION - 912 MO CHARLESTON, WY 25001 (20 FAX (304) 342-4711 CAYEE OMMED HENTAL AND TISTING BYGINEE	RRIS STREET 1) 244-0421	CINCING (512	RATE CEN EN PARK (1 321-010 1 321-010	12R CENT 18WE 7801 228 COLU	GOF	INI 348 WAL LAWRE	BC	10N ET. 87E 14(4782) 60	s 47
	Client		Ame	rican Electric Powar				Boring No),		B-	7	
	Project		Botto	m Ash Dam Evaluation	- Amos Plant, WV			Date Star	ted	8/11/200	15		
	Boring	Location						Date Con	pleted	8/11/200	5		
	Elevation	on Ref.	AEP	Boring Location Plan				Work Ord	er No.	90979.05	59		
	ELEV.	DEPTH				L	_			BAMPLE			
			color, mat	DESCRIPTION OF MA erial description, moleture, still			r	DEPTH	BLOWS/8	F REC.	RQD	W	u
	h.	ft.		visual classification unless of		NO.	TYPE	ft.	(N Value)	· · · · ·	%	%	%
	532.50	35.5	0,0	Gray and multicolore GRAVEL with SAND		8	SS	35.0-36.5	6-16-18 (34)	100			
	1	1	[o_d 2.	5		1							

Project Boring Locatio			Ash Dam Evaluation - Amos Plant, W			Date Star Date Con		<u>8/11/20</u> 8/11/200					•
-	•	460.0					_					-	•
Elevation Ref.		ALP BO	oring Location Plan			Work Ord		90979.0					-
ELEV. DEP			DESCRIPTION OF MATERIALS		- r	DEPTH	BLOWS		— ——	w	1.11	Pf	7
ft. ft.	00	xor, materia (visi	al description, moleture, stittness/density/hardne usi classification unless otherwise noted)	15 NO.	TYPE		(N Value)	REC.		%	и. %	96	
532.50 35.	5			<u> </u>	- <u></u>		6-16-18		+	1	-	<u> </u>	1
	0	°C 2.5	Gray and multicolored, SILTY GRAVEL with SAND (GM) (gravel	8	SS	35.0-36.5	(34)	100	1	ļ	 		-
530.00 38.0		o] 2.5	=sandstone fragments), nonplastic to low plasticity, wat, dense				1			6.			3
330.00 30.0	ήŤ	<u>щ</u> —	Reddish brown and gray, LEAN CLAY						1	Vi	R/	\mathbf{A}	ĺ
F		2.9		, i -					ł				
527.10 40.9			very stiff - very hard	9	SS	40.0-40.9	30-50/0.4	100	1			-	1
	X	X	Raddish brown, CLAYSTONE, completely to highly weathered,										1
E	K	X	extremely soft - very soft										
_		4.8		1	NQ2	40,9-45,7		100	0				
	\otimes	3							ĺ				
<u>522.30 45.7</u>	-14	¥	BORING COMPLETED @ 45.7				*	+					ł
<u> </u>		1											
F													ł
<u> </u>										Í			l
-													ļ
+				1									
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General No	<u> </u>	L	Remarks								1		

HCN	Located boring at dam toe, appr. 3.5' above creek. Hay stick used for	Immediate	4.0	n. 🗸
	Remarks	Wate	F Level Observation	5
Seneral Notes				
\vdash				
ГІ				

sodiment control. Water level upon completion measured through the

augers before NO2. 24 hr. water level measured through the augers.

Installed MW with screen from 40.9' to 30.9'.

After

At Completion

Water used in drilling

4.0

3.0

Hrs.

3.0

20.0

24

BF = BACKFILLED NVV = NO WATER (Measured from ground surface)

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ft, 🔻

ft,

Page 2 of 2

PPR

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BLUEGRABS REGION 470-B COMMAY CT., STE. 9-6 LEXINGTON, KY 405-1 (869) 458-350 FAX (859) 456-350

			C		A	H.C. NUTTING COMPANY PPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WY 25301 (304) 344-0821 FAX (304) 342-1711 LOYCE OWNED	911 U	PORATE C	INTER CE	OG (IN RCAD	540 WA	BC	GION BLET, STI	ED 4	PLUE	GRA2S RE	010N . STE B-0
		SEOTE-	HINCA	LEW		MENTAL AND TESTING ENGINEERS SINCE 1021		518 321-0 K (519) 321	818 ·	(#14) 883- FAX (814) 80	3113		(812) <u>536</u> X (812) 536	300	49	jild	(458) 455.863 (458) 455.8	0
	Clier	it		-		rican Electric Power			Boring I	No.	·		8-	8				
	Proje	ect		_	Botte	om Ash Dam Evaluation - Amos Plant, Wh	/		Date St	arted	8	/12/20	05					
		ig Loc							Date Co	mplete	d <u>6</u>	/12/200)5					
	Eleva	ation F	lef. ЕРТН		AEP	Boring Location Plan			Work O	rder No	_	0979.0	59		_			
	ft		trin t			DESCRIPTION OF MATERIALS		- 1	DEPTH			MPLE	1	T	1		T	
	568.0		п. 0.0	0000	or, mal (tarial description, moisture, stiffness/denaity/hardnes (visual classification unless otherwise noted)	IS NO). TYF			OWS/8*	REC.	ROD	W	L LL	PI	HCSI	PPR
	567.7		0.3		<u>he</u>	2 Topsail				-	Value) 50/0.4	100	*	5	*	%	╁╌╾╌┥	taaf
	567.1	-	Q <u>.9</u>			 B. FILL: Reddish brown, lean clay with sand (CL) (shale fill), molst, madium stiff FILL: Greenish brown and gray, sandy shale and sandstone COBBLES (drill pressure at 8.0'; 800 psi) some clayey-soft seams 							D	R	A	F	T	
		Ł		J	8.	6 - some daycy solt seams	2	ss	5.0-6.5		-22-7 (29)	93						
	ſ	F		J.			3	Iss	7.5-7.9		2/0.4							
i		Γ		ZZ,	Å			100		<u> </u>	<u>/0.4</u>	100						
	<u>558.5</u>	0 - 3	.5	4	/	Dark gray, LEAN CLAY (CL) (mostly	-]								
		F				Ilquid), wet, very soft	4	ss	10.0-11.5	1-WO	H-WOH	100						
					7.0	- trace organics (wood) - slight organic odor	1	ST	11.5-13.5			D						
		F			ļ													
-	551.50	<u> 16</u>	.5		 	······	5	SS	15.0-16.5	WOH	WOH-1	100						
		-	.			Gray, SILTY SAND (SM), nonplastic, wet, loose	2	SТ	17.0-19.0			55				-+ -+		
			- -			- trace coal fragments at 21	6	SS	20.0-21.5	2-2 (5	2-3 5)	100						
			•															
			•		16.0		7	SS	25.0-28.5	2-3 (7		100						
61 4/US		 - -	. . .			- trace wood, trace 0,25" coal												
		-	·.	-		fragments, and little gravel (sandstone fragments) at 30'	8	SS	30.0-31.5	4-4 (7)		100				+-		
5	34.00	- <u>34.0</u>	_															
-		Beer"	<u>.</u>							_							1	
SI D	riller	neral i F	NO 198 ICN			Remarks							r Leve	I Obs	êrva	tione		1
ใก	lg No.		lillan	is_	30	ocated boring at dam toe, appr. 3.5' above ediment control. Water level upon comple	Cree tion r	K. Hay	stick used for	or	Immed				6.0			⊻
R	g Type		rack		81	ugers before NQ2. Recovery of ST-1 faile	d due	to var	v soft materi	<u>90</u>	At Con After	npletio	_		1.5	•	ħ. 1	V
	ethod		/SS/S	<u>n</u>	F			10. 9.91	<u>,</u>		Water	used ir			Hrs.	<u>NA</u> 30	<u>∖_</u> #. π.	
in:	spector		NG		F							= BACI		NM C	/ = NC	WAT	TER	

4	ich		APPA	C. NUTTING COMPANY LACHIAN REGION - 912 MORRIS STREET IARLESTON W 2500 (1041) 344-0821 FAX (3041) 342-4711	CORP	DRATE CEN	TER CENT	G OF 1	ja Ja	OINNA RE	GION		BLUEOR		Ċĸ¢
GEO	TECHNICAL			E OWNED TAL AND TESTING ENGINEERS SINCE 1921		NEN PARK NATI, OH 4 15 321-801 (219) 321-60	92346 COLL	IDERIBON ROAD INIGUE, ON 43236 INIG 505-3113 I (214) 603-0475	UNWAR	UNUT STR RICEBURG 912) 539-4 R (812) 539), IN 1762 1998		18-18 COMM LEXUNION (F397 PAX (ES		401 10
Client		Ar	neric	en Electric Power			Boring No).		B -	8				
Project		Bo	tom	Ash Dam Evaluation - Amos Plant, V	w		Date Ster	ted <u>(</u>	3/12/200)5					
Boring L	ocation						Date Con	pleted 8	3/12/200	5					
Elevation	<u>n Ref.</u>	AE	PBo	ring Location Plan			Work Ord		0979.0	59					-
ELEV.	DEPTH		Đ	ESCRIPTION OF MATERIALS			DEPTH	S. BLOWS/6"	REC.	ROD	w	T LL	PI		1
ft.	ft.	color, r		a description, molsture, stimpess/density/hero al classification unless otherwise noted)	NO.	TYPE		(N Value)	%	%	76	70	*	HC\$1	
	-	•••	3.5	Gray, SILTY GRAVEL with SAND (GM) (gravel=sandstone fragments) nonplastic, wet, medium dense -	9	SS	35.0-36.5	6-16-25 (41)	100						
530.50	- <u>37.5</u>			dense (LAYER CONTINUED \DESCRIPTION REPEATED)			1			ſ	DF		ΎΕ	T	
	-		2.9	Gray and Reddish brown, LEAN CLAY with SAND (CL) (residual SHALE), molst - dry, hard - very har	đ	ĺ									
527.60	-40.4	73		Reddish brown and gray,	10	ISS.	40.0-40.4	50/0.4	100				- +		F
F	_		5.0	CLAYSTONE, completely to highly weathered, extremely soft - very soft			10 4 15 4						ŀ		
F	_		5.0		1	NQ2	40.4-45.4		100	0				0-1	
522.60	45.4	\sim		- bottom 2" residual soll BORING COMPLETED @ 45.4"					+-			_		_	
ŀ															
	.														
Ę															
Ę															
F													ļ		
F															
F															
Gene	ral Notes		7		┸		<u>_</u>			Ļ			L		
filler	HCN	•	Loc	Remark ated boring at dem toe, appr. 3.5' ab		e binne	efick used fo			er Lev	ei Ob		tions	-	
ig No.	J. Willian	19	eed	iment control. Water level upon com	plation n	Neasun	ed through th		ediate ompletic			<u>6.0</u> 1.5		ft. ft.	
g Туре _	Track		aug	ers before NQ2. Recovery of ST-1 f	lied dua	to very	soft materia	I. After			24	Hrs.	NA		
	102/55/	<u>57</u>	<u> </u>						used.	_	_		30	_n.	
spector _	NG		┣					<u> </u>	BF = BAC	KFILLE				ER	

(2	t co	I.C. NUTTING COMPANY RPORATE CENTER - 611 LUNKEN PARK DRIVE CINCINNATI, 0H 45226 (513) 321-5818 FAX (513) 321-0294	APPALACH	IAN REGION	CENTRAL	OF TI		NAREGI	ON	8 470-4	LUEGRAS	3 1 Of	8-8
			LOYEE OWNED	912 MORR CHARLESTO	IS STREET	790 MOH 31 COLUMB	RISON ROAD US, OH 43230 863-3113	LAWRENC (812	EBURG, I 1) 539-430	IN 47025 30	U	EXINGTON (859) 45	N, KY 40511 55-8530	
		EMP	MENTAL AND TESTING ENGINEERS SINCE 1921	(304) 3 FAX (304	44-0821 1 342-4711	FAX (6	14) 853-0475	FAX (12) 539-	4301		FAX (859)	455-8630	
	CHNICKE, E	AEF				Boring No.			<u>B-1</u>					
Client			os RFD Retrofit			Date Starte		9/2005						
Project Boring Lo	cation		Staked			Date Comp		9/2005	7					
Elevation			ne Surveying			Work Orde		0979.05	·					
ELEV.	DEPTH				T	DEPTH	BLOWS/6"	REC.	RQD	w	u	PI	Qu F	PP
ft.	ft.		DESCRIPTION OF MATERIALS	NO.	TYPE	ft.	(N Value)	%	%	%	%	%	tsf	ts
591,35	0.0	color, n	naterial description, moisture, stiffness/density/hardness Brown SILTY CLAYEY SAND (SM),			0.0-1.5	3-6-3	67						
-			moist-loose	1	SS	0,0-1.5	(9)							_
				2	SS	2.5-4.0	4-3-5 (8)	100						
	-		7.5											_
	-	/./		3	ss	5.0-6.5	7-4-5 (9)	67						
-	-	/./		ļ_			(9)							-
583.85	7.5		Brown and gray mottled SILTY CLAY				5-5-7	100	1	19	34	12		1
	-		(CL-ML), moist-stiff to very stiff	4	SS	7.5-9.0	(12)			+				
	-				_	 	6-8-11	-		+		+		2
T	- 1			5	SS	10.0-11.5	(19)	100		19	<u> </u>	1		-
576 35	- - 15.0		Brown, fine to medium grained	6	SS	15.0-16.5	5-3-2	100		22				-
Г	-		POORLY GRADED SAND (SP), wet-loose			13.0-10.0	(5)		+		+			ŀ
1	-		5.0											
T	-													
-71 35	7 20.0					. <u> </u>	2-1-1		+				+	t
11.33	<u> </u>	\boxtimes	Brown SILTY WITH SAND (SM), tra clay, saturated-very loose	7	SS	20.0-21.5	(2)	67			_	_		4
		\bigotimes												
T .	F	KX:												
1	-	١X.	10.0	E	s se	3 25.0-26.	5 1-1-1 (2)	10	0					
1	\vdash	\bigotimes	4	-	_	-+					1		Τ	-
50/02	F	\aleph	X										1	
il c	-	$\left \right\rangle$	2											
g 2661.35	- 200	X	>							-+			+	
ž 561.35	30.0	V.	Brown SILTY SAND (SM), saturated-loose		9 S	s 30.0-31.	5 * ^{* 2}-2-3 (5)		00					
2 1	-	V.	Saturateuriouse	\vdash										
a	-	1/	5.0											
	F	1/	1											
2	- 25.0	Y.	1					1	Wat	er Lev	el Ol	bserva	ations	
ž 556.3	5 35.0 General I	Votes		narks				Immed				20.0)	_
priller	<u>D</u> .	Smith						At Cor		ion		23.0		
Rig N		3-57 Truck						After Water	used	Lin dril	0 lina	_ Hrs.	25.0	
Rig Ty		Q/SS							- 0 4	CKEUL	ED 1	NW = 1	AW ON	T

+ n2 5 x 21 * *

Clien		IICAL, I	ENVIRON	PLOYEE OWNED	е сни	PALACHI 12 MORRI VRLESTOI (304) 34 AX (304)	S STREET N. WV 250 4-0821	r 790 131 CO	NTRAL OHIO REGI DI MORRISON ROA LUMBUS, OH 432; (614) 663-3113 AX (614) 863-0475	D 349 V 30 LAW	INDIANA R VALNUT STI RENCEBUR (812) 539- FAX (812) 53	REET, ST 1G, IN 470 4300	E 8 4	470-8 CON LEXING (85)	RASS RE 4WAY CT. 570N, KY 9) 455-45; 859) 455-4	, STE 8 40511
Proje			AEP			·······	-	Boring N	lo.		B-	11			1307 4334	
	ici Ig Locati	07		os RFD Retrofit			-	Date Sta	irted	5/9/200						
	tion Rel			Staked			-	Date Cor	mpleted	5/9/200)5					
		T	<u></u>	he Surveying	r			Work Ord	der No.	90979.	057					
ELEV ft				DESCRIPTION OF MATERIALS	-					SAMPLI						
<u>п</u> .	ft.		color, ma	iterial description, moisture, stiffness/density/hardn	ess	10. T		DEPTH	BLOWS	1	ROD	w	LL	PI	Qu	PP
		V	Λ	Brown SANDY SILT (ML) moist to			YPE	ft.	(N Valu		%	%	%	%	tsf	ts
				wet-loose to medium dense		10 5	35 :	35.0-36.5	2-3-3 (6)	100						
	-	K	10	.0	1	1 S	is 4	0.0-41.5	4-7-7 (14)	100						
	-								(14)							
546 35	45.0	0		Brown, fine to medium grained		_			17 20 4	-						
		00000	្នុំ ១ 4 5.0	POORLY GRADED SAND WITH WITH GRAVEL (SP), wet-dense	1:	2 S	S 4	5.0-46.5	17-30-1 (40)	100						
41.35	50.0	00		0												
				Brown, fine to medium grained POORLY GRADED SAND (SP), wet-medium dense	13	SS	5 50	0.0-51.5	5-6-8 (14)	100			-+			
			10.0													
					14	SS	55	.0-56.5	5-6-6 (12)	100						
1.35		· · · · · ·	a •													
		000000	.4	Brown, fine to medium grained POORLY GRADED SAND WITH GRAVEL (GP), wet-dense to very dense	15	SS	60.	0-61.5	23-25-27 (52)	100	+- +-					
6.35	65.0	0000														
	-			Reddish-brown to gray, fine grained SILTY CLAYSTONE, thick to masive bedded, highly weathered, very soft to soft	1	<u>SS</u> NQ		5-70.2	50/0.2	7 100 39	0	+	+	1-: HC		=
	eral Not	\bigotimes	1													
er No. Type	D. Srr B-5	nith 7	-6	Remarks 50.9 tsf at 60.9	I			<u>L</u>		Wate Wate nediate Completic	er Løve		20.0	tions	ft. `	
hod hod	Truc NQ/S				`				Afte		n drillir	0 1g	23.0 Hrs. 2	BF 5.0	ft. ft. ft.	v

(;	CN		FAX (513) 321-0254	APPALACHI 912 MORR CHARLESTO (304) 3 FAX (304)	IS STREET	CENTRAL 790 MOR 1 COLUMB	OHO REGION RISON ROAD IUS. OH 43230 1 653-3113 14) 563-0475	INDIA 349 WALNU LAWRENC (812 FAX (8	NA REGK	DN T, STE 8 N 47025 0 .301	8 470-8 U	E CONW EXINGTO (859)	ASS REGIOF AY CT , STE 2N, KY 4051 455-8530 9) 455-8530	E 8-8 11
GEOT	ECHNICAL,					Boring No.			D-1					
ient		AEP	Detrofit			Date Starte		9/2005						
roject		Amos RFD	Reton			Date Comp		/9/2005						
oring L	ocation	As Staked	•			Work Orde		0979.05	/					
levation	n Ref.	Exline Surv	veying					MPLE		w	u	PI	Qu	PPF
LEV.	DEPTH ft.	DES	CRIPTION OF MATERIALS escription, moisture, stiffness/density/hardness	NO.	ΤΥΡΕ	DEPTH ft.	BLOWS/6" (N Value)	REC.	RQU %	%	%	%	tsf	tsf
ft.		10.2 R S b	eddish-brown to gray, fine grained ILTY CLAYSTONE, thick to masive edded, highly weathered, very soft o soft (LAYER CONTINUED DESCRIPTION REPEATED)	2	NQ	70.2-75.2		100	0				1-2 HCSI	
516.15 5			3ORING COMPLETED @ 75.2				•							
H Fage 1 Dec 0 DH Fa			Re	marks				Imm	Wa		evel (rvatior	15
CB		al Notes	60.9 tsf at 60.9'						omple				3.0	
Dri		D. Smith B-57						After			0			BF
- Rig	ј No ј Туре	Truck						Wat	er use	ed in d	Inilling		25.0	
9 Die		Truck						i vval				·	= NO V	



H.C. Nutting Company 2006

Test Boring Logs

B-0601 to B-0610

			CH	LACHIAN REGION - 912 MORRIS STREET ARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711	611 LUN	ORATE CEN	VTER CENT DRIVE 790	TRAL OHIO REGI MORRISON ROA	AD 349 WA	VDIANA RE	GION EET, STE	8 4	BLUE 470-B CO	GRASS RE	STE
GEO	TECHNICA			EE OWNED)	(51	NATI, OH 4 13) 321-581 (513) 321-0	3	UMBUS, OH 432 (614) 863-3113 X (614) 863-0475		ENCEBURG (812) 539-4	300	5	(8	GTON, KY 59) 455-853	80
Client				an Electric Power	FAAL	(513) 52 1-0.			> F4	B-0			FAX	(859) 455-8	630
Project						_	Boring No		2/40/200		001				
			538.9	mos Plant Access Road to Dewatering Islar	10		Date Star		3/10/200						
Boring L							Date Com		3/10/200						
Elevation	DEPTH		ovide	d by American Electric Power	1		Work Ord	ler No.	90979.0						
ft.	ft.			DESCRIPTION OF MATERIALS			DEPTH	BLOW	SAMPLE	1	W	LL	PI		F
577.60	0.0	color		ial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO.			(N Val		%	%	%	%	HCSI	
011.00	0.0			Brown, SILTY CLAY, moist, very soft			- 11.	0-0-		/0	/0	/0	70		-
	-				1	SS	0.0-1.5	(1)							
	_														
	z		5.0		1	ST	1.5-3.5		45					1	
											<u> </u>				
572.60	- 5.0														
J12.00				Brown, SILTY CLAY, trace gravel,		-		1-1-;	2		+	-			\vdash
	-	$\left \right\rangle$		moist, very soft	2	SS	5.0-6.5	(3)							
	<u> </u>	\mathbb{Z}							-		-				\vdash
	_	$\left \right\rangle$	5.4		2	ST	6.5-8.5	1	15						
		//											<u> </u>		
	-	\bigvee								1					
567.20	10.4	44			<u> </u>			0-2-2	,						-
	_			Gray, SILT, trace sand, trace gravel, moist, very loose	3	SS	10.0-11.5	(4)	80						
f	_		2.6												
564.60	7 13.0				3	ST	11.5-13.5		100						
		$\langle A \rangle$		Brown and gray, SILT with SAND, trace gravel, wet, loose		1									
	_		3.0	gravel, wel, loose										-	
561.60	- 16.0							2-3-4						_	
561.60	10.0			Gray, SILT with SAND, trace gravel,	4	SS	15.0-16.5	(7)	100						
ŀ	-			moist, loose - medium dense											
F	- 1					1									
	_ [1									
Γ	-		9.0		5	SS	20.0-21.5	2-6-7	100						
	-				5	- 33	20.0-21.5	(13)	100						
-	-	$/\Lambda$													
F	-														
ļ.	- +	\square													
552.60	25.0	//								İ			1		
		$/\Lambda$		Brown, SILT with SAND, moist, loose	6	SS	25.0-26.5	2-2-4	100			1	-	1	
ļ.	-						20.0 20.0	(6)	100	.					
F	-	\square													
-	-		6.0												
F	-														
Ĺ	_ ł														
546.60	31.0				7	SS	30.0-31.5	2-3-4	100						
		$\overline{\Lambda}$		Gray, SILT with SAND, trace gravel,				(7)							
F	-			moist, loose											
F		// •	4.0												
-		\square								ŀ					
542.60	35.0	\square													
	neral Not			Remarks						ter Le	vel O				
Driller Dia No	Johns	on	-	······································					Immediate	-		13.			t.
Rig No. Rig Type	AT∖	/	-						At Completi	on _	N1A	3.0			t. '
Rig Type Method	NQ2/SS								After Water used	in dell	NA	_ Hrs	s. <u>1</u> 41.5	VA_f	
100100	11442/00	101	L.						Water used	in anii	ng		41.5	<u> </u>	ί.

				C. NUTTING COMPANY				G OF 1	.E81		PI	NG		Page 2	? of 2
		2	CH	LACHIAN REGION - 912 MORRIS STREET IARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711	611 LUN	ORATE CEN	ITER CENT DRIVE 790	RAL OHIO REGION MORRISON ROAD	ار 349 WA	NDIANA REG	GION EET, STE	8 4	BLUEC	GRASS REG	
GEO	TECHNICA	Self of the logical section of the logical se		TAL AND TESTING ENGINEERS SINCE 1921	(51	NATI, OH 4 13) 321-5816 (513) 321-02		UMBUS, OH 43230 (614) 863-3113 X (614) 863-0475		ENCEBURG (812) 539-4 X (812) 539	300	5	LEXING (85	GTON, KY 4 9) 455-853 859) 455-8	40511 10
Client		-		an Electric Power			Boring No			B-06					
Project		J	ohn A	mos Plant Access Road to Dewatering Isla	nd		Date Star		3/10/200						
Boring L	ocation	N	1 538,9	936.4 E 1,729,204.2			Date Com	pleted 3	3/10/200)6					
Elevatio	n Ref.	F	Provide	d by American Electric Power			Work Ord	er No. 9	0979.0	<u>6</u> 7			_		
ELEV.	DEPTH		1	DESCRIPTION OF MATERIALS	<u> </u>			1	AMPLE	-	1	<u> </u>			
ft.	ft.	colo		rial description, moisture, stiffness/density/hardness sual classification unless otherwise noted) Reddish brown, SHALE, completely	NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC.	. RQD %	W %	LL %	PI %	HCSI	PPF tsf
	-	<u>www</u>	-	weathered, extremely soft	8	SS	35.0-36.5	8-6-12 (18)	80						
		M	6.0												
	_	\otimes	0.0												
		\geq													4
536.60	41.0	\leq			9	SS	40.0-41.5	12-18-50/6	' 100	-		-			
536.10	41.5		0.5	Gray, SHALE, completely weathered,	<u> </u>		+0.0 +1.0	12-10-00/0		-		ļ			
	-	\geq	2.3	\extremely soft - soft Gray, SHALE, laminated, moderately	4										ĺ
533.80	- 43.8	\otimes	2.0	weathered, soft											
	_	\geq		Reddish brown, SHALE, moderately	1	NQ2	41.5-46.3		83	73					I.
	_	\geq		weathered, soft											I
-	_	\leq	4.1	High angle fracture at 44.3' to 44.5'											
1	_	\geq													
529.70	47.9	\leq													
	_	\leq		Reddish and gray, SHALE, laminated, highly weathered, very soft	2	NQ2	46.3-51.3		74	48					
		\geq	3.4	ing ing treatmond, tony bont	-	. TORE	40.0 01.0		17	10					
t		\sim													
526.30 -	- 51.3	\geq	-	BORING COMPLETED @ 51.3'	<u> </u>										
ŀ	-			BORING COMPLETED @ 51.3											
ŀ	-														
F	-												Ì		
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	-				ŀ										
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Γ													1	ł	
Ger	eral Not	es		Remarks	I	J			Wa	ter Lev	vel O	bserv	/ation		
Driller	Johns							Imm	ediate			13.		fl	t.
Rig No.								At C	ompleti	on _		3.0)	fi	t. V
Rig Type	AT							Afte			NA	_ Hrs		IA ft	
/lethod nspector	NQ2/SS Ven										-	11.4.4	41.5		
Speciol	ven	u							BF = BA (Mea	CKFILL asured f					

(;		APPA Cł	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET MARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711	611 LUN CINCIN	ORATE CEN KEN PARK WNATI, OH 4	ITER CENT DRIVE 790 5226 COLI	RAL OHIO REGION MORRISON ROAD UMBUS, OH 43230	ii 349 WA LAWRI	NDIANA REG LINUT STRI ENCEBURG	GION EET, STE 6, IN 4702	8 4	BLUEG 70-B CON LEXING	RASS REG IWAY CT., TON, KY 4	STE 8
GEO	TECHNICAL	ENVIRONMEN	ITAL AND TESTING ENGINEERS SINCE 1921	(5' FAX	13) 321-5816 (513) 321-02	94 FA	614) 863-3113 X (614) 863-0475		(812) 539-4 XX (812) 539	-4301			9) 455-853 859) 455-8	
Client		Americ	an Electric Power			Boring No			B-06	602				
Project		John A	mos Plant Access Road to Dewatering Isla	nd		Date Star	ed	3/9/2006	6					
Boring L	ocation	N 540,5	557.7 E 1,726,086.2	-		Date Com	pleted	3/9/2008	6					
Elevation		Provide	d by American Electric Power			Work Ord	er No.	90979.0	67					
ELEV.	DEPTH		DESCRIPTION OF MATERIALS			· · · ·	1	SAMPLE	,	т.	· · · ·	·		
ft. <u>886.80</u>	ft.	color, mate (vi	rial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO.		DEPTH ft.	BLOWS/6 (N Value)		. RQD %	W %	LL %	PI %	HCSI	P t
885.50	- 1.3	2 1.3	Brown, CLAYEY SAND, little organics (roots), moist, soft	1	SS	0.0-1.5	1-1-2 (3)	100						
	_		Reddish brown, SANDY LEAN CLAY, trace rock fragments, moist, soft - medium stiff											
	_	8.7		2	SS	5.0-6.5	4-4-5 (9)	100						
876.80	_ 													
			Brown, SANDSTONE, fine grained, slightly weathered, medium hard	3	A SS NQ2	10.0-10.3	50/4"	<u></u>	70				3	
	_ ł	3.3												
873.50 873.00	- 13.3	0.5	High angle fractures at 11.3' to 11.5' and 12.8' to 13.1' Brown, SHALE, laminated, moderately weathered, soft	2	NQ2	11.3-16.3		100	44				3-2	
871.10	<u>15.7</u> - - -		Gray, SHALE, thinly laminated, slightly weathered, soft - medium hard Gray, SANDSTONE, fine grained, micaceous, faintly weathered, medium hard - hard	3	NQ2	16.3-21.3		100	88				3-4	
		× × × × × × 15.6		4	NQ2	21.3-26.3		100	92				3-4	
	- /			5	NQ2	26.3-31.3		100	92				3-4	
855.50	313	$\langle \rangle \rangle$												
000.00	01.0		BORING COMPLETED @ 31.3'				·		_		+			
Ger	neral Note	es	Remarks					Wa	ater Le	vel O	bser	vation	ns .	
Driller	Williar	ns					lm	mediate	_		N۷	N	f	t.
Rig No.								Complet	ion _		NV			t.
Rig Type	Track						Aft			24	_ Hrs			t.
/lethod	NQ2/S						Wa	ater usec		~		10.3		t.
nspector	Venu	. 1						BF = BA	0.000					

GEO	DTECHNICA	Construction of the local diversion of the local diversion of the local diversion of the local diversion of the	EMPLO	HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 YEE OWNED NTAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCII (5	PORATE CE/ NKEN PARK NNATI, OH 4 (13) 321-581 (513) 321-0	DRIVE 790 15226 COL 6	TRAL OHIO REGION MORRISON ROAD LUMBUS, OH 43230 (614) 863-3113 AX (614) 863-0475	349 WA LAWR	NDIANA RE LNUT STF ENCEBUR (812) 539-4 XX (812) 53	REET, STE G, IN 4702 1300	5 4	170-B CON LEXING (85	GRASS REG WAY CT., STON, KY 4 9) 455-853 (859) 455-81	STE 1 10511 0
Client		A	meric	an Electric Power			Boring No	D		B-0	603				
Project		J	ohn A	mos Plant Access Road to Dewatering Is	land		Date Star	ted	3/8/2006	5					
Boring L	_ocation	N	540,	310.5 E 1,726,267.7			Date Con	npleted –	3/8/2006	3					
Elevatio	n Ref.	F	rovide	ed by American Electric Power			Work Orc	• -	90979.0						
ELEV.	DEPTH	H							SAMPLE						
ft. 940.80	ft.	colo	or, mate	DESCRIPTION OF MATERIALS rial description, moisture, stiffness/density/hardnes /isual classification unless otherwise noted)	s NO	. TYPE	DEPTH	BLOWS/	6" REC	_	W %	LL %	PI %	HCSI	P t
				Brown, fine SAND, moist, medium dense	1	SS	0.0-1.5	3-4-12 (16)	100						
935.80	5.0		5.0												
		WWW		Reddish brown, SHALE, completely weathered, soft	2	SS	5.0-6.5	14-26-30 (56)	0 100						
030.00		WWW	5.0											-	
930.80	10.0			Brown, SANDY SHALE, laminated,	3	SS	10.0-10.8	12-50/4"	38						
		WWW	5.2	highly weathered, soft			10.0 10.0	12 00/4							
	-	WWW	5.2												
925.60	<u> </u>		4.7	Brown, SANDSTONE, fine to medium grained, weakly cemented, micaceous, moderately weathered - slightly weathered, soft	1	NQ2	10.8-20.8		95	52				2	
920.90	19.9			Brown, SANDY SHALE, laminated,	_										
919.40	- 21.4	\sim	1.5	slightly weathered, very soft										_	
916.80	- - 24.0	MMMM	2.6	Reddish brown, SHALE, laminated, moderately weathered, soft Vertical fracture from 21.4' to 21.9'											
	_	WWW	3.3	Brown and reddish brown, SHALE, laminated, slightly weathered, soft	2	NQ2	20.8-30.8		95	46				2-1	
913.50	- 27.3	NNN		Vertical fracture from 25.9' to 26.7' High angle fracture from 26.7' to 26.9' Gray, SHALE, laminated, moderately											
	-	WWWW/	3.9	weathered, very soft - soft											
909.60 -	- 31.2	MMMM/M		Reddish brown, SHALE, slightly weathered, extremely soft - very soft											
	neral No		-	Remark	s				Wa	ter Le	vel O	bserv	/ation	IS	
Driller Rig No. Rig Type	 Trac							At	mediate Completi	on _	KI A	11.	. *	ft	
"A type	11d		L					Af	.ei		NA	Hrs	5. N	IA ft	

GE	OTECHNICA		APPA CH	C. NUTTING COMPANY LACHIAN REGION - 912 MORRIS STREET IARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE OWNED	611 LUN CINCIN (51	ORATE CEN IKEN PARK I NNATI, OH 4 13) 321-5816 (513) 321-02	ITER CENT DRIVE 790 M 5226 COLU	IGOF RAL OHIO REGION MORRISON ROAD JMBUS, OH 43230 614) 863-3413 (614) 863-3475	ii 349 WA LAWR	NDIANA REALINUT STR ENCEBURG (812) 539-4 AX (812) 539	GION EET, STE 6, IN 4702 300	8 4	BLUEG 170-B CON LEXING (85	Page 2 BRASS REC WAY CT., BTON, KY 4 9) 455-8530 859) 455-8630	GION STE B-8 0511
Client		_		an Electric Power	1700	(010) 02 1-02	Boring No			B-0			FAA	039) 433-00	
Project				nos Plant Access Road to Dewatering Isla	nd		Date Start		3/8/2006	-					
	Location		540,3			_	Date Com		3/8/2006						
Elevatio				d by American Electric Power	= .		Work Orde		90979.0						
	DEDTU			· · · · · · · · · · · · · · · · · · ·	1				AMPLE						
ELEV. ft.	DEPTH ft.		r, mater	DESCRIPTION OF MATERIALS ial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)			W %	LL %	PI %	HCSI	PPF tsf
		<u>www.www</u>	9.6	Reddish brown, SHALE, slightly weathered, extremely soft - very soft (LAYER CONTINUED DESCRIPTION REPEATED)	3	NQ2	30.8-40.8		33	19				0-1	
000.00	-	\leq													
900.00	40.8	<u>www</u>	3.7	Gray and reddish brown, SHALE, laminated, moderately weathered, soft											
896.30	<u> 44.5</u> _			Gray, SILTSTONE, thinly bedded, fresh, soft - medium hard	4	NQ2	40.8-50.8		98	80				2-3	
880.00	-		6.4	-											
889.90			· · ·	Gray, SANDSTONE, fine to medium grained, micaceous, fresh, hard											
			12.4		5	NQ2	50.8-60.8		100	98				4	
877.50	- - 63.3			Prove CANDOTONE for to modium											
				Brown, SANDSTONE, fine to medium grained, micaceous, fresh, hard	6	NQ2	60.8-70.8		95	95				4	
270.00															
370.80	70.0 [neral Not			Dameula					1	to-1		here			
Ge Driller	Willia			Remarks				Imn	wa nediate	ter Le	ver O	usen	vatior	is ft	
Rig No.									Completi	ion –				ft	
Rig Type								Afte	•	-	NA	_ Hrs	sN	JA ft	
/lethod	NQ2/								ter used		ing	_	10.8		
nspector		u	1		<			1						ATER	

TEST BORING JOHN AMOS DEWATERING PLANT ACCESS ROAD.GPJ HC NUTTING.GDT 10/25/11

6			H.C. NUTTING COMPANY APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821			LC	G OF 1	EST	BC	DRI	NG		age 3	3 of
GEO	TECHNICAL		FAX (304) 342-4711 ' IMPLOYEE OWNED ONMENTAL AND TESTING ENGINEERS SINCE 1921	611 LUNK CINCINI (51)	RATE CEN EN PARK D NATI, OH 45 3) 321-5816 513) 321-029	0RIVE 790 226 COL	RAL OHIO REGION MORRISON ROAD JMBUS, OH 43230 614) 863-3113 X (614) 863-0475	349 WA LAWRI	NDIANA REG ILNUT STRI ENCEBURG (812) 539-4 (X (812) 539	EET, STE 5, IN 4702 300		70-8 CON LEXING (859	RASS RE WAY CT., TON, KY 0) 455-853 859) 455-8	STE B-8 40511 0
Client		A	merican Electric Power			Boring No		_	B-06					
Project		Jo	ohn Amos Plant Access Road to Dewatering Isla	nd		Date Star		8/8/2006	3					
Boring L	ocation	N	540,310.5 E 1,726,267.7			Date Com		8/8/2006						
Elevatio	n Ref.	Pr	rovided by American Electric Power			Work Ord		0979.0						
ELEV.	DEPTH		DESCRIPTION OF MATERIALS			_		AMPLE						
ft.	ft.		r, material description, moisture, stiffness/density/hardness (visual classification unless otherwise noted)	NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC.	RQD	W %	LL %	PI %	HCSI	PP tst
	_		Gray, SANDSTONE, fine grained, micaceous, faintly weathered, hard											
	-		5.8	7	NQ2	70.8-75.8		100	100				4	
005.00														
865.00			BORING COMPLETED @ 75.8'											
	_											1		
-	_													
-	-													
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-	-													
	Note		Remarks						ter Le	vel O	bserv	ation		
Priller Rig No.	Williar	TIS						iediate					f	
Rig Type	Track						Afte	ompleti r	UII	NA	Hrs	. N	f	
lethod	NQ2/S							' er used	in drilli			10.8	' fi	
nspector	Venu	1						BF = BA		ED N	1W = 1	NO W	ATER	

		AI	H.C. NUTTING COMPANY PPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 LOYEE OWNED	611 LUN CINCII (5)	ORATE CEN IKEN PARK NNATI, OH 4 13) 321-581	NTER CEN DRIVE 790 15226 COL 6	DG OF TRAL OHIO REGION MORRISON ROAD UMBUS, OH 43230 (614) 863-3113	1 1 349 W/ LAWR	NDIANA RE ALNUT STR ENCEBURC (812) 539-4	GION EET, STE 3, IN 4702	8 4	BLUEC 170-B COP LEXING (85	GRASS REG NWAY CT., GTON, KY 4 59) 455-853	, STE 40511 30
	ECHNICAL		MENTAL AND TESTING ENGINEERS SINCE 1921	FAX	(513) 321-02	294 FA	X (614) 863-0475		AX (812) 539	9-4301			(859) 455-8	
Client		-	erican Electric Power			Boring No	D		B-0	604				
Project		Johr	Amos Plant Access Road to Dewatering Is	land		Date Star	ted _	3/8/2000	5					
Boring Lo	ocation	N 54	0,073.9 E 1,726,436.9			Date Corr	npleted	3/8/2006	3					
Elevation	n Ref.	Prov	ided by American Electric Power			Work Ord	ler No.	90979.0	67					
ELEV.	DEPTH		DESCRIPTION OF MATERIALS		_			SAMPLE						
ft.	ft.	color, m	naterial description, moisture, stiffness/density/hardnes	s		DEPTH	BLOWS	'6" REC	. RQD	W	LL	PI	1100	F
909.80	0.0		(visual classification unless otherwise noted)	NO.	. TYPE	E ft.	(N Value	e) %	%	%	%	%	HCSI	
	-	5	Brown, SANDY LEAN CLAY, moist, very stiff	1	SS	0.0-1.5	6-10-10 (20)	^D 100						
904.80	5.0													
	_		Brown, SANDSTONE, fine grained, micaceous, highly weathered, medium hard	2	SS NQ2	5.0-5.0	50/0	0	20				3	
899.60	- _10.2		Brown, SANDSTONE, fine to medium grained, micaceous, slightly weathered									:		
895.70	- 14.1	3.	9 Wertical fracture from 11.9' to 12.6'								1			1
	-	7.	Brown, SANDSTONE, fine grained, micaceous, faintly weathered, medium hard	2	NQ2	10.6-20.6		100	79				3	
888.20	21.6		Brown, SANDSTONE, fine to coarse											
884.00	25.8	<pre></pre>		3	NQ2	20.6-30.6		0	98				3-4	
			Brown, SANDSTONE, fine grained, faintly weathered, hard											
-		× × 8.3 × × × × × ×	3											
875.70	34.1													
Gen	eral Note		Remark	is i	L			10/-	ater Le		heer	vation	16	
Driller	Willian	1	Renar	~			In	nmediate		VOI U	NW			ť.
Rig No.								t Completi	on –		NW		11 f1	
Rig Type	Track	<u> </u>						fter		NA	Hrs		VÁ ft	
Nethod	NQ2/S							ater used	 Lin drill		c	5.0	<u>×~</u> (1 ft	
		1												

GEO	TECHINICA	API-SIX Plaza	CH EMPLOY	LACHIAN REGION - 912 MORRIS STREET ARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE OWNED TAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCI (5	PORATE CEN NKEN PARK INNATI, OH 4 513) 321-5816 ((513) 321-02	ITER CENTI DRIVE 790 M 5226 COLL	GOFT MORRISON ROAD MBUS, OH 43230 614) 863-3113 (614) 863-0475	ii 349 WA LAWR	NDIANA REG ALNUT STRI ENCEBURG (812) 539-43 AX (812) 539	GION EET, STE 1, IN 4702 300	8 4	BLUEC 70-B COP LEXING (85	GRASS REG NWAY CT., GTON, KY 4 59) 455-853 (859) 455-8	STE 10511 0
Client		A	meric	an Electric Power			Boring No			B-06	504				
Project		J	ohn A	mos Plant Access Road to Dewatering Isla	and		Date Start	ed 3	8/8/2006	5					
Boring L	ocation	N	540,0	73.9 E 1,726,436.9			Date Com	pleted 3	8/8/2006	5					
Elevation	n Ref.	P	rovide	d by American Electric Power			Work Orde		0979.0						
ELEV.	DEPTH			DESCRIPTION OF MATERIALS			1		AMPLE	1		1		,	-
ft.	ft.		r, mate	ial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO		DEPTH	BLOWS/6" (N Value)	REC	. RQD	W %	LL %	PI %	HCSI	F
872.90			2.8	Gray, SANDSTONE, fine grained, faintly weathered, hard (LAYER CONTINUED DESCRIPTION REPEATED)	4				100					4	
	-			Brown, SANDSTONE, fine to medium grained, slightly weathered, hard											
	-		5.5									 			
867.40	- 42.4	1-1-1-	[Gray, SANDSTONE, fine to medium	-										1
	_		4.3	grained, faintly weathered, hard											
	_				5	NQ2	40.6-50.6		0	75				4-3	
863.10	46.7	/ √ √ · / √ √ ·		Brown, SANDSTONE, fine grained,											
	_			faintly weathered, medium hard Shale interbeds from 47.4' to 47.9' and											
	-		6.6	50.1' to 50.6'											
-	-														
856.50	- 53.3 -			Brown, SANDSTONE, fine grained, faintly weathered, hard											
-	-		5.5		6	NQ2	50.6-60.6		100	71				4-2	
851.00	- 58.8			Vertical fracture from 56.6' to 58.2'											
	-		1.8	Gray, SHALE, laminated, moderately weathered, soft							ĺ			1	
849.20 847.80	60.6 - 62.0		1.4	Gray, SANDSTONE, fine grained, micaceous, slightly weathered, medium hard											
	-			Gray, SHALE, laminated, slightly weathered, medium hard											
	-	MMM	9.3		7	NQ2	60.6-70.6		100	66				3	
-	-	NWN	9.9												
		<u>w</u>	·												
Driller	willia			Remarks	;				nediate	ater Le	vel O	NV	N	f	t.
Rig No.									Complet	ion _		NV			t.
Rig Type /lethod	Trac NQ2/		-					Afte	r t er usec		NA	Hr	s. <u> </u> 5.0		t.
	NUJ/	33	1					Livva	er usec	un driil	na		- 50	f	6

Page 3 of 3 H.C. NUTTING COMPANY LOG OF TEST BORING APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 CORPORATE CENTER 611 LUNKEN PARK DRIVE CINCINNATI, OH 45226 CENTRAL OHIO REGION 790 MORRISON ROAD COLUMBUS, OH 43230 BLUEGRASS REGION 470-B CONWAY CT., STE B-8 LEXINGTON, KY 40511 INDIANA REGION 349 WALNUT STREET, STE 8 LAWRENCEBURG, IN 47025 EMPLOYEE OWNED (513) 321-5816 (614) 863-3113 (812) 539-4300 (859) 455-8530 GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921 FAX (513) 321-0294 FAX (614) 863-0475 FAX (812) 539-4301 FAX (859) 455-8630 Client **B-0604** American Electric Power Boring No. Project John Amos Plant Access Road to Dewatering Island 3/8/2006 Date Started **Boring Location** N 540,073.9 E 1,726,436.9 Date Completed 3/8/2006 Elevation Ref. Provided by American Electric Power Work Order No. 90979.067 SAMPLE ELEV. DEPTH DESCRIPTION OF MATERIALS DEPTH BLOWS/6" RQD W ΡI PPR REC. LL color, material description, moisture, stiffness/density/hardness ft. ft. HCSI (visual classification unless otherwise noted) NO. TYPE ft. (N Value) % % % % % tsf Gray, SHALE, laminated, slightly weathered, medium hard (LAYER 838.50 71.3 **CONTINUED DESCRIPTION** 8 NQ2 70.6-72.6 100 100 3 0.9 837.60 72.2 REPEATED) 837.20 72.6 0.4 Reddish brown and gray, SHALE, laminated, faintly weathered, soft medium hard Gray, SANDSTONE, fine grained, micaceous, fresh, medium hard BORING COMPLETED @ 72.6 10/25/11 JOHN AMOS DEWATERING PLANT ACCESS ROAD.GPJ HC NUTTING.GDT **General Notes** Remarks Water Level Observations Driller Williams Immediate NW ft. Rig No. At Completion NW ft. BORING Rig Type Track After NA ft. Hrs. NA Method NQ2/SS Water used in drilling 5.0 ft. TEST Venu BF = BACKFILLED NW = NO WATER Inspector

(Measured from ground surface)

DEPTEMERAL EVENCEURAL AN DESTINCE POWER Provide 1921 cost Provide 1021 cost Provide 1021 cost Provid	ASS REGION (AY CT., STE B- DN, KY 40511 455-8530	0-B CONWA LEXINGTO	8 47	ION ET, STE IN 47025 00	DIANA REG INUT STRE NCEBURG, 812) 539-43	IN 349 WAI LAWRE (D REGION IN ROAD DH 43230 3113	TRAL OHIO RE MORRISON R UMBUS, OH 4 (614) 863-3113	ER CENT RIVE 790 1 26 COLU	RATE CENT EN PARK D VATI, OH 45 3) 321-5816	611 LUNH CINCIN (51)	PALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 OYEE OWNED	EMPL			
Project John Amos Flant Access Road to Dewatering Island Date Started 377.005 Boring Location N 538,910.0 E 1,726,830.7 Date Completed 382/2008 ELEV. DEFTH OG979.0677 SAMPLE OG979.0677 R. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft	9) 455-8630			4301	K (812) 539-	FA		X (614) 863-04	FA					ICAL, E	OTECH	
Boring Location N 539.810.0 E 1/26.630.7 Date Completed 30873067 Envention Ref. Provided by American Electric Prover Work Order No. 30873067 Elev. DEPTH BLOWS®® REC.				05		-					_					
Elevalor Ref. Provided by American Electric Power Work Order No. 90579.067 ELEV. DPFTH 1. ft. ft. ft. DESCRIPTION OF MATERIALS 793.70 0.0 Comment descension, mature, attense detense index destination interes detense interes detense inter											d		_			-
ELEW. DEPTH ft: DESCRIPTION OF MATERIALS columentarial description, motion, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transm, stiffinescentrolynamics readed action user adjustment description. Transment descriptintescription. Transmen						8/2006	d <u>3/</u>	npleted	Date Com					n		0
ft. DESCRIPTION OF MATERIALS (Name classification materia distribution of model (Name classification materia distribution of model) (Name classification of material distribution of model) (Name classification of model) (Name classification of model) (Name classification of material distribution of model) (Name classification of model)					67		elinate di una una sere sere	ler No.	Work Orde			ded by American Electric Power	Provid			
T93.70 D.O. TYPE ft. (N Value) %								7		1		DESCRIPTION OF MATERIALS				
Brown, SANDY LEAN CLAY, trace organics (roots), moist, soft 1 SS C.0-1.5 1-1-2 100 5.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0	HCSI PP	H								TYPE	NO					
788.70 5.0 Reddish brown, SANDY LEAN CLAY, trace rock fregments, moist, stiff 2 SS 5.0-6.5 5-7-8 100 100 10.0 3 SS 10.0-11.5 4-2-10 100 100 100 778.70 15.0 0.2 Gray, SHALE, laminated, moderately weathered, soft medium hard 4 SS 15.0-15.2 50/2* 100 100 2 778.70 15.0 0.2 Gray, SHALE, laminated, moderately weathered, soft medium hard 4 SS 15.0-15.2 50/2* 100 100 2 778.70 15.0 12.8 12.8 100 100 100 2 778.70 15.0 12.8 100 100 100 2 778.70 15.0 12.8 100 100 100 2 778.70 15.0 12.8 100 100 100 2 778.70 15.0 15.2 100 100 100 2 778.70 15.0 100 100 100 2 2 100 100 2 <tr< td=""><td></td><td></td><td>70</td><td>70</td><td>70</td><td></td><td>1-1-2</td><td>1-1</td><td></td><td></td><td></td><td></td><td></td><td></td><td><u></u></td><td>190.10</td></tr<>			70	70	70		1-1-2	1-1							<u></u>	190.10
778.70 15.0 778.70 15.2 778.70 15.2 778.70 15.0 778.70 15.2 778.70 15.2 778.70 10.0 778.70 10.0 778.70 10.0 77												0	5.0		- 5.	788.70
778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 15.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 778.70 10.0 764.70 28.0 764.70 1.0 762						100			5.0-6.5	SS	2				_	
765.70 28.0 2 NQ2 15.8-20.8 100 94 2 765.70 28.0 12.8 3 NQ2 20.8-25.8 100 100 2 765.70 29.0 10 Gray, SANDSTONE, fine grained, micaceous, slightly weathered, soft - medium hard 3 NQ2 20.8-25.8 100 100 2 765.70 28.0 -	2				100	100	(12)	(12	15.0-15.2	SS		2 A Gray, SHALE, laminated, moderately				
micaceous, slightly weathered, soft-medium hard 2 NQ2 15.8-20.8 100 94 2 12.8 3 NQ2 20.8-25.8 100 100 2 65.70 28.0 20.8-25.8 100 100 2 65.70 28.0 10 100 100 2 64.70 29.0 10 Gray, SANDSTONE, fine grained, micaceous, faintly weathered, medium finace, micaceous, fish, medium hard 4 NQ2 25.8-30.8 100 100 2 62.80 30.9 1.9 Gray, SANDSTONE, fine to medium grained, micaceous, fresh, medium hard 5 NQ2 30.8-34.8 100 93 3-4 59.40 34.8 0.5 Gray, SHALE, laminated, fresh, soft 5 NQ2 30.8-34.8 100 93 3-4 General Notes Remarks Water Level Observations Immediate NW	-				100	100			15.2-15.8	NQ2	1		~		-	
765.70 28.0 3 NQ2 20.8-25.8 100 100 2- 765.70 28.0 -	2-3	2			94	100			15.8-20.8	NQ2	2	micaceous, slightly weathered, soft -	* * * * * * *			
r65.70 28.0	2-3	2-		Î	100	100			20.8-25.8	NQ2	3	8	\sim 1	· · · · · · · · · · · · · · · · · · ·		
64.70 29.0 1.0 Gray, SANDSTONE, fine grained, micaceous, faintly weathered, medium hard 4 NQ2 25.8-30.8 100 100 2-4 62.80 30.9 1.9 Gray, SANDSTONE, medium grained, micaceous, fresh, medium hard 4 NQ2 25.8-30.8 100 100 2-4 62.80 30.9 9 Gray, SANDSTONE, medium grained, micaceous, fresh, medium hard 5 NQ2 30.8-34.8 100 93 3-4 59.40 34.3 3.4 Gray, SHALE, laminated, fresh, soft 5 NQ2 30.8-34.8 100 93 3-4 Water Level Observations Immediate Immediate NW															- 201	65 70
62.80 30.9 1.9 Indicaceous, frainty weathered, medium 62.80 30.9 1.9 Gray, SANDSTONE, medium grained, Gray, SANDSTONE, fine to medium Gray, SANDSTONE, fine to medium 100 93.4 3.4 Gray, SANDSTONE, firesh, medium hard 5 59.40 34.3 3.4 100 93 62.80 34.8 0.5 Gray, SHALE, laminated, fresh, soft Water Level Observations Immediate	-3	2-			100	100			25.8-30.8	NQ2	4			1.1		
02.80 30.9 micaceous, fresh, medium hard Gray, SANDSTONE, fine to medium 3.4 grained, micaceous, fresh, medium hard 3.4 59.40 34.8 0.5 Gray, SHALE, laminated, fresh, soft General Notes riller Williams Micaceous, fresh, medium hard 5 NQ2 30.8-34.8 100 93 3-4 Segment in the image in the ima		-									-	hard	/ 1.9	~~ ~~	L	
58.90 34.8 0.5 Gray, SHALE, laminated, fresh, soft General Notes Remarks Williams Water Level Observations	-4	3-			93	100		· · · · ·	30.8-34.8	NQ2	5	micaceous, fresh, medium hard Gray, SANDSTONE, fine to medium	3.4		_	02.80
General Notes Remarks Water Level Observations Driller Williams Immediate NW											1	Croy OHALE Jaminated fronts of		1~		
riller Williams Immediate NW					tor l -	NAL-							-1 0.5			
				vel O	ter Lev		10000					Remarks				
I AL COMDITION NW	ft.												- -	marris		
ig Type Track After NA Hrs. NA	ft. Aft.			NΔ	JII								- -	rack		+
lethod NQ2/SS Water used in drilling 12.2	<u>α</u> π. ft.		- 115		in drilli					· · · ·			-			* • •
spector Venu BF = BACKFILLED NW = NO WAT				<u> </u>									-			

TEST BORING JOHN AMOS DEWATERING PLANT ACCESS ROAD GPJ HC NUTTING GDT 10/25/11

(-CN	H.C. NUTTING COMPANY APPALACHIAN REGION - 912 MORRIS STREET CHARLESTON, WV 25301 (304) 344-0821			LC	G OF 1	rest	вс	DRI	NG		Page 2	2 of 2
GEO	TECHNICAL,	FAX (304) 342-4711 EMPLOYEE OWNED ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921	611 LUNI CINCIN (51	DRATE CEN KEN PARK I INATI, OH 45 3) 321-5816 513) 321-02	DRIVE 790 5226 COLI (RAL OHIO REGION MORRISON ROAD UMBUS, OH 43230 614) 863-3113 X (614) 863-0475	349 WA LAWRE	DIANA REG LNUT STRI ENCEBURG (812) 539-4 X (812) 539	EET, STE 5, IN 47025 300		70-B CON LEXING (85	BRASS REG JWAY CT., STON, KY 4 9) 455-853 859) 455-8	STE B-8 40511 0
Client		American Electric Power			Boring No			B-06	605				
Project		John Amos Plant Access Road to Dewatering Is	land		Date Start	ed :	3/7/2006	3					
Boring L	ocation	N 539,810.0 E 1,726,630.7			Date Com		3/8/2006						
Elevatio	n Ref.	Provided by American Electric Power			Work Ord		90979.00						
ELEV.	DEPTH	DESCRIPTION OF MATERIALS					AMPLE				-		
ft.	ft.	color, material description, moisture, stiffness/density/hardnes (visual classification unless otherwise noted)	s NO.	TYPE	DEPTH ft.	BLOWS/6' (N Value)	' REC. %	RQD %	W %	LL %	PI %	HCSI	PPF tsf
	_	BORING COMPLETED @ 34.8'											
	- - -												
	- -												
- - - -	-									-			
	-												
	-												
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-	-												
													:
Ger	eral Note	s Remark	s				Wa	ter Lev		hson	ation	19	
Driller	William		-			Imn	nediate			NW		is fi	t.
Rig No.							Completie	on —		NW		fi	
Rig Type	Track					Afte			NA	Hrs	. N	JA fi	
/lethod	NQ2/S	<u>S</u>	<u>.</u>				ter used				12.2		t.
nspector	Venu						BF = BA						
_							(Mea	isured f	rom gr	ound	surfac) (e)	

GEO			APPA CH	C. NUTTING COMPANY LACHIAN REGION - 912 MORRIS STREET IARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE OWNED TAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCIN (51	DRATE CEN KEN PARK [iNATI, OH 45 3) 321-5816 (513) 321-02	TER CENTI DRIVE 790 M 5226 COLL (1	RAL OHIO REGIK MORRISON ROA UMBUS, OH 4322 614) 863-3113 X (614) 863-0475	D 349 WA IO LAWR	NDIANA RE ALNUT STR ENCEBUR (812) 539-4 AX (812) 53	GION REET, STE 3, IN 4702 4300	E8 4	BLUEC 170-B COI LEXING (85	GRASS REC WAY CT., GTON, KY 4 59) 455-853((859) 455-86	STE B- 0511)
Client		_A	meric	an Electric Power			Boring No			B-0	606				
Project		J	ohn Ai	mos Plant Access Road to Dewatering Islar	nd		Date Start	ed	3/6/2006	5					
Boring L	ocation		539,3				Date Com	pleted	3/6/2006						
Elevatio		F	rovide	d by American Electric Power			Work Orde	•	90979.0						
ELEV.	DEPTH	T			1				SAMPLE						
ft.	ft.	colc		DESCRIPTION OF MATERIALS rial description, moisture, stiffness/density/hardness			DEPTH	BLOWS			W	LL	PI		PP
746.30	0.0]		sual classification unless otherwise noted)	NO.	TYPE	ft.	(N Valu	ie) %	%	%	%	%	HCSI	ts
				Brown, SANDY LEAN CLAY, trace rock fragments, moist, soft	1	SS	0.0-1.5	1-2-2	2 67						
741.30	- 5.0		5.0												
41.50				Brown, SANDSTONE, fine to medium grained, completely weathered, very soft	2	SS	5.0-6.5	4-7-7 (14)	100						
			5.5												
735.80	<u>10.5</u>			Brown, SHALE, laminated, highly weathered, very soft	3	SS	10.0-11.5	8-12-1 (29)	7 100						
-			4.5												
731.30	15.0	\leq													
-	_	WWW		Reddish brown and gray, SHALE, laminated, moderately weathered, very soft	4	SS	15.0-16.5	9-27-3 (63)	6 100						
-	-	MMM/	5.2												
26.10	_20.2	\leq													
25.30	21.0		0.8	Brown, SANDSTONE, fine grained,	5	NQ2	20.0-20.2	50/0.2		80				2-3	
		\geq		moderately weathered, soft - medium		NINGS/	20.2-20.7		100						
ŀ	- [\leq	2.3	Gray, SHALE, laminated, faintly]					
23.00	- 23.3		,	weathered, soft	2	NQ2	20.7-25.7		100	58				2	
ļ		\leq		Vertical fracture from 21.3' to 21.5'						1					
-	_	\geq		Reddish brown, SHALE, faintly											
	_	\leq		weathered, soft											
	-	\leq	6.6												
ŀ	-	\leq													
ŀ	-	\geq			3	NQ2	25.7-30.7		94	72				2	
+	-	\leq			i										
16.40	29.9		0.8	Gray, SHALE, faintly weathered, soft	1										
15.60	<u>30.7</u>	2	0.0	BORING COMPLETED @ 30.7'									1		
	-														
Ger	neral Not			Remarks			· · ·	-	Wa	ater Le	evel C)bser	vatio	ns	
riller	Williar	ms							mmediate			NV			t.
ig No.									At Complet	ion _		N			t.
ig Type	Trac		\vdash						After	۔ انسام حط ا	24 ling	Hn		NA f	
lethod spector	NQ2/S		-					`	Nater used BF = BA		-	NNA7 -	20.2		Γ.
opeolor	v C(II	u	- I							asured					

GEO			CH EMPLO	ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 //EE OWNED VTAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCI	PORATE CEI NKEN PARK NNATI, OH 4 13) 321-581 (513) 321-0	NTER CENT DRIVE 790 1 15226 COLI 6 (PG OF RAL OHIO REGION MORRISON ROAD UMBUS, OH 43230 (614) 863-3113 X (614) 863-0475	I 349 W/ LAWR	NDIANA REG ALNUT STRI ENCEBURG (812) 539-4: AX (812) 539	GION EET, STE 5, IN 4702 300 I-4301	8 4	BLUE \$70-B CO LEXIN (85	GRASS REC NWAY CT., GTON, KY 4 59) 455-853 (859) 455-86	STE E 40511 0
Client		A	Americ	an Electric Power			Boring No)		B-06	607				
Project		J	ohn A	mos Plant Access Road to Dewatering I	sland		Date Starl	ted	3/6/2008	6					
Boring L	ocation	N	1 539,0	042.2 E 1,727,354.8			Date Com	pleted	3/6/2006	6					
Elevatio	n Ref.	F	Provide	ed by American Electric Power			Work Ord	er No.	90979.0	67					
ELEV.	DEPTH	1		DESCRIPTION OF MATERIALS					SAMPLE						
ft.	ft.	colo	or, mate	rial description, moisture, stiffness/density/hardne	ss		DEPTH	BLOWS/6	6" REC	. RQD	W	LL	PI	HCSI	P
740.60	0.0]	(v	isual classification unless otherwise noted)	NO	. TYPI	E ft.	(N Value) %	%	%	%	%		t
	-		5.0	Brown, SANDY LEAN CLAY, trace organics, trace cinders, moist, mediun stiff	n 1	SS	0.0-1.5	4-2-4 (6)	100						
735.60	5.0			Brown, SHALE, completely weathered	I,			3-4-5				- - -			
			5.0	very soft	2	SS	5.0-6.5	(9)	100						
730.60	10.0	NWWN		Reddish brown, SHALE, completely	3	SS	10.0-11.5								
	-	<u>wwww</u>	5.0	weathered, very soft			10.0-11.3								
705 00	-	\geq			1										
725.60	15.0	\leq		Gray, SHALE, laminated, moderately	4	SS	15.0-15.4						-		
704.00	- 40.0	\sim	1.6	weathered, soft	1	NQ2	15.5-16.0		100	0				2	
724.00	16.6	MMM		Reddish brown, SHALE, slightly weathered, soft											
	_	WWWW	4.8		2	NQ2	16.0-21.0		90	70				2	
719.20	<u>- 21.4</u> -			Gray, SANDSTONE, fine grained, faint weathered, soft - medium hard	ly										
715.30	- 25.3		3.9	Vertical fracture from 24.6' to 24.8'	3	NQ2	21.0-26.0		100	90				2-3	
713.10	- 27.5	WWW	2.2	Gray and reddish brown, SHALE, laminated, slightly weathered, soft											
712.10	28.5		1.0	Gray, SHALE, slightly weathered, extremely soft Gray, SANDSTONE, fine grained, fresh soft - medium hard	4	NQ2	26.0-31.0		100	58				3-0	
	-		6.5	on mountifier											
					5	NQ2	31.0-35.0		98	88				2-3	
705.60 Ger Driller	35.0 neral No Willia			BORING COMPLETED @ 35.0'Remar	ks	<u> </u>		Im	Wa mediate	ter Le	vel O	bser		ns fi	 t
Rig No.								At	Completi	ion _	0.1	NV	V	ft	t.
Rig ⊤ype ∕lethod								Af	ier ater used		24	_ Hrs	s. <u> </u>	NA_ft 5 ft	

GEO			APP/ CI	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 YEE OWNED NTAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCII (5	PORATE CEI VKEN PARK NNATI, OH 4 (13) 321-581 (513) 321-0	NTER CENT DRIVE 790 / 5226 COLU 3 (PGOF RAL OHIO REGIOI MORRISON ROAD JMBUS, OH 43230 614) 863-3113 X (614) 863-0475	N II 349 WA LAWRI FA	NDIANA REG ALNUT STRI ENCEBURG (812) 539-4: AX (812) 539	GION EET, STE 3, IN 47025 300 94301	8 4	BLUEGR 70-B CONW LEXINGT (859)	AY CT.,	STE 0511)
Client		A	meric	an Electric Power			Boring No			B-06	608				
Project		J	ohn A	mos Plant Access Road to Dewatering Isla	nd		Date Start	ed	2/27/200)6					
Boring L	ocation			877.6 E 1,727,472.3			Date Com	- nleted	3/3/2006						
Elevation				ed by American Electric Power			Work Orde	• -	90979.0						
ELEV.	DEPTH		101100	Su by Anterican Electric i ower			WOIR Old		SAMPLE						
ft.	ft.			DESCRIPTION OF MATERIALS			DEPTH	BLOWS			W	LL	PI		Р
				erial description, moisture, stiffness/density/hardness risual classification unless otherwise noted)										HCSI	
825.90	0.0	<u>)</u> 	1	Reddish brown, LEAN CLAY with	NO	TYPI	ft.	(N Value	·	%	%	%	%		1
	-			SAND, trace gravel, moist, medium stiff	1	SS	0.0-1.5	2-2-3 (5)	100						
			5.0												
820.90	5.0				-		5050	5010.0	100						
	_		1	Brown, SANDSTONE, fine grained, moderately weathered, soft - medium	2		5.0-5.2 5.2-5.8	50/0.2	100	100				2	
		1-1-1	3.3		<u> </u>				100	1					
}	_	$\langle \vee \vee \rangle$	1		1										
817.60	- 8.3		<u> </u>	2	2	NQ2	5.8-10.8		100	34				2-3	
 	_	\leq		Brown, SHALE, laminated, highly weathered, soft	2	1.002	0.0 10.0		100	0.4				- "	
	_	\leq		Vertical fracture from 9.2' to 9.8'					1	1					
Ţ		<pre>>WWWWWW</pre>													_
ŀ	_	\geq	6.5												
ŀ	_	\geq	0.0			1									
	_ i	8													
İ		\geq			3	NQ2	10.8-15.8		100	10				2	
811.10	14.8	N													
	-	× , ×/.		Gray, SILTSTONE, moderately	1	1									
F	-	~ <u>/</u> ~	2.3	weathered, soft		-									
808.80	_ 17.1	~` <u>~</u> `													
				Brown, SANDSTONE, fine grained,	1										
1	-			micaceous, moderately weathered, medium hard - hard	4	NQ2	15.8-20.8		96	74			12	2-4	
-	-	1.1.1		niculum natu - fialu		1						l			
-	_ ł														
	_ ^	/~~				-									
	- k		8.8			ļ									
-	- !	/~~			1	1									
ŀ	- ł				5	NOO	20 0 25 0		100	00	1				
	_	/~~		High angle fracture at 23.6'	5	NQ2	20.8-25.8		100	90			13	3-4	
1	ł			9	ĺ	1								ĺ	
800.00	25.9	~~~		Shale layer at 25.2'											
	-	~~~	1.0	Gray, SANDSTONE, fine to medium		1		·						-	
799.00	26.9			grained, micaceous, moderately											
	. 1	\geq		weathered, medium hard						1					
	. .	\leq	3.9	Brown, SHALE, laminated, moderately	6	NQ2	25.8-30.8		100	38			3	-2	
F	· -	\leq	0.0	weathered, soft		1									
705 10	30.8	\leq								Ì	ļ			Ì	
<u>795.10</u>	- 30.0 ·	\leq		Brown, SANDSTONE, fine grained,											_
793.90	32.0	1	1.2	moderately weathered, medium hard	[
Ţ		\sim		Gray and brown, SHALE, laminated,											
F	·	\leq	2.4	moderately weathered, soft	7	NQ2	30.8-35.8		100	54			3	-2	
791.50	34.4	\leq					ļ			ļ					
		~~						·							
	neral Not			Remarks						ater Le	vel O		vations		
Driller	Willia	ms							nmediate	_		N۷	-	ft	
Rig No.								-	t Completi	ion _		NV		ft	
Rig Type	Trac								fter	_	24	_ Hrs			
/lethod	NQ2/5							v	Vater used		0		5.2	ft	
nspector	Venu/E	3 B	1						BF = BA	CKEILI		N// -		TEP	

GEO			CH EMPLOY	LACHIAN REGION - 912 MORRIS STREET ARLESTON, WV 25301 ⁻ (304) 344-0821 FAX (304) 342-4711 EE OWNED TAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCI (5	PORATE CEN NKEN PARK NNATI, OH 4 13) 321-5816 (513) 321-02	VTER CENT DRIVE 790 / 15226 COLI 6 (IGOF RAL OHIO REGION WORRISON ROAD UMBUS, OH 43230 614) 863-3113 X (614) 863-0475	li 349 WA LAWRI FA	NDIANA REG LINUT STRI ENCEBURG (812) 539-4 X (812) 539	GION EET, STE 6, IN 4702 300 1-4301	E8 4	BLUE 470-B COI LEXING (85	GRASS REG NWAY CT., GTON, KY 4 59) 455-853 (859) 455-80	STE 8 40511
Client		A	merica	an Electric Power			Boring No			B-06	508				
Project		Jo	ohn Ar	nos Plant Access Road to Dewatering Is	land		Date Start	ed	2/27/200)6					
Boring L	ocation	N	538,8	77.6 E 1,727,472.3			Date Com	pleted	3/3/2006	5					
Elevatio	n Ref.	Р	rovide	d by American Electric Power			Work Ord	er No.	90979.0	67					
	DEDTU					÷		S	AMPLE						-
ELEV. ft.	DEPTH ft.	1	r, mater	DESCRIPTION OF MATERIALS ial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	s NO	. TYPE	DEPTH E ft.	BLOWS/6' (N Value)	REC.	RQD %	W %	LL %	PI %	HCSI	Pl t
787.50	_ _ 38.4_		4.0	Brown, SANDSTONE, fine grained, micaceous, vertical fracture from 34.8' to 35.4', highly weathered, soft - medium hard (<i>LAYER CONTINUED</i> <i>DESCRIPTION REPEATED</i>)	- 8	NQ2	35.8-40.8		100	82				3-0	
787.10	38.8		0.4	Gray, SILTSTONE, moderately weathered, soft Gray, SHALE, laminated, slightly		11G2			100	02	1			0-0	
			8.6	High angle fracture at 41.9	9	NQ2	40.8-45.8		100	90				0-2	
778.50	- 47.4 		3.4	Brown, CLAYSTONE, slightly weathered, soft - extremely soft	10	NQ2	45.8-50.8		100	96				0-2	
775.10	<u>50.8</u> 		6.6	Gray, SHALE, thinly laminated, slightly weathered, soft	11	NQ2	50.8-55.8		100	84				2	
768.50	- 57.4 - 58.5 -		1.1	Brown, SANDSTONE, fine grained, micaceous, high angle fracture at 57.5' to 57.7', moderately weathered, soft - medium hard	12	NQ2	55.8-60.8		100	84				2-3	
762.20	63.7		5.2	Brown, SANDSTONE, fine grained, micaceous, slightly weathered, medium hard Gray, SANDSTONE, fine grained,	13	NQ2	60.8-65.8		100	92				3	
759.80	– _ 66.1		2.4	micaceous, vertical fracture from 63.8' to 64.1', faintly weathered, medium hard											
758.50	- 67.4 -		1.5	Dark gray, SHALE, thinly laminated, faintly weathered, very soft Black, COAL, blocky, fresh, soft	14		65.8-70.8		00	44				1.0	
-	-		4.4			NQ2	00.0-70.8	Ţ	92	44				1-2	
Driller Rig No. Rig Type	Willia	ms xk		Remark	(S			At At	nediate Complet er	_	24)bser N\ Hr	W W rs	f f NA f	ft. ft. ft.
Vethod	NQ2/ Venu/l							Wa	ter usec	ı ın drill	ling		5.2	f	ft.

GE			APPA CH	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 REE OWNED	611 LUN CINCIN (51	ORATE CEM KEN PARK INATI, OH 4 (3) 321-5810 (513) 321-02	VTER CENT DRIVE 790 M 5226 COLL 6 (6	GOF RAL OHIO REGION MORRISON ROAD JMBUS, OH 43230 514) 863-0475	li 349 WA LAWRI	NDIANA REG LINUT STRI ENCEBURG (812) 539-41 X (812) 539	310N EET, STE 5, IN 4702 300	8 4	BLUEG 70-B CON LEXING (85)	RASS REC IWAY CT., STON, KY 4 9) 455-8530 859) 455-86	STE B-8 10511 0
Client		ŀ	Americ	an Electric Power			Boring No.			B-06	608				
Project	t		John A	mos Plant Access Road to Dewatering Islar	nd		Date Start		2/27/200						
	Location		1 538,8				Date Com		3/3/2006		_				
Elevatio				ed by American Electric Power			Work Orde		90979.0						
							WORK OTHE		AMPLE						
ELEV.				DESCRIPTION OF MATERIALS rial description, moisture, stiffness/density/hardness			DEPTH	BLOWS/6			W	LL	PI		PPF
ft.	ft.			isual classification unless otherwise noted)	NO.	TYPE	E ft.	(N Value)	%	%	%	%	%	HCSI	tsf
754.10	71.8			Black, COAL, blocky, fresh, soft (LAYER CONTINUED DESCRIPTION REPEATED)											
753.10	72.8	\leq	1.0	, , , , , , , , , , , , , , , , , , , ,		1									
	_			Gray, SANDSTONE, fine grained, faintly weathered, medium hard	15	NQ2	70.8-75.8		80	64				1-3	
	<u> </u>		4.4												
740 70	- 77.2		1												
140.10		Š	:	Gray, SHALE, laminated, fresh, soft -											
740.00	70.0	\mathbb{N}	2.1	medium hard	16	NQ2	75.8-80.8		100	100				3-2	
746.60	- 79.3	1		Gray, SILTSTONE, fresh, medium hard	-						:				
		1	3.0												
- 10 00		1.	1 0.0												
743.60	- 82.3	Ž		Gray, SHALE, thinly laminated, fresh,											
	-	\leq		soft - medium hard	17	NQ2	80.8-85.8		100	100				2-3	
	-	8				Ì									
		N												1	
	-	\leq													
	-	N													
	-	2	127	Vertical fractures from 88.3' to 88.5' and	18	NQ2	85.8-90.8		100	50				2-3	
	-	\leq	12.1	88.7' to 89.0'										Í	
		\geq													
	-	\otimes						-							
	-	W													
	-	\otimes			19	NQ2	90.8-95.8		98	58			[21	
	-	\geq			10	1106	50.0-50.0		30	50				3-1	
730.90	95.0	\sim		Poddish brown SUALE fresh wares											
	-	\sim		Reddish brown, SHALE, fresh, very soft											
	L I	\leq	3.2							1					
727.70	- 98.2	\sim													
				Gray, SANDSTONE, fine grained, slightly weathered, medium hard	20	NQ2	95.8-100.8		100	90				1-3	
		/~~	20	Signuy weathered, medium nard	-										
			3.8	ļ				<u> </u>						_	
723.90	102.0														
		\geq	1.4	Gray, SHALE, laminated, fresh, soft											
722.50	<u>- 103.4</u> -		1.6	Reddish brown, SHALE, fresh, very soft	21	NQ2	100.8-105.8		98	86				3-1	
20.90	105.0 eneral No			Remarks				1	10/-	iter Le		been	untin		
Driller	Willia			Remarks				Imr	vva nediate	uei Le	veiU	DServ NV		is fi	t.
lig No.							-		Completi	on _		NV			t.
Rig Type								Afte	er	_	24	Hrs		IA ft	t.
1ethod	NQ2/					_		Wa	ter used		•		5.2	ft	t.
nspector	r Venu/l	ы.ы.							BF = BA	CKELL	ED 1	$\sqrt{M} =$	NOW	ATER	

TEST BORING JOHN AMOS DEWATERING PLANT ACCESS ROAD.GPJ HC NUTTING.GDT 10/25/11

			APP/ Cł EMPLOY	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 YEE OWNED	611 LUN CINCIN	ORATE CEN KEN PARK 1 {NATI, OH 4 13) 321-5816	TER CENTR DRIVE 790 M 5226 COLU	G OF RAL OHIO REGIO IORRISON ROAD MBUS, OH 43230 14) 863-3113	N II 349 WA LAWRI	NDIANA REC ALNUT STRE ENCEBURG (812) 539-43	GION EET, STE 5, IN 4702	8 4	BLUEG 70-B CON LEXING	BRASS RE(WAY CT., STON, KY 4 9) 455-853	STE 8-8 10511
	OTECHNICA	L, ENVI	RONME	NTAL AND TESTING ENGINEERS SINCE 1921	FAX	(513) 321-02	94 FAX	(614) 863-0475	FA	AX (812) 539	4301			(859) 455-8	
Client			Americ	an Electric Power			Boring No.			B-06	508				
Project	t		lohn A	mos Plant Access Road to Dewatering Isla	nd		Date Starte	ed _	2/27/200)6					
Boring	Location	1	1 538,8	877.6 E 1,727,472.3			Date Comp	oleted	3/3/2006	6					
Elevatio	on Ref.	F	Provide	ed by American Electric Power			Work Orde	er No.	90979.0	67					
ELEV.	DEPTH			DESCRIPTION OF MATERIALS			_		SAMPLE						
ft.	ft.		or, mate	rial description, moisture, stiffness/density/hardness isual classification unless otherwise noted)	NO.	TYPE	DEPTH ft.	BLOWS (N Valu		. RQD %	W %	LL %	PI %	HCSI	PPF tsf
<u>719.3</u> 0	106.6		1.6												
717.30	108.6	WW	2.0	Reddish brown, SHALE, laminated, few slickensided surfaces, fresh, soft - very soft	22	NO2	105.8-110.8		98	82				2-1	
			1.2	Gray, SHALE, laminated, slightly		THOSE .	100.0-110.0		50	02	ł			2-1	
716.10	109.8	\geq	- 1.2	_ weathered, soft											
713.80			2.3	hard											
		1		Shale interbed at 110.9' to 111.6'	4										
	_		3.3	Gray, SHALE, laminated, faintly weathered, soft	23	NQ2	110.8-115.8		98	82				3-2	
710.50	115.4	\leq			4										
			•	Gray, SANDSTONE, fine grained, faintly weathered - moderately weathered, medium hard - soft											
			6.1	Vertical fracture from 118.6' to 120.3'	24	NQ2	115.8-120.8	a	100	44				3-2	
	-														
704.40 703.30			1.1	High angle fracture (60°) from 120.8' to											
		WWW		Brownish gray to gray, SHALE, laminated, slightly weathered, soft Reddish brown, SHALE, laminated, slightly weathered, very soft	25	NQ2	120.8-125.8		100	72				2-1	
	-		5.5												
697.80	_ _128.1	MM													
	-	WWW	, -	Reddish brown and gray, SHALE, moderately weathered, extremely soft - very soft	26	NQ2	125.8-130.8		98	82			1	1-0	
93.40		WWW	4.4												
93.40 92.30	132.5		1.1	Brown and gray, SANDSTONE, fine grained, slightly weathered, medium	27	NQ2	130.8-135.8		100	88				0-3	
	-	MMM		hard/ Browish gray to gray, SHALE,											
		MM	60	laminated, moderately fractured, slightly weathered, soft - medium hard Sandstone interbed at 135.1' to 135.8'											
	_	NNNNN	6.9	Horizontal fracture at 136.1' Vertical fracture from 137.7' to 137.9'	28	NQ2	35.8-140.8		100	54				2-3	
Ge	eneral Not	tes		Remarks					Wa	ater Le	vel O	bserv	/atior	າຣ	
riller	Willia	ms						lr	nmediate			NV	V	f	t.
ig No.								A	t Completi	ion –		NV			t.
ig Type								A	fter	_	24	Hrs	sN	NA fi	t.
lethod	NQ2/							V	/ater used		0		5.2	fi	t.
spector	r Venu/I	B.B.							BF = BA	CKEILI		MM -		ATER	

TEST BORING JOHN AMOS DEWATERING PLANT ACCESS ROAD GPJ HC NUTTING GDT 10/25/11

GEO		NUMBER OF STREET	APPA CH EMPLOY	C. NUTTING COMPANY LACHIAN REGION - 912 MORRIS STREET IARLESTON, WV 25901 (304) 344-0821 FAX (304) 342-4711 EE OWNED	611 LUN CINCIN (51	ORATE CE IKEN PARK NNATI, OH 13) 321-581 (513) 321-0	NTER CENT DRIVE 790 M 15226 COLU 6 (f	CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC CALC	349 WA LAWRE	NDIANA REG LNUT STRI ENCEBURG (812) 539-4 X (812) 539	GION EET, STE 3, IN 4702 300 9-4301	8 4	BLUEC 70-B CON LEXING (85	3RASS RE(WAY CT., 3TON, KY 4 99) 455-8534 (859) 455-86	STE E 10511 0
Client		A	merica	an Electric Power			Boring No.			B-06	<u>608</u>				
Project		J	ohn Ar	mos Plant Access Road to Dewatering Isl	and		Date Start	ed	2/27/200)6					
Boring L	ocation	N	1 538,8	377.6 E 1,727,472.3			Date Com	pleted -	3/3/2006	;					
Elevatio				d by American Electric Power			Work Orde	• -	90979.0						
			Tovido				Work Orde		SAMPLE						
ELEV.	DEPTH			DESCRIPTION OF MATERIALS rial description, moisture, stiffness/density/hardness			DEPTH	BLOWS	1		W	LL	PI		P
ft.	ft.	COID		sual classification unless otherwise noted)	NO.	. TYP	Ξ ft.	(N Value		%	%	%	%	HCSI	t
685.40 684.30	<u> 140.5 </u>	M	1.1	Reddish brown, SHALE, laminated,	1										
		<u>wwwwww</u>	4.9	Brown, SHALE, laminated, fresh, soft Vertical fracture from 142.1' to 142.2'	29	NQ2	140.8-145.8		100	52				2	
679.40	<u>146.5</u> - -	MWWWWWW	5.3	Reddish brown and gray, SHALE, slightly weathered, very soft - soft 30° fracture at 149.1'	30	NQ2	145.8-150.8		86	32				1-2	
674.10	151.8			Reddish brown, CLAYSTONE, moderately weathered, very soft	31	NQ2	150.8-155.8		100	26				1-2	
			11.5	No recovery from 155.8 ft to 160.8 ft (inner barrel did not latch).	32	NQ2	155.8-160.8		0	0				1	
662.60	- - - 163.3			Brown and reddish brown, SHALE,	- 33	NQ2	160.8-165.8		98	24				1-2	
	-	WWWWW	5.3	slightly weathered, very soft - soft Vertical fracture from 164.0' to 164.3' 10° fracture at 166.0' and 166.9'											
357.30	168.6			Horizontal fracture at 167.7' Gray and reddish brown, SHALE, thinly laminated, slightly weathered, soft	34	NQ2	165.8-170.8		96	74			1	1-2	
354.60	- - 171.3		2.7	Gray, SANDSTONE, fine grained, fresh,					-						
	-		4.1	medium hard - hard	35	NQ2	170.8-175.8		100	98				3-4	
Ger Driller Rig No. Rig Type Method	veral No Willia Trat NQ2/	ims 		Remark	s		······	A	Wa mmediate t Complet tfter Vater usec	_	24	bser N\ N\ Hr	N	f f <u>NA</u> f	t. t. t.
nspector	Venu/	B.B.		•					BF = BA (Me	CKFILI					

GEO	TECHNICAL	2	APPAI CH/	C. NUTTING COMPANY ACHIAN REGION - 912 MORRIS STREET ARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 E OWNED	611 LUNI CINCIN (51	DRATE CEN KEN PARK I INATI, OH 4 13) 321-5816 (513) 321-02	ITER CENTR DRIVE 790 M 5226 COLU 6 (6	G OF AL OHIO REGION IORRISON ROAD MBUS, OH 43230 14) 863-3113 (614) 883-0475	li 349 WA LAWRI	NDIANA REF LINUT STR ENCEBURG (812) 539-4 X (812) 539	GION EET, STE 3, IN 4702 300	8 4	BLUEC 70-B COI LEXING (85	CRASS REC NWAY CT., GTON, KY 4 59) 455-853 (859) 455-85	GION STE B-8 40511 0
Client		An	nerica	n Electric Power			Boring No.			B-00	608				
Project				nos Plant Access Road to Dewatering Isla	ind		Date Starte		2/27/200						
	ocotion					_	Date Com		3/3/2006						
Boring L			538,8												
Elevation	n Ref.	Pro	ovideo	by American Electric Power			Work Orde		90979.0 AMPLE						
ELEV.	DEPTH			DESCRIPTION OF MATERIALS			DEPTH	BLOWS/6		-	W	LL	PI		PPF
ft.	ft.	color,		al description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO.	TYPE	1	(N Value)		%	%	%	%	HCSI	tsf
650.50	175.4	1		Gray and reddish brown, SHALE,	_										
		\geq	2.2	laminated, slightly weathered, soft											
	-	\sim	3.2												
647.30	178.6	\leq		High angle fracture (60°) at 177.7'	36	NQ2	175.8-180.8		100	80				2-3	
645.10	180.8		2.2	Gray, SANDSTONE, fine grained, faintly weathered, medium hard High angle fracture (60°) from 178.8' to \179.1' and 179.8' to 179.9'	/										
	_		4.0	Reddish brown, SHALE, laminated, slightly weathered, soft	37	NQ2	180.8-185.8		94	50				2-1	
641.10	184.8 -			Reddish brown, CLAYSTONE, slightly weathered, very soft		-			-						
-	_				38	NQ2	185.8-190.8		94	32				1	
			11.1		39	NQ2	190.8-195.8		100	42				1	
630.00	<u>195.9</u> - - 200.0		4.1	Gray, SANDSTONE, fine grained, faintly weathered, medium hard	40	NQ2	195.8-200.8		96	86				3	
-	-		11.4	Reddish brown, SHALE, thinly laminated, faintly weathered, soft	41	NQ2	200.8-205.8		100	96				2	
	-		- T		42	NQ2	205.8-210.8		100	100				2	
	neral Not			Remarks	5			1		ater Le	vel C				E4
Driller ⊇ia No	Willia	1115	\vdash						mediate	-		<u></u> N'			ft. ft.
Rig No. ⊇ia Type	Troo		-					At	Complet er	uUII -	24	Hr			nt. ft.
Rig Type Method Inspector	Trac NQ2/ Venu/E	SS		· · · · · · · · · · · · · · · · · · ·					ater used BF = B/		ling LED	NW =	5.2 NO V	VATER	ft.

GEO			MPLOY	ARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE OWNED TAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINC! (5	ORATE CE IKEN PARK NNATI, OH 13) 321-581 (513) 321-0	DRIVE 790 M 45226 COLU 6 (6	AL OHIO REGION ORRISON ROAD MBUS, OH 43230 14) 863-3113 (614) 863-0475	349 WA LAWRI	NDIANA REG LINUT STRI ENCEBURG (812) 539-4 X (812) 539	EET, STE 5, IN 4702 300		170-B CON LEXING (859	BRASS REG WAY CT., STON, KY 4 9) 455-8530 859) 455-86	STE 10511 0
Client		Ar	nerica	an Electric Power			Boring No.			B-06	608				
Project		Jo	hn Ar	nos Plant Access Road to Dewatering Islar	nd		Date Starte	ed	2/27/200	06					
Boring L	ocation	N	538,8	77.6 E 1,727,472.3			Date Comp	oleted	3/3/2006	3	-				
Elevatio	n Ref.	Pr	ovide	d by American Electric Power			Work Orde	r No.	90979.0	67					
	DEPTH								SAMPLE						
ELEV. ft.	ft.		, mater	DESCRIPTION OF MATERIALS ial description, moisture, stiffness/density/hardness sual classification unless otherwise noted)	NO	. TYP	DEPTH E ft.	BLOWS/6 (N Value)		. RQD %	W %	LL %	PI %	HCSI	P
<u>614.50</u> 613.70	<u>211.4</u> 212.2		0.8	Reddish brown, SHALE, thinly laminated, faintly weathered, soft \ <u>(LAYER CONTINUED DESCRIPTION</u>	\vdash										
013.70		NVVV	2.8	Gray, SANDSTONE, fine grained, faintly weathered, medium hard - hard	43	NQ2	2 210.8-215.8		100	100				2-4	
610.90	215.0			Gray, SHALE, thinly laminated, fresh, medium hard										1	
			4.0	Gray, SANDSTONE, fine grained, fresh, medium hard Shale interbed at 216.6' to 217.4'											
606.90	219.0			Reddish brown, SHALE, laminated,	44	NQ2	215.8-220.8		100	96				3-2	
		WWW	3.7	claystone interbed at 221.0' to 221.3', faintly weathered, soft - medium hard											
603.20	222.7			Reddish brown, CLAYSTONE,	45	NO2	220.8-225.8		100	52				3-2	
			5.8	slickensided surfaces, few shale interbeds, few thin clay seams, faintly weathered, soft											
597.40		×,		Gray, SANDSTONE, fine grained,	46	NQ2	225.8-230.8		100	74				2-4	
	_			micaceous, medium to thinly bedded, fresh, medium hard - hard											
	-		8.5		47	NQ2	230.8-235.8		96	100				3-4	
588.90	237.0											-			
	-		5.6	Reddish brown to gray, SILTSTONE, very thinly bedded, clayey upper 1.5', faintly weathered, soft - medium hard	48	NQ2	235.8-240.8		100	100				4-2	
583.30	242.6														
	-			Gray, SANDSTONE, fine grained, medium bedded, micaceous, faintly weathered - fresh, hard	49	NQ2	240.8-245.8		100	100				2-4	
Gei	neral No	tes		Remarks		1	<u>. </u>		Wa	ater Le	vel C	bser	vatio	ns	
Driller	Willia	ms						In	nmediate	-		N\	-		ft.
Rig No.								At	Complet	tion		N۱			ft.
Rig Type	Tra								ter	_	24	_ Hr			ft.
Nethod	NQ2/		 					W	ater used		÷		5.2		ft.
nspector	Venu/	B.B.						I	BF = BA	ACKFIL	LED	NW =	NOW	/ATER	

GEO			CHAR	ACHIAN REGION - 912 MORRIS STR RLESTON, WV 25301 (304) 344-082 FAX (304) 342-4711	21	611 LUNK CINCINI (51:	DRATE CEN KEN PARK NATI, OH 4 3) 321-5816 513) 321-02	TER CENTR DRIVE 790 M 5226 COLU (6	GOF AL OHIO REGION ORRISON ROAD MBUS, OH 43230 14) 863-3113 (614) 863-0475	8 349 WA LAWRI	NDIANA REG LNUT STRI INCEBURG (812) 539-4: X (812) 539	GION EET, STE 3, IN 4702 300 94301	8 4	BLUEC 170-B COI LEXING (85	3RASS REC VWAY CT., 3TON, KY 4 39) 455-8531 (859) 455-86	STE B- 10511 0
Client		Am	nerican	Electric Power				Boring No.			B-06	608				
Project		Joh	nn Ame	os Plant Access Road to Dew	atering Island	d		Date Starte	ed	2/27/200)6					
Boring L	ocation	N 5	538,87	7.6 E 1,727,472.3				Date Comp	oleted	3/3/2006	6					
Elevatior	n Ref.	Pro	ovided	by American Electric Power				Work Orde	r No.	90979.0	67					
ELEV.	DEDTU				•				S	AMPLE						
ft.	DEPTH ft.	color,	material	ESCRIPTION OF MATERIALS I description, moisture, stiffness/dens ial classification unless otherwise not	sity/hardness	NO.	TYPE	DEPTH ft.	BLOWS/6 (N Value)	' REC. %	RQD %	W %	LL %	PI %	HCSI	PF ts
				Gray, SANDSTONE, fine grai medium bedded, micaceous, weathered - fresh, hard (LAY CONTINUED DESCRIPTION REPEATED)	faintly ′ER	50	NQ2	245.8-250.8		100	100				4	
			18.9			51	NQ2	250.8-255.8		100	100				4	
-						52	NQ2	255.8-260.8		100	100				4	
564.40 561.40			3.0 c	Light gray, SANDSTONE, me coarse grained, medium bedd conglomeratic, faintly weather Reddish brown, CLAYSTONE slickensided surfaces, slightly	ed, hard	53	NQ2	260.8-265.8		88	74				4-2	
	- - -			weathered, soft		54	NQ2	265.8-270.8		84	42				2	
	- - - -	2	0.5			55	NQ2	270.8-275.8		100	20				2	
	-					56	NQ2	275.8-280.8		92	72				2	
Ger Driller Rig No. Rig Type Method	Merai Note Williar Tract NQ2/S	nsk			Remarks				At	mediate Complet er a ter use c	- _ I in drill	24 ling	N\ N\ Hr	N N s 5.2	f f <u>NA</u> f	t. t. t.

GEO		APP C EMPLO	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 YEE OWNED	611 LUNH CINCIN (51)	RATE CEN EN PARK I NATI, OH 4 3) 321-5816 513) 321-02	TER CENTR DRIVE 790 M 5226 COLUI (6	G OF AL OHIO REGION ORRISON ROAD MBUS, OH 43230 14) 863-3113 (614) 863-0475	IN 349 WA LAWRE (FA	NDIANA RE(LNUT STRE ENCEBURG (812) 539-4: X (812) 539	GION EET, STE 5, IN 47025 300 1-4301	8 47	BLUEG 70-B CON LEXING (859	RASS REG WAY CT., ITON, KY 4 9) 455-8530 859) 455-86	STE B- 0511)
Client		Americ	can Electric Power			Boring No.			B-0 6	508				
Project		John A	Amos Plant Access Road to Dewatering Isla	nd		· Date Starte	ed	2/27/200	6					
Boring L	Location	N 538,	,877.6 E 1,727,472.3			Date Comp	oleted	3/3/2006	;					
Elevatio	on Ref.	Provid	ed by American Electric Power			Work Orde	er No.	90979.00	67					
	_							SAMPLE						
ELEV. ft.	DEPTH ft.	color, mat	DESCRIPTION OF MATERIALS erial description, moisture, stiffness/density/hardness visual classification unless otherwise noted)	NO.	TYPE	DEPTH ft.	BLOWS/6	" REC.	RQD %	W %	LL %	PI %	HCSI	PP tsi
540.90	_ _ _ 		Reddish brown, CLAYSTONE, slickensided surfaces, slightly weathered, soft <i>(LAYER CONTINUED</i> DESCRIPTION REPEATED)	57	NQ2	280.8-285.8		90	82				2-3	
	-	~ ~ ~ ~ 6.8 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Reddish brown to gray, SILTSTONE, medium bedded, slickensided surfaces, clayey, faintly weathered, soft - medium hard	58	NQ2	285.8-290.8		100	66				2-3	
34.10		5.0	Gray, SANDSTONE, very fine grained, thinly bedded, faintly weathered, medium hard - hard	59	NQ2	290.8-295.8		100	100				3-4	
529.10 525.90	296.8 - - 300.0	3.2	Gray to reddish brown, CLAYSTONE, slickensided surfaces, slightly weathered, soft	60	NQ2	295.8-300.0		90	64				4-2	
			BORING COMPLETED @ 300.0'											
	neral Not		Remarks						ater Le	vel O				
riller ig No. ig Type	Willian 	[·····					mediate Completi ter	ion _	24	NV NV Hrs	V	_	t. t. t.
ethod spector	NQ2/	SS						ater used BF = BA	CKFILI	l ing LED 1		5.2	f ATER	

TEST BORING JOHN AMOS DEWATERING PLANT ACCESS ROAD.GPJ HC NUTTING.GDT 10/25/11

			CH EMPLOY	LACHIAN REGION - 912 MORRIS STREET IARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 EE OWNED TAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCII (5)	ORATE CEN IKEN PARK NNATI, OH 4 13) 321-5816 (513) 321-02	NTER CEN DRIVE 790 5226 CO1	DG OF TRAL OHIO REGION MORRISON ROAD UMBUS, OH 43230 (614) 863-3113 XX (614) 863-0475	I II 349 WA LAWR	NDIANA REG LNUT STRI ENCEBURG (812) 539-4 X (812) 539	GION EET, STE G, IN 4702 300 9-4301	.8 4	BLUE(70-B CO) LEXIN((85	GRASS RE NWAY CT., GTON, KY 4 59) 455-853 (859) 455-8	STE 40511
Client		A	merica	an Electric Power			Boring No	D		B-06	609				
Project		J	ohn Ar	mos Plant Access Road to Dewatering Isla	and		Date Star	ted _	3/9/2006	6					
Boring L	ocation	N	538,8	13.6 E 1,728,060.6			Date Con	npleted	3/9/2008	3					
Elevatio			rovide	d by American Electric Power			Work Ord	ler No.	90979.0	67					
ELEV.	DEPTH		1	DESCRIPTION OF MATERIALS		_,	1		SAMPLE						
ft.	ft.	colo	or, mater	ial description, moisture, stiffness/density/hardness			DEPTH	BLOWS/	6" REC		W	LL	PI	HCSI	F
664.00	0.0]	(Vi:	sual classification unless otherwise noted)	NO	. TYPE	ft.	(N Value	e) %	%	%	%	%		
	L		}	Reddish brown, LEAN CLAY with SAND, moist, soft	1	ss	0.0-1.5	1-1-2	100						
			1.0					(3)							-
	F		4.0												
000.00															
660.00	4.0		· .	Reddish brown and brown, SANDY	-					1					
	F	\leq		SHALE, highly weathered, soft		-				<u> </u>					1
	 	\leq			2	SS	5.0-6.5	17-17-1 (30)	3 100						ł
		\leq						(30)							-
		\leq	7.0												
	F	\leq													
		\otimes													1
		\sim				+			-		<u> </u>				
653.00	11.0				3	SS	10.0-11.4	18-36-50/	5" 100						
]	_	\leq		Brown, SANDY SHALE, laminated, highly weathered - moderately		1									
		\geq	2.6	weathered, soft											
650.40	13.6	\geq			_										
r	_	\mathbb{N}		Reddish brown, SHALE, laminated, moderately weathered, extremely soft -	1	NQ2	11.4-16.4		98	58				2-0	
ľ		\otimes		soft											
	-	N													
	_	\leq				1		-							_
		\leq													
		N	9.8		-	NICO	10 1 01 1		100				l		
ŀ	_	\leq			2	NQ2	16.4-21.4		100	84				2-0	
ł	_	\leq			1						[ľ			
F	-	\geq													
Ļ	-	\leq											-		
640.60	- 22 /	\leq			3	NQ2	21.4-23.4		100	95			ŀ	2-0	
0.0U	- 23.4	~		BORING COMPLETED @ 23.4'											_
F	-	ļ					Î			Ì		Î		ļ	
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	-														
Ger	neral Not	es		Remarks	; ;		I		Wa	iter Le	vel O	bserv	vatio	าร	
riller	Willia	ms						In	nmediate	~*	. 3	NV			ť.
ig No.								A	t Completi	on _		NV			t.
ig Type	Trac					-			fter		24	_ Hrs	s. [BFf	t.
lethod	NQ2/		-					W	ater used				11.4		ŧ.
spector	Ven													ATER	

GEO		and the second second	APP. C	C. NUTTING COMPANY ALACHIAN REGION - 912 MORRIS STREET HARLESTON, WV 25301 (304) 344-0821 FAX (304) 342-4711 YEE OWNED NTAL AND TESTING ENGINEERS SINCE 1921	611 LUN CINCII (5	ORATE CE VKEN PARK NNATI, OH 13) 321-581 (513) 321-0	NTER CEN DRIVE 790 15226 COL 6	DG OF TRAL OHIO REGION MORRISON ROAD LUMBUS, OH 43230 (614) 863-3113 AX (614) 863-0475	349 W. LAWF	NDIANA RE ALNUT STF ENCEBURI (812) 539-3	GION REET, STE G, IN 4702 4300	E 8 4	BLUE 70-B CO LEXIN (8	GRASS REC DNWAY CT., IGTON, KY 4 59) 455-853 (859) 455-86	STE 8 40511 10
Client		A	meric	can Electric Power			Boring No	o.		B-0	610				
Project		Jo	hn A	mos Plant Access Road to Dewatering Isla	and		Date Star	ted	3/7/200	6					
Boring L	ocation	N	538,	986.3 E 1,728,717.8			Date Con	npleted	3/7/200	5					
Elevatio	n Ref.	Pr	rovide	ed by American Electric Power			Work Ord	• -	90979.0						
ELEV.	DEPTH								SAMPLE						
ft.	ft.	color		DESCRIPTION OF MATERIALS erial description, moisture, stiffness/density/hardness			DEPTH	BLOWS/			w	LL	PI	1	PI
638.20	0.0	1		visual classification unless otherwise noted)	NO	. TYP	E ft.	(N Value	e) %	%	%	%	%	HCSI	t
[000.20]	_			Brown, SANDY LEAN CLAY, trace organics (roots), moist, medium stiff	1	SS	0.0-1.5	1-4-5 (9)	100	+	70		70		
633.20	 		5.0												
			FO	Reddish brown, SHALE, completely weathered, very soft	2	SS	5.0-6.5	14-21-2 (46)	5 100						
628.20		WWWW S	5.0	Brown, SANDSTONE, fine grained,	3	SS	10.0-10.4	50/5"	100						
				weakly cemented, moderately weathered, soft		NQ2			74	40				2	
			9.3												
	- - - 19.3		1.1	Brown, SANDY SHALE, laminated,	2	NQ2	15.4-20.4		100	72				2-1	
617.80	<u>-20.4</u>			slightly weathered, very soft - soft Brown, SANDSTONE, fine grained, micaceous, slightly weathered, soft	-										
	- -		5.7		3	NQ2	20.4-25.4		92	54		4		2	
612.10	_ 26.1 - -			Reddish brown, SHALE, slightly weathered, very soft - soft	4	NQ2	25.4-30.4		94	70			i	2-1	
	-		5.5						-			-			
606.60 605.80 -	31.6 32.4		0.8	Gray, SANDY SHALE, laminated, faintly weathered, soft BORING COMPLETED @ 32.4'	5	NQ2	30.4-32.4		100	100				2	
Ger Driller Rig No. Rig Type	neral Not Willia Trac	ms		Remarks				At	Wa nmediate Complet	ater Le	evel O	bser NV NV	V V	fl	 t. t.
/lethod nspector	NQ2/ Ven	SS							ater used BF = BA		ling LED I		10.4 NO W	I ft VATER	t.



Arcadis 2016

Soil Boring Logs

MW-1601 to MW-1606, SB-1601 to SB-1607

JOB NUMBER	OH015976.0	007		LUG
	nerican Elect	ric Power		
PROJECT Joh	nn E. Amos Pl	ant CCR		
COORDINATES	N 538,186.6	E 1,731,490	.3	
GROUND ELEVA	TION 586.5	SYSTEM		
Water Level, ft	⊻ 18.5	Ţ	Ţ	
TIME				
DATE	4/26/2016			

BORING NO. <u>MW-1601</u>	DATE 7/19/16	SHEET	г <u>1</u>	OF	2
BORING START 4/25/	16 BORING F	INISH _	4/26/16		
PIEZOMETER TYPE NA	WELL	TYPE	OW		
HGT. RISER ABOVE GROUI	ND <u>3.0'</u>	DIA _	2"		
DEPTH TO TOP OF WELL S	CREEN <u>28.61</u> BO	гтом _	38.0'		
WELL DEVELOPMENT 5	/18 & 6/13/16 BAC	KFILL _	NA		
FIELD PARTY NA		RIG	Diedric	h	

SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1		SS	0.0	1.5	1/2"	0					No recovery.		
2		SS SS	1.5 3.0	3.0 4.5	1/2" 1/2"	3 5		-			Ash, fine sand, trace silt, trace medium and coarse angular sand and slag, saturated, very soft, dark grayish brown (10YR 4/2).		
4		ss	4.5	6.0	1-2-4/0"	7		-		CL	Clay, little silt, trace ash sand and gravel, moist,		
5	:	SS	6.0	7.5	2-5-5/0"	13		5		ML CL	\soft, reddish brown (5YR 4/3). Silt, little clay, medium stiff, low plasticity, moist, no dilatancy, dark gray (10YR 4/1). Clay, little silt, medium stiff, medium plasticity, moist, dark yellowish brown (10YR 4/4).		
6	:	SS	7.5	9.0	2-2-4/0"	12		-					
7	\$	SS	9.0	10.5	1-1-2/0"	12		- 10 –		CL	Clay, little silt, trace sand, very soft, medium plasticity, wet, dark yellowish brown with gray		
8 GPJ		SS	10.5	12.0	2-4-5/0"	16		-		CL	Note: dark yellowish brown (10YR 4/3) with <1mm thick black laminations from 10.5 to 10.7 feet.		
AEP.GDT - 7/19/16 15:49 - C:UUSERS\SBREWER\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ 1 1 1 0 6 1 1 1 0 6		SS SS	12.0 13.5	13.5 15.0	4-6-9/0" 4-7-11/0"	16 14		-			Clay, some silt, trace sand, stiff, low plasticity, moist, dark yellowish brown with dark brown and gray (10YR 4/6).		
AENTS/AEP	1	SS	15.0	16.5	3-5-7/0"	16		15 -		ML	Silt and very fine sand, little clay, moist, medium stiff, non plastic, strong brown and gray (7.5YR		
VER/DOCUI	2	SS	16.5	18.0	2-4-7/0"	16		-			9/6). Note: stiff from 16.5 to 18.0 feet.		
ERS/SBRE/	3	SS	18.0	19.5	4-4-6/0"	21		-		SP	Sand, fine grain, well sorted, angular to round little	Ţ	
SU::- 14	1	SS	19.5	21.0	3-2-1/0"	15					silt and decreasing to trace at 19.0 feet, stiff, wet (7.5YR 4/6).		
6 15:49			TYPE	OF C	ASING USED		T				Continued Next Page		
GDT - 7/19/1			NQ-2 R0 6" x 3.25 9" x 6.25	HSA HSA		411			OTTE	ED S	SCREEN, G = GEONOR, P = PNEUMÁTIC		
			<u>hw cas</u> <u>Nw cas</u> Sw cas	SING	VANCER	4" 3" 6"		WELL TY	/PE:	0\	W = OPEN TUBE SLOTTED SCREEN, GN	Л = G	EOMON
AEP			AIR HAN			8"					RECORDER <u>K. Eldridge</u>		

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. MW-1601
 DATE 7/19/16
 SHEET 2
 OF 2

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/25/16
 BORING FINISH
 4/26/16

 BORING NO. <u>MW-1601</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>2</u>

SAMPLE NUMBER	SAMPLE	SAN DEF IN F		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0 22.5	22.5 24.0	2-1-3/0" 2-2-3/0"	17 15					Note: trace silt and clay from 19.5 to 21.0 feet. Note: some clay from 20.7 to 20.9 feet. Note: trace silt and clay from 21.0 to 22.5 feet. Note: trace silt and clay from 22.5 to 23 feet.		
17	SS	24.0	25.5	3-4-7/0"	15		25 -	-		Note: <2% silt and clay, trace small black subrounded gravel from 24.3 to 25.5 feet.		
18	SS	25.5	27.0	3-5-6/0"	15					Note: black lenses 1-2 mm thick at 24.5 and 25 feet. Note: trace small black subrounded gravel, <2% silt and clay from 25.5 to 27 feet.		
19 20	SS SS	27.0 28.5	28.5 30.0	3-6-13/0" 6-10-13/0"	14 13			-		Note: dark brown to black horizontal lamination from 26.0 to 27.0 feet. Note: 5% silt and clay, dark yellowish brown from 27 to 27.5 feet. Note: sand, fine grain, well sorted, loose, 2% silt and clay, wet, strong brown, from 27.5 to 28.0		
21	SS	30.0	31.5	9-8-10/0"	20		30 -			feet. Note: lighter in color from 29.5 to 30.0 feet.		
22	SS	31.5	33.0	2-3-8/0"	15			-		Note: <2% silt and clay from 30.0 to 31.5 feet.		
23	SS	33.0	34.5	2-5-11/0"	7			_		Note: 2-3 mm thick laminations of gray clay from 32.5 to 32.6 feet. Note: sand, fine to medium grain, well sorted, loose, wet, gray, angular to round from 32.6 to		
24	SS	34.5	36.0	4-7-10/0"	12		35 -	_		33.0 feet. Note: 2-3 mm lamination of brown clay from 34.0 to 34.3 feet.		
25	SS	36.0	37.5	2-3-12/0"	2			_		Note: trace coarse sand, granules of coal from 34.5 to 36.0 feet. Note: trace coarse sand sized pieces of coal from 36.0 to 37.5 feet.		
26	SS	37.5	39.0	4-7-7/0"	9			_		Note: trace angular fine to coarse gravel from 37.5 to 39.0 feet.		
27	SS	39.0	40.5	6-6-9/0"	14		40 -	-	SP	Sand, fine grained well-sorted, angular to round, loose, grayish brown, wet (10YR 5/2).		
27 28 28	SS	40.5	42.0	6-6-8/0"	14							
AEP.GUI - //19/16 15:49 - C:USE										Note: 1-2 mm thick lamination of black coal from 40.0 to 40.5 feet. End of boring at 42.0 feet.		

JOB NUMBER	OH015976.0	007		LUG
	nerican Electi	ric Power		
PROJECT Joh	nn E. Amos Pl	ant CCR		
COORDINATES	N 537,031.1	E 1,730,894	.1	
GROUND ELEVA	TION 598.0	SYSTEM		
Water Level, ft	⊻ 15.8	Ţ	$ \Psi $	
TIME				
DATE	5/25/2016			

BORING NO. MW-1602A	DATE 7/19/16	SHEET	1	OF <u>3</u>	
BORING START 5/25/16	BORING FI	NISH <u>5</u>	/25/16		
PIEZOMETER TYPE NA	WELL	TYPE 0	W		
HGT. RISER ABOVE GROUND	3.0'	DIA 2			
DEPTH TO TOP OF WELL SCR	EEN 48.4' BOT	том 5	8.0'		
WELL DEVELOPMENT 6/14	1/2016 BACI	KFILL <u>N</u>	Α		
FIELD PARTY NA		rig <u>D</u>	iedric	h	

	NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	1	SS	0.0	1.5							Hydro-Vac 0.0 to 6.0 feet.		
	2	SS	1.5	3.0				-	-				
	3	SS	3.0	4.5				-	-				
	4	SS	4.5	6.0				5 -					
	5	SS	6.0	7.5	4-4-3/0"	6		-		GM	Small subangular gravel, some silt, trace medium sand, trace gravel, fine sand, stiff, moist, red brown, non plastic, no dilatancy (5YR 4/6).		
	6 7	SS SS	7.5 9.0	9.0 10.5	2-2-6/0" 4-6-7/0"	0 13		-			Note: gravel clogged in shoe from 7.5 to 9.0 feet.		
	8	SS	10.5	12.0	3-2-3/0"	12		10		SP CL	Fine sand, very uniform grain size, trace silt (3-5%), moist, medium stiff, no dilatancy, non plastic, moist (5YR 4/6). Silty clay, little silt, mottled red brown/gray, stiff,		
R\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ	9	SS	12.0	13.5	2-1-1/0"	0		-		<u>ML</u> SP	 high plasticity, no dilatancy (5YR 4/6-5YR 5/1). Fine sand, very uniform grain size, trace silt (3-5%), moist, medium stiff, no dilatancy, non plastic, moist (5YR 4/6). 		
EP\AEP WIN	10	SS	13.5	15.0	1-1-0/0"	16		15		SP SM	Fine sand, some silt, trace organics, roots, wood, soft, moist, medium dilatancy, low-no plasticity (5YR 5/1).		
UMENTS/A	11	SS	15.0	16.5	1-1-1-0/0"	16		-			Note: color change 5YR 3/1 at 14.5 feet. Note: water at 15.75 feet, very soft and rapid	Ţ	
	12	SS	16.5	18.0	1-1-2/0"	10		-			dilatancy. Note: trace organics from 16.3 to 16.5 feet. Note: color shift 0.5-10 mm alternating laminate of fine sand, trace silt at 16.5 feet.		
JSERS\SBR	13	SS	18.0	19.5	1-2-2/0"	12		-		SP	Fine sand, trace silt, very soft, wet, uniform grain size, poorly sorted, gray, trace black sand,		
6 - C:\L	14	SS	19.5	21.0	2-2-2/0"	0					medium dilatancy, non plastic (7.5YR 5/1).		
6 15:4	TYPE OF CASING USED										Continued Next Page		
Instruction Instruction						4"		PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON					
SW CASING 6"								WELL T	II E.		RECORDER <u>T. Runge</u>	O	

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. <u>MW-1602A</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
16	ss	21.0	22.5	1-1-1/0"	18					Note: subrounded sandstone gravel clogged shoe from 19.5 to 21.0 feet. Note: very fine sand, trace silt, wet from 21.5 to 22.5 feet.		
17	SS	22.5	24.0	1-1-2/0"	5.5			_	•	Note: trace (1 piece) of small subrounded gravel in run at 16.5 feet.		
18	SS	24.0	25.5	1-1-1/0"	11		25 -		ML	Very fine sand, little silt (2%), very soft, moist-wet, medium dilatancy, no plasticity, gray, poorly graded (7.5YR 5/1).		
19	SS	25.5	27.0	1-2-2/0"	12.5			-		Note: trace clay, low plasticity from 25.9 to 28.0 feet.		
20	SS SS	27.0 28.5	28.5 30.0	1-1-1/0" 3-2-4/0"	16 4.5			-		Note: clay content no longer present, no plasticity, wet at 28.0 feet.		
22	SS	30.0	31.5	2-3-4/0"	16.5		30 -	_		Note: addition of trace clay, moist, medium stiffness from 30.4 to 31.9 feet.		
23	SS	31.5	33.0	3-4-5/0"	15.5			-		Note: moist not wet, slow dilatancy from 31.9 to 33.0 feet.		
24	SS	33.0	34.5	3-3-5/0"	14				ML	Very fine sand, some silt, trace (8-10%) clay, soft, moist-wet, low-medium plasticity, slow dilatancy,		
25	SS	34.5	36.0	3-3-4/0"	17		35 -	-	ML	gray, grains of micah/muscovite visible (7.5YR 5/1).		
26	SS	36.0	37.5	2-3-4/0"	13			_		Very fine sand, little silt (2%), very soft, moist-wet, medium dilatancy, no plasticity, gray, poorly graded (7.5YR 5/1). Note: 3-5 mm laminate of fine sand in shoe, silt,		
27	SS	37.5	39.0	2-2-4/0"	17			-		trace frequency at 34.8 feet. Note: trace amounts of clay, low plasticity from 		
28	SS	39.0	40.5	2-2-3/0"	19.5		40 -	-				
29	SS	40.5	42.0	2-2-2/0"	17			-	SW	Fine sand, trace silt (10%), very soft, wet, medium-rapid dilatancy, no plasticity, gray, muscovite grains visible (7.5YR 5/1). Note: 5-10 mm laminations of silt rich deposits,		
30	SS	42.0	43.5	1-1-3/0"	13					fine sand with little silt (25%) at 41.0 feet. Note: wet from 42.0 to 43.5 feet.		
31	SS	43.5	45.0	3-14-14/0"	14			•••••	SW	Fine sand with little subangular to angular small sandstone gravel, trace silt (5%), wet, stiff, no		
32	SS	45.0	46.5	6-7-11/0"	10.5		45 -			dilatancy, non plastic, sandstone, fine sand clast size (7.5YR 5/1).		

AEP - AEP.GDT - 7/19/16 15:49 - C:\USERS\SBREWER\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power PROJECT _ John E. Amos Plant CCR

BORING NO. <u>MW-1602A</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

ше	ш		1PLE	STANDARD		RQD	DEPTH IN FEET	υ	S			
SAMPLE NUMBER	SAMPLE	DEF IN F	PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	OTAL	%	IN	RAPHI LOG	sco	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
λ N	/S	FROM	то	BLOWS / 6"	REC	70	FEET	GF	n			NOTES
33	SS	46.5	48.0	10-10-13/0"	13		-		SP	Note: less sandstone gravel, trace (5-8%), very wet, rapid dilatancy from 46.0 to 46.5 feet. Fine sand, trace silt, uniform sand grain size, soft,		
34	SS	48.0	49.5	8-9-13/0"	9.5		-			wet, rapid dilatancy, no plasticity, gray (7.5YR 5/1). Note: 3-4 mm bands/laminate of black sand,		
35	SS	49.5	51.0	6-5-10/0"	12.5		50 -			same grain size, trace frequency from 48.0 to 49.5 feet. Note: 1" black bank/lamination of black material		
36	SS	51.0	52.5	14-11-7/0"	10		-			(small gravel to fine sand in size) within band there is no regular material at 49.5 feet. Note: slight color shift (7.5YR 5/2), silt (3-5%) contains dispersed in run, black material in trace amounts 3-5% from 51.0 to 52.5 feet.		
37	SS	52.5	54.0	6-5-6/0"	7		-			amounts 5-5% from 51.0 to 52.5 feet.		
38	SS	54.0	55.5	4-7-8/0"	9		55			Note: laminae 2-3mm of black sand (fine size)		
39	SS	55.5	57.0	7-8-10/0"	9.5		-			present from 54.5 to 55.7 feet.		
40	SS	57.0	58.5	6-8-14-3/0"	14		-			Note: trace amounts (3%) of small angular sandstone gravel from 57.0 to 58.5 feet.		
41	SS	58.5	60.0	9-10-23/0"	7		-					
							60 -			Weathered sandstone.		
- //19/16 15:49 - C::USEK&ISBKEWEKIDOCOMENTSMEPWEP WINFIELD WV.GPJ							00 -			End of boring at 60 feet.		

JOB NUMBER	LUG OF BORING
COMPANY American Electric Power	BORING NO. <u>MW-1603A</u>
PROJECT John E. Amos Plant CCR	BORING START
COORDINATES N 538,963.7 E 1,729,315.5	PIEZOMETER TYPE
GROUND ELEVATION 584.1 SYSTEM	HGT. RISER ABOVE GRO
Water Level, ft $\boxed{4}$ 19.1 $\boxed{4}$	DEPTH TO TOP OF WELL
TIME	WELL DEVELOPMENT _
DATE 5/24/2016	FIELD PARTY NA

BORING NO. MW-1603A DATE	7/19/16 SHE	ET <u>1</u> OF <u>2</u>
BORING START 5/23/16	BORING FINISH	5/24/16
PIEZOMETER TYPE NA	WELL TYPE	WO
HGT. RISER ABOVE GROUND	DIA	2"
DEPTH TO TOP OF WELL SCREEN	38.0' воттом	43.0'
WELL DEVELOPMENT 6/14/2016	BACKFILL	NA
FIELD PARTY NA	RIG	Diedrich

SAMPLE	NUMBER	SAMPLE	SAM DEF IN F	νTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	1 2	SS SS	0.0	1.5 3.0				-			Hydrovac from 0.0 to 6.0 feet. Fill materials, large cobbles to small gravel, limestone.		
	3	SS	3.0	4.5				-					
	4	SS	4.5	6.0				5 -					
	5	SS	6.0	7.5	5-3-3/0"	7		-		CL	Clay with little silt, soft, high plasticity, moist, gray (7YR 4/1), no dilatancy. Note: sandstone plug from sluff in shoe for first		
	6	SS	7.5	9.0	3-2-3/0"	4.5		-			1/2 of run (6.0 to 7.5 and 7.5 to 9.0 feet).		
	7	SS	9.0	10.5	2-2-2/0"	9		10 -			Note: gray (7YR 4/1) mottling, trace (1%) grains of medium to coarse sand.		
	8	SS	10.5	12.0	2-1-2/0"	20		-					
R\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ	9	SS	12.0	13.5	1-1-1/0"	22		-		SW	Sand, medium to fine with little silt, soft, wet, gray (10YR 4/1), rapid dilatancy, no plasticity, trace amounts of oxidized mudstone.		
EPAEP WIN	10	SS	13.5	15.0	1-1-1/0"	12		15		ML	Silt with trace clay, medium plasticity, very uniform, moist gray (10YR 4/1), trace organics (wood, organics, roots), soft, dilatancy.		
MENTSVA	11	SS	15.0	16.5	3-1-1/0"	15							
	12	SS	16.5	18.0	1-2-2/0"	10		-			Note: little clay from 16.0 to 16.5 feet.		
- AEP.GDT - 7/19/16 15:49 - C:\USERS\SBREWE	13	SS	18.0	19.5	1-1-2/0"	15		-				∇	
- C:\USE	14	SS	19.5	21.0	2-2-2/0"	15.5		-		SW	Fine sand, little silt, well sorted, poorly graded, $_{\rm l}$ soft, wet, gray, uniform, grain size, trace oxidized $_{\rm l}$	$\overline{\Delta}$	
6 15:49	TYPE OF CASING USED										Continued Next Page		
DT - 7/19/1	NQ-2 ROCK CORE 6" x 3.25 HSA 9" x 6.25 HSA							PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC					
Opened HW CASING ADVANCER 4" W NW CASING 3"							WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON				EOMON		
SW CASING 6" AIR HAMMER 8"						6"					RECORDER T. Runge		

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO.
 MW-1603A
 DATE
 7/19/16
 SHEET
 2
 OF
 2

 PROJECT
 John E. Amos Plant CCR
 BORING START
 5/23/16
 BORING FINISH
 5/24/16
 BORING NO. <u>MW-1603A</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>2</u>

	SAMPLE NUMBER	SAMPLE	SAN DEF IN F	PTH	STANDARD PENETRATION RESISTANCE	OTAI	RQD %	DEPTH IN	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	<i>"</i> ∠	0)	FROM	то	BLOWS / 6"	- <u>Э</u> й		FEET	U U				
	15	SS	21.0	22.5	1-1-2/0"	13				ML ML	Sandstone pieces. Note: water at 19.1 feet.		
	16	SS	22.5	24.0	4-4-6/0"	22			<u>``+L`` th'</u>	SM	no diltancy, trace root structures. Silt with little clay, medium plasticity, moist, stiff, no diltancy, trace root structures.		
	17	SS	24.0	25.5	4-3-6/0"	22					Fine sand with some silt, trace medium sand, wet, soft, non plastic, rapid dilatancy, trace amounts of black/oxidized material, coarse sand sized subangular.		
-	18	SS	25.5	27.0	2-2-2/0"	7		25 -	-		Weathered sandstone, small gravel sized, angular clasts with fine sand with some silt, stiff, moist, wet, no dilatancy, non plastic.		
	19	SS	27.0	28.5	1-2-2/0"	10					Note: yellow (2.5Y 6/6) fine sand seam at 26.7 feet.		
	20	SS	28.5	30.0	3-3-4/0"	17.5				ML	Note: oxidized sandstone, angular, small gravel, wet from 28.0 to 28.2 feet.		
	21	SS	30.0	31.5	4-5-6/0"	20		30 -			moderate plasticity, uniform texture.		
	22	SS	31.5	33.0	2-3-4/0"	16				SM	Weathered sandstone, small angular gravel with little fine sane, little silt, wet, no dilatancy, no plasticity, well graded, stiff.		
	23	SS	33.0	34.5	2-2-3/0"	23				SM	Sandy silt, some fine sand, wet, stiff, trace amount of clay, low to no plasticity, slow dilatancy. Silty sand, fine with some silt, wet, fast dilatancy,		
.GPJ	24	SS	34.5	36.0	2-2-5/0"	21		35 -		ML	very soft, poorly graded, very uniform, grain size, some 1-2" bands of more silt, rich sediment, these rare slightly stiff and more moist/wet.		
	25	SS	36.0	37.5	3-1-5/0"	22			-		Silt with trace clay, trace fine sand bands (some 30%) of more clay rich sediment 1/2 to 1" thick laminae, moist, moderately stiff, no dilatancy, medium plasticity.		
SMEPME	26	SS	37.5	39.0	3-6-6/0"	14					Note: trace fine sand, wet (saturated) at 38.3 with 2" band of fine sand with trace silt.		
RIDUCUMEN	27	SS	39.0	40.5	3-5-5/0"	14		40 -			Weathered sandstone, small, angular gravel with trace silt, little fine sand, trace coarse sand, stiff, wet, non plastic, no dilatancy. Note: trace small oxizided gravel at 39.0 feet.		
0/0BKEVEK	28	SS	40.5	42.0	3-5-5/0"	14					Note: some fine sand and trace oxidized sand veins at 40.5 feet.		
- C:\USEK	29	SS	42.0	43.5	4-7-44/0"	14							
64:GL QL/AL/	30	SS	43.5	45.0	50-3/0"	15					Weathered sandstone (fairly competent) dry with some moisture (localized).		
AEP.GUI - /								45 -			End of boring at 45.0 feet.		
4													

JOB NUMBER	OH015976.0	007		IG OF BORING
	merican Elect	ric Power		BORING NO. MV
PROJECT	hn E. Amos P	lant CCR		BORING START
COORDINATES	N 539,459.6	E 1,729,931.	.7	PIEZOMETER TY
GROUND ELEVA	TION 586.0	SYSTEM		HGT. RISER ABO
Water Level, ft	⊻ 18.8	Ţ	Ā	DEPTH TO TOP (
TIME				WELL DEVELOPI
DATE	5/6/2016			FIELD PARTY

BORING NO. MW-1604	DATE 7	//19/16 SHE	ET <u>1</u>	OF _	3
BORING START 5/5/16		BORING FINISH	5/6/16		
PIEZOMETER TYPE NA		WELL TYPE	OW		
HGT. RISER ABOVE GROUN	D <u>3.0'</u>	DIA	2"		
DEPTH TO TOP OF WELL SC	REEN _	33.9' воттом	43.5'		
WELL DEVELOPMENT 5/	18/2016	BACKFILL	NA		
FIELD PARTY NA		RIG	Diedric	h	

SAMPLE	NUMBER	SAMPLE	SAM DEF IN F	νTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	1	SS	0.0	1.5	1-0-0/0"	0					No recovery, rock (limestone), clogged shoe.		
	2	SS SS	1.5 3.0	3.0 4.5	1-1-1/0" 1-1-1/0"	5		-		GM	Silty gravel and sand, silt some fine sand, little small subangular gravel, soft, wet, slow dilatancy, non plastic, brown, trace organics and root fibers.		
	4	SS	4.5	6.0	2-2-3/0"	11.5		_		ML	Silt with fine sand, very fine sand, soft, moist, no		
	5	SS	6.0	7.5	2-3-5/0"	16		5 -	-		diltancy, moderate plasticity, brown (10YR 4/4), uniform texture, trace small black sand inclusions (1 mm).		
	6	SS	7.5	9.0	3-4-6/0"	15.5		-			Note: more stiff, trace root fibers, trace small (2-3 mm) areas of gray (10YR 4/4) coloration from 7.5 to 9.0 feet.		
	7	SS	9.0	10.5	3-4-4/0"	0		10 -			Note: sandstone (very fine grain) clogged shoe on run from 9.0 to 10.5 feet, subangular medium gravel size.		
;	8	SS	10.5	12.0	3-4-6/0"	16.5					•		
LP WV.GPJ	9	SS	12.0	13.5	9-15-13/0"	18		-		ML	Silty sand, fine, little silt, stiff, uneven distribution of sand, moist, no diltancy, non plastic, gray brown (10YR 4/2).		
RIDOCUMENTSIAEPIAEP WINFIELD WV.GPJ	10	SS	13.5	15.0	5-7-10/0"	11.5				ML	inclusions-angular). Silt with very fine sand, little very fine sand, stiff, red brown (5YR 4/3), no dillatancy, no to low plasticity.		
1TS/AE	11	SS	15.0	16.5	5-8-14/0"	12		15 -			process;		
	12	SS	16.5	18.0	5-8-8/0"	15		-			Platy mudstone, interbedded with silt and very fine sand. Silty sand, fine, little to trace silt, very soft, moist, non plastic, brown, gray (2.5Y 4/2), no dilatancy, trace small, soft, sandstone, rounded gravel.		
- 7/19/16 15:49 - C:\USERS\SBREWE	13	SS	18.0	19.5	4-4-5/0"	13					Note: water at 18.75 feet, rapid dilatancy.	$\overline{\nabla}$	
1-C:/	14	SS	19.5	21.0	5-7-11/0"	19							
16 15:4	TYPE OF CASING USED										Continued Next Page		
7/19/1	NQ-2 ROCK CORE 6" x 3.25 HSA							PIEZOM			,		EN TUBE
						4"		SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC					
W CASING 3"					WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
SW CASING 6" W AIR HAMMER 8"									RECORDER T. Runge				

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. MW-1604
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 5/5/16
 BORING FINISH
 5/6/16

 BORING NO. <u>MW-1604</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE	SAMPLE	DE	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD DEP % IN FEE	TH	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-5/0"	16.5		-			Note: color change to 7.5YR 4/2 at 19.9 feet. Note: oxidation/iron staining, color change to 7.5YR 5/8 at 20.7 feet.		
16	SS	22.5	24.0	3-7-10/0"	17		_					
17	SS	24.0	25.5	5-6-9/0"	15.5	2			SP	Poorly graded sand, fine, trace silt (5-8%), very soft, rapid dilatancy, brown, no plasticity, poorly graded. Note: 0.2' layer of silt with fine sand at 24.7 feet.		
18	SS	25.5	27.0	9-7-6/0"	12		יד כ - -			Note: color change to 7.5YR 5/8 at 24.8 feet. Note: heaving sand at 25.5 feet.		
19	SS	27.0	28.5	3-4-4/0"	15.5					Note: small (1mm) layers of black sand (2 layers) at 26.9 feet. Note: contains trace small (5mm) layers of sandy		
20	SS	28.5	30.0	2-2-1/0"	19		-			silt, color change to 7.5YR 4/3 from 27.0 to 28.5 feet. Note: black material from 28.8 to 28.9 feet. Note: band of oxidation/iron staining at 29.25 feet,		
21	SS	30.0	31.5	1-2-3/0"	11.5		-− C			0.4' thick, 7.5YR 5/8.		
22	SS	31.5	33.0	3-2-3/0"	15					Note: 0.3' band of 10YR 6/6 coloration at 31.0 feet.		
23	SS	33.0	34.5	3-3-4/0"	16					Note: colored bands (5-10mm) 7.5YR 4/1 at 33.0 feet.		
24	SS	34.5	36.0	3-4-10/0"	10	3	5 –			Note: very soft, very wet, trace silt (3-5%) at 34.5 feet.		
	SS	36.0	37.5	4-5-8/0"	12					Note: slightly stiff, 3% silt, very poorly graded, well sorted from 36.0 to 37.5 feet.		
	SS	37.5	39.0	4-5-6/0"	11.5		•			Note: trace angular sandstone, small gravel (one clast per 18"), slight stiff, 3% silt from 37.5 to 39.0 feet.		
27	SS	39.0	40.5	7-10-11/0"	17					Note: color grey 1 5G-/1, poorly cemented (3-5% silt) from 39.0 to 40.5 feet.		
	SS	40.5	42.0	5-6-8/0"	12.5	4	ן - נ -					
	SS	42.0	43.5	7-11-10/0"	7.5					Note: trace silt (3-4%) from 42.0 from 43.5 feet. Note: rock stuck in shoe (sandstone) at 42.5 feet.		
30	SS	43.5	45.0	6-5-4/0"	14.5					Note: 10mm thick bands of higher concentration of silt and little amount of silt, 25% of run at 43.5 feet.		
AEP.60	SS	45.0	46.5	3-5-8/0"	16		ר כ 					

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. MW-1604
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 5/5/16
 BORING FINISH
 5/6/16

 BORING NO. <u>MW-1604</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
SAMPL	SAMPL	IN F	ΥΤΗ EET TO	PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGT RECOVE	%	IN FEET	C C C C C C C C C C C C C C C C C C C			MELL	

JOB NUMBER	OH015976.0	007		LOG
	nerican Elect	ric Power		E
PROJECT Joh	nn E. Amos P	ant CCR		I
COORDINATES	N 540,038.8	E 1,731,401	.7	i
GROUND ELEVA	TION 583.4	SYSTEM		I
Water Level, ft	⊻ 18.0	Ţ	$ \Psi $	
TIME				\
DATE	5/2/2016			F

BORING NO. MW-1605 DATE	7/19/16 SHE	ET <u>1</u> OF <u>3</u>
BORING START 4/29/16	BORING FINISH	5/2/16
PIEZOMETER TYPE NA	WELL TYPE	NA
HGT. RISER ABOVE GROUND	DIA	2"
DEPTH TO TOP OF WELL SCREEN	26.3' воттом	41.0'
WELL DEVELOPMENT5/18/2016	BACKFILL	NA
FIELD PARTY NA	RIG	Diedrich

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F	νTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES	
	1	SS	0.0	1.5	0-1-0/0"	4		-		SM	Sandy silt, little fine sand, trace coarse sand, moist, soft, no dilatancy, low plasticity, 2.5YR 4/6.			
	2	SS	1.5	3.0	1-0-0/0"	2		-			Note: trace amounts of small angular limestone gravel (roadbed) from 1.5 to 3.0 feet.			
	3	SS	3.0	4.5	1-0-0/0"	5.5		-			Note: wet, slightly stick from 3.0 to 4.5 feet.			
_	4	SS	4.5	6.0	2-2-4/0"	5.5		5 –						
	5	SS	6.0	7.5	5-11-8/0"	12.5		-						
	6	SS	7.5	9.0	4-5-7/0"	7.5		-			Note: at 6.75 feet rock fragment stuck in spoon, from 6.0 to 6.76 wet, from 6.76 to 7.5 dry. Note; trace small rounded gravel (3%) from 7.0 to 7.5 feet.			
	7	SS	9.0	10.5	2-3-6/0"	13		10		SM	Note: root structures (2-3%) from 7.3 to 9.0 feet. Note: little small gravel from 7.9 to 9.0 feet. Note: sandstone lodged in spoon at 8.8 feet.			
	8	SS	10.5	12.0	3-4-6/0"	16.5		10			Silt, trace medium sand, little fine sand, stiff, brown, moist, no dilatancy, 10YR 3/1.			
WV.GPJ	9	SS	12.0	13.5	2-4-7/0"	13.5		-	-	ML	Silt, very fine sand, stiff, moist, grey mottling (3%), non plastic, no dilatancy 2.5Y 5/6.			
- 7/19/16 15:49 - C:\USERS\SBREWER\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ	10	SS	13.5	15.0	5-5-7/0"	19		-			Note: slightly more stiff from 13.0 to 13.5 feet. Note: higher silt concentration, little amount of very fine sand (20%).			
JMENTSVAEP	11	SS	15.0	16.5	2-2-3/0"	17		15	-	ML	Silt, little fine sand (25%), moderate stiff, moist, low plasticity, 2.5Y 5/6. Note: moisture increases from 15.0 to 16.5 feet.			
EWER/DOCL	12	SS	16.5	18.0	2-1-3/0"	21.5		-	-		Note: 2" thick layers of higher dilatancy, silt concentration more stiff, less moisture (40% of total run) from 16.5 to 18.0 feet.			
JSERS\SBRI	13	SS	18.0	19.5	1-2-2/0"	14		-			Note: wet, medium dilatancy, very soft, no water in spoon from 18.0 to 19.5 feet. Note: water at 18.0 feet.	$\overline{\Delta}$		
1):	14	SS	19.5	21.0	2-1-2/0"	16.5						-		
16 15:4			TYPE	OF C	ASING USED						Continued Next Page			
T - 7/19/			NQ-2 RO 6" x 3.25 9" x 6.25	HSA	RE			 PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC 						
AEP.GDT				ING AD	VANCER	4" 3"		WELL TY	YPE:	٥١	V = OPEN TUBE SLOTTED SCREEN, GM	∕ I = G	EOMON	
AEP - A			SW CAS	ING		6" 8"					RECORDER T. Runge			

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. MW-1605 DATE 7/19/16 SHEET 2 OF 3 4/29/16 **BORING START**

BORING FINISH 5/2/16

SAMPLE STANDARD RQD SAMPLE NUMBER тĶ GRAPHIC LOG DEPTH SAMPLE S DEPTH PENETRATION SOIL / ROCK DRILLER'S TOTAL LENGT ECOVE S S WELL IN IN FEET RESISTANCE % **IDENTIFICATION** NOTES \supset FEET ТО FROM BLOWS / 6" ñ Sandy silt with some fine sand, wet, soft, rapid SM dilatancy, low plasticity, high quantity of water in spoon, 2.5Y 5/6. 15 SS 21.0 22.5 1-2-2/0" 16 16 SS 22.5 24.0 1-2-2/0" 15.5 Note: saturated, slightly less silt and more sand, very soft from 23.5 to 24.0 feet. SS 24.0 12 SM 17 25.5 3-4-9/0" Silty sand, fine sand, trace silt (10%), very soft, 25 wet, rapid dilatancy, non plastic, poorly graded, 2.5Y 5/6. Rock lodged into shoe at 25.5 feet. SS 25.5 27.0 2-5-6/0" SP 18 11.5 Chert fractures, no cleavage, angular, all fresh breaks from split spoon. Chalky inclusions. Heaving sand encountered at 25.5 feet. 19 SS 27.0 28.5 4-5-9/0" 12 Poorly graded fine sand, trace (3%) silt, very soft, brown, wet, non plastic, rapid dilatancy, poorly graded. 2.5Y 5/6. 20 SS 28.5 30.0 4-7-7/0" 16.5 Note: trace 5mm layers of black sand from 28.5 to 30.0 feet. 30 SS 30.0 31.5 4-5-8/0" 16 21 Note: 2.5" band of silty sand, wet, stiff to moderately stiff, fine sand, little silt at 30.4 feet. Note: 5mm layers of black sand (trace amounts) 3-4-4/0" SS 31.5 22 33.0 18 from 30.8 to 31.5 feet. Note: oxidation/iron staining, 5YR 5/8 at 32.6 feet. 23 SS 33.0 34.5 4-3-6/0" 16 Note: color change at 32.8 feet 5Y 5/1. Note: very abrupt and clear color shift to Gley 1 4N at 33.3 feet. 24 SS 34.5 36.0 4-5-6/0" 16.5 35 Note: color change to 7.5YR 4/1 at 35.25 feet. 25 SS 36.0 37.5 10.5 6-3-6/0" Note: 2-3" trace/little amounts of black material in 2mm bands at 36.8 feet. 26 SS 37.5 12.5 39.0 2-3-4/0" Note: little black material, slightly more stiff, 10YR 2/1 at 38.2 feet. 27 SS 39.0 40.5 3-3-2/0" 14 Note: color change at 38.5 feet to 10YR 5/8.

40 42.0 6-2-6/0" 17 SP Poorly graded, fine sand, trace to little silt (10-12%), very soft, wet, brown, no plasticity, rapid dilatancy. Note: sand grain size slightly larger at 40.5 feet. 43.5 10-6-7/0" 24 Note: trace silt from 42.0 to 43.5 feet. Note: angular piece of sandstone matching sand 45.0 5-3-4/0" 3 in color, small gravel size at 43.0 feet. Note: heaving sand encountered at 43.5 feet. Note: pieces of platy mudstone within sand in 45 46.5 8-4-6/0" 10

shoe, small gravel sized, very soft rock, subangular at 44.7 feet.

Continued Next Page

28 SS

29 SS

30 SS

31

SS

40.5

42.0

43.5

45.0

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. MW-1605
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/29/16
 BORING FINISH
 5/2/16

BORING NO. <u>MW-1605</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	2-6-8/0"	11.5		-			Note: color change to 7.5YR 4/1 at 45.0 feet. Note: 2" band of silt with very fine sand layered 50/50. Note: heaving sand encountered at 46.5 feet.		
33	SS	48.0	49.5	6-5-7/0"	14.5		-			Note: trace small gravel, subangular from 47.8 to 48.0 feet.		
34	SS	49.5	51.0	4-7-10/0"	20		50			Note: 0.5mm seam of black material, coarse to fine sand size and slight color change from 48.0 to 49.0 feet.		
							-			Note: well graded, little rounded small gravel from 50.4 to 51.0 feet.		

JOB NUMBER	LOU		
PROJECT Jol	nn E. Amos Pl	ant CCR	
COORDINATES	N 539,197.0	E 1,731,559.	.3
GROUND ELEVA	TION 580.8	SYSTEM	
Water Level, ft	⊻ 12.0	Ţ	Ţ
TIME			
DATE	5/3/2016		

BORING NO. MW-1606	DATE 7	//19/16	SHE	et <u>1</u>	OF _	3
BORING START 5/2/16		BORING FI	NISH	5/3/16		
PIEZOMETER TYPE NA		WELL 1	IYPE	OW		
HGT. RISER ABOVE GROUND	3.0		DIA	2"		
DEPTH TO TOP OF WELL SCR	REEN _	24.32BOT	том	39.0		
WELL DEVELOPMENT NA		BACK	FILL	NA		
FIELD PARTY NA			RIG	Diedric	h	

	NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
F	1	SS	0.0	1.5	1-0-0/0"	0					No recovery.		
	2 3 4	SS SS SS	1.5 3.0 4.5	3.0 4.5 6.0	1-0-0/0" 9-10-14/0"	4 2 0		- - - 5		ML	Note: grade is sandy silt, topsoil, silt, trace fine sand, trace medium sand, root structures (5%), soft, low plasticity, no dilatancy, moist, brown (5YR 3/1). Note: only recovery is inside shoe from 3.0 to 4.5 feet. Note: rock lodged in shoe, sandstone, no recovery		
	5	SS	6.0	7.5	8-9-7/0"	6.5		-	-	ML	from 4.5 to 6.0 feet. Silt, trace fine sand, brown, moist, moderate plasticity, no dilatancy, soft, very uniform texture (10YR 4/4).	-	
	6	SS	7.5	9.0	2-2-4/0"	15		-		SM SM	Some fine sand, trace medium sand, soft, moist, on dilatancy, low plasticity, root structures (3%)		
	7	SS	9.0	10.5	4-4-7/0"	17		10 -		SM	(10YR 3/3). Silt, some fine sand, stiff, moist, low plasticity, no dilatancy (10YR 3/3).	-	
Ŋ	8	SS	10.5	12.0	1-1-2/0"	21		-			Fine sand, little silt, soft, moist, no dilatancy, no plasticity, higher moisture content at bottom of 10.5 feet (10YR 5/6).		
IELD WV.GF	9	SS	12.0	13.5	2-2-3/0"	22		-			Note: wet, very soft from 12 to 13.5 feet. Note: water at 12.0 feet.	Ţ	
AEP.GDT - 7/19/16 15:50 - C:\USERS\SBREWER\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ	10	SS	13.5	15.0	2-2-3/0"	22		-					
UMENTS/AE	11	SS	15.0	16.5	2-1-3/0"	14		15					
EWER\DOC	12	SS	16.5	18.0	3-5-4/0"	14		-			Note: very soft from 16.5 to 18 feet. Slight color shift to 10YR 4/6 at 16.7 feet.		
USERS\SBR	13	SS	18.0	19.5	5-4-7/0"	14		-			Note: heaving sand encountered at 18 feet. Flushed with water, not enough to push down added mud.		
50 - C:\	14	SS	19.5	21.0	5-7-10/0"	12							
16 15:{					ASING USED						Continued Next Page		
DT - 7/19/			<u>NQ-2 R0</u> 6" x 3.25 9" x 6.25	HSA	RE			 PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC 					
AEP.GI				SING AD	VANCER	4" 3"		WELL T	YPE:	٥V	W = OPEN TUBE SLOTTED SCREEN, G	∕l = G	EOMON
G SW CASING 6" AIR HAMMER 8"											RECORDER <u>T. Runge</u>		

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. <u>MW-1606</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

BORING START _______ BORING FINISH ______

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15 16	SS SS	21.0 22.5	22.5 24.0	5-8-10/0" 5-10-13/0"	13 13					Note: band of black/dark brown and, 1 cm thick (5Y 3/2), trace silt, same characteristics. Note: same band of dark brown/black sand, trace silt from 21.0 to 21.1 feet. Color change to 7.5YR 5/6 with band layers of 5YR 5/3 (25%) heavily oxidized.		
17	SS	24.0	25.5	7-10-13/0"	12.5		25 -			Note: abrupt color change to 10YR 6/6 at 23.7 feet. Note: slight shift in color, back to 7.5YR 5/8		
18	SS	25.5	27.0	3-8-8/0"	10		25			oxidized slightly paler at 25.5 feet (10YR 6/6).		
19	SS	27.0	28.5	3-3-6/0"	1				SM	Note: color change to 10YR 4/8, trace silt at 26.5 feet. // Silty sand, fine sand, trace silt, trace medium sand, little medium sand size subangular bits of black material (coal 15%), wet, soft-medium stiff,		
20	SS	28.5	30.0	6-4-4/0"	12.5					no dilatancy, no plasticity, gray, small bands of oxidation (5 mm) (5Y 5/1).		
21	SS	30.0	31.5	7-3-3/0"	17.5		30 -			Note: slightly darker coloration, no oxidation coloration, trace amounts of medium sand sized coal fragments from 30 to 31.5 feet.		
22	SS	31.5	33.0	9-7-7/0"	17				SP	Poorly graded sand, fine sand, little medium sand, subangular, trace silt (3%), gray, wet, no		
23	SS	33.0	34.5	4-3-3/0"	15.5			-	SP	dilatancy, soft, no plasticity (5Y 5/1). Poorly graded sand, fine sand, trace silt (3%),		
, 24	SS	34.5	36.0	3-3-5/0"	13.5		25	-		soft, wet, no plasticity, no dilatancy, red-gray (7.5YR 5/3).		
25	SS	36.0	37.5	2-3-3/0"	13.5		35 -					
26	SS	37.5	39.0	2-3-6/0"	18					Note: 5 mm bands of trace medium sand with fine sand from 37.5 to 39.0 feet.		
	SS	39.0	40.5	4-4-6/0"	10							
27	SS	40.5	42.0	4-7-8/0"	13		40 -			Note: 10 mm band of black sand at 39.9 feet. Note: red streak on side of spoon (10YR 4/6), very fine sand from 40.5 to 42.0 feet.		
29	SS	42.0	43.5	3-4-5/0"	12.5		-			Note: trace medium sand (5-7%), slight color change to 10YR 5/8 from 42.8 to 43.5 feet.		
30	SS	43.5	45.0	3-3-6/0"	13.5							
31	SS	45.0	46.5	3-4-9/0"	16		45 -			Note: 0.3" layer of little amount of coal bits ranging in size from fine to coarse, fine-little medium coarse sand at 44.25 feet.		

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. MW-1606
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 5/2/16
 BORING FINISH
 5/3/16

BORING NO. <u>MW-1606</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	РΤΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	12-19-22/0"	11.5		-	·····	sw sw	Note: trace rounded small gravel at 46.4 feet. Well graded sand, fine sand, little medium sand, trace coarse sand, little small rounded gravel, wet,		
33	SS	48.0	49.5	50-4/0"	0		-			soft, non plastic, no dilatancy. Well graded sand, fine sand, trace medium sand, trace coarse sand (5Y 5/1), little angular to		
34	SS	49.5	51.5	50-2/0"	0			× • • • • • • • • • • • • • • • • • • •		subangular small gravel sized pieces of sandstone (Gley 1 5/N) and mudstone (2.5YR 3/6). Note: nothing in shoe or spoon, likely a medium to large cobble from 48.0 to 49.5 feet. End of boring at 49.7 feet due to refusal.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

						AE	PC	IVIL E			ERING LABORATORY F BORING			
				5976.00					_					
				n Electr							DRING NO. <u>SB-1601</u> DATE <u>7/19/16</u> SH			
				mos Pl							DRING START <u>4/25/16</u> BORING FINISH			
											EZOMETER TYPE NA WELL TYPE			
GRO	UND	ELEVA	TION		SY	STEM					GT. RISER ABOVE GROUND NA DIA			
Wate	er Lev	/el, ft	∑ 9	.0	Ţ		Ţ				PTH TO TOP OF WELL SCREEN NA BOTTOM			
TIME											ELL DEVELOPMENT NA BACKFILL			
DAT	E		4/26/	/2016						FIE	ELD PARTY NA RIG	; <u>H</u>	ollow Stem Auger 2	
SAMPLE NUMBER	SAMPLE	DE	APLE PTH FEET TO	2016 STAN PENETI RESIS BLOV	DARD RATION TANCE /S / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES	
1	SS	0.0	1.5	1-0-	0/0"	0.2					Ash, fine sand, trace medium angular sand, greenish gray, moist, very soft, no dilatancy, moderate plasticity (Gley 1 5/N).			
2	SS	1.5	3.0	1-1-	0/0"	0.2					Note: trace organics, root fibers from 1.8 to 3.0 feet.			
3	SS	3.0	4.5	5-5-	10/0"	1.1				CL	Clay, little silt, trace medium sand sized coal and ash bits (angular) very stiff, moist, greenish gray, no dilatancy, low placticity (Gley 1 5/N).			
5	SS	4.5	6.0	14-9-	10/0"	1.3		5 -			Ash, some fine sand, trace medium subangular sand, very stiff, moist, greenish gray, no dilatancy, low plasticity (Gley 1 5/N).			
6	SS	6.0	7.5	5-7-	·5/0"	0.1					Note: addition of organics, root fibers and trace coarse sand-subangular from 6.2 to 7.5 feet.			
7	SS	7.5	9.0	5-3-	.3/0"	0.8					Ash, some fine sand, trace medium subangular sand, soft, trace silt, moist, slow dilatancy (Gley 1 5/N).	$\overline{\Delta}$		
8	SS	9.0	10.5	2-2-	2/0"	0.7		10 -			Note: saturation encountered from 9.0 to 10.5 feet.	_		
9	SS	10.5	12.0	2-2-	3/0"	0.8					Note: small-medium sand, pieces of brick from 10.5 to 12.0 feet.			
10	SS	12.0	13.5	3-3-	5/0"	0.7								
11	SS	13.5	15.0	6-9-	10/0"	0.7		15 -			Note: layer of finer material, some fine sand (70%), little medium sand (15%), little silt (25%) from 13.1 to 13.5 feet. Note: laminae/layers of black "bottom ash" admist			
12	SS	15.0	16.5	5-5-	7/0"	0.9		10-	15 — gray ash 0.75/1.0 cm spacing (approximately) 0.25 cm thick.					
13	SS	16.5	18.0	6-9-	10/0"	1.1								

Note: black layers are not present from 19.5 to

SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

RECORDER T. Runge

Continued Next Page

PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE

OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

14 SS

15 SS

19.5

21.0

HW CASING ADVANCER

NQ-2 ROCK CORE

6" x 3.25 HSA

9" x 6.25 HSA

NW CASING SW CASING

AIR HAMMER

TYPE OF CASING USED

18.0

19.5

8-10-9/0"

7-8-9/0"

0.9

1

4"

3"

6"

8"

PIEZOMETER TYPE:

WELL TYPE:

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1601
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/25/16
 BORING FINISH
 4/26/16

 BORING NO. <u>SB-1601</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

	PLE BER	SAMPLE	SAM DEF	PTH	STANDARD PENETRATION	TOTAL LENGTH RECOVERY	RQD	DEPTH	GRAPHIC LOG	c s	SOIL / ROCK	ILL	DRILLER'S
	SAMPLE	SAM	IN F FROM	EET TO	RESISTANCE BLOWS / 6"		%	IN FEET	GRAI	n S	IDENTIFICATION	WELL	NOTES
-	16	SS	21.0	22.5	4-8-5/0"	1.1		-			21.0 feet.		
	17	SS	22.3	24.0	2-2-3/0"	0.9		- - 25 –		ML	Silt, some clay, soft, medium sized pieces of muscovite, brown-gray, moist, dilatancy, high		
	19	SS	25.5	27.0		0		25 -			plasticity, uniform texture (Gley 1 6/N). No recovery.		
	20	SS	27.0	28.5	1-1-0/0"	1.4		-		SP	Medium sand, some fine sand, trace silt, moderate dilatancy, low plasticity, moist, very soft		
	21	SS	28.5	30.0	1-1-5/0"	1		-			(Gley 1 5/N.		
	22	SS	30.0	31.5	2-3-3/0"	1.3		30 -					
	23	SS	31.5	33.0	3-4-6/0"	1.1		-	-	•			
	24	SS	33.0	34.5	9-2-1/0"	0.9		-					
C1	25	SS	34.5	36.0	2-3-3/0"	1.73		35 -		SM	Medium sand, subangular, trace fine sand, trace		
P WINFIELD WV.GPJ	26	SS	36.0	37.5	4-5-5/0"	1.55		-			silt, brown, wet, rapid dilatancy, low plasticity, very soft (7.5YR 4/2). Note: higher concentration of silt (15%) from 36.8		
	27	SS	37.5	39.0	2-2-5/0"	1.45		-		ML	to 37.1 feet. Silt, trace fine sand, trace medium angular sand,		
	28	SS	39.0	40.5	3-2-6/0"	1.25		40 -		SM	little organics, root fibers, bits of wood (0.25 - 0.75 cm) (7.5YR 4/2). Medium sand, subangular, trace fine sand, trace		
KS\SBKEWER\DOCUMEN I S\AEP\AE	29	SS	40.5	42.0	3-7-9/0"	1.25		40 -			silt, brown, wet, rapid dilatancy, low plasticity, very soft (7.5YR 4/2). Note: layer of silt, trace fine sand, very uniform from 39.3 to 39.5 feet.		
	30	SS	42.0	43.5	7-8-10/0"	0.95		-			Note: stiff from 40.5 to 42.0 feet. Note: trace subrounded gravel (small) from 41.7 to 42.0 feet.		
//19/16 15:50	31	SS	43.5	45.0	6-6-6/0"			-			Note: medium gravel, piece plugged shoe briefly at 43.0 feet.		
AEP.GUI -	32	SS	45.0	46.5	3-6-9/0"	17		45			Note: brown laminae/layers at 45.0 feet.		

Continued Next Page

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1601
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/25/16
 BORING FINISH
 4/26/16

 BORING NO. <u>SB-1601</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
33	SS	46.5	48.0	6-7-11/0"	14.5			-		Note: color change to Gley 1 5/N at 46.8 feet.		
34	SS	48.0	49.5	5-7-6/0"	16.25							
35	SS	49.5	51.0	3-6-5/0"	0		50 -		sw	No recovery.		
36	SS	51.0	52.5	3-5-14/0"	16.25				SW	Medium sand, little fine sand, soft, wet, no plasticity, no dilatancy, gray, sand, subangular (Gley 1 5/104).		
37 38	SS SS	52.5 53.0	54.0 54.5	10-17-17/0" 20-20-38/0"	6 15			- * * * * * * * * * * * * * * * * * * *	SW SW	Medium sand, little fine sand, subangular, little coarse subangular sand, trace subrounded small gravel, well graded (Gley 1 5/GN). Note: more small gravel (litle) from 53.0 to 54.5 feet.		
39 40	SS SS	54.5 55.0	56.0 56.5	20-20-38/0" 18-40-50-4/0"	15 10.5		55 -		SW	Medium sand, some fine sand, trace coarse sand, subangular, wet, soft, low plasticity, no dilatancy, gray (Gley 1 5/GN).		
										Medium sand, little coarse sand, trace small subangular gravel, trace medium subangular gravel, soft, trace fine sand (Gley 5/N).		
										Weathered sandstone, moist, very stiff, no plasticity, no dilatancy, uniform texture, gray mottling throughout (10R 3/6). End of boring at 57.5 feet.		
										End of boning at 57.5 reet.		
19:90 - 0:01												

JOB NUMBER _ OH015976	5.0007			
COMPANY American Ele	ctric Power		BORING NO. <u>SB-1602</u>	DATE 7/19/16
PROJECT <u>John E. Amos</u>	Plant CCR		BORING START 4/26/16	BORING
COORDINATES			PIEZOMETER TYPE NA	WE
GROUND ELEVATION	SYSTEM		_ HGT. RISER ABOVE GROUND	• NA
Water Level, ft \Box	Ţ	Ţ	DEPTH TO TOP OF WELL SC	REEN NA
TIME				L E
DATE			FIELD PARTY NA	

	BORING NO. <u>5B-1602</u> DATE <u>I</u>	SHE	
_	BORING START 4/26/16	BORING FINISH	4/27/16
	PIEZOMETER TYPE NA	WELL TYPE	NA
	HGT. RISER ABOVE GROUND NA	DIA	NA
	DEPTH TO TOP OF WELL SCREEN	NA BOTTOM	NA
	WELL DEVELOPMENT NA	BACKFILL	NA
	FIELD PARTY NA	RIG	Hollow Stem Auger 2"

	r	SAM	1PLE	STANDARD	,⊤≿F	RQD	DEPTH	U					
		DEI		PENETRATION	A PP			APHI OG	C S	SOIL / ROCK	WELL	DRILLER'S	
SAMPLE	SAMPLE	IN F	EET	RESISTANCE	TOTAL LENGT RECOVE	%	IN	GRAPHIC LOG	N S	IDENTIFICATION	Ň	NOTES	
0		FROM	ТО	BLOWS / 6"			FEET	U					
1	SS	0.0	1.5	1-0-0/0"	1					Ash, fine sand, little medium sand, some silt, very			
										soft, moist, gray (Gley 1 6/N) no plasticity, no			
										dilatancy.			
2	SS	1.5	3.0	1-0-0/0"	2					Ash, fine sand, some silt, trace medium sand,			
										trace coarse sand, subangular, moist, gray (Gley 1 6/N), low plasticity, no dilatancy.			
			4.5	4.4.0/0"				-888		T ONN), low plasticity, no dilatancy.			
3	SS	3.0	4.5	1-1-0/0"	15					Note: little wood pieces 0.50-1.0cm in size, trace			
								-888		amounts rounded small gravel from 3.4 to 4.5			
4	ss	4.5	6.0	3-3-6/0"	14.5					feet.			
	+		0.0				5 -		SM	Silt, little fine sand, trace medium subangular			
										sand, brown (2.5Y 3/3), medium stiffness, no			
5	SS	6.0	7.5	2-3-4/0"	12.5			7:1:1:		plasticity, moist, well graded. Note: color change to 10YR 5/6, from 6.0 to 7.5			
										feet.			
6	SS	7.5	9.0	2-3-5/0"	12			_		Note: micaceous from 7.5 to 9.0 feet.			
										Note: hardness change from 7.7 to 8.7 feet.			
7	SS	9.0	10.5	3-5-9/0"	14			-					
'		5.0	10.5	5-5-5/0	14					Note: stiff, gray mottling (Gley 1 7/N) from 9.3 to			
-							10 -	-		12.0 feet.			
8	SS	10.5	12.0	3-6-8/0"	14								
										Note: trace emplicite of ergenies/roots from 11.2			
GPJ										Note: trace amounts of organics/roots from 11.3 to 12.0 feet.			
§. ₿	SS	12.0	13.5	3-5-7/0"	16					Note: interbedded layers of silty clay, grey (10YR			
ELD								-		5/6), stiff, moist from 12.3 to 13.5 feet.			
	ss	13.5	15.0	2-3-7/0"	15					Note: no grey mottling from 13.5 to 15.0 feet.			
		10.0	10.0	2-0-170						Note: no grey motuning norm 10.5 to 10.0 reet.			
PVAE													
J 20 20 11	SS	15.0	16.5	3-4-5/0"	18		15 -		SM	Fine sand, little silt, trace medium sand, soft,			
ENT										brown, moist, low plasticity, no dilatancy.			
CUM													
0 12	s SS	16.5	18.0	3-3-3/0"	24					Note: uniform texture, poorly graded, well sorted			
WEF										from 16.5 to 18.0 feet.			
	ss	18.0	19.5	2-2-2/0"	18			-					
RS/S	00	10.0	13.5	2-2-210									
ISEI													
⁷ 14	ss	19.5	21.0	2-2-2/0"	20						-		
15:50		ТҮРЕ	E OF C	ASING USED						Continued Next Page			
- 7/19/16 15:50 - C:USERS/SBREWER/DOCUMENTS/AEP/AEP WINFIELD WV.GPJ	NQ-2 ROCK CORE												
- 7/1:		6" x 3.25				 PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC 							
GDT		9" x 6.25			411								
AEP.		NW CAS		VANCER	<u>4"</u> 3"		WELL T	YPE:	0	W = OPEN TUBE SLOTTED SCREEN, GI	∕l = G	EOMON	
AEP - /		SW CAS	SING		6"					RECORDER T. Runge			
۳.		AIR HAM	IMER		8"								

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. <u>SB-1602</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	1-1-1/0"	20				SM	Fine sand, some silt, very soft, wet, rapid dilatancy, brown (10YR 4/6), no plasticity. Note: silt (30%), very wet, very soft from 21.0 to 22.5 feet.		
16	SS	22.5	24.0	1-1-1/0"	19				SM	Fine sand, some silt, very wet, very soft.		
17	SS	24.0	25.5	3-2-4/0"	18		25 -		SP	Fine sand, trace silt, soft, brown (10YR 4/6), rapid dilatancy, no plasticity, wet, silt ~10%.		
18	SS	25.5	27.0	4-4-7/0"	14					Note: heaving sand encountered (1' up auger) at 25.5 feet, trace medium sand subrounded from 25.8 to 26.4 feet.		
19	SS	27.0	28.5	9-11-12/0"	15				SW	Fine sand, little subangular medium sand, trace coarse sand, silt 5%, soft, wet, no plasticity.	-	
20	SS	28.5	30.0	6-7-11/0"	17.5		20			Note: small laminate of fine sand only, 1-1.5 cm thick from 28.5 to 30.0 feet.		
21	SS	30.0	31.5	5-6-16/0"	19		30 -			Note: fine medium sand, trace coarse sand from 30.0 to 39.0 feet.		
22	SS SS	31.5 33.0	33.0 34.5	10-12-9/0" 3-3-8/0"	10.5					Note: color change to 10YR 4/6 at 32.1 feet.		
24	SS	34.5	36.0	8-7-5/0"	16		35 -			Note: black staining present, piece of sandstone was lodged in shoe from 34.1 to 34.5 feet.		
25	SS	36.0	37.5	4-5-12/0"	13		00	- • • • • • • • • • • • • • • • • • • •		Note: 0.5-1.5 cm layers of black staining present, very wet from 34.5 to 35.8 feet. Note: color change to 5YR 5/8 from 36.5 to 37.5		
	SS	37.5	39.0	6-7-8/0"	17					feeet.		
27	SS	39.0	40.5	5-3-5/0"	16		40 -			Fine sand, trace medium sand, trace silt, wet, soft, no plasticity, rapid dilatancy, piece of sandstone in shoe.		
26 27 27 28 27 29 29 29 29 29 29 29 29 29 29 29 29 29	SS	40.5	42.0	7-7-6/0"	14.5			_		Note: color change to Gley1 6/N at 39.7 feet.		
29	SS	42.0	43.5	3-3-7/0"	15			-		Note: color change to 2.5Y 4/2 from 42.3 to 43.5 feet.		
30	SS	43.5	45.0	3-4-5/0"	9.5		45		SW	Fine sand, trace medium sand, trace silt, wet, soft, no plasticity, no dilatancy, trace very coarse sand, subangular.		
31	SS	45.0	46.5	5-1-5/0"	11.5		45 -		SW	Fine sand, trace medium sand, trace silt, trace subangular coarse sand, wet, slow dilatancy, soft,		

Continued Next Page

AEP - AEP.GDT - 7/19/16 15:50 - C:\USERS\SBREWER\DOCUMENTS\AEP\AEP WINFIELD WV.GPJ

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1602
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/26/16
 BORING FINISH
 4/27/16

 BORING NO. <u>SB-1602</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	4-3-4/0"	20				SP	brown gray (7YR 5/2), no plasticity. Fine sand, trace medium sand, trace silt, wet,		
33	SS	48.0	49.5	7-5-7/0"	22					soft, rapid dilatancy, brown gray (7YR 5/2).		
34	SS	49.5	51.0	8-7-10/0"	18		50 -			Note: black laminated/stained sand layers 0.25-0.5 cm in thickiness from 49.2 to 49.5 feet. Note: black mottling (7YR 5/2) from 49.5 to 51.0		
35	SS	51.0	52.5	8-7-9/0"	16			-		feet. Note: color change to 10YR 5/3 at 51.0 feet.		
36 37	SS SS	52.5 53.0	54.0 54.5	7-9-12/0" 4-4-9/0"	19 11.5				sw	Fine sand, trace medium sand, trace silt, trace coarse sand, trace small subangular gravel, brown (10YR 5/3), soft, well graded, wet, no plasticity,		
38 39	SS SS	54.5 55.0	56.0 56.5	9-11-16/0" 4-23-28/0"	18 14		55 -		SP	Fine sand, trace silt, trace medium sand, wet, soft, poorly graded, no plasticity, moderate		
	SS	57.5	59.0	4-23-28/0	6				SW	soft, poorly graded, no plasticity, moderate dilatancy, brown (10YR 5/3). Fine sand, trace medium sand, little subangular, small gravel, wet, soft, rapid dilatancy, no plasticity, brown (10YR 5/3), well graded. Note: trace silt from 57.3 to 58.4 feet. Red and gray (10YR 3/4) weathered mudstone, weathered. Weathered gray (Gley1 6/N) sandstone at 59.5 feet.		

JOB NUMBE	ER OH015976.0007	L
COMPANY	American Electric Power	
PROJECT _	John E. Amos Plant CCR	
COORDINA	TES	
GROUND E	LEVATION SYSTEM _	
Water Level	.ft 🔽 🗶	V

TIME DATE

BORING NO. <u>SB-1603</u>	DATE_	7/19/16	SHE	ET <u>1</u> OF <u>3</u>
BORING START 4/27/1	<u>.</u>	BORING FINI	SH	4/28/16
PIEZOMETER TYPE NA		WELL TY	ΡE	NA
HGT. RISER ABOVE GROUNI) <u>NA</u>	C	DIA	NA
DEPTH TO TOP OF WELL SC	REEN	NA BOTTO	DM	NA
	•	BACKFI	ILL	NA
FIELD PARTY NA		R	RIG	Hollow Stem Auger 2"

щ	Ęщ	SAM		STANDARD	J∓⋩Ĕ	QD DEPTH	IC I	S	2011 / 2021			
SAMPLE	SAMPLE	DEI IN F		PENETRATION RESISTANCE	TOTAL LENGTH RECOVEF	% IN	GRAPHIC LOG	s C	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES	
ß,	s, I	FROM	то	BLOWS / 6"		FEET	GF		IDENTIFICATION		NOTES	
1	SS	0.0	1.5	1-1-1/0"	6.5		-		Ash, fine sand, trace medium sand, little silt, soft, moist, non sticky, gray, no dilatancy, no plasticity, Gley 1 4/N.			
2	SS	1.5	3.0	1-0-0/0"	3.5		-		Note: some inclusions of brown sand in small spots (medium) 5Y 5/4 from 1.5 to 3.0 feet.			
3	SS	3.0	4.5	1-2-3/0"	14			SM	Silt, some fine sand, little medium sand,			
4	SS	4.5	6.0	2-1-2/0"	15.5	5 -		SM	subangular, soft, brown, no dilatancy, moist, medium plasticity 5Y 4/4.	_		
5	SS	6.0	7.5	3-2-4/0"	14				Silt, fine sand, little silt, trace medium sand, brown, soft, moist, no dilatancy, low plasticity, 5Y 4/4.			
6	SS	7.5	9.0	3-4-5/0"	15.5			SM	Silt, fine sand, some silt, brown, soft, moist, no diltancy, moderate plasticity, 5Y 4/4. Note: color change to 2.5Y 5/6, gray fine sand			
									seams (5%) from 7.5 to 9.8 feet.			
7	SS	9.0	10.5	3-3-5/0"	17	10 -		SM	Silt, little fine sand, brown, grey mottling, trace	_		
8	SS	10.5	12.0	4-4-7/0"	17		-	SM	root fibers/organics, soft, moist, gray, medium \plasticity, no dilatancy, 2.5Y 5/6.	-		
6 BUV.GPJ	SS	12.0	13.5	3-5-8/0"	17			•	Silty sand, fine sand, some silt, veins of oxidation, black veins (5%), soft, brown, moist, no diltancy, moderate plasticity, 2.5Y 5/6.			
ERIDOCUMENTSIAEPVAEP WINFIELD WV.GPJ 11 01 6 6 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7	SS	13.5	15.0	3-4-7/0"			-					
11 IENTS/AEP	SS	15.0	16.5	3-4-5/0"	16.5			SM	Fine sand, little silt, soft, veins of oxidized sand/silt (5%), gray, no dilatancy, moderate plasticity, trace			
	SS	16.5	18.0	2-3-3/0"	17			•	black sand (5%), 2.5Y 4/3. Note: bottom 0.1' was wet. Note: 10YR 3/2 band, approximately 2" thick at 21.9 feet.			
GDT - 7/19/16 15:50 - C:\USERS\SBREW	SS	18.0	19.5	2-2-4/0"	16.5				Note: medium dilatancy, more moisture from 18.0 to 19.5 feet.			
-C:/NSI	SS	19.5	21.0	2-2-3/0"	18							
3 15:50	•	ТҮРЕ	OF C	ASING USED					Continued Next Page			
- 7/19/16		NQ-2 R0 6" x 3.25		RE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE					
P.GDT		9" x 6.25	5 HSA	VANCER	4"	 SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON 						
AEP - AEP		NW CAS	SING SING		<u>3"</u> <u>6"</u>				RECORDER <u>T. Runge</u>			
AE		AIR HAN	IMER		8"							

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1603
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/27/16
 BORING FINISH
 4/28/16

 BORING NO. <u>SB-1603</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD DEPTH % IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
16	SS	21.0	22.5	4-5-6/0"	21						
17	SS	22.5	24.0	3-2-3/0"	16			SM	Fine sand, little silt, medium stiff, grey, slow dilatancy, moderate plasticity, 7.5YR 5/2. Note: 10YR 3/2 band approximately 2" thick at 21.9 feet.		
18	SS	24.0	25.5	3-3-9/0"	22	25 -		•	Note: no oxidation indicators, wet, very soft, color change to 10YR 5/4 at 24.0 feet.		
19	SS	25.5	27.0	3-3-5/0"	18		-	SM	Fine sand, trace silt, trace medium subangular sand, medium stiff, wet, black, 0.50-0.25 cm	-	
20	SS	27.0	28.5	2-2-6/0"	13			•	veins, medium dilatancy, low plasticity, interbedded layers 1-3 cm containing little silt, 10YR 5/4.		
21	SS	28.5	30.0	5-7-10/0"	15			•	Note: heaving sand at 28.5 feet.		
22	SS	30.0	31.5	4-8-9/0"	13	30 -		••••			
23	SS	31.5	33.0	3-4-9/0"	17			•	Note: seams of black sand 0.5-1 cm thick from		
24	SS	33.0	34.5	10-9-15/0"	14			•	32.1 to 33.0 feet. Note: color band (oxidized) 7YR 5/8 from 33.1 to 33.3 feet.		
25	SS	34.5	36.0	6-9-9/0"	13	35 -		•			
AINHIELD WUGU	SS	36.0	37.5	5-5-7/0"	17				Note: oxidized color change 7YR 5/8 at 35.25 feet.		
<u>1</u>	SS	37.5	39.0	4-4-6/0"	14		-	•			
28 OCOMENIA	SS	39.0	40.5	3-4-6/0"	15				Note: color change to 7YR 4/2 at 38.7 feet.		
27 27 28 28 28 28 28 28 28 28 28 28 28 28 28	SS	40.5	42.0	6-6-11/0"	6	40 -			Note: 0.75" layer of weathered shale encountered, slight color shift 7YR 4/1 at 39.7 feet. Note: piece of sandstone lodged in shoe and another small gravel sized piece at 40.6 feet.		
30 - C:/OSEKS	SS	42.0	43.5	7-8-11/0"	11						
09:91/91/91/91/91/91/91/91/91/91/91/91/91/9	SS	43.5	45.0	5-6-9/0"	11.5						
JEP.GU	SS	45.0	46.5	3-6-9/0"	18	45 -		SM	Silty sand, fine sand, little medium sand, trace silt, very soft, wet, no dilatancy, no plasticity, 1 cm		
									Continued Next Page		

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JOB NUMBER **OH015976.0007**

COMPANY American Electric Power PROJECT John E. Amos Plant CCR

BORING NO. <u>SB-1603</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	этн	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	MELL	DRILLER'S NOTES
33	SS	46.5	48.0	5-7-9/0"	17		-			bands of higher concentrations of medium sand, gray brown 10YR 4/1. Note: trace rounded small gravel from 46.5 to 47.2 feet.		
34	SS	48.0	49.5	6-5-6/0"	19		-					
35	SS	49.5	51.0	4-6-8/0"	10		50 -			Note: trace coarse sand, subrounded from 49.5 to 51.0 feet.		
36	SS	51.0	52.5	3-4-8/0"	12		-					
37	SS	52.5	54.0	5-6-9/0"	13		-			Note: black/stained sand in end of shoe at 52.5 feet.		
38	SS	54.0	55.5	7-10-12/0"	12.5		55					
39	SS	55.5	57.0	11-13-10/0"	14		55 -		SW	Well graded sand, fine sand, some medium sand, little coarse subangular sand, little small subrounded gravel, soft, no dilatancy, no plasticity,		
40	SS	57.0	58.5	16-50-4/0"	10.5		-			\10YR 4/1. Weathered mudstone with small gravel sized pieces of gray sandstone (trace amount), Gley 1 6/N.		
41	SS	58.5	67.5	50-2/3"	5.5		-	· · · · · · · · · · · · · · · · · · ·		End of boring at 59 feet.		
C D.												

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JOB	NUM	BER _	OH01	5976.0007			LO	90	FBORING				
CON	IPAN	/ <u>An</u>	nericar	n Electric Pow	/er			BO	ORING NO. <u>SB-1604</u> DATE <u>7/19/16</u> SHEET <u>1</u> OF <u>3</u>				
PRO	JECT	Joh	n E. A	mos Plant CC	R			BO	DRING START 4/28/16 BORING FINISH 4/29/16				
								PIE	EZOMETER TYPE NA WELL TYPE NA				
GRC	UND	ELEVA		SY	STEM			HG	GT. RISER ABOVE GROUND NA DIA NA				
Wate	er Lev	el, ft	∑ 10).5 🕎	7	Ľ			PTH TO TOP OF WELL SCREEN NA BOTTOM NA				
TIM	Ξ								ELL DEVELOPMENT NA BACKFILL NA				
DAT	E		4/29/	2016				FIE	ELD PARTY NA RIG Hollow Stem Auger 2				
SAMPLE NUMBER	SAMPLE	DE	APLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH % NECOVERY %		GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION → DRILLER'S → NOTES				
1	SS SS	0.0	1.5 3.0	1-1-0/0"	2				Ash, fine sand, some silt, trace small angular gravel, soft, moist, no dilatancy, low plasticity, gray (Gley 1 5/N).				
3	SS	3.0	4.5	1-1-0/0"	3			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Note: no angular gravel present from 3 to 4.5 feet.				
4	SS	4.5	6.0	2-4-8/0"	13.5	- 5 -	-	ML	Silt, trace fine sand, trace coarse subangular sand (3%), brown, stiff, moist, no dilatancy, low				
5	SS	6.0	7.5	8-14-15/0"	16.5				plasticity, sandstone chunk in shoe (2.5Y 4/3).				
6	SS	7.5	9.0	6-8-15/0"	12				Ash, fine sand, trace medium sand, little silt, soft, grey, no dilatancy, low plasticity, moist (Gley 1 5/N).				
7	SS	9.0	10.5	4-6-7/0"	14.5	- 10 -			Note: concentrated area of fine sand and silt from 8.7 to 8.9 feet. Note: wet, slow dilatancy at 9.3 feet.				
8	SS	10.5	12.0	2-3-4/0"	13.5				Note: wet from 10.5 to 12 feet.				
9	SS	12.0	13.5	3-2-2/0"	16.5								
10	SS	13.5	15.0	1-1-2/0"	19.5	45		~~~~~~	Note: black angular bottom ash, trace amount, coarse sand to small gravel size subangular to angular from 13.5 to 14.7 feet.				
11	SS	15.0	16.5	9-3-2/0"	14	- 15 -			Ash, fine sand, little silt, trace medium sand, trace angular coarse sand, wet, gray, soft, moderate dilatancy, low plasticity (Gley 1 5/N).				
12	SS	16.5	18.0	2-1-2/0"	24				Note: coarse sand (3%) from 16.5 to 18 feet.				
13	SS	18.0	19.5	2-1-1/0"	20			~~~~~~					
14	SS	19.5	21.0	1-1-1/0"	21.5			1	Note: trace silt present, moderate stiffness from				
TYPE OF CASING USED									Continued Next Page				
		<u>NQ-2 R</u> 6" x 3.2	<u>OCK CO</u> 5 HSA	RE		PIEZOM							
		9" x 6.2	5 HSA					ED SCREEN, G = GEONOR, P = PNEUMATIC					
							L TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON						

RECORDER T. Runge

NW CASING

SW CASING

AIR HAMMER

3"

6"

8"

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1604
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/28/16
 BORING FINISH
 4/29/16

BORING NO. <u>SB-1604</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM TO		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
16	SS	21.0	22.5	3-1-1/0"	22					19.5 to 21 feet. Note: very wet and slightly less angular coarse sand (bottom ash) 3-5% from 21 to 22.5 feet.		
17 18	SS SS	22.5 24.0	24.0 25.5	4-1-1/0" 2-3-5/0"	24 21					Note: moderate stiffness from 24 to 25.4 feet.		
19	SS	25.5	27.0	3-6-4/0"	12		25 - 30 -		SM	Note: color change to Gley 1 2.5/10GY at 25.4 feet. Note: heaving sand encountered at 25.5 feet.		
20	SS	27.0 28.5	28.5 30.0	3-3-2/0" 2-1-2/0"	16.5 16				SM	angular sand, trace silt, soft, wet, no dilatancy, no plasticity (Gley 1 5/10Y). Note: trace angular-subangular small gravel (Gley 1 4/5G 2) from 26.5 to 26.8 feet. Note: no coarse sand and little silt, stiff from 27.3		
22	SS SS	30.0 31.5	31.5 33.0	1-1-2/0" 1-2-3/0"	0					to 28.7 feet. Silty sand, fine sand, trace medium sand, trace silt, medium stiff, wet, rapid dilatancy, brown gray (5Y 4/3). Note: no recovery from 30 to 31.5 feet. Note: little silt from 31.5 to 31.7 feet.		
24	SS	33.0	34.5	2-1-1/0"	10				SM	Note: color change to 2.5Y 5/4 from 32.1 to 32.9 feet. Fine sand, little silt, soft, very wet, rapid dilatancy,		
25 26	SS SS	34.5 36.0	36.0 37.5	2-3-4/0" 3-2-9/0"	10.5 15		35 -			moderate plasticty, brown gray (5Y 4/3).		
	SS	37.5	39.0	6-8-6/0"	12.5					Note: trace medium sand from 36.9 to 37.4 feet.		
28 28 29 29 29 29 29 29 29 29 29 29 29 29 29	SS SS	39.0 40.5	40.5 42.0	7-8-6/0"	14.5 5		40 -		SM	Fine sand, trace silt, soft, rapid dilatancy, wet, low-moderate plasticity, gray, poorly graded (5Y 4/3). Note: end of boring at 45.0 feet on 4/28/2016.		
27 28 29 30 30 31	SS	42.0 43.5	43.5 45.0	2-2-6/0" 5-3-5/0"	18							
31 91/61// - 32 32	SS	43.5	45.0	5-3-5/0	16.5		45 -		SM	Fine sand, trace medium sand, trace siilt, medium stiff, wet, rapid dilatancy, moderate plasticity, gray		

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JOB NUMBER **OH015976.0007**

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COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. <u>SB-1604</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE	SAMPLE	DEF	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
33	SS	46.5	48.0	2-6-13/0"	15.5					(5Y 4/3).		
34	SS	48.0	49.5	6-6-14/0"	11		-			Note: no medium sand, 0.5 cm black sand veins		
35	SS	49.5	51.0	9-10-9/0"	12		50 -			at 48.7 feet.		
36	SS	51.0	52.5	2-2-3/0"	22							
37	SS	52.5	54.0	3-3-10/0"	22							
38	SS	54.0	55.5	19-26-28/0"	17.5		55 -					
39	SS	55.5	57.0	9-11-21/0"	2				<u>sw</u> sw	Fine sand, little medium sand, trace coarse angular sand, trace (sandstone), small gravel, subrounded, few layers of sandstone 2-3 cm, sandstone (Gley 1 6N).		
40	SS	57.0	58.5	9-30-50-3/0"	17					Fine sand, trace (sandstone), small subrounded gravel, little silt, moist, soft to medium stiff, low plasticity, no dilatancy (5Y 4/3).		
41	SS	58.5	67.5	9-30-50-3/0"	3.5					Note: weathered sandstone, little small subrounded gravel from 57.4 to 58.4 feet.		
V.GUT - 1/19/10 19:30 - C:UOSERS/SBREWER/UOCUMENTSAEPAEF WINHELD WV.GFJ										End of boring at 58.4 feet.		

JOB	NUM	BER _	OH01	5976.00	007		-		LU	GO	F DURING				
сом	PAN	An An	nericar	Electr	ric Pow	/er				BC	RING NO. <u>SB-1605</u>	DATE	<u>7/19/16</u>	SHEET	1_OF_3
PRO	JECT	Joh	n E. A	mos Pl	ant CC	R				BC	RING START 4/	29/16	BORING FINIS	зн <u>5</u>	/2/16
соо	RDIN	ATES								PIE	ZOMETER TYPE	NA	WELL TY	PE <u>N</u>	Α
										HG	T. RISER ABOVE GR		A C	NA N	Α
Wate	rlev	el, ft	<u>⊻</u> 17	7 8	V		V			DE	PTH TO TOP OF WE	LL SCREEN	NA BOTTO	ом <u>N</u>	Α
TIME		0, 11	- 11	.0	-		-			WE	ELL DEVELOPMENT	NA	BACKFI	LL N	Α
DATI			5/2/2	2016			-			FIE			R	IG <u>H</u>	ollow Stem Auger 2"
2, (1)	_		0/2/1								1				-
SAMPLE NUMBER	SAMPLE	DE IN F	APLE PTH EET	PENETI RESIS	DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS		OIL / ROCK NTIFICATIO		WELL	DRILLER'S NOTES
1	SS	FROM 0.0	TO 1.5	BLUV	VS/0	<u> </u>				SM	Sandy silt, little fine	sand trace r	medium sand		
2	SS	1.5	3.0	1-1-	-0/0"	3					5/6). Note: trace coarse a 1.5 to 3.0 feet.	, brown, no o	dilatancy (7YR		
3	SS	3.0	4.5	1-1-	-2/0"	7.5		-			Road base fill, limes (7YR 4/6).		-		
4	SS	4.5	6.0	6-6-	-8/0"	11.5		5 -		SM	Silt, some fine sand brow/dark brown, no 4/6).	o dilatancy, lo	ow plasticity (7YR		
5	SS	6.0	7.5	8-4-	-2/0"	12				SM	Note: layer of black/ 4.4 feet. Note: color change to Silt, trace fine sand,	to gray at 5.5	5 feet.	Г	
6	SS	7.5	9.0	3-7-	-9/0"	14.5		-			dilatancy, gray mottl	ing, moist (7	YR 4/6).		
7	SS	9.0	10.5	8-6-	-9/0"	2		10 -			Note: color shift to 2 sand veins (5%).	2.54 at 9.22 f	feet and gray fine		
8	SS	10.5	12.0	2-3-	-5/0"	15		-							
9	SS	12.0	13.5		-5/0"	21		-			Note: lower recovery 12.0 to 13.5 feet.	y, rock jamm	ed shoe from		
10	SS	13.5	15.0		-4/0"	1.5		15 -			Note: higher moistu feet.				
11 12	SS SS	15.0 16.5	16.5		-3/0" -3/0"	10			-	ML	Silt, trace fine sand, plasticity, no dilatand Note: color change to content and little fine	cy ((Gley 1 4 to 10YR 5/6,	/10Y). higher moisture		
13	SS	18.0	19.5	2-2-	-2/0"	18		-	-		Note: wet at 17.75 f	eet.		Ţ	
14	SS	19.5	21.0	4-2-	-2/0"	14.5				<u> </u>				_	
-	-			ASING					1.1.1.	1	Continu	ued Next I	Page	1	
		NQ-2 R 6" x 3.2 9" x 6.2		RE				PIEZOM			E: PT = OPEN CREEN, G = GE		ROUS TIP, SS = PNEUMATIO		EN TUBE
		HW CA	SING AD	VANCEF	2	4"		WELL T	YPE:	O١	W = OPEN TUBE	SLOTTE	D SCREEN, G	iM = G	EOMON
		<u>NW CA</u> SW CA				<u>3"</u> 6"	_†				RECORDER T				
	SW CASING 6" AIR HAMMER 8"										RECORDER 1	. Runge			

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1605
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/29/16
 BORING FINISH 5/2/16

 BORING NO. <u>SB-1605</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	%	PTH O BKAPHIC GRAPHIC	LOG U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	6-4-3/0"	12			SM	Fine sand, trace medium sand, trace silt (10%), soft, wet, rapid dilanacy, no plasticity (10YR 5/6).		
16	SS	22.5	24.0	5-5-5/0"	10.5				Note: slightly more silt (15%) from 21.7 to 22.0 feet.		
17	SS	24.0	25.5	4-4-5/0"	8	2	25 —		Note: low recovery due to rock stuck in shoe, sandstone (cobble size) from 24.0 to 25.0 feet.		
18	SS	25.5	27.0	10-8-10/0"	3				Note: color change to 10YR 3/2 from 25.5 to 26.7 feet.		
19	SS	27.0	28.5	9-13-15/0"	15				Note: color change to 10YR 5/8 from 26.7 to 27.0 feet. Note: color change to 10YR 6/8 from 27.2 to 28.0		
20	SS	28.5	30.0	5-8-10/0"	7		_		feet.		
21	SS	30.0	31.5	8-9-9/0"	24		30 —				
22	SS	31.5	33.0	6-5-8/0"	16				Note: color change to 5YR 5/8 from 30.0 to 31.6 feet. Note: color change to 5Y 5/2 from 31.6 to 33.0 feet.		
23	SS	33.0	34.5	9-6-7/0"	12			SM	Fine sand, trace silt, trace medium sand, wet, brown/tan/gray, soft, rapid dilatancy, no plasticity.	-	
24	SS	34.5	36.0	6-5-6/0"	24		35 —		Note: heaving sand encountered at 34.5 feet.		
	SS	36.0	37.5	6-3-4/0"	7.5				Note: color shift to 10YR 4/3 at 36.0 feet.		
26	SS	37.5	39.0	2-3-4/0"	21.5						
27	SS	39.0	40.5	2-4-5/0"	8						
26 27 28 28 29 29	SS	40.5	42.0	4-3-5/0"	11		40 — -				
	SS	42.0	43.5	3-4-6/0"	16				Note: slight color shift to 10YR 4/4 at 42.0 feet. Note: end of boring at 42.0 feet 4/29/2016.		
30	SS	43.5	45.0	10-3-5/0"	10.5						
31	SS	45.0	46.5	4-5-6/0"	10	2	15	SM	Fine sand, trace silt, trace medium sand (1 to 3%), wet, brown/gray, soft to medium stiff, rapid		

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JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1605
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/29/16
 BORING FINISH
 5/2/16

 BORING NO. <u>SB-1605</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE	SAMPLE	SAN DEF IN F FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	8-4-6/0"	17		-			dilatancy, no plasticity (10YR 4/3). Note: color change to 10YR 5/1 from 46.5 to 48.0 feet.		
33	SS	48.0	49.5	2-3-4/0"	10.5		-			Note: little black pieces of medium size sand,		
34	SS	49.5	51.0	3-2-3/0"	13.5		50 -			angular coal from 48.7 to 49.4 feet.		
35	SS	51.0	52.5	10-6-12/0"	14		-			Note: trace medium sand from 50.3 to 51.0 feet. Weathered sandstone, gray with some		
36	SS	52.5	54.0	18-38-43/0"	12		-			red/oxidized inclusions, fine sand throughout sand (25%), sandstone (75%). Mudstone/shale, dark gray (2.5YR 7/4).		
37	SS	54.0	55.5	35-21-17/0"	11		-	· · · · · ·		Weathered sandstone (2.5YR 7/4). Weathered red sandstone (2.5YR 7/4). Weathered mudstone/shale, dark gray (2.5YR		
38	SS	55.5	57.0	20-21-25/0"	11.5		55 -			\7/4). / Weathered red mudstone with sandstone / \inlusions. /		
39	SS	57.0	58.5	8-22-50/0"	20		-			Wethered sandstone/mudstone/shale, moist (2.5YR 7/4). Weathered shale, dark gray, dry (2.5YR 7/4).		
							-	-		Red weathered mudstone.		
40	SS	59.5	61.0	23-43-52/0"	13		-	· · · · ·		Gray sandstone, very fine grain (2.5YR 7/4). End of boring at 59.5 feet.		
W.GPJ												
AEPAEP V												
DCUMENTS												
KEWER/DC												
UUSERS/SB												
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JOB NUMBER	OH015976.0	007		LUGU
	nerican Elect	ric Power		BC
PROJECT	nn E. Amos Pl	lant CCR		BC
COORDINATES				PI
GROUND ELEVA	TION	SYSTEM _		Но
Water Level, ft	⊻ 8.2	Ţ	Ţ	DE
TIME				W
DATE	5/12/2016			FI

BORING NO. <u>SB-1606</u> DATE	7/19/16 SHE	ET <u>1</u> OF <u>3</u>
BORING START 5/11/16	BORING FINISH	5/12/16
PIEZOMETER TYPE NA	WELL TYPE	NA
HGT. RISER ABOVE GROUND	DIA	NA
DEPTH TO TOP OF WELL SCREEN	NA BOTTOM	NA
WELL DEVELOPMENT NA	BACKFILL	NA
FIELD PARTY NA	RIG	Diedrich

	SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES	
	1	SS	0.0	1.5	1/2"	3				ML	Poor recovery due to air knife, silt, some clay and sand, fine to medium, topsoil (10YR 5/6).			
	2	SS	1.5	3.0	1-1-1/0"	9		-	-					
	3	SS	3.0	4.5	1/2"	5.5		-						
	4	SS	4.5	6.0	1-3-4/0"	18		5 -						
	5	SS	6.0	7.5	3-7-5/0"	18		-		SP	Sand, little clay, little silt, subround, poorly sorted, well graded, very loose, moist, dark gray mottling (10YR 5/6). Note: no mottling from 6.0 to 7.5 feet.			
	6	SS	7.5	9.0	2-3-5/0"	18		-			Note: wet at 8.2 feet.	Ā		
	7	SS	9.0	10.5	1-2-3/0"	13		10 -			Note: wet, minor dark gray mottling from 9.0 to 10.5 feet.			
	8	SS	10.5	12.0	1-2-2/0"	18		10						
WV.GPJ	9	SS	12.0	13.5	1-1-2/0"	18		-		CL	Clay and fine sand, some silt. Note: some sand from 11.3 to 12 feet.			
- AEP.GDT - 7/19/16 15:50 - C:USERSISBREWERIDOCUMENTSIAEPIAEP WINFIELD WV.GPJ	10	SS	13.5	15.0	2-2-2/0"	15		-		CL	Clay, some silt, little sand (fine), medium to high plasticity, slow dilatancy, wet, grayish brown (10YR 5/2).			
MENTS/AEF	11	SS	15.0	16.5	1-1-1/0"	18		15 -			Note: more silt and trace very fine sand, rapid dilatancy, low plasticity from 15.0 to 16.5 feet.			
EWER/DOCU	12	SS	16.5	18.0	1-1-2/0"	18					Note: more silt than clay and some very fine sand, still wet from 16.5 to 18.0 feet. End of boring at 16.5 feet (5-11-2016).			
S\SBRE	13	SS	18.0	19.5	1-1-2/0"	18		-						
0 - C:\USER	14	SS	19.5	21.0	2-1-3/0"	16		-			Note: very thin zone of micaceous minerals, sandstone at 18.9 feet.			
16 15:5			TYPE	OFC	ASING USED						Continued Next Page			
- 7/19/1			NQ-2 RC 6" x 3.25	HSA	RE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC						
CDT.			9" x 6.25	HSA	VANCER	4"	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
P - AEF			<u>NW CAS</u> SW CAS	SING		3" 6"		VVLLL I	II E.		RECORDER L. Martin	G		
AIR HAMMER 8"														

JOB NUMBER **OH015976.0007**

COMPANY American Electric Power

PROJECT John E. Amos Plant CCR

BORING NO. <u>SB-1606</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
16	SS	21.0	22.5	1-2-2/0"	18				CL	Clay, little silt, little very fine sand, moist, medium plasticity (10YR 5/2). Note: very soft, almost vesicles present "spongy" appearance, possibly lacustrine from 15.0 to 22.5		
17	SS	22.5	24.0	2-3-3/0"	18		-			feet. Note: minor mottling, very dark gray from 22.5 to 24.0 feet.		
18	SS	24.0	25.5	1-1-1/0"	18		25 -			Note: some very fine sand from 23.2 to 23.5 feet. Note: moist from 24.0 to 25.5 feet.		
19	SS	25.5	27.0	1-1-2/0"	18					Note: small white spots, very soft, possible		
20	SS	27.0	28.5	1-2-4/0"	18		-			weathered shell fragments from 26.0 to 27.0 feet.		
21	SS	28.5	30.0	3-4-6/0"	18		-					
22	SS	30.0	31.5	3-4-6/0"	18		30 -			Note: large pebbles of sandstone, weathered from 29.5 to 30.0 feet.		
23	SS	31.5	33.0	3-5-6/0"	18					Note: soft to medium stiff (10YR 4/4) from 30.0 to 31.5 feet.		
24	SS	33.0	34.5	3-3-5/0"	18		-			Note: minor oxidation staining around sandstone, 10YR 5/2 at 32.0 feet. Note: ~5% sand/sandstone inclusions smaller ~1-2mm from 33.0 to 34.5 feet.		
25	SS	34.5	36.0	4-7-9/0"	18		35 -			Note: medium stiff to stiff from 34.5 to 36.0 feet.		
26 27 28 29 30 31 32	SS	36.0	37.5	4-6-8/0"	15					Note: color change to reddish gray (5YR 5/2) at 35.5 feet. Note: sandstone, weathered at 36.6 feet.		
27	SS	37.5	39.0	3-5-9/0"	18		-			Note: sandstone ~5% at 37.5 feet. Note: sandstone ~25% from 38 to 38.7 feet.		
28	SS	39.0	40.5	6-6-9/0"	18		40			Note: large weathered sandstone at 39.2 feet. Note: small cobble inclusions at 39.5 feet.		
29	SS	40.5	42.0	5-6-9/0"	18					Note: color change to dark yellowish brown (10YR 4/4) from 40.5 to 42.0 feet.		
30	SS	42.0	43.5	4-6-9/0"	18		-			Note: few weathered sandstone inclusions <1% and very small from 42.0 to 43.5 feet.		
31	SS	43.5	45.0	4-7-9/0"	18		-					
32	SS	45.0	46.5	4-6-10/0"	18		45					

AEP - AEP.GDT

Continued Next Page

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1606
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 5/11/16
 BORING FINISH
 5/12/16

 BORING NO. <u>SB-1606</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
33	SS	46.5	48.0	4-6-10/0"	18				CL	Clay, some silt, some sand (very fine to fine), stiff, low plasticity, moist-dry, no dilatancy (10YR 4/4). Note: minor mottling ~15% from 46.5 to 48.0 feet.		
34	SS	48.0	49.5	5-7-10/0"	18			-		Note: no more weathered sandstone inclusions from 48.0 to 49.5 feet.		
35	SS	49.5	51.0	5-7-9/0"	18		50 -					
36	SS	51.0	52.5	3-4-8/0"	18		50			Note: soft from 51 to 51.9 feet. Note: zone of very fine to fine sand and silt, trace clay, wet, loose, subround, well sorted.		
37	SS	52.5	54.0	6-11-16/0"	18					Note: stiff to very stiff, reddish brown (5YR 4/3) with brownish yellow (10YR 6/8), mottling ~5%, very dark gray mottling ~3%, and red (2.5YR 4/6)		
38	SS	54.0	55.5	5-10-19/0"	18		55 -			mottling ~2% from 52.5 to 54 feet. Note: trace sand stone cobbles and large pebbles from 54.0 to 55.5 feet.		
39	SS	55.5	57.0	7-18-48/0"	18				ML SP	Silt, clay, very soft, slow dilatancy, wet, medium plasticity (2.5YR 3/4).		
40	SS	57.0	58.5	25-44-50-3/0"	13			-	ML	Sand, medium, subround, well sorted, wet, loose. Silt, some clay, non plastic, no dilatancy, dry, hard, dark reddish brown (2.5YR 3/4).		
41	SS	58.5	67.5	24-50-4/0"	10			-		Note: trace very fine sand from 57.0 to 58.5 feet.		
							60 -			Refusal at 59.4 feet, augered to 60.0 feet.		
C49.70										Weathered bedrock, dry.		
										End of boring at 61.9 feet.		

JOB NUMBE	R <u>OH015</u>	9/6.000/	
COMPANY	American	Electric Power	<u> </u>
PROJECT _	John E. An	nos Plant CCR	
COORDINA	TES		
GROUND EI	EVATION	SYST	EM
Water Level	, ft 🖳	Ţ	Ī

TIME DATE

BORING NO. SB-1607 DATE	7/19/16 SHE	ET <u>1</u> OF <u>3</u>
BORING START 4/27/16	BORING FINISH	4/28/16
PIEZOMETER TYPE NA	WELL TYPE	NA
HGT. RISER ABOVE GROUND NA	DIA	NA
DEPTH TO TOP OF WELL SCREEN	NA BOTTOM	NA
	BACKFILL	NA
FIELD PARTY NA	RIG	Diedrich

SAMPLE	IN FI	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"		RQD %	DEPTH IN FEET	GRAPHIC LOG	N S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES	
s	0.0	1.5	1/2"						No recovery.			
ss	1.5 3.0	3.0 4.5	1/2" 1/2"	6 3.5		-		ML	Poor recovery, slow from air knife. Silt and clay, some sand, medium plasticity, slow dilatancy, moist, very soft, yellowish brown (10YR 5/6).			
ss	4.5	6.0	1-1-4/0"	11		- 5			Note: some very dark grayish brown ~15% \mottled (10YR 4/2).			
s	6.0	7.5	1-1-5/0"	18		-		SP	No recovery. Silt and clay, some sand, medium plasticity, slow dilatancy, moist, very soft, yellowish brown (10YR 5/6).			
s	7.5	9.0	4-5-9/0"	12		-		SP	Sand, trace silt, very fine grain, very loose, well sorted, moist, subangular. Clay, little silt, small slough.			
ss	9.0	10.5	2-3-3/0"	18		-			Sand, very fine to fine, subangular, well sorted, little clay, trace silt, moist, loose, yellowish brown (10YR 5/6).			
ss	10.5	12.0	3-3-3/0"	18		10			Note: compacted from 7.5 to 8.0 feet. Sand, trace silt, very fine grain, very loose, well sorted, moist, subangular. Note: little clay and silt from 9.2 to 9.5 feet.			
S	12.0	13.5	3-3-2/0"	18		-			Note: little clay, oxidation at 10.8 feet. Note: little clay, oxidation at 11.2 feet. Note: little clay, oxidation at 11.3 feet. Note: sand, very fine to medium, mottled 7.5YR at			
SS	13.5	15.0	2-2-2/0"	18		- 15		CL SP	11.4 feet. Note: some clay, little silt, grayish brown (10YR 5/2) from 12.1 to 12.3 feet.			
S	15.0	16.5	2-1-3/0"	18		-		CL SP	5/2) from 12.6 to 12.7 feet. Note: some clay, little silt, grayish brown (10YR 5/2) from 13.4 to 13.5 feet.			
S			2-2-3/0"			-		CL	Clay, some silt, little very fine sand, medium plasticity, no dilatancy, moist, soft, gray (10YR 5/1).			
SS						-		0	Sand, medium, well sorted, dry, loose, wet. Clay. Sand, medium, well sorted, dry, loose, wet.			
50				18				СН	Continued Next Page			
N							TEP	יחעד	•			
6" x 3.25 HSA							SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC					
HW CASING ADVANCER 4"							WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON					
S	SW CAS	ING		6"					RECORDER <u>L. Martin</u>			
		J DEF FROM S 0.0 S 1.5 S 1.5 S 4.5 S 6.0 S 7.5 S 9.0 S 10.5 S 12.0 S 13.5 S 15.0 S 15.0 S 16.5 S 18.0 S 19.5 TYPE NQ-2 RC SW CAS SW CAS	$ \begin{array}{r} $	Image DEPTH PENETRATION RROM TO BLOWS / 6" S 0.0 1.5 $1/2"$ S 1.5 3.0 $1/2"$ S 1.5 3.0 $1/2"$ S 3.0 4.5 $1/2"$ S 4.5 6.0 $1-1-4/0"$ S 4.5 6.0 $1-1-4/0"$ S 6.0 7.5 $1-1-5/0"$ S 7.5 9.0 $4-5-9/0"$ S 9.0 10.5 $2-3-3/0"$ S 12.0 13.5 $3-3-2/0"$ S 12.0 13.5 $3-3-2/0"$ S 15.0 16.5 $2-1-3/0"$ S 15.0 16.5 $2-2-3/0"$ S 16.5 18.0 $2-2-3/0"$ S 19.5 21.0 $2-3-3/0"$ S 19.5 21.0 $2-3-3/0"$ S 19.5 21.0 $2-3-3/0"$ S 19.5 21.0 $2-3-3/0"$ <td>DEPTH PENETRATION PENETRATION PENETRATION PENETRATION S 0.0 1.5 BLOWS / 6" """ S 0.0 1.5 1/2" 6 S 1.5 3.0 1/2" 6 S 3.0 4.5 1/2" 3.5 S 4.5 6.0 1-1-4/0" 11 S 6.0 7.5 1-1-5/0" 18 S 7.5 9.0 4-5-9/0" 12 S 9.0 10.5 2-3-3/0" 18 S 10.5 12.0 3-3-3/0" 18 S 12.0 3-3-3/0" 18 S 12.0 13.5 3-3-2/0" 18 S 15.0 16.5 2-1-3/0" 18 S 15.0 2-2-2/0" 18 18 S 16.5 18.0 2-2-3/0" 18 S 19.5 21.0 2-3-3/0" 18 S 19.5 21.0 2-3-3/0" 18 S 19.5<td>DEPTH IN FEET PENETRATION RESISTANCE E 5 00 00 0% S 0.0 1.5 1/2" 6 S 1.5 3.0 1/2" 6 S 3.0 4.5 1/2" 3.5 S 4.5 6.0 1-1-4/0" 11 S 4.5 6.0 1-1-4/0" 11 S 6.0 7.5 1-1-5/0" 18 S 7.5 9.0 4-5-9/0" 12 S 9.0 10.5 2-3-3/0" 18 S 12.0 3-3-3/0" 18 S 12.0 3-3-3/0" 18 S 13.5 15.0 2-2-2/0" 18 S 15.0 16.5 2-1-3/0" 18 S 16.5 18.0 2-2-3/0" 18 S 19.5 21.0 2-3-3/0" 18 S 19.5 21.0 2-3-3/0" 18 S 19.5 <</td><td>d DEPTH IN FEET PENETRATION RESISTANCE PENETRATION CUO S PENETRATION % PENETRATION TH IN FEET PENETRATION RESISTANCE JEPTH PENETRATION PENETRATIO</td><td>d DEPTH IN FEET PENETRATION RESISTANCE DLP III PENETRATION RESISTANCE DLP III PENETRATION RESISTANCE DLP III PENETRATION PENETRATION RESISTANCE IN PENETRATION PE</td><td>DEPTH IN FEET PEETRATION CLI III (S) (S) (S) (S) (S) (S) (S) (S) (S) (S)</td><td>DEPTH INFEET DEPTH RESISTANCE DEPTH COLON No SOIL / ROCK IDENTIFICATION S 0.0 1.5 1/2" IDENTIFICATION IDENTIFICATION S 0.0 1.5 1/2" IDENTIFICATION IDENTIFICATION S 0.0 1.5 1/2" IDENTIFICATION 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JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1607
 DATE 7/19/16
 SHEET 2
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/27/16
 BORING FINISH
 4/28/16

 BORING NO. <u>SB-1607</u> DATE <u>7/19/16</u> SHEET <u>2</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	DEF	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-4-5/0"	16				CL	Sand, fine-medium, trace clay and silt, subangular, well sorted, wet, loose. Clay, little silt, trace fine sand, high plasticity, no dilatancy, moist, soft, dark gray brown (10YR 4/2). Note: very soft, little, wet from 18.0 to 18.5 feet.		
16	SS	22.5	24.0	2-5-7/0"	13			-	CL ML	Note: little silt and sand, very soft, wet from 18.5 to 19 feet. Note: clay from 19.0 to 19.5 feet.		
17	SS	24.0	25.5	3-5-10/0"	15		25 -	-		Clay, some silt, medium plasticity. Note: <5% light olive (10YR 5/4), medium grained, very small ~0.3" from 20.7 to 21.0 feet.		
18	SS	25.5	27.0	4-6-9/0"	18			-		Clay, large sand inclusions, fine to coarse sand, medium stiff at 21.8 feet. Silt and fine sand, clay, little fine sand, ????, stiff,		
19	SS	27.0	28.5	3-13-11/0"	18			-		non plastic, oxidized with dark yellowish brown mottling (10YR 4/6). Note: some sand, stiff, no-low plasticity, mottled, grayish brown (10YR 4/2) 50%, dark yellowish	-	
20	SS	28.5	30.0	6-7-10/0"	18				CL ML	brown (10YR 4/6) 33%, brownish gray (10YR 6/8) 10%, grayish (Gley 1 6/10GY) 5% from 25.5 to 27.0 feet.		
21	SS	30.0	31.5	5-6-8/0"	18		30 -			Note: dry-moist from 27.0 to 28.0 feet. Sand, subangular, well sorted, loose, dry, yellowish brown (10YR 5/8).		
22	SS	31.5	33.0	3-4-7/0"	18			-		Clay and silt. Note: trace gravel (large pebble-small pebble) from 28.5 to 30.0 feet.		
23	SS	33.0	34.5	4-6-9/0"	18			-		Note: silt and clay at 29.8 feet. Note: more mottled ~20% 7.5YR 5/8 from 30.5 to 31.5 feet. Note: large micaceous sandstone at 30.4 feet.		
GD: 24	SS	34.5	36.0	9-6-9/0"	16		35 -					
rd9.7m 24	SS	36.0	37.5	3-4-7/0"	18			-		Note: large pebble, weathered micaceous sandstone at 36.0 feet.		
	SS	37.5	39.0	3-5-7/0"	18			-				
27	SS	39.0	40.5	12-50-4/0"	18		40 -	-		Weathered sandstone, 0.7' cobbles (2.5Y 5/6).	-	
28 28	SS	40.5	42.0	8-6-14/0"	13			-	CL ML	 Clay and silt, large sandstone pebbles. 		
- C:\USERS\	SS	42.0	43.5	4-8-12/0"	18							
26 2719/16 15:50 - C:/USEKS/ISBREMEKI/DOCOMENTS/JEP/JEI	SS	43.5	45.0	5-8-11/0"	18							
AEP.GDT - 7	SS	45.0	46.5	6-8-50-4/0"	16		45 -			Note: large cobble sandstone from 45.5 to 45.9		
AEP - /										Continued Next Page		

JOB NUMBER **OH015976.0007**

 COMPANY
 American Electric Power
 BORING NO. SB-1607
 DATE 7/19/16
 SHEET 3
 OF 3

 PROJECT
 John E. Amos Plant CCR
 BORING START
 4/27/16
 BORING FINISH
 4/28/16

 BORING NO. <u>SB-1607</u> DATE <u>7/19/16</u> SHEET <u>3</u> OF <u>3</u>

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	этн	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	50-3/0"	3			-		feet. Weathered sandstone (2.5Y 5/6).		
33	SS	48.0	49.5	17-9-15/0"	18				CL ML	Clay and silt, large sandstone pebbles (2.5Y 5/6). Note: cobbles from 48.7 to 49.1 feet.		
34	SS	49.5	51.0	7-5-9/0"	14		50 -			Note: cobbles from 50.0 to 50.2 feet.		
35	SS SS	51.0 52.5	52.5 54.0	4-8-44/0" 3-36-16/0"	18			-		Note: very large pebble from 52.3 to 52.4 feet.		
37	SS	54.0	55.5	10-13-14/0"	18			-		Note: cobble, weathered sandstone from 53.1 to 53.6 feet.		
38	SS	55.5	57.0	4-7-10/0"	18		55 -	-		Note: cobble, weathered sandstone or schist (highly micaceous) from 54.9 to 55.3 feet. Note: cobbles/pebbles more common and less weathered from 55.5 to 57.0 feet.		
39	SS	57.0	58.5	8-10-15/0"	18					Note: less gravel and sand from 57.0 to 57.4 feet.		
40	SS	58.5	60.0	5-8-12/0"	18		60 -	-				
41 69. 42	SS SS	60.0 61.5	61.5 63.0	8-26-50-5/0" 14-27-50-3/0"	18			-	ML	Silt, some sand, little clay, no plasticity, dry, hard (2.5Y 5/6). Note: trace granules, reddish brown (2.4YR 4/3)		
	SS	63.0	64.5	29-50-3/0"	18					from 61.5 to 63.0 feet.		
44 A44	SS	64.2	65.4		14			-		Note: shale/siltstone, very weathered, dry from 63.5 to 64.2 feet. End of boring at 64.2 feet. No water detected in		
WERIDOCUM										borehole.		
USERS/SBKE												
AEP.GD1 - //19/10 15:50 - C:/USEKSISBREWEK/DOCUMENT SAEP/AEP WINHELD WV.GP/												



Arcadis 2016

Well Construction Diagrams

MW-1601 to MW-1606





		3.0' (Pro-Cover stick-up) ↑ ft (#4 Sand 0.5 Bentonite Chips) ↓ LAND SURFACE	Project <u>AEP - Amo</u>	os Plant	Well	MW-1601
		Bentonite Chips	Town/City	Winfield		
	20	Dentonite Chips	County	Putnam	State	Ohio
		8.25 inch diameter	Permit No.			
		drilled hole	Land-Surface (LS) E	levation and Datum:		
			TOC 589.48	feet	X Surveyed	
		└── Well casing,			Estimated	
	20	2inch diameter,	Installation Date(s)	5/10/2016		
		Backfill	Drilling Method	Hollow Stem /	Auger	
		X Grout 0.0 to 18.1'	Drilling Contractor	AFP Service (Corp	
			Drilling Fluid		allon for drilling	
ļ		18.1 ft* Top of pellet seal	~400 gallons for well			
			not measured).			
		Bentonite slurry				
		24_ft* X pellets	Development Techn Foot valve and surge		al pump 5/18/16	3
		25.4 ft* (100 lbs-2 buckets) (# 4 Sand-20 lbs-1/2 bag)	and 6/13/16.			
			Fluid Loss During Dr	illing NM		gallons
		ft* Top of screen	Water Removed Du	ring Development	44.6 (5/18/16 44.1 (6/13/16	
			Static Depth to Wate	er <u>14.60</u>	feet below l	M.P.
		[`] Well Screen. 2inch diameter	Pumping Depth to W	/ater 14.62	feet below l	M.P.
		<u>PVC</u> , <u>0.10</u> slot Total screen length 9.6'	Pumping Duration	1 hr 10 min hours	3	
			Yield NM	gpm	Date	NA
		/ Gravel Pack	Specific Capacity	NM_gpm/	ft	
	K	/ x Sand Pack #5 (225 lbs-4.5 bags)				
		Formation Collapse	Well Purpose	Monitoring we	:II	
		38.0 ft* Bottom of Screen				
		38.5 ft* Bottom of Screen Cap				
		40.5 ft* Bottom of Sand Pack	Remarks Square a	aluminum stick-up ca	sing. Used	
Ľ		·	100 # of quick grout	about 45 gallons tota	al for grout.	
		Measuring Point is	Global sand used.			
		Top of Well Casing Unless Otherwise Noted.				
		* Depth Below Land Surface	Prepared by	Kari Eldridge		





(Unconsolidated)	
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	<u>3.0' (</u> Pro-Cover stick-up) ↑ft (Sand #4)		Project AEP - Amos Plant Well MW					MW-1	6024	
	LAND SURFAC		-	ty						002/1
88	Bentonite ch	ips		· <u> </u>				State	Ohio	
ŔŔ	8.25	inch diameter	Permit N							
ŔŔ	drilled hole			Inface (LS						
ΪŔ			TOC 60					X Sur	aved	
	— Well casin		100.00	1.40			001		mated	
	2	inch diameter,	Inetallati	on Date(s)	5/25	/2016	Lou	nateu	
	<u>PVC</u>		Drilling				Stem Au	Ider		
	Backfill		Drinnig i	Nethod		11011011	Otem At	igei		
	Grout	0.0 to 39.0' 50 gallons/100 lbs	Drilling (Contractor		AEP Se	ervice C	orp.		
			Drilling F	Fluid		Water	~250 ga	llons us	ed	
22	<u>39.0</u> ft* Top	o of seal								
•		п.								
	Bentonite	slurry	•	ment Tec	• •		. ,			
		(100 lbs - 3/8" coated pelle		ve and su ets)	rge bloc	k with ce	entrifuga	l pump	6/14/16	<u>. </u>
	(# 7 Sand	35 lbs)								
	48.4 ft* Top	o of screen	Fluid Lo	ss During	Drilling		NM		gallon	s
	<u> </u>			emoved [During D	evelopn	nent	67.0	gallon	s
	Well Screen.		Static D	epth to Wa	ater		24.56	feet	below N	1.P.
	2	inch diameter	Pumping	g Depth to	Water		24.92	feet	below N	1.P.
	PVC Total scre	_, <u>0.10</u> slot en length 14.7'	Pumping	g Duration		50 min	hours			
			Yield	N	М	gpm		Date	N	A
	/ Gravel Pa	ck	Specific	Capacity		NM	_gpm/ft			
l l	∕ ──x Sand Pacl	k #6 (Global-300 lbs)								
		Collapse	Well Pu	rpose		Monito	ring well			
		d of #5 Sand-50 lbs		•			0			
	······	tom of Screen								
	<u>58.5</u> ft* Bot	tom of Screen Cap								
	<u>59.5</u> ft* Bot	Remarks Square aluminum stick-up casing. 8x8' pad.								
				used fror						
	Measuring Poir		Sand #6	used for	1 44.8 to	JO.U'				
	Top of Well Ca Unless Otherwi	ise Noted.					_			
	* Depth Below	Land Surface	Prepare	d by		Taylor	Runge			



WELL CONSTRUCTION LOG (Unconsolidated)

	_	3.0' (Pro-Cover stick-up)			
		↑ ft (Sand #4) ↓ LAND SURFACE	Project <u>AEP - Amos Plant</u>	Well	MW-1603A
			Town/City Winfield		
	И	Bentonite chips	County Putnam	State	Ohio
	Иł	8.25 inch diameter	Permit No.		
	Иł	drilled hole	Land-Surface (LS) Elevation a		
	И	R	TOC 586.86	feet X S	urveyed
	Иł	— Well casing,			stimated
	Иł	2 inch diameter,	Installation Date(s)5	5/24/2016	
	Иł	PVC		low Stem Auger	
	N E				
	Ŋ	Grout 0.0 to 28.0' 50 gallons - 100 lbs	Drilling Contractor AE	P Service Corp.	
	A E		Drilling Fluid Wa	ter ~300 gallons (used
	4	<u></u>			
		Bentonite slurry	Development Technique(s) an	d Date(s)	
		<u>34.0</u> ft* X pellets (100 lbs - 3/8" coated pellet	Foot valve and surge block wite ts-2 buckets)	h centrifugal pum	p 6/14/16.
		37.0 ft*	, 		
		(Sand # 6-100 lbs)			
			Fluid Loss During Drilling	NM	gallons
		<u>38.0</u> ft* Top of screen	Water Removed During Devel	opment <u>60.</u>	9 gallons
			Static Depth to Water	7.60 fee	et below M.P.
		Well Screen. 2 inch diameter	Pumping Depth to Water	9.75 fee	et below M.P.
		PVC , 0.10 slot Total screen length 14.49'	Pumping Duration 40 min		
		rotal officiniongan in to			to NA
			0		ite <u>NA</u>
		Gravel Pack	Specific CapacityN	IM_gpm/ft	
		x Sand Pack #5 (230 lbs)			
		Formation Collapse	Well Purpose Mo	nitoring well	
		43.0 ft* Bottom of Screen			
		43.4 ft* Bottom of Screen Cap	Remarks Square aluminum	stick-up casina. 8	x8' pad.
Ē		45.0 ft* Bottom of Sand Pack	Global sand used. 50 gallons/		
		Measuring Point is			
		Top of Well Casing			
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared by Tay	lor Runge	

WELL CONSTRUCTION LOG (Unconsolidated)



	3.0' (Pro-Cover stick-up) ↑ff (Sand #4) ↓ LAND SURFACE	Project <u>AE</u> P	? - Amos Plant	Well <u>MW-1604</u>		
		Town/City	Winfield			
	Bentonite Chips	County	Putnam	State <u>Ohio</u>		
	8.25 inch diameter	Permit No.				
88	anilea nole	Land-Surface	(LS) Elevation and Datum:			
		TOC 589.05	feet	X Surveyed		
88	Well casing,			Estimated		
	2inch diameter,	Installation Da	te(s) 5/6/2016			
	Backfill	Drilling Metho	d Hollow Stem A	Auger		
	X Grout 0.0 to 22.0'	Drilling Contra	ctor AEP Service (Corp		
88		Drilling Fluid	Water ~500 g			
	22.0 ft* Top of pellet seal	Drining Field	Valer 500 g			
	Bentonite slurry					
	29.0 ft* x pellets		Technique(s) and Date(s) d surge block with centrifug	jal pump 5/18/16.		
	(Sand #4-60 lbs 1.5 bags)					
	ft*					
	(#5 Sand 400 lbs-8 bags) (100 lbs-2 buckets)	Fluid Loss Du	ring Drilling NM	gallons		
	<u>33.9</u> ft* (Top of screen)	Water Remov	ed During Development			
	X	Static Depth to	o Water 20.81	feet below M.P.		
	Well Screen. 2 inch diameter	Pumping Dept	th to Water 21.78	feet below M.P.		
	PVC , 0.10 slot Total screen length 9.6'	Pumping Dura	ation 1 hr 15 min hours	3		
		Yield	NM gpm	Date NA		
	/ Gravel Pack	Specific Capa	city NM gpm/i	ft		
	/ x Sand Pack #6 (Global-300 lbs)					
	Formation Collapse	Well Purpose	Monitoring we			
	43.5 ft* Bottom of Screen					
	44.0 ft* Bottom of Screen Cap					
	45.0 ft* Bottom of Sand Pack	Remarks <u>Square aluminum stick-up casing. 8x8' pad.</u> Formation collapse (45.0 to 48.0') water pressure in				
			val required #4 Sand to se			
	Measuring Point is Top of Well Casing	sandpack.	·			
	Unless Otherwise Noted. * Depth Below Land Surface	Prepared by	Taylor Runge			



WELL CONSTRUCTION LOG (

(U	Inconso	lida	ted)
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	<u>3.0' (</u> Pro-Cover ↑ ft	stick-up)	Project		nos Plant		\\/	MW-1605
	LAND SURFAC	E	-	ty				1000
42	Bentonite Ch	ips	County		Putnam		State	Ohio
	8.25	inch diameter	Permit N		T dullam			01110
	drilled hole				Elevation ar			
			TOC 58	. ,		feet	X Sur	veved
	— Well casin	a.				_	_	imated
	2	inch diameter,	Installati	on Date(s)	5	/4/2016		
	PVC		Drilling N			ow Stem A	Auger	
	Backfill	0.0 to 17.5' 250 gallons	0					
	Grout	100 lbs per 55 gallon of grout	Drilling (Contractor	AEP	Service (Corp.	
			Drilling F	Fluid	Wat	er ~500 g	allons us	ed
44	<u>17.3</u> ft* top	of seal						
_	Bentonite <u>22.6</u> ft* (#6 Sand 5	Development Technique(s) and Date(s) Foot valve and surge block with centrifugal pump 5/17/16.					5/17/16.	
	<u>23.0</u> ft*							
(#5 Sand 450 lbs-9 bags)		150 lbs-9 bags)	Fluid Lo	ss During [Drilling	NM		gallons
	<u>26.3</u> ft* (Top of sci	reen)	Water R	emoved Du	uring Develo	pment	43.03	gallons
			Static De	epth to Wa	ter	17.39	feet	below M.P.
	Well Screen. 2	inch diameter	Pumping	g Depth to V	Water	33.89	feet	below M.P.
	PVC Total scree	_, <u>0.10</u> slot en length 9.6'	Pumping	o Duration	1hr 15 min	hours		
		9	Yield	, NM			Date	e NA
	∕ Gravel Pa	ck		Capacity		M gpm/i		
l (< #5 (Global-300 lbs)		-				
	Formation		Well Pu	rpose	Mon	itoring we	II	
	ft* Boti	tom of Screen						
	41.5_ft* Bot	tom of Screen Cap						
	42.5_ft* Bot	tom of Sand Pack	Remarks <u>Square aluminum stick-up casing. 8x8' pad.</u> Global sand used.					<u>s pad.</u>
			<u></u>					
	Measuring Poir Top of Well Ca							
	Unless Otherwi * Depth Below	se Noted.	Prepare	d by	Tayl	or Runge		



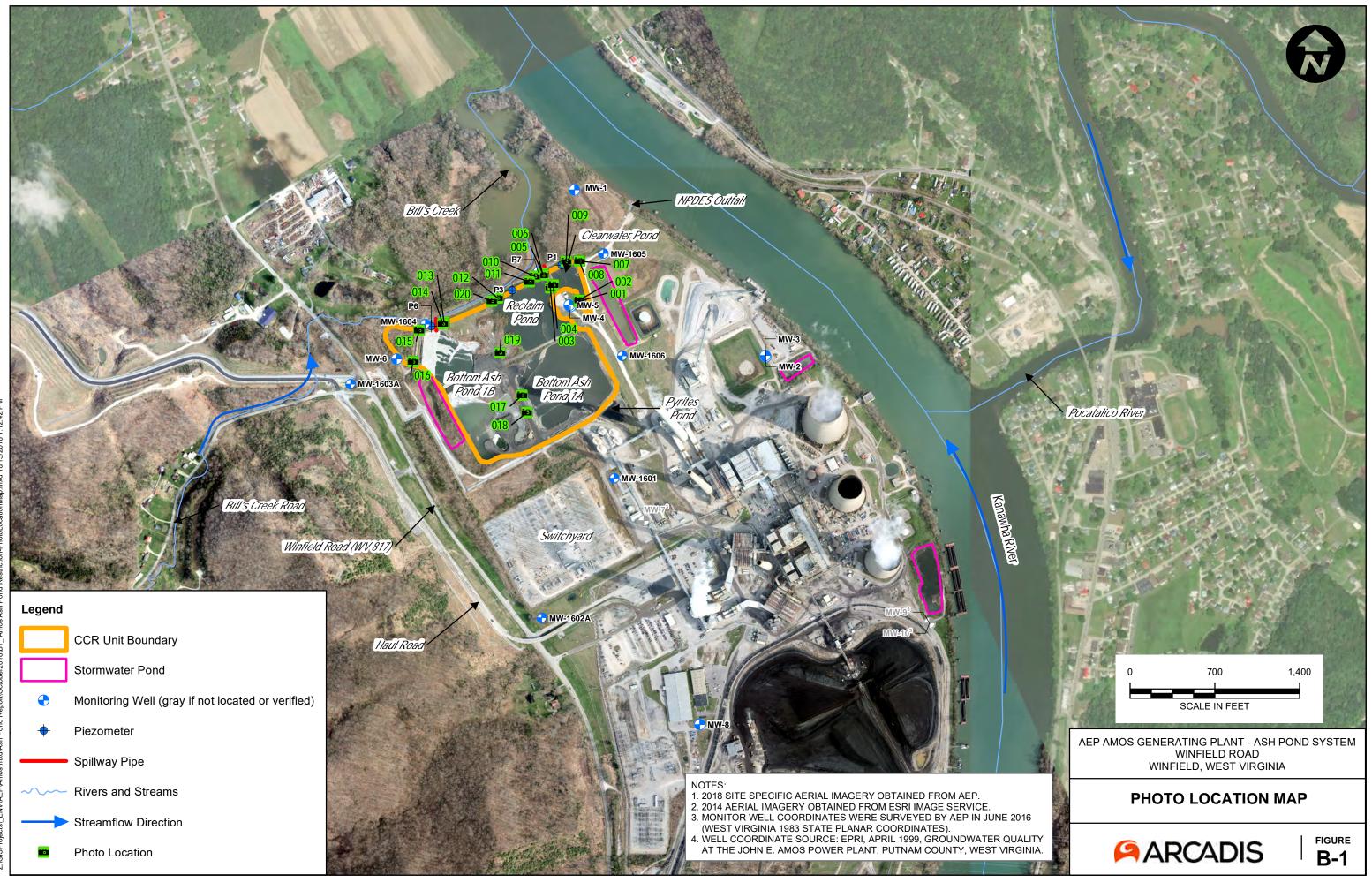


	'_(Pro-Cover stick-up)			
↑ f	LAND SURFACE		mos Plant	Well <u>MW-1606</u>
	Bentonite Chips	Town/City		
			Putnam	State <u>Ohio</u>
	- 8.25 inch diameter drilled hole	Permit No.		
		Land-Surface (LS)) Elevation and Datum:	
		TOC 583.88	feet	x Surveyed
	– Well casing,			Estimated
	2inch diameter,	Installation Date(s) 5/3/2016	
		Drilling Method	Hollow Stem /	Auger
	Backfill			
	X Grout 0-0 to 15.0'	Drilling Contractor	AEP Service (Corp.
		Drilling Fluid	Water ~500 g	allons/mud when
<u> </u>	<u>15.0</u> ft* (top of seal-110 lbs-2 1/8 bags)	needed (quick gel	50 lbs per 35 gallons)	~35 gallons
		used.		
	ntonite slurry	Development Tec	hnique(s) and Date(s)	
	20.19 ft*pellets (#6 Sand 50 lbs-1 bag)	Foot valve and su	rge block with centrifug	jal pump 5/17/16.
	21.20 ft*			
	(#5 Sand 495 lbs-10 bags)	Fluid Loss During	Drilling <u>NM</u>	gallons
	<u>24.32</u> ft* (Top of screen)	Water Removed D	During Development	68.14 gallons
		Static Depth to Wa	ater 11.23	feet below M.P.
\\	Well Screen.			
-	2inch diameter PVC,0.10slot	Pumping Depth to		feet below M.P.
	(0.19' dead screen @ joint)	Pumping Duration	<u> </u>	3
		Yield N	Mgpm	Date N/A
	Gravel Pack	Specific Capacity	NMgpm/	ft
Г	x Sand Pack #5 (Global-495 lbs)			
	Formation Collapse	Well Purpose	Monitoring we	.11
	39.0 ft* Bottom of Screen			
	39.5 ft* Bottom of Screen Cap			
	40.5 ft* Bottom of Sand Pack	Remarks Squar	e aluminum stick-up ca	asing. 8x8' pad.
		Global sand used.		
Ме	asuring Point is			
Тор	p of Well Casing less Otherwise Noted.			
	Depth Below Land Surface	Prepared by	Taylor Runge	

APPENDIX B

Photographic Log





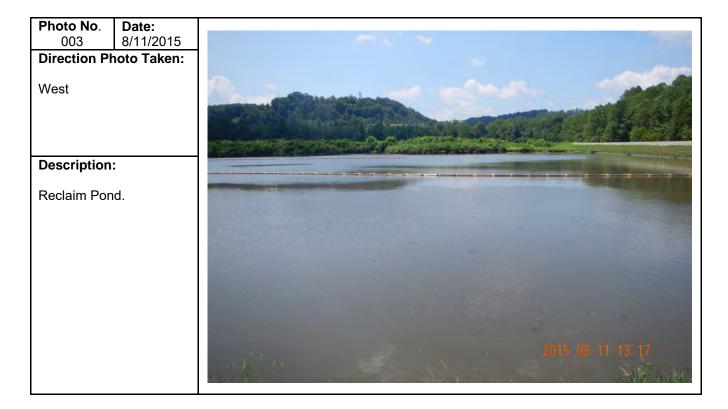












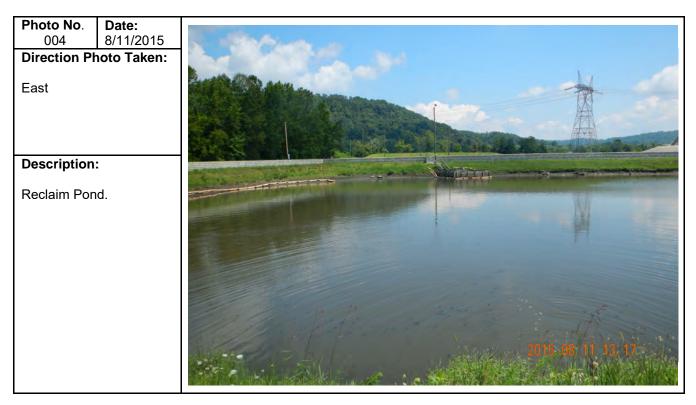
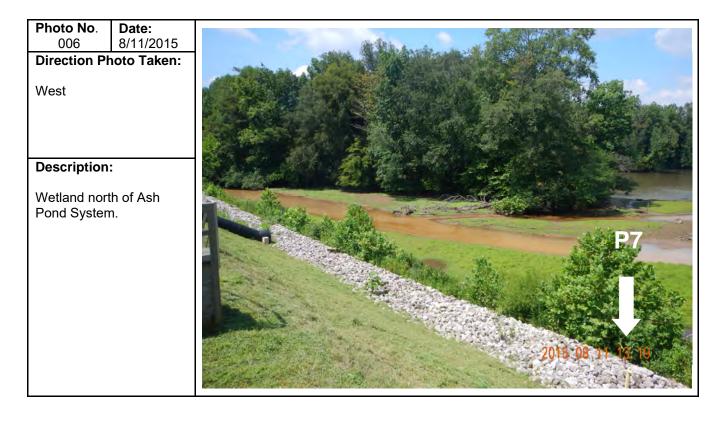






Photo No.	Date:	
005	8/11/2015	
Direction Pl	hoto Taken:	Stationality and share a state of the
Northwest		
Description	:	10
Wetland nor Pond Syster	th of Ash	P7 J 2015-08 11-13-16









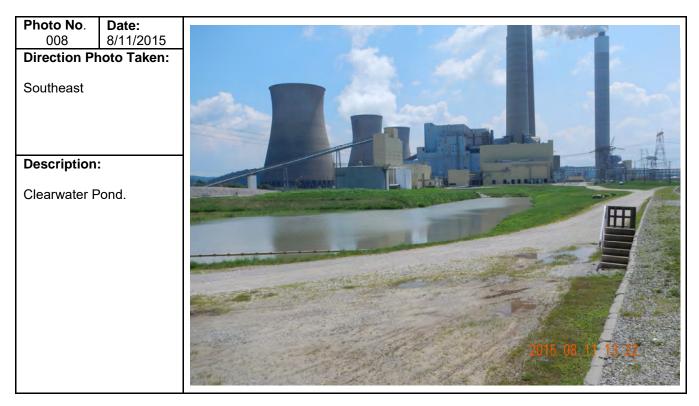




Photo No.	Date:	
009	8/11/2015	
Direction Ph	oto Taken:	setter and a setter and a setter and a setter and a setter and a setter and a setter a setter a setter a setter
West		
Description		
-		and the second second second second second second second second second second second second second second second
Dike structur	e on the	
northern exte	ent of the	
Ash Pond Sy	rstem.	
Wetland A is	north of the	Article Parts and a start of the start of th
dike system.		
		A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF
		2005 BD 1173 74 15





Photo No.	Date:	
011	8/11/2015	
Direction Ph	noto Taken:	
East		
		Overflow
Description:		Structure
Overflow structure in Reclaim Pond along dike system.		K-Pros







Photo No.	Date:	
	8/11/2015	
Direction Photo Taken:		
Northwest		
Description:		
Description: Overflow from Bottom Ash Pond 1B into Wetland A.		201E. DB. M.1. VA. SO





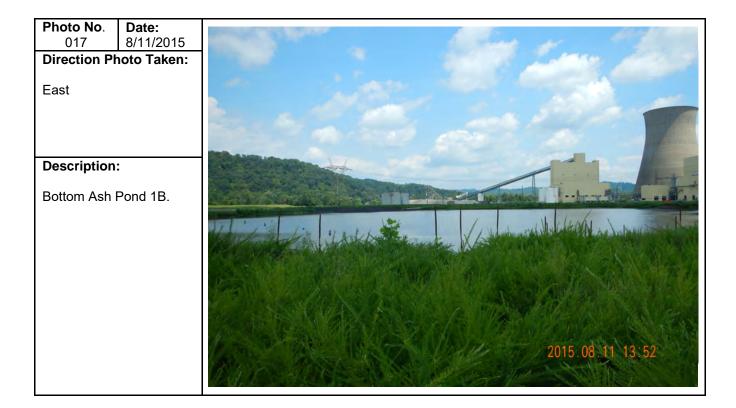


Photo No.	Date:	
015	8/11/2015	
Direction Pl	noto Taken:	
West		
Description:		
Wetland adjacent to Bottom Ash Pond 1B.		









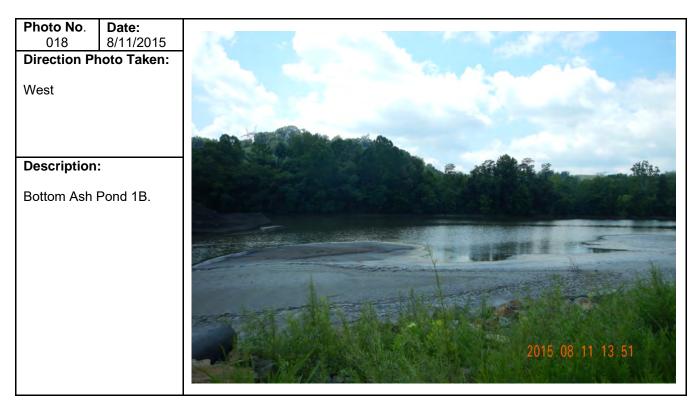




Photo No . 019	Date: 8/11/2015	
Direction Photo Taken:		
Northeast		
Description:		and the second second second second second second second second second second second second second second second
Upland area between Bottom Ash Ponds 1A and 1B.		2015 08 11 13 54

